NMFS REPORT

National Marine Fisheries Service (NMFS) will report on recent regulatory, international, and Science Center activities of interest to the Council.

Council Task:

Discussion.

Reference Materials:

1. Agenda Item J.1.a.1, Attachment 1: HMS Domestic Regulatory Activities.
2. Agenda Item J.1.a.2, Attachment 1: HMS International Activities.
3. Agenda Item J.1.a.2, Attachment 2: Request for Nominations for the General Advisory Committee and the Scientific Advisory Subcommittee to the United States Section to the Inter-American Tropical Tuna Commission (71 FR 3602).
4. Agenda Item J.1.a.2, Attachment 3: Draft North Pacific Albacore Resolution, Western and Central Pacific Fisheries Commission (WCPFC) Meeting.

Agenda Order:

a. Activity Reports
   1. Domestic Regulatory Activities — Craig Heberer
   2. International Activities — Mark Helvey
   3. Science Center Activities — Gary Sakagawa
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. Council Discussion

PFMC
02/16/06

HMS DOMESTIC REGULATORY ACTIVITIES

Highly Migratory Species (HMS) Logbooks - Status Report: A courtesy letter was mailed out to HMS albacore troll permit holders who made an albacore landing in 2004 and/or 2005, with a notice that completed future logbook sheets are to be mailed directly to the National Marine Fisheries Service (NMFS) Southwest Fisheries Science Center (SWFSC), La Jolla, California. (Previously, permit holders were allowed to hand the completed logbook sheets to the albacore port samplers at the time of off-loading).

To date, a total of 45 albacore logbooks from 2004, and 1,157 albacore logbooks from 2005 have been received and processed by personnel at the SWFSC, La Jolla. The majority of the logbooks have been entered into an Oracle database and will be used to assist in, among other tasks, development of Stock Assessment and Fishery Evaluation reports and stock assessments.

HMS Observers – Status Report: NMFS Southwest Region (SWR) and SWFSC, La Jolla staff attended the National Observer Program Advisory Team (NOPAT) meetings slated for February 28-March 2 at Woods Hole, Mass. FY06 SWR Observer Program funding requests were decided, including funds for on-going observation of HMS fisheries. The proposal cycle for FY07 requests will begin anew this summer and the SWR and SWFSC will be submitting a joint-proposal that covers funding for needed observer “sea-days” as well as vital data management costs that have gone unfunded in previous years but are now a needed and major element to be considered.

A list of NMFS Observer Program trips completed, by gear type, is presented below for the period February 1, 2005 through January 31, 2006:

Drift Gillnet:	46 trips (~20% coverage of total annual sets)
Pelagic Longline:	1 trip
Albacore Troll:	3 trips (September 05, Westport, WA departures)
Harpoon:	0 trips (no trips planned at this time)
CPFV:	0 trips (trips to begin summer 2006)
Tuna Purse Seine:	3 trips (August 05, Southern California departures)

Federal-State Observer Program Discussions: NMFS SWR Observer Program staff conducted a series of informational and logistical meetings with State Observer Coordinators from California, Oregon, and Washington. The discussions focused on ways to work collaboratively to achieve maximum efficiency of stated HMS Fishery Management Plan (FMP) goals with the limited resources available. To this end, discussions were held on the possibility of utilizing State observers/samplers to assist in meeting the sampling objectives of the HMS FMP. The objective focuses on observing commercial passenger fishing vessel (trips in a pilot mode during the 2006 season to collect needed bycatch information. More information will be available once budget issues are solidified after the NOPAT meetings. The NMFS SWR Observer Program staff will be contacting the State Coordinators to schedule follow-up discussions and lay out a strategy to accomplish the stated goals.

HMS INTERNATIONAL ACTIVITIES

Inter-American Tropical Tuna Commission (IATTC) - Nominations: A *Federal Register* Notice for the solicitation of nominations and applications for the General Advisory Committee (GAC) and Scientific Advisory Subcommittee to the U.S. Section of the IATTC has been published. The purpose of these advisory panels is to provide public input and advice to the U.S. section to the IATTC in the formulation of U.S. policy and positions at meetings of the IATTC and its subsidiary bodies. Nominations must be submitted on or before March 31, 2006.

International Tuna Management: In November 2005, National Marine Fisheries Service (NMFS) published a final rule to implement the 2005 and 2006 management measures for the purse seine and longline fishery to prevent overfishing of the eastern tropical Pacific Ocean (ETP) tuna stocks, consistent with recommendations by the IATTC and approved by the Department of State (DOS) under the Tuna Conventions Act. The final rule closes the U.S. longline fishery in the Convention Area in 2006 when bigeye tuna landings reach 150 metric tons (mt). Longline vessels will not be subjected to this closure if the permit holder declares to NMFS under the Fishery Management Plan (FMP) for the Pelagic Fisheries of the Western Pacific Region that they intend to shallow-set to target swordfish (50 CFR 660.23). NMFS will provide notice of closure of the longline fishery. These actions ensure that U.S. vessels fish in accordance with the conservation and management measures that the IATTC recommended in June 2004. These actions are taken to limit fishing mortality on tuna stocks caused by purse seine fishing and longline fishing in the Convention Area and contribute to the long-term conservation of tuna stocks at levels that support healthy fisheries.

IATTC Summary to Date: The GAC to the U.S. Section of the IATTC met on November 1, 2005 and also held an information gathering conference call on January 25, 2006. Key issues to be addressed for the June 22-30, 2006 IATTC annual meeting in Busan, Korea, include: obtain a workable and permanent bycatch resolution; adopt a trade measures resolution; adopt a sea turtle resolution requiring circle hooks for deep longline sets; adopt a binding resolution to conserve tuna for 2007- 2009; adopt a resolution addressing FADs in the bigeye tuna (BET) and yellowfin (YFT) purse seine fisheries; adopt a resolution addressing BET in longline fisheries; change definition of List of longline fishing vessels over 24 meters (LSTLFVs) from a measurement of length to something more meaningful. The 5th Meeting of the GAC will be held on June 1, 2006, in Long Beach, California.

2005 Western and Central Pacific Fisheries Commission Annual Meeting: The second annual meeting of the Commission (WCPFC2) was held December 12-16, 2005, in Pohnpei, Federated States of Micronesia.

> **Conservation and management measures for bigeye and yellowfin tuna** - Given the recommendations of the Scientific Committee to address overfishing on western and central Pacific Ocean bigeye and yellowfin tuna stocks, this became one of the most substantial issues deliberated at the meeting. The Commission ultimately adopted a decision that included separate conservation and management measures for longline fisheries and for purse seine fisheries. Longline fisheries account for most of the bigeye

tuna catch in the WCPFC Convention Area, and purse seine fisheries account for most of the yellowfin tuna catch and also take substantial amounts of relatively young bigeye tuna. The primary element for the longline fisheries is that in each of the next three years, Commission Members must limit the catch of bigeye tuna by their longline vessels to the average annual amount caught during 2001-2004 (or, for China and the U.S., the amount caught in 2004). Members whose vessels caught less than 2,000 mt in 2004 would be limited to 2,000 mt. This measure is consistent with the bigeye tuna measure adopted by the IATTC that put limits on longline bigeye tuna catches in the eastern Pacific Ocean in 2004-2006.

North Pacific and South Pacific Albacore Resolutions - The measures in the resolution for the North Pacific essentially mirror those adopted by the IATTC for the eastern Pacific Ocean: Members must limit fishing effort by their vessels fishing for North Pacific albacore in the Convention Area to "current" levels. Reporting of fishing effort and catches is also required to ensure compliance. The measures for the South Pacific call for members to not increase the number of their fishing vessels actively fishing for South Pacific albacore in the Convention Area south of 20° South latitude above the levels from the 2000-2005 period. The decision for the South Pacific will be revisited at WCPFC3.

Bycatch (Fish) - The Commission adopted a measure for non-target fish species, proposed by the Forum Fishery Agency, that calls for members to encourage their vessels operating in fisheries managed under the Convention to avoid the capture of all non-target fish species (e.g., mahi mahi, rainbow runner, and wahoo) that are not retained, and to promptly release any such captured fish to the water unharmed.

Bycatch (Turtles) - The Commission adopted a measure on sea turtle bycatch, which merged separate proposals from the United States and the FFA. The adopted measure urges members and non-members to take a number of actions to mitigate sea turtle bycatch, minimize harm, and collect data, through, inter alia, the implementation of the Food and Agriculture Organization Guidelines and existing gear technologies (e.g., circle hooks) and handling techniques.

Capacity - Japan tabled a proposal to address fishing overcapacity. This is a high priority for the United States, but is one that has been controversial in this forum due to the nature of license arrangements and the fisheries development aspirations of developing countries in the region. After substantial debate, the Commission adopted a non-binding resolution on capacity that urged Commission members and non-members to reduce any purse seine capacity that entered the fishery after earlier resolutions urging controls on increases in capacity were adopted, beginning in 1999.

2006 WCPFC Related Meetings - The Scientific Committee (SC2) meets 7-18 August in Manila, Philippines. The Northern Committee (NC2) meets 11-13 September in Tokyo, Japan. The Technical and Compliance Committee (TCC2) meets 18-22 September in Brisbane, Australia. The Third Annual Meeting of the Commission (WCPFC3) meets 11-15 December in Apia, Samoa.

information from submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR–Phlx–2005–82 and should be submitted on or before February 13, 2006.

For the Commission, by the Division of Market Regulation, pursuant to delegated authority.[18]

Nancy M. Morris,

Secretary.

[FR Doc. E6–699 Filed 1–20–06; 8:45 am]

BILLING CODE 8010–01–P

DEPARTMENT OF STATE

[Public Notice 5279]

Request for Nominations for the General Advisory Committee and the Scientific Advisory Subcommittee to the United States Section to the Inter-American Tropical Tuna Commission

SUMMARY: The Department of State is seeking applications and nominations for the renewal of the General Advisory Committee to the Inter-American Tropical Tuna Commission (IATTC) as well as to a Scientific Advisory Subcommittee of the General Advisory Committee. The purpose of the General Advisory Committee and the Scientific Advisory Subcommittee is to provide public input and advice to the United States Section to the IATTC in the formulation of U.S. policy and positions at meetings of the IATTC and its subsidiary bodies. The Scientific Advisory Subcommittee shall also function as the National Scientific Advisory Committee (NATSAC) provided for in the Agreement on the International Dolphin Conservation Program (AIDCP). The United States Section to the IATTC is composed of the Commissioners to the IATTC, appointed by the President, and the Deputy Assistant Secretary of State for Oceans and Fisheries or his or her designated representative. Authority to establish the General Advisory Committee and Scientific Advisory Subcommittee is provided under the Tuna Conventions Act of 1950, as amended by the International Dolphin Conservation Program Act (IDCPA) of 1997.

DATES: Nominations must be submitted on or before March 31, 2006.

ADDRESSES: Nominations should be submitted to David Balton, Deputy Assistant Secretary for Oceans and Fisheries, Bureau of Oceans and International Environmental and Scientific Affairs, Room 7831, Department of State, Washington, DC 20520–7818; or by fax to 202–736–7350.

FOR FURTHER INFORMATION CONTACT: David Hogan, Office of Marine Conservation, Department of State: 202–647–2335.

SUPPLEMENTARY INFORMATION:

General Advisory Committee

The Tuna Conventions Act (16 U.S.C. 951 et seq.), as amended by the IDCPA (Pub. L. 105–42), provides that the Secretary of State, in consultation with the U.S. Commissioners to the IATTC, shall appoint a General Advisory Committee (the Committee) to the U.S. Section to the IATTC (U.S. Section). The Committee shall be composed of not less than 5 nor more than 15 persons, with balanced representation from the various groups participating in the fisheries included under the IATTC Convention, and from non-governmental conservation organizations. Members of the Committee shall be invited to have representatives attend all non-executive meetings of the U.S. Section, and shall be given full opportunity to examine and to be heard on all proposed programs of investigations, reports, recommendations, and regulations adopted by the Commission. Members of the Committee may attend meetings of the IATTC and the AIDCP as members of the U.S. delegation or otherwise in accordance with the rules of those bodies governing such participation. Participation as a member of the U.S. delegation shall be subject to such conditions as may be placed on the size or composition of the delegation.

Scientific Advisory Subcommittee

The Act, as amended, also provides that the Secretary of State, in consultation with the U.S. Commissioners to the IATTC, shall appoint a Scientific Advisory Subcommittee (the Subcommittee) of the General Advisory Committee. The Subcommittee shall be composed of not less than 5 and not more than 15 qualified scientists with balanced representation from the public and private sectors, including non-governmental conservation organizations. The Subcommittee shall advise the Committee and the U.S. Section on matters including: The conservation of ecosystems; the sustainable uses of living marine resources related to the tuna fishery in the eastern Pacific Ocean; and the long-term conservation and management of stocks of living marine resources in the eastern tropical Pacific Ocean.

In addition, at the request of the Committee, the U.S. Commissioners or the Secretary of State, the Subcommittee shall perform such functions and provide such assistance as may be required by formal agreements entered into by the United States for the eastern Pacific tuna fishery, including the AIDCP. The functions may include: The review of data from the International Dolphin Conservation Program (IDCP), including data received from the IATTC staff; recommendations on research needs and the coordination and facilitation of such research; recommendations on scientific reviews and assessments required under the IDCP; recommendations with respect to measures to assure the regular and timely full exchange of data among the Parties to the AIDCP and each nation's NATSAC (or its equivalent); and consulting with other experts as needed.

The Subcommittee shall be invited to have representatives attend all non-executive meetings of the U.S. Section and the General Advisory Committee and shall be given full opportunity to examine and to be heard on all proposed programs of scientific investigation, scientific reports, and scientific recommendations of the Commission. Representatives of the Subcommittee may attend meetings of the IATTC and the AIDCP as members of the U.S. delegation or otherwise in accordance with the rules of those bodies governing such participation. Participation as a member of the U.S. delegation shall be subject to such limits as may be placed on the size of the delegation.

National Scientific Advisory Committee

The Scientific Advisory Subcommittee shall also function as the NATSAC established pursuant to Article IX of the AIDCP. In this regard, the Subcommittee shall perform the functions of the NATSAC as specified in Annex VI of the AIDCP including, but not limited to: Receiving and reviewing relevant data, including data provided to the National Marine Fisheries Service (NMFS) by the IATTC Staff; advising and recommending to the U.S. Government measures and actions that should be undertaken to conserve and manage stocks of living marine resources in the AIDCP Area; making recommendations to the U.S. Government regarding research needs related to the eastern Pacific Ocean tuna purse seine fishery; promoting the regular and timely full exchange of data among the Parties on a variety of matters related to the implementation of the AIDCP; and consulting with other experts as necessary in order to achieve the objectives of the Agreement.

[18] 17 CFR 200.30–3(a)(12).

General Provisions

Each appointed member of the Committee and the Subcommittee/NATSAC shall be appointed for a term of 3 years and may be reappointed.

Logistical and administrative support for the operation of the Committee and the Subcommittee will be provided by the Department of State, Bureau of Oceans and International Environmental and Scientific Affairs, and by the Department of Commerce, National Marine Fisheries Service. Members shall receive no compensation for their service on either the Committee or the Subcommittee/NATSAC, nor will members be compensated for travel or other expenses associated with their participation.

Procedures for Submitting Applications/Nominations

Applications/nominations for the General Advisory Committee and the Scientific Advisory Subcommittee/NATSAC should be submitted to the Department of State (See **ADDRESSES**). Such applications/nominations should include the following information:

(1) Full name/address/phone/fax and e-mail of applicant/nominee;

(2) Whether applying/nominating for the General Advisory Committee or the Scientific Advisory Committee/NATSAC (applicants may specify both);

(3) Applicant/nominee's organization or professional affiliation serving as the basis for the application/nomination;

(4) Background statement describing the applicant/nominee's qualifications and experience, especially as related to the tuna purse seine fishery in the eastern Pacific Ocean or other factors relevant to the implementation of the Convention Establishing the IATTC or the Agreement on the International Dolphin Conservation Program;

(5) A written statement from the applicant/nominee of intent to participate actively and in good faith in the meetings and activities of the General Advisory Committee and/or the Scientific Advisory Subcommittee/NATSAC.

Applicants/nominees who submitted material in response to the **Federal Register** Notice published by the National Marine Fisheries Service on November 12, 2002 or February 5, 2003, should resubmit their applications pursuant to this notice.

Margaret F. Hayes,

Acting Deputy Assistant Secretary for Oceans and Fisheries, Department of State.

[FR Doc. E6–714 Filed 1–20–06; 8:45 am]

BILLING CODE 4710–09–P

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

[Summary Notice No. PE–2006–02]

Petitions for Exemption; Summary of Petitions Received

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of petitions for exemption received.

SUMMARY: Pursuant to FAA's rulemaking provisions governing the application, processing, and disposition of petitions for exemption part 11 of Title 14, Code of Federal Regulations (14 CFR), this notice contains a summary of certain petitions seeking relief from specified requirements of 14 CFR. The purpose of this notice is to improve the public's awareness of, and participation in, this aspect of FAA's regulatory activities. Neither publication of this notice nor the inclusion or omission of information in the summary is intended to affect the legal status of any petition or its final disposition.

DATES: Comments on petitions received must identify the petition docket number involved and must be received on or before February 13, 2006.

ADDRESSES: You may submit comments [identified by DOT DMS Docket Number FAA–2005–23188] by any of the following methods:

• Web Site: *http://dms.dot.gov.* Follow the instructions for submitting comments on the DOT electronic docket site.

• Fax: 1–202–493–2251.

• Mail: Docket Management Facility; U.S. Department of Transportation, 400 Seventh Street, SW., Nassif Building, Room PL–401, Washington, DC 20590–0001.

• Hand Delivery: Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal Holidays.

Docket: For access to the docket to read background documents or comments received, go to *http://dms.dot.gov* at any time or to Room PL–401 on the plaza level of the Nassif Building, 400 Seventh Street, SW., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Kenna Sinclair (425–227–1556), Transport Airplane Directorate (ANM–113), Federal Aviation Administration, 1601 Lind Ave. SW., Renton, WA 98055–4056; or John Linsenmeyer (202–267–5174), Office of Rulemaking (ARM–1), Federal Aviation Administration, 800 Independence Avenue, SW., Washington, DC 20591.

This notice is published pursuant to 14 CFR 11.85 and 11.91.

Issued in Washington, DC, on January 13, 2006.

Anthony F. Fazio,

Director, Office of Rulemaking.

Petitions for Exemption

Docket No.: FAA–2005–23188.

Petitioner: The Boeing Company.

Section of 14 CFR Affected: 14 CFR 25.857(e).

Description of Relief Sought: To permit the carriage of up to six supernumeraries on Boeing Model 767–200 tanker transport airplanes with a Class E main deck cargo compartment.

[FR Doc. E6–656 Filed 1–20–06; 8:45 am]

BILLING CODE 4910–13–P

DEPARTMENT OF TRANSPORTATION

Federal Transit Administration

Draft Environmental Impact Statement (DEIS): Kenosha-Racine-Milwaukee Commuter Rail Extension

AGENCY: Federal Transit Administration (FTA), Department of Transportation (DOT).

ACTION: Notice of intent to prepare an Environmental Impact Statement.

SUMMARY: The FTA, in cooperation with the Southeastern Wisconsin Regional Planning Commission (SEWRPC), is issuing this notice to advise the public that a Draft Environmental Impact Statement (DEIS) will be prepared for the proposed initiation of commuter rail or bus services between Kenosha, Racine and Milwaukee, Wisconsin.

The FTA is the lead Federal agency under the National Environmental Policy Act of 1969 (NEPA). The project is being conducted by SEWRPC which is acting as the manager and fiscal agent for the DEIS and associated alternatives analysis study on behalf of an Intergovernmental Partnership of the Cities and Counties of Kenosha, Milwaukee, and Racine, and the Wisconsin Department of Transportation, and SEWRPC.

The FTA and SEWRPC invite interested individuals, organizations, and Federal, State, and local agencies to participate in refining the alternatives to be evaluated and identifying any significant social, economic, and environmental issues related to the alternatives. Comments on the appropriateness of the alternatives and

Western and Central Pacific Fisheries Commission
Second Session
12-16 December 2005

DRAFT RESOLUTION ON NORTH PACIFIC ALBACORE

WCPFC/Comm.2/DP.12
21st November 2005

Proposal submitted by the United States

Members and Cooperating Non-Members of the Western and Central Pacific Fisheries Convention (WCPFC):

Observing that the best scientific evidence on the status of North Pacific albacore, as reported by the 19th North Pacific Albacore Workshop, held in 2004, and the 5th Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean, in March 2005, indicates that the current fishing mortality rate appears to be high relative to commonly used reference points, which is a cause for concern regarding the future status of the stock;

Recognizing that North Pacific albacore migrate between the WCPF Convention Area and the Antigua Convention Area in the eastern Pacific Ocean and that some WCPF Commission members' fisheries for North Pacific albacore straddle these two areas;

Further recognizing that the Inter-American Tropical Tuna Commission (IATTC) resolved at its 73rd meeting, in June 2005, that the total level of fishing effort for North Pacific albacore in the eastern Pacific Ocean not be increased beyond then-current levels;

Aware that the IATTC resolved that all of its members and cooperating parties should call upon the members of the WCPF Commission to consider, at their earliest opportunity, taking such action as may be necessary to ensure the effective conservation and management of North Pacific albacore in the WCPF Convention Area, including, as necessary, measures to reduce fishing effort to levels commensurate with the long-term sustainability of the resource;

Recalling that the IATTC has requested the WCPF Commission to take measures for North Pacific albacore similar to those that the IATTC has taken;

Acknowledging the importance of cooperating and consulting with the IATTC in order to achieve a consistent set of conservation and management measures for fish stocks that occur in the convention areas of both organizations and for areas of overlap between the two conventions, as provided for in Article 22(4) of the WCPF Convention and Article XXIV of the Antigua Convention;

Taking into consideration the recommendations of the Northern Committee with respect to North Pacific albacore;

Resolve as follows:

1. The total level of fishing effort for North Pacific albacore in the WCPF Convention Area not be increased beyond current levels;

2. Members and Cooperating Non-Members shall take necessary measures to ensure that the level of fishing effort by their vessels fishing for North Pacific albacore in the WCPF Convention Area is not increased beyond current levels;

3. Members and Cooperating Non-Members shall report to the WCPF Commission on a semi-annual basis: (1) all catches of albacore north of the equator and (2) all fishing effort north of the equator in fisheries directed at albacore. The reports for both catch and fishing effort shall be made by gear type and within and outside the WCPF Convention Area. Catches shall be reported in terms of weight. Fishing effort shall be reported in terms of the most relevant measures for a given gear type, including at a minimum for all gear types, the number of vessel-days fished. The reports for the first half of each calendar year shall be submitted no later than the following December 31 and reports for the second half of the year shall be submitted no later than the following June 30;

4. Members and Cooperating Non-Members shall, through the Northern Committee, and in coordination with the WCPF Commission's Scientific Committee and, as appropriate, other international and national scientific bodies conducting scientific reviews of this stock, monitor the status of North Pacific albacore and fisheries that harvest the stock. At the third session of the WCPF Commission, in 2006, the Northern Committee shall report on the status of fisheries for the stock and, as necessary, present any further recommendations for the conservation and management of the stock to the Commission;

5. The Executive Director shall communicate this resolution to the IATTC and request that, in accordance with Article 22 of the WCPF Convention, the two commissions engage in consultations to further develop and, as soon as practicable, adopt consistent conservation and management measures for North Pacific albacore, including any reporting or other measures needed to ensure compliance with such agreed measures.

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

At the November meeting, the Pacific Fishery Management Council (Council) tasked the Highly Migratory Species Management Team (HMSMT) to begin preparing materials to assist the Council in recommending appropriate biological reference points for determining the stock status of the HMS management unit species. The HMS Fishery Management Plan (FMP) identifies the Council's goal of managing fisheries to maintain optimum yield, using maximum sustainable yield (MSY) based benchmarks as outlined in National Standard 1. However, given the varying levels of data available for stock assessments of HMS species in the Pacific, MSY benchmarks are not always available. In those situations, the HMS FMP dictates that MSY proxies should be used. A list of proxies is identified in the FMP, but the Council and HMSMT have struggled with the question of which proxies are most appropriate for the Council managed HMS stocks. The HMSMT recommends that the Council's decision be ultimately made in consideration of, or cooperation with, the other Pacific HMS management organizations, particularly the Inter-American Tropical Tuna Commission and Western and Central Pacific Fisheries Commission, given the international nature of the fisheries for most of the HMS management unit species in areas beyond the Council's jurisdiction.

The HMSMT discussed a work plan to provide guidance to the Council on Biological Reference Points. Recognizing that the Council would like to select preferred reference points at the June meeting, the HMSMT will, with the help of Southwest Fisheries Science Center (SWFSC) staff, develop the following:

1) A list of reference points currently being used for management or stock status determination by other HMS fisheries management organizations in the Pacific.
2) A diagram demonstrating the relative risk of a suite of potential reference points with respect to status determination criteria adopted by the Council in the HMS FMP.
3) A decision tree to assist the Council in selecting the appropriate reference points given the level of data availability and the Council's management goals.

Timeline

The HMSMT and SWFSC staff will prepare the materials on biological reference points prior to and during the next HMSMT meeting planned for May. Draft materials will be made available to the Council and will undergo review by the Scientific and Statistical Committee at the June meeting.

PFMC
03/09/06

BIGEYE TUNA OVERFISHING RESPONSE

National Marine Fisheries Service (NMFS) notified the Council that it must take action to address overfishing of bigeye tuna by June 14, 2005. A similar notification was given to the Western Pacific Fishery Management Council (WPFMC). At the June 2005 meeting, the Council moved to begin work on an amendment to the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) as the proper response to address this issue. NMFS Southwest Region agreed to take lead responsibility on developing the amendment package for Council consideration. At their November 2005 meeting, the Council was to have adopted a preliminary range of alternatives for public review. However, because of time constraints at that meeting, the agenda item was deferred for a future meeting. This has also allowed NMFS staff to provide a more complete document for the Council to review.

NMFS has recently advised that since no regulatory action would result from an amendment and that any future regulations would be linked to conservation and management measures adopted internationally, it would be more prudent at this point for the Council to develop a position for international consideration rather than a detailed FMP amendment. Therefore, NMFS believes at this meeting it is more relevant for the Council to consider the draft analysis of management options for a West Coast position on how to control fishing mortality on Pacific bigeye tuna in the eastern Pacific provided by NMFS (Agenda Item J.2.a, Attachment 1). This document provides the Council with the information needed to form a position that has the potential to influence any new conservation and management decisions adopted by the relevant international bodies governing bigeye tuna stocks in the eastern Pacific in future years.

As noted in the Situation Summary for the November 2005 Council meeting, the HMS Stock Assessment and Fishery Evaluation (SAFE) Report, available at that Council meeting, includes new information indicating that the Eastern Pacific Ocean bigeye tuna stock is apparently overfished (i.e., the stock biomass is below the minimum stock size threshold). The December 15, 2004, letter notifying the Council that overfishing is occurring states that "the stock structure of bigeye tuna in the Pacific Ocean is unresolved." NMFS based the determination on two stock assessments, one treating bigeye as a single Pacific-wide stock and the other, conducted by the Inter-American Tropical Tuna Commission, for the Eastern Pacific stock only. A reevaluation of this question could lead to a reconsideration of stock status in the Eastern Pacific. However, the most recent NMFS *Status of U.S. Fisheries* report (describing the status of fish stocks through December 31, 2005) retains the conclusion that bigeye tuna are not in an overfished state. If declared overfished, NMFS advises that Council participation in an international solution may be a more practical approach than unilaterally developing a rebuilding plan FMP amendment.

Council Task:

1. **Review and discuss the development of a Pacific Council position on an overfishing response for consideration in the appropriate international forums.**
2. **Discuss any implications of a potential overfished designation for bigeye tuna.**

Reference Materials:

1. Agenda Item J.2.a, Attachment 1: Draft Analysis of Management Options for Development of a Plan to End Overfishing of Pacific Bigeye Tuna.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. NMFS Report — Mark Helvey
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt Alternatives for a Pacific Council Position on an Overfishing Response for Bigeye Tuna for Public Review

PFMC
02/21/06

DRAFT
Analysis of Management Options for Development of a Plan to End Overfishing of Pacific Bigeye Tuna

PREFACE

Pacific bigeye tuna are subject to overfishing Pacific-wide and this document sets out alternatives that might be used to end overfishing. Bigeye tuna, like other highly migratory species (HMS) are nomadic in behavior, thus do not recognize boundaries that management, policy, or science have established. Bigeye tuna are fished by many nations in addition the United States, thus future efforts to reduce fishing mortality on bigeye tuna in the Eastern Pacific Ocean (EPO) will require coordination and communication among all relevant regional fisheries stakeholders. The capacity for unilateral action by the United States to prevent overfishing, as required under National Standard 1 of the Magnuson-Stevens Act (16 U.S.C. 1851(a)(1), is limited, as is the capacity of the Pacific Fishery Management Council (Council), which is required to develop a plan to end overfishing, under 50 CFR 600.310(e)(4)(i)).

Pacific-wide, the U.S. annually lands approximately 200,000 metric tons (mt), or about five percent of the total bigeye catch. The Pacific-wide catch for bigeye tuna in the EPO between years 1999 and 2003 was between 88,000 mt and 142,000 mt. The U.S. West Coast commercial catch for this period was less than one percent, thus any unilateral action by U.S. fisheries to end overfishing would have little effect on the stock. Multilateral management action is essential to ensure that overfishing on bigeye tuna in the Pacific Ocean ends.

The current resolution that places conservation and management measures on fishing nations in the EPO for bigeye tuna is set to expire in 2006, thus this document provides future management options that would address overfishing of Pacific bigeye tuna in the EPO. The Council will choose a West Coast position to advance to the U.S. delegation to the Inter-American Tropical Tuna Commission (IATTC), as domestic management for 2007 and beyond depends on international management actions to reduce fishing on bigeye tuna stocks.

1.0. PURPOSE AND NEED FOR ANALYSIS

1.1 Purpose and Need

This document is intended to provide the Council with information needed to form a position on how to control fishing mortality on Pacific bigeye tuna in the EPO. Management and conservation options are a shared responsibility of both domestic and international fisheries management entities, and thus the requirement to reduce fishing mortality will dictate that the United States find an appropriate balance between protecting the resource and achieving sustainable utilization of the resource within its straddling jurisdictions. Once the Council approves a strategy to reduce fishing mortality it will be presented to the U.S. delegation for the consideration by the IATTC. Any new conservation and management measures adopted by the IATTC, as a result of its June 2006 meeting will be implemented domestically.

To provide context for the development of a strategy, the stock status, the contribution of U.S. fisheries to fishing mortality in the EPO, the sources of fishing mortality, the current regulatory framework for HMS on the West Coast, and existing conservation and management measures relevant to bigeye tuna are described within this document.

After consideration of this document, the Council will determine its preferred strategy for the conservation and management of bigeye tuna in the EPO. In the event that regulatory action is considered, the Council will direct the preparation of a management document for public review, including environmental analysis consistent with the National Environmental Policy Act (NEPA). This will ensure adequate consideration of the impacts of a broad range of alternatives as the Council formulates recommendations.

1.2 History of Action

NOAA's National Marine Fisheries Service (NMFS) notified the Council that it must take action to address overfishing of bigeye tuna by June 14, 2005. A similar notification was given to the Western Pacific Fishery Management Council. At the June 2005 meeting, the Council moved to begin work on Amendment 1 to the FMP for U.S. West Coast Fisheries for HMS as the proper response to address this issue. NMFS Southwest Region agreed to take lead responsibility on developing the amendment package for Council consideration. At its November 2005 meeting, the Council was to have adopted a preliminary range of alternatives for public review. However, because of time constraints at that meeting, the agenda item was deferred for a future meeting. This has also allowed NMFS staff, who initiated the preparation of an environmental assessment (EA) containing the alternatives and analysis of them, to provide a more complete document for the Council to review.

Shortly after NMFS staff began the development of the EA, it was determined that no regulatory action would result from an amendment since future actions are dependent on conservation and management measures adopted internationally. Therefore, at this juncture, a management options analysis for the development of a West Coast position on how to control fishing mortality on Pacific bigeye tuna in the eastern Pacific is a more relevant approach than is an environmental effects analysis of proposed conservation and management measures. The management options analysis will provide the Council with the information needed to form a position, which has the potential to influence any new conservation and management decisions adopted by the relevant international bodies governing bigeye tuna stocks in the eastern Pacific, in future years.

1.3 Current Management Controls

Primary management of Pacific bigeye tuna occurs internationally by the IATTC in the EPO and by the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPFC). The IATTC was established by international convention in 1950 and is responsible for the conservation and management of tuna fisheries and other species taken by tuna fishing activity in the EPO. The organization consists of a Commission where each member country may be represented by up to four commissioners and a Director of Investigations, or the Director who is responsible for drafting research programs, budgets, administrative support, directing technical staff, coordination with other organizations and preparing reports to the Commission.

Staff scientists at the IATTC coordinate and conduct research, observer programs, and the collection, compilation, analysis and dissemination of fishery data and scientific findings. The work of the IATTC research staff is divided into two main groups: The IATTC Tuna-Billfish Program and the IATTC Tuna-Dolphin Program. Current membership of the IATTC includes Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Spain, USA, Vanuatu and Venezuela. Canada, China, the European Union, Honduras, Korea and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

On September 5, 2000, the WCPFC was adopted. The Convention, which is subject to ratification, establishes a Commission that would adopt management measures for HMS throughout their ranges. The U.S. has yet to sign onto the Convention, but is participating as a cooperating non-member. Both Commissions affect West Coast-based HMS fisheries. Figure 1 illustrates the geographical delineation of the WCPO and the EPO.

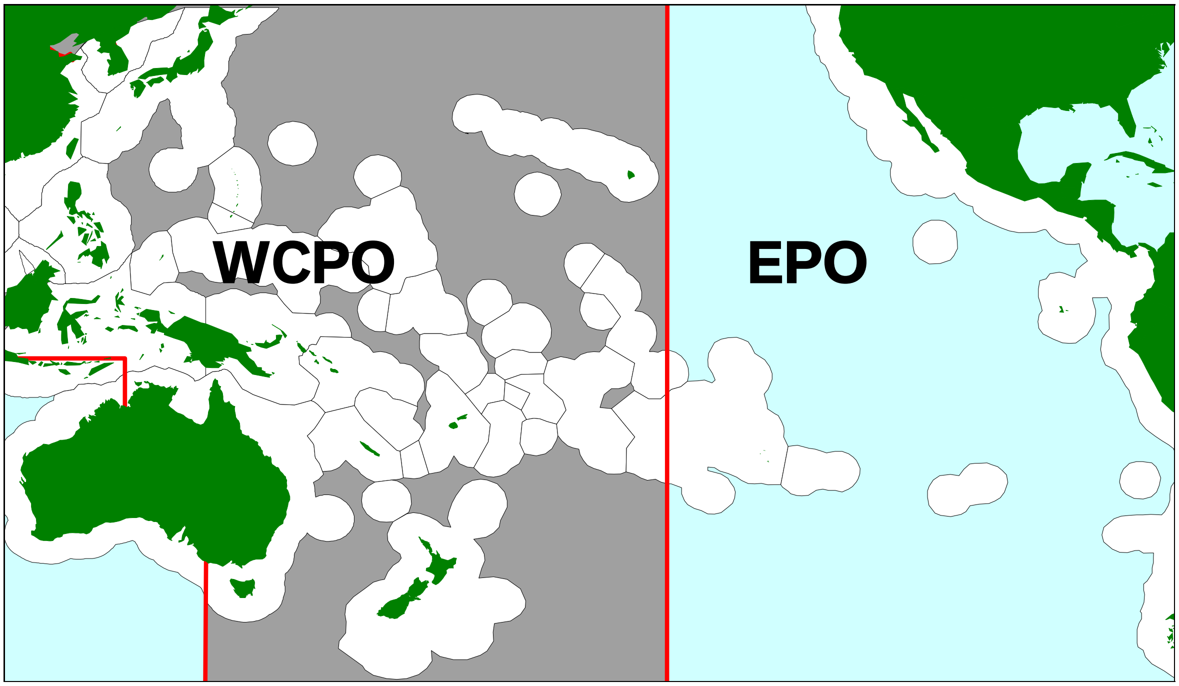


Figure 1. The geographical delineation of the Western and Central Pacific from the Eastern Pacific Ocean for statistical purposes.

The West Coast HMS FMP includes management context to carry out recommendations of the IATTC. In particular and of interest to the FMP, regulations are in place to collect data on vessels harvesting HMS in the Convention Area, with the intent of assisting the IATTC in monitoring international fisheries as well as enforcing conservation measures. The vessels register system is also intended to assist the Council in monitoring West Coast based HMS fisheries north Pacific albacore, yellowfin, bigeye, skipjack, Pacific bluefin, common thresher shark, pelagic thresher, bigeye thresher, shortfin mako, blue shark, striped marlin, Pacific swordfish and dolphinfish.

In June of 2004, the IATTC adopted Resolution C-04-09 on Tuna Conservation Measures. The resolution established a multi-annual program to protect tuna in the EPO for years 2004 through 2006. The resolution includes conservation measures for yellowfin, bigeye, and skipjack tunas. Purse seine vessels fishing in the EPO will be affected by these conservation measures. The conservation resolution includes a national choice of one of two possible six week closures of the Convention Area. The possible choices are either a six-week closure in the summer or winter. Longline vessels fishing for bigeye tuna will be restricted to a national catch not to exceed their national catch for the year 2001. The 2004 conservation resolution introduced a precedent-setting multi-year management framework with a review of the stock(s) response in 2005 and 2006. The multi-annual plan allows the industry to plan and minimize economic impacts. Pole-and-line and sportfishing vessels are not subject to this resolution. Also, members of the IATTC agreed to compliance measure prohibiting landings, transshipments, and commercial transactions involving tunas caught in contravention of the conservation measures in this resolution.

1.4 Management Option Process

March 2006 Council Meeting: Management Options for a West Coast Strategy to Address Overfishing of Bigeye Tuna in the Eastern Pacific Ocean document goes out for Council and public review. At this time the Council reports on its preferred management option.

April 2006 Council Meeting: Report on Public Comment.

April 2006 – May 15th 2006: Finalize document.

May 16th: Submission to the GAC for their review, contemplation, and consideration as an agenda item for their June 1st meeting.

The expectation here is that the GAC will embrace the Council's preferred strategy in part or whole as a part of their strategy and advice to the U.S. Section of the IATTC, which meets in late June to discuss future management options for bigeye tuna.

June 1st 2006: 5th meeting of the GAC.
June 22 – 30th 2006: IATTC meeting in Korea.

2.0 SUMMARY OF THE MANAGEMENT OPTIONS

2.1 Management Objective

The Council will choose a strategy for the establishment of a West Coast position to end overfishing of bigeye tuna in the EPO. The strategy should include measures that meet requirements to end overfishing contained in the MSA as well as meet international obligations. Conservation and management measures to explore include time/area closures for fishing effort in the EPO; limits on mortality of juvenile bigeye associated with fishing on floating objects; and finally, if successful, the United States would then implement the IATTC program for bigeye tuna through quotas and/or time/area closures.

2.2 Management Option 1 (No Action)

NMFS and the Council would not develop and implement controls necessary to end overfishing by Pacific-wide fishermen, nor submit comments or actively participate in the development of input and recommendations on the conservation and management of Pacific bigeye to the U.S. delegation to the IATTC.

2.3 Management Option 2

The Council would work with NMFS to develop conservation and management recommendations for Pacific bigeye tuna, of which NMFS would then recommend to the IATTC. Management options would include a combination of measures that if adopted may include:

(1) Closure of the purse seine fishery in the EPO for two months;

(2) Reduce the purse seine fishing effort on Pacific bigeye by 50 percent in 2007, and possibly beyond, with one or more of the following management options:

> a) Close the purse seine fishery for six months in the area between 8^{o}N and 10^{o}S west of 95^{o}W (this closure would not be intended to occur simultaneously with the two month EPO closure); or
>
> b) Close the purse seine fishery on floating objects for six months in the area west of 95^{o}W (this closure is not intended to occur simultaneously with the two month EPO closure); or
>
> c) Limit the total annual catch of bigeye by each purse seine vessel that is required to carry an observer to 500 metric tons, estimated either by the observer or, at the request of the fishing vessels Captain, by scientific sampling of the vessel's catch conducted by IATTC staff at the time of unloading. If this latter option is chosen, the vessel would be responsible for the costs of the sampling.

(3) Reduce longline catches in the EPO to 2000 levels; and

(4) Prohibit landings, transshipments and commercial transactions in tuna or tuna products that have been positively identified as originating from fishing activities that disregard conservation and management options specified for Pacific bigeye tuna.

Management Option 2 allows NMFS and the Council to work collaboratively in the development of a proposal to IATTC, as the relevant Regional Fishery Management Organization (RFMO). The NMFS and the Council would respond in a formal manner to any resolution adopted by IATTC by implementing appropriate fishery management requirements in the eastern Pacific.

2.4 Management Option 3

Management Option 3 would include all management options contained in alternative 2, plus would exempt fleets that catch 1 percent or less of the total Pacific bigeye tuna landings in the EPO and establish an annual international fishing quota (total allowable catch) of which the amount is to be divided among all nations in the EPO fishing on the stock. Each nation's quota would be based on historical effort. Additionally, this option would explore possible minimum size limitations on juvenile bigeye.

2.5 Management Option 4

Same as Management option 3 plus either use the existing control date or re-establish a more current control date to notify present and potential participants that a limited entry and/or another management program may be considered by the Council for west coast fisheries in the EPO so as to avoid excess capacity.

2.6 Management Option 5

Close all fisheries under the Council's jurisdiction that target Pacific bigeye tuna in the EPO.

3.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The following summary of the oceanography of the Pacific Ocean is taken from the West Coast HMS FMP published in 2004, which is believed to be a complete and accurate account of that ecosystem. For a complete list of citations referenced in this document please see the West Coast HMS FMP.

The west coast of North America from the Strait of Juan De Fuca to the tip of Baja California is part of an eastern boundary current complex known as the California Current System. The U.S. West Coast EEZ encompasses one of the major coastal upwelling areas of the world, where waters provide a nutrient-rich environment and high densities of forage for HMS species, especially from the Columbia River Plume south to the southern California Bight. The region is influenced by various currents and water masses, the shifting nature of which affects the occurrence and distribution of HMS at particular times of the year and from year to year. Diverse bathymetric features also influence current patterns and concentrations of HMS prey and their predators. Large-scale currents within this region include the surface-flowing California Current and Inshore Countercurrent (Davidson Current), and the subsurface California Undercurrent. The region includes two major river plumes (Columbia River and San Francisco Bay), several smaller estuaries, numerous submarine canyons (especially in the north), and the complex borderland of the Southern California Bight with its offshore islands, undersea ridges and deep basins. The system generally contains waters of three types: Pacific Subarctic, North Pacific Central and Southern (or Subtropical Equatorial). Pacific subarctic water, characterized by low salinity and temperature and high oxygen and nutrients is advected equatorward along the coast by the California Current.

The California Current forms the eastern limb of a large clockwise circulation pattern in the North Pacific Ocean, being broader in the north and narrower in the south, extending approximately to the outer EEZ boundary south 40° N latitude. The cold, low salinity water of the California Current dominates much of the EEZ. Its position and intensity changes seasonally and from year to year with shifts in the southeastern extension of the Subarctic Frontal Zone (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 California Current mixes with the more oceanic waters of the Transition Zone. This zone lies between the Subarctic and Subtropical fronts, separating the Subarctic Water Mass and North Pacific Central Water Mass (Saur 1980; Lynn 1986; Smith et al. 1986). During the winter and spring, westerlies in the denser portion of this Transition Zone and trade winds to the south create convergent fronts where colder water from the north meets warmer, less dense water from the south. In this area, extending across northern the Pacific, is a chlorophyll front located at the boundary between the low chlorophyll subtropical gyres and the high chlorophyll subarctic gyres. This chlorophyll front is distinct from the subtropical and subarctic fronts, but seasonally migrates through these two features (Polovina 2001). Areas of convergence along this front concentrate phytoplankton and other organisms (shrimps, squids and other fishes), serving as forage habitat for higher trophic level predators, such as albacore, skipjack tuna, bluefin tuna, swordfish, marlin, blue shark and dolphinfish (Pearcy 1991; Polovina et al. 2000; Polovina et al. 2001).

Physical oceanographic features of the environment change seasonally and also during periods of large scale, oceanic regime shifts such as El Niño. The California Current generally flows southward year round, with strongest flows in spring and summer. Inshore, these flows may be reversed by the seasonal appearance in fall and winter of the surface poleward-flowing Inshore Countercurrent (Lynn and Simpson 1987). The California Undercurrent primarily intensifies in late spring and summer as a narrow ribbon of high-speed flow which presses northward at depth against the continental slope, generally beneath the equatorward flowing upper layers (Lynn and Simpson 1987). Coastal upwelling of cold, salty and nutrient-rich water to the surface occurs primarily in spring and summer in California and into early fall off Oregon, driven by prevailing seasonal winds. Upwelling is often most intense near such promontories as Cape Mendocino and Point Conception. During El Niño events, flow in the California Current is anomalously weak, the California Undercurrent is anomalously strong, and the water in the upper 500 m of the water column is anomalously warm (Chelton et al. 1982).
Although the coastline is relatively straight between the Strait of Juan de Fuca and Baja California, a large bend occurs from Point Conception to San Diego. This region, called the Southern California Bight (SCB), differs dramatically from regions to the north and south (Hickey 1998). The shelves in this area are generally very narrow (< 10 km), but can also be relatively wide in certain areas such as Santa Monica Bay and the San Pedro Shelf south of Long Beach. The sea bed offshore is cut by a number of deep (> 500 m) basins. South of Point Conception a portion of the California Current turns in a counterclockwise gyre. This feature is called the Southern California Countercurrent during years when the northward flow successfully rounds Point Conception, or the Southern California Eddy, when the flow recirculates within the Bight (Hickey 1998). The ocean is generally warmer and more protected here than areas to the north, especially inshore of a line roughly drawn from San Miguel Island to San Clemente Island.

Within the EEZ south of Point Conception, 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, higher salinity oceanic waters to the west beyond the outer EEZ boundary (Hickey 1998; Lynn and Simpson 1990; Lynn et al. 1982, Norton 1999). The pattern and intensity of the California Current and of upwelled waters, can influence habitats by serving as a cool barrier, preventing incursion of warm water into more northerly EEZ waters. Conversely, relaxation of these cold-water barriers can increase habitat in the EEZ for warm water tunas and billfishes from the west and south. Additionally, intensification of the northerly flowing Davidson Current, or other incursion of warm, southerly waters from Mexico, can enhance and extend habitat for warm water tunas and billfish into the inshore waters of the U.S. EEZ.

From Point Conception northward to off Cape Flattery, Washington, the coastline is relatively unprotected from the force of the sea and prevailing northwest winds. In contrast to the Southern California Bight, rugged water and sea state conditions are common north of Point Conception. During much of the year, the coastal waters of central Oregon to offshore central Washington are under the influence of the eastern portion of the eastward flowing Subarctic Current or West Wind Drift. The current has a moderating influence on coastal temperatures during the summer, when sea surface temperatures may be several degrees warmer from off northern Oregon to central Washington than to the south off California and the north off British Columbia (Squire and Smith 1977). In this region the Columbia River freshwater plume also has a considerable effect on oceanographic features along the northwest coast. The plume flows poleward over the shelf and slope in fall and winter, and equatorward well offshore of the shelf in spring and summer, extending its influence as far south as Cape Mendocino, California (Hickey 1998).

3.2 Biological Environment

The following summary of the biological environment of the Pacific Ocean is taken from the West Coast HMS FMP published in 2004, which is believed to be a complete and accurate account of that ecosystem. For a complete list of citations referenced in this document please see the West Coast HMS FMP

In addition to highly migratory species, the marine ecosystem offshore Washington, Oregon and California is home to groundfish species (shelf and slope rockfishes, Pacific whiting, flatfishes, sablefish, lingcod, greenlings, sturgeon; sharks; skates, rays); four species of Pacific salmon; steelhead; small coastal pelagic species (sardines, herring, anchovy, mackerels, smelts, and squid); marine mammals (California sea otter and various whales, porpoises and dolphins, sea lions, and seals); pelagic seabirds (including northern fulmar, brown pelican, albatrosses, shearwaters, loons, murres, auklets, storm petrels and others) (Leet et al. 2001).

The California Current system is particularly rich in microscopic organisms (diatoms, tintinnids and dinoflagellates) which form the base of the food chain, especially in upwelling areas. This rich supply of diatoms and other small plankters also provides food for many zooplanktonic organisms such as euphausiids, shrimps, copepods, ctenophores, chaetognaths, oceanic squids, salps, siphonophores, amphipods, heteropods, and various larval stages of invertebrates and fishes. Grazers like small coastal pelagic fishes and squid depend on this planktonic food supply, and in turn provide forage for larger species nearer the apex of the food chain, such as highly migratory tunas, marlin, swordfish, sharks and dorado. Certain seabirds and turtles and also baleen whales also depend on the planktonic food supply, and many fishes, seabirds and toothed cetaceans feed on fishes that are plankton feeders. In the outer EEZ and to the west also lies the rich chlorophyll front that moves seasonally through the subtropical and subarctic fronts, serving as a rich forage habitat for a variety of organisms (Polovina 2001). In the more coastal areas, multi-celled alga like the giant kelp also provide temporary refuge and foraging opportunities for HMS such as dorado and juvenile tunas. The kelp also provides food, shelter, substrate and nursery areas for nearly 800 animal and plant species (Bedford 2001). In addition to the thirteen HMS management unit species and species mentioned above, many other species inhabit the oceanic pelagic zone and are taken by

HMS gear in waters of the EEZ and beyond. These include louvar, oarfish, lancetfishes, escolar, oilfish, opah, saury, common mola, spearfish, sailfish, blue marlin, wahoo, bonito, black skipjack, and 18 species of sharks and rays.

Episodic oceanographic events such as El Niño (warm water incursion) and La Niña (cooler water incursion) may effect the occurrence and distribution of organisms and the short-term productivity of the system. Longer periods of certain ocean temperature regimes that persist for decades can also affect reproduction and recruitment of marine species (e.g., sardine, rockfish) for several generations and result in substantial changes in abundance over time (Leet et al. 2001). During episodic or persistent warm periods, the more tropical species (such as striped marlin, pelagic thresher shark, dorado, tropical tunas, loggerhead sea turtles) may become more abundant within the EEZ, along with some of the more tropical prey species upon which they feed (e.g., pelagic red crab).

Fishery Resources

According to NMFS (1999), the Pacific Coast fisheries resources have a prorated U.S. long term potential yield of approximately 852,263 mt. The major species are Pacific salmon, Pacific groundfish, coastal pelagic species, Pacific halibut, highly migratory species, and nearshore resources. The West Coast HMS FMP provides a detailed description of the above mentioned resources which includes information on production, abundance, and stock status. Also, please refer to the HMS FMP for a complete list of references.

Threatened and Endangered Species

The following table outlines threatened and endangered species that occur in the Council's jurisdiction, which may be affected by the fisheries managed in the West Coast HMS FMP. Each species is identified as either endangered or threatened following guidelines under the ESA (CH indicates that critical habitat has been distinguished as well).

Amphibians and Reptiles

Loggerhead Sea Turtle	*Caretta caretta*	Threatened
Green Sea Turtle	*Chelonia mydas*	Threatened
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered, CH
Olive (Pacific) ridley Sea Turtle	*Lepidochelys olivacea*	Threatened

Fish

Chum Salmon (Hood Canal summer, Columbia River)	*Oncorhynchus keta*	Threatened
Coho Salmon (Central California)	*Oncorhynchus kisutch*	Threatened
Coho Salmon (S. Oregon. N. Calif. Coast)	*Oncorhynchus kisutch*	Threatened
Steelhead (Upper Columbia River, S. California)	*Oncorhynchus mykiss* ssp.	Endangered
Steelhead (Snake River Basin)	*Oncorhynchus mykiss* ssp.	Threatened
Steelhead (Upper Willamette River)	*Oncorhynchus mykiss* ssp.	Threatened
Steelhead (Columbia River)	*Oncorhynchus mykiss* ssp.	Threatened
Steelhead (South-Central California, Central Valley, Northern California)	*Oncorhynchus mykiss* ssp.	Threatened
Sockeye Salmon (Snake River)	*Oncorhynchus nerka*	Endangered, CH
Sockeye Salmon (Ozette Lake)	*Oncorhynchus nerka*	Threatened
Chinook Salmon (Lower Columbia River)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Upper Willamette River)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Snake River Spring/Summer/Fall runs)	*Oncorhynchus tshawytscha*	Threatened, CH
Chinook Salmon (Sacramento River Winter, Upper Columbia River Spring)	*Oncorhynchus tshawytscha*	Endangered
Chinook Salmon (Central Valley Spring, California Coastal)	*Oncorhynchus tshawytscha*	Threatened
Tidewater Goby	*Eucyclogobius newberryi*	Endangered

Marine Mammals

Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
North Pacific Right Whale	*Eubalaena glacialis*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Threatened, CH
Guadalupe Fur Seal	*Arctocephalus townsendi*	Threatened
Southern Sea Otter	*Enhydra lutris nereis*	Threatened

Birds

Short-tailed Albatross	*Phoebaotria albatrus*	Endangered
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Brown Pelican	*Pelecanus occidentalis*	Endangered
California Least Tern	*Sterna antillarum browni*	Endangered
Western Snowy Plover	*Charadrius alexandrinus*	Threatened
Marbled Murrelet	*Brachyramphus marmoratus*	Threatened, CH
California Clapper Rail	*Rallus longirostris obsoletus*	Endangered

Invertebrates

White Abalone	*Haliotis sorenseni*	Endangered

Chapter 4 of the West Coast HMS FMP summarizes information about the marine species that occur in or near the management area that are listed under the ESA and for which assessments of potential impacts from the fisheries are necessary. Potential impacts of specific proposed actions and alternatives are also assessed separately, by alternative, in Chapter 9. More detail about these species can also be found in Appendix E of the West Coast HMS FMP.

3.2.1 Pelagic Management Unit Species

The MSA defines "highly migratory species" as tuna species, marlin (*Tetrapturus* spp. and *Makaira* spp.), oceanic sharks, sailfishes (*Istiophorus* spp.) and swordfish (*Xiphias gladius*). The term "tuna species" includes albacore tuna (*Thunnus alalunga*), bigeye tuna (*T. obesus*), bluefin tuna (*T. thynnus* and *T. orientalis*), skipjack tuna (*Katsuwonus pelamis*) and yellowfin tuna (*T. albacares*). The Council examined a number of different criteria and alternatives for species to be included in the management unit, which allows for active management, i.e., the fisheries for these species are regulated by the federal government.

The Council established the pelagics management unit species based on the following criteria:

- Occur in the Pacific Council's management area;
- Occur in West Coast highly migratory species fisheries;
- Are defined as HMS in the MSA or the Law of the Sea Annex I;
- Have importance (moderate to high value) in the landings or to a fishery; and
- Are managed by the Western Pacific Fishery Management Council.

According to the MSA, the species included in the pelagic management unit (Table 1) are managed according to maximum sustainable or optimum yield (bio-analytically-based or proxy). The proxy specific to bigeye tuna has yet to be specified and as such the Council has directed the HMS management team to scope management reference points for bigeye tuna, as well as for albacore and bluefin tuna.

Table 1. HMS Species included in the West Coast Fishery Management Plan.

Common Name	Scientific Name
striped marlin	*Tetrapturus audax*
swordfish	*Xiphias gladius*
common thresher shark	*Alopias vulpinus*
pelagic thresher shark	*Alopias pelagicus*
bigeye thresher shark	*Alopias superciliosus*
shortfin mako (bonito shark)	*Isurus oxyrinchus*
blue shark	*Prionace glauca*
North Pacific albacore	*Thunnus alalunga*
yellowfin tuna	*Thunnus albacares*
bigeye tuna	*Thunnus obesus*
skipjack tuna	*Katsuwonus pelamis*
northern bluefin tuna	*Thunnus thynnus*
Dorado (a.k.a. mahi mahi, dolphinfish)	*Coryphaena hippurus*

3.2.2 Pacific Bigeye Tuna (*Thunnus obesus*)

As this management options analysis is concerned with measures to address overfishing of bigeye tuna, a detailed account of bigeye tuna life history and stock assessments is presented in this section. The following account of bigeye tuna life history, habitat movement and stock stricture are from the WPFMC's Amendment 14 to the Pelagics Fishery Management Plan, which also addresses overfishing of the bigeye stock in the WCPO and the EPO. Please refer to Amendment 14 for a complete list of citations referenced in this section.

3.2.3 Life History and Habitat

Bigeye tuna are believed to have recently evolved from a common parent stock of yellowfin tuna (*Thunnus albacares*), remaining in a close phylogenetic position to yellowfin with similar larval form and development. Although the species shares a similar latitudinal distribution with yellowfin tuna worldwide, bigeye have evolved to exploit cooler, deeper and more oxygen poor waters when compared to yellowfin in a classic example of adaptive niche partitioning. Several investigators have demonstrated that this has been accomplished through a combination of physiological and behavioral thermoregulation and other anatomical adaptations for foraging at depth, e.g. respiratory adaptations, eye and brain heaters (Holland and Sibert 1994; Lowe, et al 2000; Fritsches, and Warrant 2001). In this way, the species is considered to be intermediate between a tropical tuna (e.g. yellowfin, blackfin <*T. atlanticus*>, longtail tuna <*T. tonggol*>) and the temperate water tunas (e.g. albacore <*T. alalunga*>, the bluefin tunas). This combination of traits can be characterized by rapid growth during the juvenile stage, movements between temperate and tropical waters to feed and spawn, equatorial spawning with high fecundity -- combined with a preference for cool water foraging and a protracted maturity schedule, an extended life span and the potential for broad spatial movements. It is believed that bigeye tuna are relatively long lived in comparison to yellowfin tuna but not as long lived as the three bluefin tuna species.

Feeding is opportunistic at all life stages, with prey items consisting of crustaceans, cephalopods and fish (Calkins 1980). There is significant evidence that bigeye feed at greater depths than yellowfin tuna, utilizing higher proportions of cephalopods, and mesopelagic fishes and crustaceans in their diet thus reducing niche competition (Whitelaw and Unnithan 1997).

Spawning spans broad areas of the Pacific and occurs throughout the year in tropical waters and seasonally at higher latitudes at water temperatures above 24°C (Kume 1967; Miyabe 1994). Hisada (1979) reported that bigeye tuna require a mixed layer depth of at least 50 m with a sea surface temperature (SST) of at least 24°C. While spawning of bigeye tuna occurs across the Pacific, the highest reproductive potential was considered to be in the EPO based on size frequencies and catch per unit of effort inferred abundance (Kikawa, 1966).

Basic environmental conditions favorable for survival include clean, clear oceanic waters between 13°C and 29°C. However, recent evidence from archival tags indicates that bigeye can make short excursions to depths in excess of 1000 m and to ambient sea temperatures of less than 3°C (Schaefer and Fuller 2002). Juvenile bigeye tuna in the smaller length classes occupy surface mixed layer waters with similar sized juvenile yellowfin tuna. Larger bigeye frequent greater depths, cooler waters and areas of lower dissolved oxygen compared to skipjack and yellowfin. Hanamoto (1987) estimated optimum bigeye habitat to exist in water temperatures between 10° to 15°C at salinities ranging between 34.5 percent to 35.5 percent where dissolved oxygen concentrations remain above 1 ml/l. Recent data from archival tagging has largely corroborated these earlier findings while extending the actual habitat range of the species.

The determination of age, growth and maturity schedules for bigeye tuna are only now becoming better defined. There is no doubt that bigeye tuna are considerably longer lived, slower growing and therefore more vulnerable than the yellowfin. It is now considered that bigeye mature at 3 – 4 years of age after which growth slows considerably with fish capable of living well past ten years. Critical to the understanding of bigeye biology and management are better estimates of maturity schedules by area which are just now beginning to become available. Preliminary results indicate that earlier assessments may have been utilized unrealistically low estimates of size at "maturity" for the species. For the purposes of this review paper, the following categories of bigeye life stage will be used:

1) egg/larval/early juvenile;	< 20 cm
2) juvenile;	20 – 75 cm
3) sub-adult;	76 – 110 cm
4) adult.	> 110 cm

Egg, larval and early juvenile development

The eggs of bigeye tuna resemble those of several scombrid species and can not be differentiated by visual means. Therefore, the distribution of bigeye eggs has not been determined in the Pacific Ocean. However, the duration of the fertilized egg phase is very short, approximately one day, meaning egg distributions are roughly coincident with documented larval distributions. Eggs are epipelagic and buoyed at the surface by a single oil droplet until hatching occurs.

Kume (1962) examined artificially fertilized bigeye eggs in the Indian Ocean, noting egg diameters ranging from 1.03 to 1.08 mm with oil droplets measuring 0.23 to 0.24 mm. Hatching began 21 hours post-fertilization, and larvae measured 1.5 mm in length. Larval development soon after hatching has been described by Kume (1962) and Yasutake et al. (1973). Descriptions of bigeye larvae and keys to their differentiation from other Thunnus species are given by Matsumoto et al. (1972) and Nishikawa and Rimmer (1987). However, the early larval stages of bigeye and yellowfin are difficult or impossible to differentiate without allozyme or mitochondrial DNA analyses (Graves et al. 1988). An indexed bibliography of references on the eggs and early life stages of tuna is provided by Richards and Klawe (1972).

The distribution or areas of collection of larval bigeye in the Pacific has been described or estimated by Nishikawa et al. (1978), Strasburg (1960) and Ueyanagi (1969). Data compiled by Nishikawa et al. (1978) indicates that bigeye larvae are relatively abundant in the western and eastern Pacific compared to central Pacific areas and are most common in the western Pacific between 10^{o}N and 15^{o}S. The basic environment of bigeye larvae can be characterized as warm, oceanic surface waters at the upper range of temperatures utilized by the species, which is basically a consequence of preferred spawning habitat.

Bigeye larvae appear to be restricted to surface waters of the mixed layer well above the thermocline and at depths less than 50 to 60 m, with no clear consensus on diurnal preference by depth or patterns of vertical migration (Matsumoto 1961, Strasburg 1960, Ueyanagi 1969). Prey species inhabit this zone, consisting of crustacean zooplankton at early stages, shifting to fish larvae at the end of the larval phase and beginning of early juvenile stages. The diet of larval and juvenile bigeye tuna is similar to that of yellowfin tuna, consisting of a mix of crustaceans, cephalopods and fish (Uotani, et al. 1981).

The age and growth of larval, post-larval and early juvenile bigeye is not well known or studied. Yasutake et al. (1973) recorded newly hatched larvae at 2.5 mm in total length, growing to 3.0 and 3.1 mm at 24 and 48 hours. The early post-larval stage was achieved at 86 hours after hatching. However, it is likely that the early development of bigeye tuna is similar to that of yellowfin tuna which is the subject of current land based tank studies by the IATTC (IATTC 1997). The larval stages of bigeye tuna likely extend for approximately two to three weeks after hatching. The short duration of the larval stage suggests that the distribution of bigeye larvae is nearly coincident with the distribution of bigeye spawning and eggs. It has been suggested that areas of elevated productivity are necessary to support broad spawning events that are characteristic of skipjack, yellowfin and bigeye tuna whose larvae would subsequently benefit from being in areas of high forage densities (Sund et al. 1981, Miller 1979, Boehlert and Mundy 1994; Itano 2000).

Juvenile and sub-adult stages (20 – 110 cm)

The juvenile phase of bigeye is not clearly defined in the literature. Technically, the term "juvenile" should refer to all sexually immature fish. Calkins (1980) suggests grouping bigeye into larval, juvenile, adolescent, immature adult and adult stages. For the purposes of this management related review, length/age classes were selected in relation to their landings in major fisheries coupled with their size-related vulnerability to various gear types and fishing methods and what is known of bigeye maturity schedules.

Defined this way, the "Juvenile" category will refer to bigeye tuna of 20 – 75 cm fork length which closely corresponds to their size at first recruitment to surface fisheries and includes the majority of surface catches, e.g. purse seine, pole and line, troll. The "Sub-Adult" category of 76 – 110 cm includes the interesting middle size class of bigeye that first enter longline fisheries, are also taken by surface fisheries but are generally not sexually mature or contributing to the spawning biomass.

Juvenile and sub-adult – Habitat and feeding

It is well known that juvenile tunas, including bigeye aggregate strongly to floating objects or to large, slow-moving marine animals, such as whale sharks and manta rays (Calkins 1980, Hampton and Bailey 1993). This behavior has been exploited by surface fisheries to aggregate juvenile yellowfin and bigeye tuna to anchored or drifting FADs (Sharp 1978; Hampton and Bailey 1993). Juvenile, sub-adult and adult bigeye tuna are also known to aggregate near seamounts and submarine ridge features where they are exploited by pole-and-line, handline and purse-seine fisheries (Fonteneau 1991, Itano 1998a; Hallier and Delgado de Molina 2000; Itano and Holland 2000).

Juvenile bigeye form mono-specific schools at or near the surface with similar-sized tuna or may form mixed aggregations with skipjack and/or juvenile yellowfin tuna (Calkins 1980). Yuen (1963) has suggested that these mixed-species schools are actually separate single-species schools that temporarily aggregate to a common element such as food. Echo sounder, sonar data and test fishing strongly suggest a vertical separation of bigeye, yellowfin and skipjack schools that are aggregated to the same floating object. A great deal of circumstantial evidence supports species specific vertical stratification of tuna on drifting objects, with bigeye being the deepest, yellowfin intermediate and skipjack closest the surface. Several studies have come very close to defining these issues using sophisticated sonar and echo sounder equipment capable of measuring target strength readings of individual fish (Josse, et al. 2000; Josse and Bertrand 2000). However, species specific remote sensing of tuna needs further study. An added complication is that normal daytime deep diving behavior of bigeye tuna appears to break down when in association with drifting and anchored FADs where the fish tend to remain within the mixed layer (Schaefer and Fuller 2002; Musyl et al. 2003).

The majority of feeding studies on bigeye tuna have sampled gut contents of large longline-caught fish. Very few studies have specifically examined the feeding behavior of juvenile bigeye tuna. Collette and Nauen (1983) state that juvenile bigeye have been noted to feed opportunistically during day and night on a wide variety of crustaceans, cephalopods and fish in a manner similar to yellowfin of a similar size. Prey items include epipelagic or mesopelagic members of the oceanic community or pelagic post-larval or pre-juvenile stages of island-, reef-or benthic-associated fish and crustaceans. Alverson and Peterson (1963) state that juvenile bigeye less than 100 cm generally feed at the surface during daylight, usually near continental land masses, islands, seamounts, banks or floating objects. Much of this information should be considered dated or incomplete in nature.

Recent and ongoing work in Hawaiian waters may significantly alter the perception that juvenile bigeye feed on epipelagic fauna in a similar manner to similar sized yellowfin tuna. Grubbs et al. (2002) found that small and medium sized juvenile yellowfin and bigeye tuna in a size range of 40 – 80 cm exploited similar broad groups of prey but significantly different species. Yellowfin were noted to feed almost exclusively on epipelagic fish or crustaceans or mesopelagic organisms that vertically migrate into the shallow mixed layer at night. Bigeye tuna of the same size and in the same aggregations fed primarily on a deeper dwelling complex of mesopelagic crustaceans, cephalopods and fish, and fed more successfully near seamounts compared to yellowfin. Interestingly, neither species appears to feed well on anchored FADs but continue to exploit different species that are apparently advected past the FAD by currents or exist in the surrounding waters: yellowfin eating epipelagic organisms and bigeye concentrating on mesopelagic organisms of the sound scattering layer.

Schaefer and Fuller (2002) characterized vertical behavior by association type for bigeye archivally tagged in association with drifting FADs in the equatorial EPO. An interesting behavioral pattern was evident during 27.7 percent of the time (pooled data) with fish remaining shallow during the night and most of the day as is characteristic of FAD associated bigeye tuna. However, extended deep diving activity took place during afternoon which may have represented a temporary break in the association to forage at depth. Additional archival data in conjunction with acoustic surveys and gut analysis is necessary to resolve these issues.

Juvenile and sub-adult importance to fisheries

Juvenile bigeye are regularly taken as an incidental in surface fisheries, and occasionally as targeted catch, such as in the seamount and FAD associated offshore handline fishery of Hawaii (Adam et al. 2003). Juvenile bigeye tuna of very small sizes are taken in the equatorial Philippine ringnet and small purse seine fishery, but are poorly documented due to mixing in the statistics with yellowfin tuna and other tuna species (Lawson 2004). These fisheries are based on anchored FADs, taking advantage of the strong tendency of juvenile tuna to aggregate to floating objects.

Juvenile bigeye are regularly taken as an incidental in pole and line fisheries, especially when floating objects or FADs are utilized. Tsukagoe (1981) describes interesting techniques used by distant water Japanese pole and line skipjack vessels to target juvenile and sub-adult bigeye tuna on drifting logs in the tropical western Pacific. However, bigeye as small as 32 cm are taken in the Japanese coastal pole-and-line fishery (Honma et al. 1973). Bigeye tuna have also been recorded from a seamount-associated handline fishery and FAD-based pole-and-line and handline fisheries in Hawaii as small as approximately 40 cm FL (Boggs and Ito 1993, Itano 1998). Smaller sized fish are apparently available but not retained due to marketing preferences. The smallest bigeye tuna of 7957 bigeye tag releases achieved during the Hawaii Tuna Tagging Project was 29.0 cm captured by handline gear (Itano and Holland 2000).

Both juvenile and sub-adult bigeye are taken as an incidental catch in floating object sets in western Pacific purse seine fisheries. In the eastern Pacific Ocean, purse seine catches of sub-adult bigeye have been quite high in some years and should be considered as a retained component of the catch in the skipjack floating object fishery. Schaefer and Fuller (2002) from archival tag data noted that bigeye less than 110 cm spent a greater percentage of their time in association with drifting FADs in the EPO but that the larger bigeye still had an affinity for aggregating to floating objects. Very small bigeye tuna are also taken in equatorial purse seine fisheries though may be discarded or poorly enumerated due to market demands and mixed reporting with juvenile yellowfin tuna.

Juvenile and sub-adult bigeye of increasing size appear in higher latitude fisheries, suggesting portions of the population move away from equatorial spawning/nursery grounds to feed and grow, only to return later to spawn. The distribution of these juvenile and sub-adult tuna becomes better understood as they begin to enter catch statistics of temperate water fisheries. The sub-adult size bigeye figure significantly in several handline and longline fisheries. For example, the Hawaii based longline fishery takes primarily sub-adult bigeye tuna. During the 16 year period 1987-2002, annual average size of bigeye ranged from 111 – 120 cm (WPRFMC, 2004B).

Adult distribution and habitat preference

Adult bigeye are distributed across the tropical and temperate waters of the Pacific, between northern Japan and the North Island of New Zealand in the western Pacific, and from 40oN to 30oS in the eastern Pacific (Calkins 1980). Numerous references exist on the distribution of Pacific bigeye tuna in relation to general distribution and migration (Hanamoto 1986; Kume 1963, 1967, 1969a, 1969b; Kume and Shiohama 1965; Laevastu and Rosa 1963); the oceanic environment (Blackburn 1965, 1969; Hanamoto 1975, 1976, 1983, 1987; Nakamura and Yamanaka 1959; Suda et al. 1969; Sund et al. 1981; Yamanaka et al. 1969); the physiology of tunas (Magnuson 1963; Sharp and Dizon 1978; Stretta and Petit 1989); and fish aggregation devices (Holland et al. 1990).

There is some consensus that the primary determinants of adult bigeye distribution are water temperature and dissolved oxygen levels. Salinity does not appear to play an important role in tuna distribution in comparison to water temperature, dissolved oxygen levels and water clarity. Hanamoto (1987) reasons that optimum salinity for bigeye tuna ranges from 34.5 percent to 35.5 percent given the existence of a 1:1 relationship between temperature and salinity within the optimum temperature range for the species. Alverson and Peterson (1963) state that bigeye tuna are found within SST ranges of 13° to 29°C with an optimum temperature range of 17° to 22°C. However, the distribution of bigeye tuna cannot be accurately described by SST data since the fish spend a great deal of time at depth in cooler waters. Hanamoto (1987) analyzes longline catch and gear configurations in relation to vertical water temperature profiles to estimate preferred bigeye habitat. He notes that bigeye are taken by longline gear at ambient temperatures ranging from 9° to 28°C and concludes from relative catch rates within this range that the optimum temperature for large bigeye lies between 10° and 15°C if available dissolved oxygen levels remain above 1ml/l. In a similar study in the Indian Ocean, the optimum temperature for bigeye tuna was estimated to lie between 10° and 16°C (Mohri et al. 1996).

According to several authors, bigeye can tolerate dissolved oxygen levels as low as 1 ml/l, which is significantly lower than the dissolved oxygen requirements of skipjack and yellowfin tuna (Sund et al. 1981). Brill (1994) has proposed a physiological basis to explain how bigeye are able to utilize oxygen in a highly efficient manner, thereby allowing them to forage in areas that are not utilized by other tuna species. He theorizes that bigeye tuna spend the majority of their time at depth, making short excursions to the surface to warm up. Lowe et al. (2000) demonstrate that the blood of bigeye tuna has a significantly higher affinity for O_2 compared to other tunas, thus explaining their ability to exploit O_2 poor regions and depths.

This vertical movement pattern, which has been clearly demonstrated by sonic tracking experiments of bigeye tuna, is exactly the opposite pattern demonstrated by skipjack and juvenile yellowfin tuna (Holland et al. 1992). Sonic tracking and archival tagging of bigeye tuna consistently indicate deep foraging during the daytime near or below the thermocline and shallow swimming behavior at night.

The use of sonic and archival tagging technologies has greatly expanded our knowledge of bigeye behavior and habitat selection. Schaefer and Fuller (2002) noted that bigeye in the EPO spend most of the day at depths of 200 – 300 m and ambient temperatures of 13 – 14^{o}C, although dives to below 1500 m and ambient temperatures of < 3^{o}C were noted.

Size at maturity and the classification “sub-adult” and “adult” bigeye

Estimates of size at maturity for Pacific bigeye vary widely between authors (Whitelaw and Unnithan 1997). This is likely due to a mixing between estimates and/or observations of “size at first spawning”; “size of fish observed in running ripe condition” or some estimate or guess of “size at sexual maturity for the stock” as determined by a variety of methods using vastly different temporal and spatial sampling protocols. Maturity of bigeye is most accurately indicated by the presence of hydrated oocytes in the ovarian lumen or microscopically observed post-ovulatory follicles of recent age or for the male, by a variety of visual observations of the testis (Nikaido, et al., 1991). Large-scale stratified sampling over multi-year periods may be necessary to adequately address area effects and inter-annual variation in oceanographic conditions, e.g. ENSO effects.

Kikawa (1957, 1961) estimated size at first maturity for males at 101–105 cm and 91–95 cm for female bigeye and selected 100 cm as a general size for "potential maturity" for Pacific bigeye. Kume (1962) recorded a running ripe female bigeye of 93 cm, and McPherson (1988) recorded mature bigeye of 100 cm using histological methods. The study by Yuen (1955) agreed with Kikawa (1953) with an estimated size at first spawning for central Pacific bigeye at roughly 90 – 100 cm. In a later study, Kikawa (1962) reported finding very few sexually mature female bigeye less than 100 cm in fork length. Sun (1999) reported on a year of bigeye port sampling of Taiwanese longline vessel catch from the far western Pacific and noted the smallest mature female sampled measured 99.7 cm. Nikaido et al. (1991) reported that most of the bigeye over 100 cm were "sexually very active" from taken near Java and from waters south of Johnston Atoll. These observations are incomplete and clearly unsuitable for stock assessment purposes.
The IATTC is in the process of concluding and publishing results of a two-year investigation on the reproductive biology of bigeye tuna from the Eastern Pacific Ocean that evaluated 1869 gonad samples from male and female bigeye ranging between 80 and 163 cm FL to determine spawning habitat, maturity, fecundity and sex ratios. Histological methods were used to evaluate sexual maturity, spawning periodicity and spawning time. The smallest female bigeye tuna histologically classified as mature was 120 cm FL and only 4 percent of fish 120.0-124.0 cm FL (n=70) were mature (IATTC 2004). Approximately 54 percent of samples 140.0-144.9 and 78 percent of fish 150.9-154.9 were classified sexually mature.

These initial findings suggest considerably larger sizes at maturity for bigeye tuna in the EPO in comparison to observations made in the central and western Pacific. However, it should be noted that spawning of bigeye has been linked with sea surface temperatures above 24^{o}C. It has been suggested that sexual maturity, or more accurately, the development into active spawning condition appears to be linked to mixed layer water temperatures above 26^o C (Mohri 1998). Kume (1967) noted a correlation between mature but sexually inactive bigeye at SSTs below 23^o to 24^{o}C, which appears to represent a lower limit to bigeye spawning activity

Sea surface temperatures are considerably lower in the equatorial EPO compared to the WCPO which could depress and lengthen maturity schedules of bigeye tuna in the EPO if they remained in that area for extended periods. For example, mean annual SSTs measured at oceanographic buoys in the area of the EPO study at 0^o, 95^{o}W and at 0^o, 180^o during 2000 (the time period of the sampling by Schaefer) were 23.1 and 27.5^{o}C respectively.

In other words, bigeye maturity schedules and spawning patterns need to be examined on a regional basis. A broad scale investigation of bigeye maturity and reproductive parameters using histological methodology is clearly indicated.

In review of the available information, the categorization of 100 cm bigeye tuna as "generally mature" may be inaccurate and potentially dangerous for stock assessment purposes. The selection of 100 cm to describe mature bigeye would be similar to selecting a size of ~ 60 cm to describe mature yellowfin when this actually represents the size when a few yellowfin first enter maturity. Estimates of L50 for WCPO and EPO yellowfin are 105 cm and 92 cm respectively (Itano 2000; Schaefer 1998).

For the purposes of this review, a conservative value of 110 cm has been selected to differentiate sub-adult populations from adult bigeye.

Reproduction

Sex ratios: Information on sex ratios of bigeye by area are incomplete and somewhat inconsistent though there is general agreement that males are more abundant, particularly in the larger size classes. Most studies agree that sex ratios of bigeye tuna are close to the expected 1:1 up to a fork length of approximately 140 cm after which several authors have noted an increase in the proportion of males in the population (Miyabe and Bayliff 1998; Miyabe 2001; Sun et al. 2004). Bigeye larger than 160 cm are predominantly males, and females appear to be completely absent from the largest size classes.

The cline in sex ratios after 140 cm may be related to a slowing of growth, increased natural mortality, increased catchability or some factor related to courtship and spawning. The cline in sex ratios toward males near the size of maturity for females has lead many investigators to speculate that the energetic costs of maturation and spawning may slow somatic growth in females, eventually leading to higher natural mortality. Estimates of differential cost of spawning on the basis of gonadal production, bioenergetics modeling (locomotion, metabolism, energy loss and growth) or some combination of both have been made for yellowfin tuna (Olson and Boggs 1986; Schaefer 1996: 1998). Although several energetic factors may not be fully addressed in these studies, they do agree that energetic costs for females and the massive cytoplasmic investment of females in daily expenditures of ova far outweigh that expended by the males. In short, it appears that female tuna, particularly the tropical tunas simply burn out and stop growing or die young as a consequence of massive reproductive output.

Reproductive parameters: Bigeye tuna spawn throughout the year in equatorial regions, engaging in night time mass spawning events in oceanic waters above approximately 24^{o}C, but ideally closer to 26^{o}C. Kume (1967) noted a correlation between mature but sexually inactive bigeye at SSTs below 23^{o} to 24^{o}C, which appears to represent a lower limit to bigeye spawning activity. Bigeye tuna are serial spawners, capable of repeated spawning events at daily or near daily intervals during extended spawning periods of unknown length (Nikaido et al. 1991). Spawning takes place during the late afternoon or evening hours at or near the surface (McPherson 1991a). Spawning peaks in the evening from about 1900 to 2400 hours, with batch fecundities of millions of ova per spawning event. Batch fecundity, as with many fishes, increased dramatically with body length with estimates of bigeye batch fecundities ranging from around one to five million eggs per spawn for fish ranging from 120 to 180 cm FL (Nikaido, et al. 1991). Sun et al.

(1999) estimated average batch fecundity for western Pacific bigeye of 3.47 million oocytes, or 59.5 oocytes per gram of body weight for samples.

Additional information on the maturity and spawning of western and central Pacific bigeye is provided by Kikawa (1953, 1957, 1961, 1962, and 1966). However, none of these older studies applied histological techniques that are necessary to accurately define maturity stages and reproductive parameters of tuna populations (Schaefer 2001). Goldberg and Herring-Dyal (1981) provide one of the few accessible studies on bigeye maturity using histological techniques.

Spawning areas and seasons: In a general sense, bigeye tuna are believed to spawn throughout the year in tropical regions (10^{o}N – 10^{o}S) and during summer months at higher latitudes (Collette and Nauen 1983). A study by McPherson (1991a) in eastern Australian waters supports this concept of equatorial spawning of bigeye throughout the year with seasonal spawning of bigeye in the north Australian zone, e.g. higher latitudes. Hisada (1979) noted from a study in the central and eastern Pacific that a temperature of 24^{o}C to a depth of 50 m were necessary for maturity and spawning, suggesting a similar seasonal pattern of spawning in the western Pacific. It can be assumed that bigeye spawning and larval development are common at SSTs above 26^{o}C, but may occur in some regions with surface mixed layers of 23^{o}-24^{o}C and above.

Yuen (1955) found fully mature, spawning condition bigeye in samples collected in the western Pacific, Caroline and Marshall Islands (1^{o} – 7^{o}N latitude) throughout the period of his sampling (April – October). Sampling at similar latitudes among the central Pacific, Line Islands of Kiribati suggested two peak spawning periods in January through February and July through October. However, these results were considered preliminary due to restricted sample sizes and periods. A large data set from the Hawaiian Islands revealed no bigeye tuna in spawning condition with the nearest spawning condition bigeye sampled 400 miles southeast of Hawaii.

Two years of ovary sampling of Hawaiian bigeye revealed a definite increase in relative ovary weight from winter to summer, peaking in June, but no fully mature or spawning-condition bigeye were ever sampled (Yuen 1955). June also coincides with the annual low in the landings of large bigeye in Hawaiian waters. Yuen (1955) suggested that large bigeye in maturing stages leave Hawaii in spring and summer to spawn, presumably to the south. Gear selectivity was not considered a plausible explanation for the reduced summertime catches, as the same gear takes large, spawning condition bigeye at that time of year near Palmyra Atoll, 800 nmi south of Hawaii. This would also concur with a central equatorial spawning season of July - October, peaking in August - September as was inferred by the Line Islands samples examined in the same study.

Nikaido et al., (1991) noted bigeye in active spawning condition in waters described as “south-western offshore of Hawaii.” Several tables and graphs in the paper are labeled as “Hawaii samples”, which has lead to some confusion of the status of bigeye spawning in Hawaiian waters. His “Hawaii” samples were actually taken from locations 11^{o}- 13^{o}N, and 163^{o} – 176^{o}W which are well south of Johnston Atoll and over 700 miles from the closest Hawaiian island. Nevertheless, the sampling occurred from May 27 – July 10.

Boehlert and Mundy (1994), in larval fish tows around the Hawaiian island of Oahu tentatively identified five bigeye tuna larvae collected in June using visual criteria. However, these identifications are now considered suspect due to more recent work defining visual characters of tuna larvae using DNA techniques (Graves et al. 1988; Mundy, pers. comm.).

Sun et al. (1999), examined bigeye tuna gonads taken in the western Pacific longline fishery over a one year period. Based on monthly variation in gonad size and oocyte stage he proposed that the spawning season of western Pacific bigeye extended from February to September with peaks from March to June. These samples were taken primary from areas east and west of the Philippines; therefore around 10^{o}N. 120^{o} - 130^{o}E.

<u>Age and growth</u>

Whitelaw and Unnithan (1997) provide a summary of early studies on the age and growth of bigeye tuna in the Pacific and Indian Oceans using primarily analyses of modal progression in size frequencies. Pertinent references include Iverson (1955), Kume and Joseph (1966), Marcille and Stequert (1976), Peterson and Bayliff (1985), Tankevich (1982) and Talbot and Penrith (1960). Yukinawa and Yabuta (1963) examined scale increments. Lehodey et al. (1999) and Sun et al. (2001) provide summarized tables of growth parameters derived by bigeye studies in the Pacific and Atlantic Oceans.

Significantly, the IATTC has completed an otolith age validation study on central Pacific bigeye tuna in collaboration with the University of Hawaii, Pelagic Fisheries Research Program (IATTC 2002). Saggital otoliths from recaptured bigeye tuna previously marked with oxytetracycline (OTC) from Hawaiian waters and the Eastern Pacific Ocean were evaluated. The study concluded that daily microincrements were deposited on bigeye otoliths within the range of sampling (38-135 cm FL), but that expanded sampling and evaluation was necessary to expand the significance of the work.

In more recent studies, Hampton and Leroy (1998) developed a von Bertelanffy growth curve fitted to tag recapture data and otolith readings for western and central Pacific bigeye tuna, resulting in the growth curve as depicted in Figure 10 of Hampton et al. (1998b). Lehodey et al. (1999) refit the composite model, excluding otolith readings from fish >110 cm FL due to difficulties in reading daily increments beyond three years. Figure 6 in Lehodey et al (1999) was felt to provide a reasonably good fit to both tagging and otolith data, with the tagging data providing estimated $L\infty$ within a more realistic framework.

Within the past few years, CSIRO has developed techniques to age bigeye tuna using seasonal annuli on otoliths (Farley et al. 2003). Annuli are not clearly defined during the first two years of life due to rapid growth but become easily discernable after two or three years of life. Leroy (1991) concludes that the second and third annuli can be accurately determined by visual enumeration of daily microincrements in prepared saggital otoliths. Therefore, a combination of daily and annular readings of otoliths should provide accurate estimates of bigeye growth.

In an independent study, Sun et al. (2001) used presumed annular marks on the first dorsal spine of western Pacific bigeye tuna to develop estimates of age and growth. Spines from 1149 specimens ranging between 45.6 and 189.2 cm FL were examined. Age estimates of mean and back calculated fork lengths of bigeye up to ten year estimates are provided.

Stequert and Conand (2004) examined the age and growth of bigeye tuna sampled from the western Indian Ocean. Presumed daily microincrements on saggital otoliths were interpreted using scanning electron microscope for 164 samples. A growth curve was derived indicating bigeye in this region measure 59 cm at year 1,111 cm at year 3 and 147 cm at 6 years. Marks on the first dorsal spines of 140 bigeye were also interpreted. Comparable results were reached using otoliths and spines up to estimated ages of three years, but they did not feel that spines were suitable for ageing larger fish.

These studies in combination with tag recapture data suggest that bigeye growth is rapid and parallels yellowfin growth for the first two years, after which it slows down significantly prior to the onset of sexual maturity. The disparity in results by area also suggests that studies need to be carried out on a regional basis and results from one area should be used with caution in other areas if at all. Maximum age of bigeye is not known, but tag recapture data provides empirical evidence that bigeye tuna grow to at least 12+ years of age which is considerably longer than yellowfin. Recently, large bigeye tuna have been aged using a combination of daily and annular marks at 13 to 15 years of age (Leroy pers. comm.).

<u>Adult diet and feeding</u>

Several investigators have proposed that the greater depth distribution of bigeye is a foraging strategy to exploit regions less utilized by yellowfin or skipjack tuna, thus reducing niche competition. Bigeye tuna are opportunistic feeders like yellowfin, relying on a mix of crustaceans, fish and cephalopods with feeding taking place during the day and night (Calkins 1980; Collette and Nauen 1983). However, the composition of adult bigeye diet differs significantly from that of similar-sized yellowfin (Watanabe 1958, Talbot and Penrith 1963, Kornilova 1980). Adult bigeye prefer to forage at significant depths, utilizing a higher proportion of squid and mesopelagic fishes compared to yellowfin. Solov'yev (1970) suggests that the preferred feeding depth of large bigeye is 218–265 m, which is the most productive depth for longline catches. Miyabe and Bayliff (1998) summarize diet items of bigeye in the Pacific in tabular form from studies by Alverson and Peterson (1963), Blunt (1960), Juhl (1955), King and Ikehara (1956) and Watanabe (1958).

Any discussion of preferred bigeye habitat must address the vertical temperature structure, thermocline depth and local characteristics of the sound scattering layer (SSL) of the region in discussion. Josse et al. (1998) used tracking of bigeye and yellowfin marked with depth transmitting tags with simultaneous recording of biotic elements of the water column to examine tuna behavior during the day and night. The study clearly illustrated the importance of the SSL and prey to tuna movements and presumed feeding behavior. Sonic tracking and the use of archival data loggers have clearly shown the ability of adult bigeye to exploit prey and forage in a much deeper environment when compared to yellowfin (Dagorn et al. 2000; Musyl et al. 2003).

Bigeye tuna are also known to aggregate to large near surface concentrations of forage, such as the spawning aggregations of lanternfish (Diaphus sp.) [MYCTOPHIDAE] that occur seasonally in the Australian Coral Sea (Hisada 1973, McPherson 1991b).

<u>Adult importance to fisheries</u>

Large, mature-sized bigeye tuna are sought by high value sub-surface fisheries, primarily longline fleets landing sashimi grade product. Adult bigeye tuna aggregate to drifting flotsam and anchored buoys, though to a lesser degree than juvenile fish. Large bigeye also aggregate over deep seamount and ridge features where they are targeted by some longline and handline fisheries.

Regions of elevated primary productivity and high zooplankton density—such as near regions of upwelling and convergence of surface waters of different densities that are very important to the distribution of skipjack and yellowfin tuna—are less important to the distribution of adult bigeye. This is logical if one assumes skipjack and yellowfin are inhabitants of the upper mixed layer while adult bigeye are sub-surface in nature, more closely tied to the thermocline and organisms of the deep scattering layer. Water temperature, thermocline depth and season appear to have much stronger influences on the distribution of large bigeye (Calkins 1980). The fact that large bigeye take longline hooks at greater depths than yellowfin coupled with a rising demand for sashimi-grade tuna and improved storage techniques prompted a shift to deep longline gear to target bigeye tuna during the late 1970s and early 1980s (Sakagawa et al. 1987, Suzuki et al. 1977). This development promoted numerous studies on differential catch rates and gear configurations to define productive hooking depths for bigeye given different oceanographic conditions (Bahar 1985, 1987; Boggs 1992; Gong et al. 1987, 1989; Hanamoto 1974; Nishi 1990; Saito 1975; Shimamura and Soeda 1981; Suzuki and Kume 1981, 1982; Suzuki et al. 1979).

Hanamoto (1987) proposed that productive longline fishing grounds for bigeye do not necessarily equate to regions of higher abundance, but “are nothing more than areas where the hook depths happened to coincide with the optimum temperature layer and where the amount of dissolved oxygen happened to be greater than the minimum required for bigeye tuna (1ml/l).” Nakamura (1969) suggests that bigeye tuna are closely associated with particular water masses or current systems during different life stages. Fish taken in the higher latitude longline fishing grounds tend to be large sub-adults, reproductively inactive young adults, or spent (mature but reproductively inactive) adults, while the fish taken in the equatorial longline fishery are actively spawning adults (Calkins 1980).

3.2.4 Movement

Horizontal movements

There have been relatively few bigeye tagged in the Pacific in comparison to skipjack and yellowfin due to the difficulty in capturing quantities of bigeye in suitable condition for tagging. The South Pacific Commission tagged and released approximately 147,000 tuna from 1989 – 1992, of which only 5.5 percent were bigeye. As a result, horizontal movement data from conventional tagging programs is not conclusive.

Miyabe and Bayliff (1998) present summary information of some long distance movements of tagged bigeye in the Pacific. Hampton and Williams (2005) describes 8,074 bigeye releases made in the western Pacific by the South Pacific Commission (SPC) Regional Tuna Tagging Project (RTTP) during 1989–1992. An overall recapture rate of 12.5 percent of bigeye releases was reported.

For large release data sets in the Philippines and from the Coral Sea of Australia, more than 80 percent of recaptures were reported within 200 nmi of release. In contrast, about 50 percent of equatorial releases occurred beyond 200 nmi from their point of release and 10 percent beyond 1000 nmi. The authors suggest the difference may be due to a greater tendency for bigeye to remain close to large land masses, FADs or tightly packed island groups. The equatorial releases were made in high seas areas or near isolated, oceanic islands and atolls.

Approximately 63 percent of all SPC/RTTP bigeye tag releases were made in the northeastern Australian EEZ, most of which were captured in large feeding aggregations in the Coral Sea at approximately 17-18^{o} S latitude (Itano and Bailey 1991). Hampton and Gunn (1998) examined a release dataset of 4,277 bigeye using a tag-attrition model with seasonally variable catchability and targeting options. Tag recaptures supported some linkage of Australian bigeye to the broader western and central Pacific and as far east as 130-140 W longitude. However, the majority of recaptures came from the general area of release with a significant seasonal pulse during mid-year. Various explanations are given but some degree of localization of bigeye can not be discounted.

The Hawaii Tuna Tagging Project (HTTP) conventionally tagged and released 7,440 yellowfin and 7,957 bigeye tuna throughout the Hawaiian archipelago, primarily from 1996 – 1999. Most of the bigeye releases were juvenile fish (mean 59.8 cm) tagged and released near a large seamount feature in the Hawaii EEZ or on offshore buoys that were acting as fish aggregation devices (Itano and Holland 2000). Bigeye recaptures reached 15 percent overall, which were primarily short term recaptures at or near their point of release, reinforcing the importance of aggregation and schooling to juvenile bigeye tuna behavior. Recaptured bigeye apparently remained within the Hawaii zone for at least two or three years, repeatedly aggregating to the same seamount or FADs where recaptures continued to be reported. Adam et al. (2003) supported some degree of regional fidelity or island association of these juvenile and sub-adult phase bigeye with a low level of mixing with the broader WCPO. In this respect, the results were somewhat similar to those reported by Hampton and Gunn (1998) for bigeye tuna in the Australian Coral Sea.

Sibert et al. (2003) applied a Kalman filter statistical model to refine horizontal movement data from geolocating archival tags recovered from Hawaiian bigeye tuna. Juvenile and sub-adult bigeye recoveries showed little real movement and a strong tendency to remain at the seamount and FADs where they had been tagged. The only large bigeye (131 cm) apparently remained associated with the coastal features and nearshore bathymetry of the island of Hawaii during 84 days at liberty. The authors suggest that large features, such as islands may also act as points of attraction and aggregation for bigeye tuna. This is a commonly held belief of traditional handline fishermen in Polynesia who target deep swimming tunas at specific locations close to atolls and high islands. There are several of these traditional handline areas along the south shore of the island of Hawaii that are known to hold bigeye and yellowfin tunas (Rizutto 1983).

However, over time, increasing numbers of HTTP recaptures have been reported radiating out from the Hawaiian islands in all directions, but primarily to the south of Hawaii toward Johnston and Palmyra Atolls. This recapture pattern may reflect different life stages of bigeye tuna, with semi-resident juveniles and sub-adults strongly aggregated to island and seamount features, expanding out into oceanic environments and tropical spawning grounds with their development to maturity. It should be noted that higher recapture rates to the south of Hawaii are undoubtedly influenced by differential fishing effort, but effort and abundance are often closely related.

Horizontal movements of bigeye in relation to FADs and drifting objects are not well described, although a great deal of anecdotal information is available from the fishing industry. Schaefer and Fuller (2005) noted that bigeye tended to remain tightly aggregated and upcurrent of anchored FADs and downcurrent from the drifting research vessel during the day. At night, the bigeye aggregations became more diffuse when it was presumed that individuals were foraging on organisms of the SSL. Bigeye returned to their daytime positions at dawn, often forming monospecific schools at the surface, usually termed a “breezer.”

Bigeye tuna can move freely throughout broad regions of favorable water temperature and dissolved oxygen values; and are capable of large, basin-scale movements as documented by tag recoveries. However, most bigeye recaptures have occurred within 200 miles of their point of release. However, these results may be confounded by the preponderance of juvenile fish in tag release cohorts, a protracted time to reach adult stages, reporting problems for recaptures of large fish from high seas fleets and a general paucity of adequate tag release data.

If the majority of spawning takes place in equatorial waters, then this infers mass movements of juvenile and sub-adult fish to higher latitudes, and presumably some return movements of mature or maturing fish to spawn. However, the extent to which these are directed movements is unknown and the extent of bigeye movement between the western, central and eastern Pacific remains unclear. An increase in tag releases of medium and large bigeye tuna throughout their range, incorporating fishery independent technologies where possible is needed.

Vertical movements

A great deal of information on the vertical behavior of bigeye tuna has been inferred from commercial or research derived longline data. However, this indirect source of information has been largely superceded by fisheries independent depth data either transmitted or recorded in situ and at fine time scales using sonic and archival (data logging) tags. Holland et al. (1990) tracked FAD associated bigeye tuna (72.0, 74.5 cm) fitted with pressure-sensitive (= depth recording) ultrasonic transmitters in Hawaiian waters. The fish exhibited a deep daytime (220 – 240 m) vs. shallow night-time (70 – 90 m) behavior. This pattern broke down when FAD-associated, when average on-FAD daytime depths of 50 – 60 m. were noted. Daytime behavior was characterized by large, regular, but brief vertical excursions between the thermocline and the bottom of surface mixed layer, oscillating between the 14^{o} and $17^{o}C$ isotherms.

Holland and Sibert (1994) examined thermoregulation in Hawaiian bigeye tuna with data produced by depth and temperature transmitters and simultaneous use of expendable bathythermographs for vertical temperature profiling. Juvenile and sub-adult bigeye (65 – 80 cm) exhibited regular vertical daytime movements as described in Holland et al. (1990). These excursions consistently began when internal body temperatures declined to 17.5 to $18^{o}C$, suggesting this may represent a lower body temperature limit for this medium size bigeye tuna.

Dagorn et al. (2000) tracked large bigeye in open ocean environments in French Polynesia, noting the same shallow night-time vs. deep daytime behavior. The largest adult bigeye tuna (estimated 50 kg body weight) rose from daytime base depths of 400 – 460 m to mixed layer depths of 74 – 119 m moving through a temperature gradient of 11.5 – $25.6^{o}C$. This fish made only four upward excursions, one every 2.5 hours compared to eleven upward excursions per day recorded by Holland et al. (1990) for a much smaller bigeye tuna in Hawaii (74.5 cm). The authors attribute the difference to differences in body size, thermal inertia and the more frequent need for smaller bigeye to rise to the surface to warm core temperatures. A comparison of day and night swimming depth and simultaneous recording of the prey-rich sound scattering layer (SSL) indicated that bigeye tuna appear to maximize their time within the SSL; deep in the daytime and shallow at night. Vertical movements through the SSL were noted, possibly indicative of hunting/feeding behavior (Josse et al. 1998).

Schaefer and Fuller (2002) report on the largest documented archival dataset for bigeye: 27 sub-adult or potentially adult size fish (88 – 124 cm) tagged and released in drifting FAD aggregations in the equatorial Eastern Pacific Ocean. Vertical behavior was characterized into unassociated, drifting object associated, intermediate, or deep diving.

Classic unassociated behavior was characterized as remaining at mostly < 50 m during the night and spending most of the day at 200 – 300 m within ambient sea temperatures of 13 – 14^{o}C. Fish associated with a drifting FAD generally remained within the shallow mixed layer throughout the day and night above 50 m, although the daytime depth was slightly deeper. An intermediate behavior was noted in the data characterized by remaining shallow at night and day coupled with some deeper diving periods in the afternoon. The authors speculated that this behavior may have been representative of a fish associated with a drifting FAD that broke that association to feed at depth, or a fish feeding on forage aggregated unusually shallow during the daytime as sometimes occurs with some mesopelagic fishes. Sporadic, deep diving behavior was noted when bigeye tuna quickly dove to below 1000 m and ambient temperatures of < 3^{o}C. The archival tags employed were only capable of reading to 1000 m, but it was inferred from ambient sea temperatures that some fish may have reached depths of 1500 m. It is not known why bigeye would dive so deep, but predator avoidance (i.e. marine mammals) or feeding was proposed.

Pooled data characterized the behavior of tagged bigeye as 54.3 percent unassociated, 27.7 percent intermediate-type behavior and only 18.7 percent of the time associated with a floating object, e.g. FAD as natural logs are very rare in this region of the EPO. Daytime diving depths were noted to be significantly shallower than those recorded in the central/western Pacific. The authors suggested that the main determinant of bigeye depth preferences at night and day had to do with their prey and feeding within the vertically migrating sound scattering layer. FAD associations were noted to be of short duration (mean residence time 3.1 days) but were though to contribute significantly to fishing mortality and vulnerability as evidenced by the high recapture rate of this tag release cohort (30 percent overall).

Musyl et al. (2003) report on the vertical movements of bigeye tuna equipped with similar archival tags that had been released and recaptured from different types of aggregations in Hawaiian waters. Bigeye frequenting open-water areas exhibited the classic deep-daytime vs. shallow-night time behavior observed by Schaefer and Fuller (2002). Bigeye periodically rose from daytime depths of ~300 – 500 m to spend short periods in the upper mixed layer, presumably to warm up after foraging at depth. All fish rose to very shallow depths at dusk only to sink down again at dawn. A strong positive correlation was found between body size and daytime depth as Dagorn et al. (2000) had suggested. Bigeye tuna tagged and later recaptured in association with an offshore anchored FAD spent the majority of their time in the upper mixed layer around 50 - 100 m. It is not known if the fish remained in association with the FAD during their entire time at liberty, but they exhibited this shallow "abnormal" behavior after release and when recaptured on the FAD. Bigeye tagged and recaptured on an offshore seamount feature exhibited vertical behavior similar to but not as regular as the vertical behavior of unassociated bigeye. In agreement with previous studies, bigeye in open water areas and on the seamount appeared to maximize their time within the SSL, presumably to maximize foraging success. In contrast to the observations of Holland et al. (1990) from brief sonic tracking data, internal temperatures of juvenile and sub-adult bigeye (52 – 86 cm) were recorded to fall to a minimum of ~ 12 – 13^{o}C. The deepest recorded depth was

817 m and the coldest ambient temperature visited was 4.7°C, but fish spent very little time at these extremes.

By using a combination of archival tags and ultrasonic telemetry, Schaefer and Fuller (2005) report on the vertical behavior of bigeye tuna in mixes species aggregations on an anchored FAD. A larger bigeye (108 cm) occupied significantly deeper waters, day and night, compared to a smaller fish (59 cm). For the large fish, mean depths were significantly deeper during the day vs. night. However, this pattern was curiously reversed for the smaller bigeye. Generally, the presence of FADs or drifting objects appears to significantly influence the vertical behavior of bigeye tuna.

Archival tag data is essential to characterize the habitat and behavior of tuna and billfish to refine habitat based models and to estimate the impact of fisheries. Currently, the SPC is attempting to obtain data on the vertical behavior of principal tuna species across a wide expanse of the WCPO that covers a wide range of oceanic environments.

3.2.5 Stock Structure

The geographic distribution of bigeye tuna is pan-Pacific with no physical or oceanographic barriers to movement within temperature extremes. Analyses of genetic variation in mitochondrial DNA and nuclear microsatellite loci have been conducted on bigeye otoliths from nine geographically scattered regions of the Pacific (Grewe and Hampton 1998). The study noted some evidence for restricted gene-flow between the most geographically distinct samples (Ecuador and the Philippines). However, the data otherwise failed to reject the null hypothesis of a single Pacific-wide population of bigeye tuna. In other words, the study supported the possibility of some degree of population mixing throughout the basin; results that may be termed inconclusive. It should be noted that in a separate study, Grewe et al, (2000) found no evidence to suggest that bigeye from the Indian Ocean were genetically different from the Pacific Ocean samples examined in the earlier study. This suggests that the methodology currently used may be an inappropriate tool for determining the issue of stock structure.

Miyabe and Bayliff (1998) suggest that there is insufficient information currently available to definitively determine the stock structure of bigeye in the Pacific, and therefore, a single stock hypothesis is usually adopted for Pacific bigeye tuna. However, consistent areas of low catch separate principal fishing grounds in the eastern and central/western regions (around 165 – 170°W) and there appears to be little mixing of tagged populations: although the tagging data is quite limited. Due to these considerations and the existence of two major, geographically separated fishing grounds and fisheries coupled with the possibility of ocean basin movements of Pacific bigeye tuna, stock assessments have been carried out on both a Pacific-wide basis and a two-stock hypothesis: separating the WCPO from the EPO. The two-stock hypothesis conforms to the definition of yellowfin stocks proposed by Suzuki et al. (1978) as "*...an exploitable subset of the population existing in a particular area and having some uniqueness relative to exploitation.*"

The results of the genetic analyses are broadly consistent with SPC tagging experiments on bigeye tuna; most stay close but some go far. Bigeye tagged in locations throughout the western tropical Pacific have displayed eastward movements of up to 4,000 nautical miles (nmi) over periods of one to several years. The widespread distribution of bigeye spawning throughout the tropical Pacific and the greater longevity of bigeye relative to other tropical tunas, such as yellowfin (Hampton et al. 1998), are also consistent with a high potential for basin-scale gene flow. However, large-scale movements of bigeye > 1,000 nmi have accounted for only a small percentage of returns, with most recaptures occurring within 200 nmi of release. In addition, a significant degree of site fidelity of bigeye tuna in some locations has been suggested, such as near large land masses, island-rich archipelagos and possibly areas of high FAD densities.

Sibert and Hampton (2003) estimated median lifetime displacements of skipjack and yellowfin tuna in the order of some hundreds of nautical miles, rejecting the notion that these tropical tuna species are widely ranging by nature and "highly migratory." These findings are consistent with the concept of "semi-discrete stocks" of yellowfin in the Pacific as proposed by Suzuki et al. (1978). Bigeye tuna, representing a unique blend of traits between a tropical and temperate tuna species with a protracted life span, may be expected to remain in a general area for extended periods of time and to also range further and have a higher potential for broader displacements throughout their extended life span. Stock assessments are currently carried out for 1) the entire Pacific bigeye stock; 2) the western and central Pacific regional stock and 3) the eastern Pacific regional stock. For purposes of this amendment, only the EPO regional stock assessment will be discussed in this document (Section 3.3.2).

3.3 Fisheries

Sources of bigeye tuna fishing mortality as they pertain to West Coast fisheries include the California recreational fishery; the U.S. purse seine fishery in the EPO; and the U.S. longline fishery on the high seas (Table 2). The total Pacific wide fishing mortality of bigeye is roughly 200,000 mt annually, which is about five percent of total Pacific-wide landings. West Coast landings amount to less than 1 percent of the Pacific wide catch.

Table 2. U.S. Sources of bigeye tuna fishing mortality in the Pacific Ocean.

Fishery	Authorities	2003 Reported Landings (mt)
California Recreational Fishery	MSA (West Coast HMS FMP)	200 *fish*
California Longline Fishery (High Seas Fishing only)	MSA (West Coast HMS FMP) Tuna Conventions Act (IATTC)	30
Hawaii Recreational Pelagic fisheries	MSA (WP Pelagics FMP) State of Hawaii	unknown
Hawaii Longline Fishery (including High Seas Fishing)	MSA (WP Pelagics FMP) South Pacific Tuna Act Tuna Conventions Act (IATTC)	3,620
Hawaii Commercial Handline and Troll Fishery	MSA (WP Pelagics FMP) State of Hawaii	180
American Samoa Longline Fishery (including High Seas Fishing)	MSA (WP Pelagics FMP) South Pacific Tuna Act	240
U.S. Purse Seine Fishery (EPO)	Tuna Conventions Act (IATTC)	2,600
U.S. Purse Seine Fishery (WCPO)	South Pacific Tuna Act	3,580
Total		**~10,250**

3.3.1 EPO Tuna Fisheries and Bigeye Landings

The following discussion relates to tuna fisheries operating in the Pacific Ocean, with particular focus on the EPO. A more detailed discussion HMS fisheries in the Pacific Ocean can be found in Chapter 2 of the West Coast HMS FMP. For a complete list of citations referenced in this section please see the West Coast HMS FMP.

U.S. fishers harvest eastern Pacific yellowfin, skipjack and bigeye tunas with three main types of fishing gear, purse seines, pole-and-line (baitboat), and longlines. Some quantities are also caught with troll and rod-and-reel gears. Over the 1981-99 period, the most important HMS in terms of landings by all gear types were yellowfin, skipjack, and albacore tunas, swordfish, and common thresher shark. In recent years, the most important HMS have been albacore tuna, swordfish, and common thresher shark. By the end of the 1990s landings of yellowfin and skipjack tuna were substantially less than the amounts landed in the early 1980s. Bluefin tuna landings during the period were characterized by a high degree of variability. Through the 1980s and into the early 1990s albacore landings fell sharply, but by the late 1990s they had returned to relatively high levels of the late 1970s. Swordfish landings declined during the 1980s, but were on the rise through most of the 1990s. Common thresher shark landings followed a pattern similar to that for swordfish over the period. Landings of shortfin mako shark exhibited a fairly sharp decline over the 1981-99 period. Landings of pelagic thresher, bigeye thresher and blue sharks as well as dorado were relatively minor during the 1981-99 period.

Over the 1981-1999 period, the most important HMS in terms of exvessel revenue (constant $1999), were albacore and swordfish, except for yellowfin and skipjack tunas in the early 1980s. Although variable, bluefin tuna exvessel revenues were comparatively high during the period. Swordfish and common thresher shark exvessel revenues peaked in the mid-1980s, and then declined rather steadily through 1999. Over the more recent

1994-1999 period, albacore exvessel revenues have ranged from $12.4 million to $28.6 million, yellowfin tuna exvessel revenues from $1.5 million to $5.9 million, skipjack tuna exvessel revenues from $1.9 million to $5.6 million, bigeye tuna exvessel revenues from $0.3 million to $0.6 million, bluefin tuna exvessel revenues from about $1 million to $4.2 million, swordfish exvessel revenues from $6 million to $10.5 million, and from $0.5 million to $0.6 million for common thresher shark. Exvessel revenues from other HMS sharks and dorado during 1994-1999 were much smaller.

Purse seine fishery: Tropical tuna caught in the U.S. purse seine fishery are canned as light meat tuna. Catches have been delivered or transshipped to canneries in California, Puerto Rico, American Samoa, and other canneries in the Pacific Rim or to Europe. In 1980, there were 20 U.S. tuna processing plants in operation, declining to seven in 1990. By mid-1982, Bumble Bee had closed its plants in Hawaii and San Diego. In 1984, Van Camp closed its San Diego plant and Star-Kist closed its Terminal Island (San Pedro) plant. These plants were shut down because of their high costs of operation relative to foreign competition. Conditions that led to the closure of mainland tuna processing plants and a major restructuring of the U.S. tuna industry during the 1980s and 90s are documented in four reports by the U.S. International Trade Commission (USITC 1984, 1986, 1990, 1992). Today only four U.S. plants are in operation, two in America Samoa (conventional canneries), and one in California and one in Puerto Rico, the latter two processing imported loins only.

Until recently, most of the U.S. purse seiners operating in the EPO have been Inter-American Tropical Tuna Commission (IATTC) class 6 vessels (more than 360 mt carrying capacity); lately however, smaller purse seine vessels have outnumbered the larger vessels. The U.S. fleet of purse seiners in the EPO reached approximately 144 vessels in 1979 but by 1999, had decreased to 10 vessels. U.S. purse seine vessels employ a standard purse seine. Generally, three types of sets have been historically used: sets associated with schools of dolphin, unassociated free-swimming school sets and log or other floating object associated sets. Dolphin sets are now rare as most U.S. purse seiners currently operate in the central-western Pacific where this mode of fishing does not occur. In the WCPO most (90 percent in 1999) of the purse seine sets are on artificial floating objects known as fish aggregating devices or FADS, the remainder on free-swimming schools. The remaining U.S. tropical tuna purse seine vessels in the EPO now also set on FADs. With most the U.S. tropical tuna purse seine fishing now taking place in the WCPO catches are delivered or transshipped directly to canneries in American Samoa. Landings and corresponding exvessel revenues at West Coast ports have greatly decreased since the 1980s, when the major West Coast canneries began relocating overseas. Most of the tropical tuna landings on the West Coast are now made by “wetfish” (sardine, mackerel, anchovy) purse seiners that catch relatively small quantities of tropical tunas when they are seasonally available.

In 1999, 10 U.S. purse seiners participated in the EPO tuna fishery, five in IATTC size classes 2-5, and five in class 6. No tuna seiners have been constructed for U.S. documentation since 1990, and sales of existing U.S. seiners to foreign citizens are expected to continue in 2001. Since 1992, U.S. tuna vessels have been adversely affected by restricted access to historic fishing grounds located within the EEZs of EPO nations to the south of California. This kindled interest by many of the displaced vessels in purse seining for coastal pelagic species within the U.S. West Coast EEZ, particularly with the resurgence of the Pacific sardine. However, some were then thwarted by the limited entry program for coastal pelagic finfish instituted under the Pacific Fishery Management Council's, Coastal Pelagic Species Fishery Management Plan.

Longline Fishery: The longline fishery targets mainly swordfish and bigeye tunas. The U.S. longline fishery catches eastern Pacific yellowfin tuna mainly as an incidental catch species. Yellowfin tuna are caught in the northern extremes of the eastern Pacific yellowfin tuna range, between Hawaii and the West Coast, while targeting bigeye tuna. Catches have ranged between 350 mt in 1992 and 1,100 mt in 1997. Most of the catch is landed in Hawaii with lesser amounts in California. The catches are utilized in fresh fish markets and restaurants. Vessels range in length from 20 to 35 m. The U.S. fleet total (East and West Pacific) has ranged between 141 vessels in 1991 and 105 in 1997. The U.S. fleet uses a typical longline gear with a mainline up to 30 nm in length and a series of floats and branch lines. A set may fish 1,200 or more hooks. The gear is deployed at various depths depending on the target species sought and light sticks are used to enhance catches.

The U.S. longline fishery also catches eastern Pacific skipjack tuna as an incidental species catch. Skipjack tuna are caught in the northern extremes of the eastern Pacific skipjack tuna range, between Hawaii and the U.S. West Coast, while the vessels are targeting bigeye tuna. Catches have ranged between 1 mt in and 106 mt. Most of the catch is landed in Hawaii with lesser amounts in California. The catches are utilized in fresh fish markets and restaurants.

Eastern Pacific yellowfin, skipjack and bigeye tunas are also caught as incidental catch in U.S. troll fisheries and as target species in recreational fisheries.

General profile of domestic HMS fisheries: There are no directed fisheries for tropical tunas off of Oregon or Washington; however California still maintains a substantial commercial fishery for tropical tunas. Several large purse seine vessels continue to use California as a home base, while a larger number of small "wetfish" seiners fish for tropical tunas on a more seasonal basis. These vessels may not be dependent on tuna as their principal target species, which are instead coastal pelagics; however, when tunas are available, these vessels will target on tuna for local markets. Total landings have been between 8,000 mt and 12,000 mt in recent years, valued at more than $12 million per year.

Under California law, longline fishing in the EEZ off California is prohibited. However, California registered vessels are allowed to land longline caught fish in California ports as long as fishing takes place outside of the EEZ. In 1991, there were three longline vessels that fished beyond the EEZ targeting swordfish and bigeye tuna and unloaded their catch and re-provisioned in California ports. In 1993, a Gulf coast fish processor set up an infrastructure at Ventura Harbor, California to provide longline vessels with ice, gear, bait, and fuel, and fish offloading and transportation services (Vojkovich and Barsky 1998). Consequently, longline vessels seeking an alternative to the Gulf of Mexico longline fishery, and precluded from entering the Hawaii fishery, began arriving in Southern California. By 1994, 31 vessels comprised this California based fishery, fishing beyond the EEZ, and landing swordfish and tunas into California ports. These vessels fished side-by-side with Hawaiian vessels in the area around 1350 W longitude in the months from September through January.

General profile of international HMS fisheries: Numerous foreign fisheries target and catch species covered by the West Coast HMS FMP. These fisheries operate throughout the range of the various stocks. With the exception of the Canadian troll fishery for albacore, no foreign fisheries operate in the U.S. EEZ under the jurisdiction of the Council. However, each of the foreign fisheries exploiting a common stock with U.S. fisheries may have a direct impact on the abundance of the species in question and may, under international management, affect domestic management measures. Because of the implications, an understanding of the major foreign fisheries is thoroughly discussed in Chapter 2 of the HMS FMP.

Currently, Japan, Korea and Taiwan, and to a lesser extent China, operate large, specialized, industrial longline fisheries for catching tropical tunas, temperate tunas and billfish, including swordfish throughout the Pacific Ocean. In the Pacific Ocean alone industrial longline fisheries operate more than 3,800 vessels fishing for HMS. By comparison the U.S. industrial longline fleet operating in the Pacific is estimated not to exceed 120 vessels with the vast majority operating out of Hawaii.

Both Spain and Chile operate small industrial longline fleets in the EPO. Spain is reported to have approximately 40 vessels operating throughout the mid-1990s with as few as 10 vessels at the end of the decade. Chile had about 120 vessels operating in the early 1990s in the EPO although the numbers declined to 40 or less by 1996.

Industrial longline vessels in the Pacific range in size from 30 to 1,000+ gross t with the smaller vessels being generally home-based. Larger vessels (50 - 1000+ gross t) may be foreign-based or deck-loaded motherships. Most of the larger vessels are modern, have super-cold (-40 to -60^{o}C) freezing capability and can remain at sea up to 3-4 months between fueling stops. These vessels may remain away from home port in excess of a year and return to land their frozen catch. Smaller vessels generally fish closer to home ports.

Longline operations in the higher latitudes (30 to 50^{o} north and south) produce target catches of albacore and swordfish. Fishing in the subtropics produces a mix of yellowfin, bigeye and albacore tunas, marlins and swordfish. Fishing in tropical waters produces catches of bigeye and yellowfin tunas, marlins and limited amounts of swordfish and albacore. High catches of selected species such as bluefin tuna, marlins and swordfish occur in limited time/area strata on the order of 1 or 2 - 5x5 degree squares over a 2 or 3 month period. Industrial longline fisheries operate in the EPO) (east of 150° W longitude to the U.S. EEZ) and in the remainder the WCPO.

The international purse seine fishery targets yellowfin and skipjack tunas, although substantial quantities of bigeye tuna also are taken. Much smaller quantities of bonito, albacore and black skipjack also are taken. In the EPO in 1997, purse seine catches of yellowfin, skipjack and bigeye tunas exceeded 250,000 t, 150,000 t and 50,000 t, respectively. In the WCPO in 1997, purse seine catches of yellowfin, skipjack and bigeye tunas exceeded 230,000 t, 600,000 t and 28,000 t, respectively.

Bigeye Landings

As Table 3 illustrates, Japan has the highest bigeye landings, followed by Taiwan, South Korea and China. 2003 landings were the highest to date, information on landings following imposition of the 2004-2006 IATTC quota are unavailable at this time. Under this quota, countries were to reduce their landings to those reported in 2001. Approximately 5 percent of Hawaii-based longline bigeye landings are estimated to come from the EPO, as well as 100 percent of longline bigeye landings from domestic vessels ported on the west coast (i.e. in California).

Table 3. EPO longline catches of bigeye tuna (mt) (IATTC, 2005).

Year	**Japan**	**South Korea**	**Taiwan**	**China**	**Other fleets**	**USA**	**Total**
1999	22,224	9,431	910	660	961	228	34,414
2000	27,929	13,280	5,214	1,320	3,719	162	51,624
2001	37,493	12,576	7,953	2,639	4,169	147	64,977
2002	33,794	10,358	16,692	7,351	3,597	132	71,924
2003	20,517	10,272	12,501	10,065	1,292	232	54,879
Total	141,957	55,917	43,270	22,035	13,738	901	277,818
Percent of total	51.1%	20.13%	15.57%	7.93%	4.94%	0.32%	100%

Three U.S. flag purse seiners > 1,001 gross ton were active in the EPO fleet during 2004. These vessels operate within the jurisdiction of the IATTC and are also monitored by NMFS. The vessels are monitored by mandatory logbooks, the IATTC observer and port sampling programs, national surveillance activities and cannery records. EPO purse seine fisheries account for approximately 40 percent of the EPO bigeye catch, and in 2003 reported catching 40,122 t of bigeye tuna.

3.3.2 EPO Regional Stock Assessment

From Maunder and Hoyle 2005.

The IATTC Working Group on Stock Assessment found that their analysis suggests that by the beginning of 2004, the spawning stock biomass of bigeye in the EPO dropped below levels required to produce the average maximum sustainable yield (AMSY), and was predicted to drop to historic lows by 2007 – 2008 due to recent weak recruitments and high fishing mortality. The average weight of fish in the catch of all fisheries combined has been below the critical weight (about 49.8 kg) since 1993, suggesting that the recent age-specific pattern of fishing mortality is not satisfactory from a yield-per-recruit perspective.

The EPO assessment assumes no stock recruitment relationship and estimates below average recruitment in recent years. The researchers agree that recruitment is highly variable and difficult to predict, strengthening the importance of gaining increased understanding of recruitment processes.

The impact of purse seine and longline fisheries on the stock is considered to be highly significant. The analysis suggests that the initial decline in stock biomass was caused by longline fishing but accelerated declines since 2000 are mainly attributable to floating object based purse seine fishing. Under the current model, Spawning Biomass Ratio (SBR) levels are predicted to remain at very low levels for many years unless fishing mortality is significantly reduced or recruitment increases for several years.

Available information has shown that FADs substantially increase catchability of bigeye in offshore waters where they were formerly unexploited and that the floating object purse seine fishery has caused significant increases in fishing mortality of juvenile bigeye. A significant and more concerning matter is that that the EPO floating object FAD fishery takes a far higher proportion of sub-adult size bigeye compared to the WCPO fishery that harvests mainly smaller juvenile size bigeye. It might be expected that impacts on sub-adults would have a greater impact on potential spawning stock biomass and stock condition.

The authors conclude that the purse-seine fishery on floating objects has the greatest impact on the EPO bigeye tuna stock. Restrictions applied only to a single fishery (e.g. longline or purse-seine), particularly restrictions on longline fisheries, are predicted to be insufficient to allow the stock to rebuild to levels that will support the AMSY. Large (50%) reductions in effort (on bigeye tuna) from the purse-seine fishery will allow the stock to rebuild towards the AMSY level, but restrictions on both longline and purse-seine fisheries are necessary to rebuild the stock to the AMSY level in ten years. Simulations suggest that the restrictions imposed by the 2003 Resolution on the Conservation of Tuna in the EPO will not be sufficient to rebuild the stock.

There have been important changes in the amount of fishing mortality caused by the fisheries that catch bigeye tuna in the EPO. On average, the fishing mortality for bigeye with an age of less than about 20 quarters old has increased substantially since 1993, and that on fish with an age of more than about 24 quarters old has increased slightly. The increase in average fishing mortality on the younger fish was caused by the expansion of the fisheries that catch bigeye in association with floating objects. The base case assessment suggests that:

- The use of FADs has substantially increased the catchability of bigeye by fisheries that catch tunas associated with floating objects, and

- Bigeye are substantially more catchable when they are associated with floating objects in offshore areas.

Recruitment of bigeye tuna to the fisheries in the EPO is variable, and the mechanisms that explain variation in recruitment have not been identified. Nevertheless, the abundance of bigeye tuna being recruited to the fisheries in the EPO appears to be related to zonal-velocity anomalies at 240 meters during the time that these fish are assumed to have hatched. Over the range of spawning biomasses estimated by the base case assessment, the abundance of bigeye recruits appears to be unrelated to the spawning potential of adult females at the time of hatching.

There are two important features in the estimated time series of bigeye recruitment. First, greater-than average recruitments occurred in 1977, 1979, 1982-1983, 1992, 1994, 1995-1997, and during the second quarters of 2001 and 2002. The lower confidence bounds of these estimates were greater than the estimate of virgin recruitment only for 1994, 1997, and the recruitment in 2001 and 2002. Second, aside from these two recruitment pulses in 2001 and 2002, recruitment has been much less than average from the second quarter of 1998 to the end of 2003, and the upper confidence bounds of many of these recruitment estimates are below the virgin recruitment. Evidence for these low recruitments comes from the decreased CPUEs achieved by some of the floating-object fisheries, discard records collected by observers, length-frequency data, and poor environmental conditions for recruitment. The extended sequence of low recruitments is important because, in concert with high levels of fishing mortality, they are likely to produce a sequence of years in which the spawning biomass ratio (the ratio of spawning biomass to that for the unfished stock; SBR) will be considerably below the level that would support the average maximum sustainable yield (AMSY).

The biomass of 1+-year-old bigeye increased during 1980-1984, and reached its peak level of about 586,000 t in 1986. After reaching this peak, the biomass of 1+-year-olds decreased to an historic low of about 156,000 t at the start of 2004. Spawning biomass has generally followed a trend similar to that for the biomass of 1+-year-olds, but lagged by 1-2 years. There is uncertainty in the estimated biomasses of both 1+-year-old bigeye and spawners. Nevertheless, it is apparent that fishing has reduced the total biomass of bigeye present in the EPO. Both are predicted to be at their lowest levels by the end of 2004. There has been an accelerated decline in biomass since the small peak in 2000. Analysis of the impacts attributed to each fishery indicates that the initial decline can be attributed to longline fishing but the most recent declines are mainly attributed to purse-seine fishing. The estimates of recruitment and biomass were not sensitive to the range of alternative parameterizations of the assessment model considered or to the alternative data source included in the assessment. However, in the current assessment, a narrower range of alternative analyses were considered.

At the beginning of January 2004, the spawning biomass of bigeye tuna in the EPO was declining from a recent high level. At that time the SBR was about 0.14, about 32% less than the level that would be expected to produce the AMSY, with lower and upper confidence limits (± 2 standard deviations) of about 0.07 and 0.21. The estimate of the upper confidence bound is only slightly greater than the estimate of (Spawning Biomass Ratio-Average Maximum Sustainable Yield) SBRAMSY (0.20), suggesting that, at the start of January 2004, the spawning biomass of bigeye in the EPO was less than the level that is required to produce the AMSY. The dramatic change from being above the SBRAMSY level to below it has been predicted by the past three assessments. Estimates of the average SBR projected to occur during 2004-2014 indicate that the SBR is likely to reach an historic low level in 2007-2008, and remain below the level required to produce the AMSY for many years unless fishing mortality is greatly reduced or recruitment is greater than average levels for a number of years. This decline is likely to occur because of the recent weak cohorts and the high estimated levels of fishing mortality.

The average weight of fish in the catch of all fisheries combined has been below the critical weight of about 49.8 kg since 1993, suggesting that the recent age-specific pattern of fishing mortality is not satisfactory from a yield-per-recruit perspective. The average weight of purse-seine-caught fish is currently about 10 kg, while the average weight of longline fish is about 60 kg. Recent catches are estimated to have been about 26% above the AMSY level. If fishing mortality is proportional to fishing effort, and the current patterns of age-specific selectivity are maintained, the level of fishing effort that is estimated to produce AMSY is about 62% of the current level of effort. Decreasing the effort to 62% of its present level would increase the long-term average yield by 8% and would increase the spawning potential of the stock by about 156%.

The AMSY of bigeye in the EPO could be maximized if the age-specific selectivity pattern were similar to that for the longline fishery that operates south of 15°N because it catches individuals close to the critical size. All analyses considered suggest that at the start of 2004 the spawning biomass was below the level that would be present if the stock were producing the AMSY. AMSY and the fishing mortality (F) multiplier are sensitive to how the assessment model is parameterized, the data that are included in the assessment, and the periods assumed to represent average fishing mortality, but under all scenarios considered, fishing mortality is well above the level that will produce the AMSY. Presently the purse-seine fishery on floating objects has the greatest impact on the bigeye tuna stock. Restrictions that apply only to a single fishery (e.g. longline or purse-seine), particularly restrictions on longline fisheries, are predicted to be insufficient to allow the stock to rebuild to levels that will support the AMSY. Large (50%) reductions in effort (on bigeye tuna) from the purse-seine fishery will allow the stock to rebuild towards the AMSY level, but restrictions on both longline and purse-seine fisheries are necessary to rebuild the stock to the AMSY level in ten years. Simulations suggest that the restrictions imposed by the 2003 Resolution on the Conservation of Tuna in the EPO will not be sufficient to rebuild the stock. Projections indicate that, if fishing mortality rates continue at their recent (2002 and 2003) levels, longline catches and SBR will decrease to extremely low levels. As the base case does not include a stock recruitment relationship, recruitment will not decline, so purse-seine catches are predicted to decline only slightly from recent levels under this model.

Table 4 illustrates bigeye stock status; however note that at this time the stock structure of bigeye tuna in the Pacific Ocean is unresolved. NMFS is requesting that the HMS

Management Team and the HMS Advisory Sub-Panel look at establishing biological reference points for bigeye tuna, which are necessary before NMFS can support an overfished determination. If NMFS determines that bigeye tuna is overfished in the Eastern Pacific, the agency would provide formal notification of that determination to the Council; that determination would trigger the requirement in the MSA to prepare a rebuilding plan.

Table 4. Recent stock status with respect to management criteria (Pacific Fishery Management Council 2005).

Stock	$F_{Recent/}$ F_{MSY}[1]	Overfishing? (F/F_{MSY}>1.0)	$B_{Recent/}$ B_{MSY}	B_{MSST}/ B_{MSY}1	Overfished? (B_{Recent}/ B_{MSST})	B_{Flag} (1.25B_{MMST} /B_{MSY})	Assessment
Bigeye (EPO)	1.61[2]	Yes	0.57	0.6	Yes		IATTC, Harley and Maunder 2004
Bigeye (WCPO)	0.89-1.02[3]	Possibly[3]	1.75-2.28[3]		No		SCTB, Hampton et al., 2004

4.0 CONSEQUENCES OF MANAGEMENT OPTIONS CONSIDERED

4.1 Management Option 1: No Action

IATTC staff scientists determined that under the current exploitation patterns, and assuming recruitment at recent average levels, yields of bigeye tuna are expected to decline in the near future to levels below the average maximum sustainable yield, potentially leading to an overfished condition.

By implementing the no action management option (i.e. failure to implement measures that end overfishing) it is likely that a continued decline in Pacific bigeye stocks would result. If the Council chooses management option 1 as their strategy (no action), the stock could become overfished. Additionally, no action would be contrary to requirements in international agreements and to requirements of the MSA.

4.2 Management Option 2

Impacts on target and non-target stocks: As discussed previously (Table 3), west coast fisheries for bigeye tuna are small compared to other fishing nations and often are not a main target species. If management option 2 were adopted as part of the U.S. foundation

[1] Measures of F_{MSY} and B_{MSY} are not available. Various proxies for these values have been used in the preparation of this table. However, the Council has not adopted the use of a particular proxy and hence the designation of Overfished should be considered preliminary.
[2] EPO Bigeye and yellowfin results based on a base case assessments assuming no stock recruitment relationships.
[3] WCPO Bigeye results are based on 4 models where longline catchability was assumed constant over time. The probability that F_{Recent} /F_{MSY}>1 was greater than or equal to 0.67.

plan, domestic fishing mortality on bigeye could be reduced through regulatory controls, such as time/area closures. Additional controls on domestic fisheries for bigeye tuna would reduce future impacts to bigeye in the EPO; however, this action may overly burden U.S. fishermen that have a relatively minor role in bigeye tuna fishing mortality.

Because bigeye landings by West Coast fisheries are so small relative to Pacific-wide fishing nations, none of the regulatory controls considered here would be anticipated to have measurable impacts on bigeye stocks. Similarly, because landings of all non-target species are small relative to Pacific-wide landings, and options are not expected to adversely affect the catches of any of these fisheries, they are not anticipated to result in measurable impacts on non-target stocks.

Impacts on marine habitat: Purse seine and longline fisheries operations do not involve contact with the seabed, and because measures under management option 2 are not expected to alter these fishing operations, no adverse impacts on marine habitat are anticipated.

Impacts on biodiversity and ecosystem functions: The overall West Coast catch of bigeye tuna is less than 1 percent of the total Pacific-wide catch, thus adverse impacts to the tropical and subtropical pelagic ecosystems and biodiversity are not expected to occur.

Impacts to public health and safety: None of the measures contained in management option 2 are expected to require participants to fish in ways noticeably outside of historical patterns, and thus no impacts on public health and safety are anticipated.

Impacts on fishery participants and fishing communities: Anticipated impacts to affected participants would vary widely according to the severity of any new fishery management reduction in quota or fishing opportunities. However, because west coast bigeye tuna fishery participants are not highly dependent on bigeye for a majority of their landings the effects of any fishing restrictions could potentially be offset over time with increased landings of other species.

If management option 2 were adopted it would provide for the sustained participation of fishing communities by helping to ensure the long-term availability of bigeye tuna, however there would likely be a short-term reduction in economic benefits from the fisheries until the stock recovers.

Impacts on data collection and monitoring: Under this management option no new data collection or monitoring requirements are required.

4.3 Management Option 3

Impacts on target and non-target stocks: See section 7.2. Additionally, any measure that imposes minimum size limits on bigeye could potentially have a positive impact on the population by reducing fishing mortality on juvenile species. Management option 3 would also consider minimum size regulations on juvenile bigeye, which would prevent fishing nations from retaining and/or landing fish below a determined minimum size. Minimum size regulations are intended to conserve juvenile fish in three ways. First, prohibition on landing and/or sale prevents development of a commercial market for small fish, thereby discouraging fishermen from targeting them. Secondly, some of the small fish that are discarded will survive and mature to reproduce and contribute to the stock biomass. Third, a minimum size results in fewer fish being retained per mt than would be otherwise. However, to the extent that fishermen cannot control the size composition of the fish they catch, minimum sizes can result in significant discards of undersized fish. The objective to minimize bycatch and bycatch mortality, and the requirement to end overfishing should be considered when evaluating this management option.

Overall, greater restrictions on purse seine FAD fishing combined with minimum size limits would likely have a measurable beneficial impact on bigeye tuna conservation.

Impacts on marine habitat: See section 7.2.

Impacts on biodiversity and ecosystem function: See section 7.2.

Impacts on public health and safety: See section 7.2

Impacts of fishery participants and fishing communities: See section 7.2. Additionally, if fleets that catch 1 percent or less of the total Pacific bigeye tuna in the EPO are exempted then the focus of management and conservation would be on the fisheries with the greatest impacts and on the regions of highest catches. An exemption recognizes the need to avoid overly burdening those fleets and countries which are peripheral in generating fishing mortality for bigeye tuna.

Impacts on data collection and monitoring: See section 7.2.

4.4 Management Option 4

See sections 7.2 and 7.3 for impact determinations.

This control date would not bind the Council to establishing limited access or other management programs for these fisheries, but it would notify current and prospective fishery participants that additional management measures may be taken by the Council for these fisheries. The implementation of a control date would be in recognition of the fact that unlimited expansion of purse seining and longline fishing is untenable with the conservation of bigeye tuna.

4.5 Management Option 5

Closure of all fisheries under the Council's jurisdiction that catch bigeye tuna in the EPO would appear to address the contribution to overfishing from U.S. vessels in the eastern Pacific. However, this unilateral action would place an unfair burden on U.S. fishermen by threatening their livelihoods without any significant impact on reducing bigeye fishing mortality. This would not be consistent with the Council objective of addressing overfishing in a cost-effective and equitable manner and for that reason this alternative was not analyzed in detail.

5.0 MITIGATION AND UNAVOIDABLE ADVERSE IMPACTS (To be completed after Council decisions)

5.1 Mitigating Measures

5.2 Unavoidable Adverse Impacts

5.3 Irreversible and Irretrievable Commitment of Resources

6.0 LIST OF PREPARERS

Heidi Taylor

8.0 REFERENCES

National Marine Fisheries Service. 1999. Final Fishery Management Plan for Atlantic Tuna, Swordfish, and Sharks, Including the Revised Final Environmental Impact Statement, the Final Regulatory Impact Review, the Final Regulatory Flexibility Analysis, and the Final Social Impact Assessment. National Marine Fisheries Service, Office of Sustainable Fisheries, Highly Migratory Species Management Division. Silver Spring, MD.

National Marine Fisheries Service. 2005. Draft Strategy to end overfishing of bigeye tuna in the Pacific Ocean. National Marine Fisheries Service, Southwest Regional Office and Pacific Islands Regional Office. Long Beach, CA. and Honolulu, Hawaii.

Pacific Fishery Management Council. 2003. Fishery Management Plan and Environmental Impact Statement for U.S. West Coast Fisheries for Highly Migratory Species. Portland, Oregon.

Pacific Fishery Management Council. 2005. Status of the U.S. West Coast Fisheries for Highly Migratory Species through 2004, Stock Assessment and Fishery Evaluation (SAFE). Pacific Fishery Management Council. Portland, Oregon.

Western Pacific Fishery Management Council. 2005. Management Measures for Bigeye Tuna in the Pacific Ocean, Amendment 14 to the Pelagics Fishery Management Plan including an Environmental Assessment. Western Pacific Fishery Management Council. Honolulu, Hawaii.

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON BIGEYE TUNA OVERFISHING RESPONSE

The Highly Migratory Species Advisory Subpanel (HMSAS) reviewed the list of options presented in Agenda Item J.2.a, Attachment 1 and support Option 3, which includes the list of recommended management measures listed under Option 2 and additionally would exempt fleets that catch one percent or less of the total Pacific bigeye tuna landing in the Eastern Pacific Ocean (EPO) and establish an annual international quota divided amongst nations fishing in the EPO. It was noted that there would not be an objection to Option 4, which additionally includes revision of the current control date, but the rationale for such an action was not clear to the HMSAS. Furthermore, the HMSAS supports the recommendations made by the Highly Migratory Species Management Team to clarify some of the measures included in the options, such as whether the two-month purse seine closure is a consecutive period and whether the one percent exemption applies to all U.S. fleets or subnational fleets defined by location, gear type, etc.

PFMC
03/09/06

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON BIGEYE TUNA OVERFISHING RESPONSE

The Highly Migratory Species Management Team (HMSMT) reviewed the draft Analysis of Management Options for Development of a Plan to End Overfishing of Pacific Bigeye Tuna (Agenda Item J.2.a, Attachment 1) on the five options (with sub-options) to end bigeye tuna overfishing and discussed the process and options with National Marine Fisheries Service Southwest Region staff and NOAA General Counsel. Based on that review and discussion, the HMSMT does not believe that the Draft Options and Analysis, as presented, are ready for Council consideration. The HMSMT recommends that the following items be explored and addressed in a subsequent Draft Analysis and that the Council's selection of a preferred option occur in April.

Coverage Area and Process

It is the HMSMT's understanding that, although not explicit in the Draft Analysis, the options are proposed to apply to the Eastern Pacific Ocean with the intent of addressing the overfishing of bigeye tuna in this area. Therefore, the selection of a preferred management option by the Council would be in the form of a recommendation to NMFS to carry forward to the Inter-American Tropical Tuna Commission (IATTC). The implementation of the preferred option by the Council and NMFS is contingent upon IATTC adopting the option through a formal process.

If these bodies adopt the Council preferred option, then NMFS would implement regulations consistent with the Council's action. If those international bodies adopt resolutions that differ from the Council's preferred option, then the Council would consider revising its preferred option prior to NMFS implementing regulations consistent with the international resolutions.

Timeline

With regard to the timeline, the HMSMT notes that the process described in the Draft Analysis outlines potential steps that would occur between now and June, which would include the selection of a preferred option at this Council meeting (rather than April).

Application of Restrictions

The HMSMT requests clarification on which vessels would be covered under the different options. For example, option 2 is described as applying to "purse seine vessels;" however, the HMSMT notes that there are two purse seine fisheries described in the fishery management plan—a large vessel purse seine and a small vessel purse seine. Clarification on whether both of these fisheries would be subject to the restrictions would help the HMSMT better understand the effects of the different options. Another example is option 3, which exempts 'fleets' that have caught one percent or less of the bigeye tuna landings—the HMSMT suggests that the wording of this option be changed to explicitly describe which vessels and/or fisheries would be exempt from this action.

Also, the Draft Analysis should explicitly describe whether the Eastern Pacific Ocean regulations (adopted through the IATTC and Pacific Council) would apply to all vessels (including Hawaii-permitted vessels) fishing in the Eastern Pacific Ocean. The HMSMT's understanding is that this would be case, however, the Draft Analysis does not explain this, nor does it seem to include any Hawaii-permitted vessels in the analysis section.

Western Pacific Fishery Management Council Action
It was brought to the HMSMT's attention that the Western Pacific Fishery Management Council (WPFMC) has adopted Amendment 14, which includes a proposal to end bigeye tuna overfishing Pacific-wide; however, the details of the proposal have not been provided to the HMSMT nor the Council. The HMSMT recommends that the WPFMC's proposal be included as one of the options for the Pacific Council's consideration. This would facilitate an analysis of the effects of that proposal on Pacific Council-managed fisheries and a comparison of that proposal with the other options presented in the Draft Analysis.

It was brought to the HMSMT's attention that the WPFMC withdrew Amendment 14 to add a section addressing yellowfin tuna. It was suggested that, since the Amendment has been withdrawn, NMFS Southwest Region may wish to take this opportunity to work with the Pacific Island Region to ensure that conflicting regulations are not adopted for the Eastern Pacific Ocean.

NMFS Recommendation
Finally, it was unclear from the Draft Analysis whether (larger) NMFS had a preferred option; however, during our discussion, it became apparent that NMFS did not support option 1. As NMFS staff and NOAA General Counsel may be more familiar with the bigeye overfishing issue, the legal requirements under Magnuson-Stevens Fishery Conservation and Management Act relative to this issue, and the trade-offs associated with the different options, the HMSMT would appreciate an indication from NMFS regarding which option was favored (i.e., which option, when combined with the WPFMC option for the Western Pacific Ocean, would accomplish the objective, which is to end overfishing on bigeye on a Pacific-wide basis).

Again, the HMSMT recommends that the issues identified above be addressed in a subsequent Draft Analysis that the Council could consider at their April meeting, and that the selection of a preferred option occur in April.

HMSMT Recommendations:

1. Develop and select a process and timeline for the consideration and potential implementation of a preferred option and include this revised schedule in the Draft Analysis.

2. Explicitly describe the vessels and/or fisheries that would be affected by the different options and the economic effects of the options on those fisheries.

3. Include a description of the WPFMC's proposal as one of the options for the Council's consideration and a comparison of that proposal with the other options in the Draft Analysis.

4. Indicate a (larger) NMFS preferred option and the rationale for its support.

5. Schedule the Council's selection of a preferred option for April.

DRIFT GILLNET MANAGEMENT

Since 2001 an annual August 15–November 15 time/area closure has been applied to the drift gillnet (DGN) fishery currently managed under the Council's fishery management plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS). This seasonal closure extends from the waters off of Monterey, California to the mid-Oregon coast and westward beyond the Exclusive Economic Zone (EEZ) to 129° West longitude. National Marine Fisheries Service (NMFS) established the closure because of the incidental take of species listed under the Endangered Species Act (ESA) and in particular the endangered leatherback sea turtle (*Dermochelys coriacea*). Representatives from the DGN fishery argue that this seasonal closure has made the fishery less economically viable, leading to a steady decline in participation. Furthermore, there is new information on the incidental take rate (or catch per unit of effort) of leatherback sea turtles in the DGN fishery and new information on leatherback distribution. In response to these concerns and at the request of the Council, the Highly Migratory Species Management Team (HMSMT), with input from the Highly Migratory Species Advisory Subpanel (HMSAS), developed a range of alternatives to the current regulatory regime for the DGN fishery. The Council reviewed these alternatives at the November 2005 meeting and approved them for public review. A draft environmental assessment (EA) has been prepared by NMFS and Council staff and other members of the HMSMT, evaluating the impacts of these alternatives. This draft EA is intended to support Council decision-making in choosing a preferred alternative from those presented in the document.

The alternatives have two main features. First, an exempted fishing permit (EFP) fishery is proposed in order to allow carefully controlled testing of the efficacy of various management measures and the economic viability of a DGN fishery within the current time/area closure. Use of an EFP would also allow gathering additional information about the effects of changes to the fishery (a smaller closed area for example), and interactions with protected species, particularly the leatherback sea turtle, before considering new regulations to permanently change current DGN management measures. The EFP fishery would be limited by means of either a cap on the incidental take and/or mortalities of leatherback sea turtles, a limit on effort (number of sets), or a combination of these two limits. In order to ensure accurate accounting, the EFP would be subject to 100% observer coverage with a mechanism for real-time reporting of any takes. If the cap on takes is reached, the EFP would immediately cease. Likewise, if a set limit were established the EFP would cease if that limit were reached before the incidental take cap or the end of the time/area closure (November 15) were reached. Some of the alternatives also include restrictions on the area where the EFP could operate within the time/area closure in order to prevent fishing where leatherback sea turtles are thought to be more abundant. Notably, the amount of available observer time, which is currently uncertain, may impose a constraint on the level of effort expended under the EFP.

A second feature of the alternatives is a permanent modification to the configuration of the closed area through a regulatory amendment. Different boundary changes are proposed, which would reduce the size of the time/area closure and allow all DGN permit holders to access areas opened by the change. Unlike the proposed EFP fishery, any non-EFP DGN fishery allowed into these areas would only be subject to the current 20% observer coverage rate.

Alternatives 1–3 would implement the EFP fishery alone without any regulatory changes to the closed area boundary. Alternatives 4 and 5 would combine an EFP fishery with a modification to the southern boundary of the time/area closure. Alternative 6 proposes a regulatory change to the time/area closure without an EFP fishery. Alternative 7 would result in the elimination of the time/area closure.

Alternatives that include an EFP fishery (Alternatives 1–5) each include nine suboptions representing the different levels for the take/mortality cap, set limits, or a combination of these two measures.

It is important to note that the Council will review and make their recommendations on EFPs, including the EFP proposal that is component of this DGN fishery action, under Agenda Item J.4. Thus, the choice of a preferred alternative under the current agendum is a decision in principal with respect to a recommendation under Agenda Item J.4. However, the Council could make more detailed recommendations on the EFP under the latter agenda item.

Once the Council chooses a preferred alternative NMFS Southwest Region Sustainable Fisheries Division will initiate formal consultation with the Protected Resources Division and a biological opinion (BO) will be completed for the action. The preferred alternative must be implemented in a manner consistent with the findings of the BO. The process is designed to have an EFP and/or any regulatory changes implemented on or before August 15, 2006.

Council Action:

Adopt Final Preferred Alternative to Modify the Drift Gillnet Time/Area Closure.

Reference Materials:

1. Agenda Item J.3.a, Attachment 1: Management of the Drift Gillnet Fishery by Exempted Fishing Permit and/or Regulatory Amendment: Draft Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis.
2. Agenda Item J.3.d, Public Comment.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Highly Migratory Species Management Team Report — Dale Squires
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Adopt Final Preferred Alternative to Modify the Drift Gillnet Time/Area Closure

PFMC
02/15/06

Agenda Item J.3.a
Attachment 1
March 2006

MANAGEMENT OF THE DRIFT GILLNET FISHERY EXEMPTED FISHING PERMIT AND/OR REGULATORY AMENDMENT

DRAFT

ENVIRONMENTAL ASSESSMENT, REGULATORY IMPACT REVIEW & REGULATORY FLEXIBILITY ANALYSIS

PREPARED BY:
PACIFIC FISHERY MANAGEMENT COUNCIL
7700 NE AMBASSADOR PLACE, SUITE 200
PORTLAND, OREGON 97220-1384
(503) 820-2280
HTTP://WWW.PCOUNCIL.ORG

AND THE:
DEPARTMENT OF COMMERCE
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST REGION
AND
SOUTHWEST FISHERIES SCIENCE CENTER

MARCH 2006

This document is published by the Pacific Fishery Management Council pursuant to National Oceanic and Atmospheric Administration Award Number NA03NMF4410067.

Cover Sheet
Drift Gillnet Fishery Exempted Fishing Permit / Regulatory Amendment

Proposed Action:	Implement revised management measures for the California drift gillnet fishery. These management measures will be implemented by authorization of an exempted fishing permit (EFP) allowing participating vessels to fish in the annual August 15 to November 15 protected resource area closure in waters in and around Monterey Bay, California, northward to the mid-Oregon coast, subject to conditions established by NMFS; modifying regulations at 50 CFR 660.713(c)(1) establishing this closed area; or a combination of both types of action.
Type of Statement:	Environmental Assessment
For Further Information:	
Pacific Fishery Management Council:	Dr. Kit Dahl Staff Officer–Highly Migratory Species Telephone: (503) 820-2280 Kit.Dahl@noaa.gov
National Marine Fisheries Service, Southwest Region:	Elizabeth Petras (Elizabeth.Petras@noaa.gov) Council Liaison for Protected Resources Craig Heberer (Craig.Heberer@noaa.gov) Fishery Biologist NMFS F/SWR2 501 Ocean Blvd. Long Beach, CA 90802 Telephone: (562) 980-4000

Abstract: Since 2001 an annual August 15–November 15 time/area closure has been applied to the drift gillnet (DGN) fishery currently managed under the Council's fishery management plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS). This seasonal closure extends from the waters off of Monterey, California to the mid-Oregon coast and westward beyond the Exclusive Economic Zone (EEZ) to 129° West longitude. National Marine Fisheries Service (NMFS) established the closure because of the incidental take of species listed under the Endangered Species Act (ESA) and in particular the endangered leatherback sea turtle (*Dermochelys coriacea*). Representatives from the DGN fishery argue that this seasonal closure has made the fishery less economically viable, leading to a steady decline in participation. Furthermore, there is new information on the incidental take rate (or catch per unit of effort) of leatherback sea turtles in the DGN fishery and new information on leatherback distribution.

The alternatives evaluated in this EA have two main features. First, a fishery operating under an exempted fishing permit (EFP) would allow carefully controlled testing of the efficacy of various management measures and the economic viability of a DGN fishery within the current time/area closure.

The EFP fishery would be limited by means of either a cap on the incidental take and/or mortalities of leatherback sea turtles, a limit on effort (number of sets), or a combination of these two limits. In order to ensure accurate accounting, the EFP would be subject to 100 percent observer coverage with a mechanism for real-time reporting of any takes. If the cap on takes or set limit is reached, the EFP would immediately cease. Some of the alternatives also include restrictions on the area where the EFP could operate within the time/area closure in order to prevent fishing where leatherback sea turtles are thought to be more abundant.

A second feature of the alternatives is a permanent modification to the configuration of the closed area through a regulatory amendment. Different boundary changes are proposed, which would reduce the size of the time/area closure, or eliminate it entirely, and allow all DGN permit holders to access areas opened by the change. Unlike the proposed EFP fishery, any non-EFP DGN fishery allowed into these areas would only be subject to the current 20 percent observer coverage rate.

Table of Contents

Tables

Figures

1.0 INTRODUCTION

1.1 Organization of the Document

This document provides background information about, and analysis of, actions intended to modify management measures for the pelagic drift gillnet (DGN) fishery covered by the *Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species* (HMS FMP), which was developed by the Pacific Fishery Management Council (hereafter, the Council) in collaboration with the National Marine Fisheries Service (NMFS) and implemented in 2004 and allows for more comprehensive federal management of FMP fisheries, supported by decision-making through the Council process. The action must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nmi from shore. In addition to addressing MSA mandates, this document is an environmental assessment (EA), pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. The purpose of an EA is to disclose and evaluate the effects of the proposed action on the human environment, considered by means of a range of alternatives, and “Briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact” (40 CFR 1508.9). (Section 1.5 provides an initial screening of potentially significant effects to determine the scope of the analysis.) This document is organized so that it contains the analyses required under NEPA, the Regulatory Flexibility Act (RFA), and Executive Order (EO) 12866, which mandates an analysis similar to the RFA. The evaluation of adverse impacts to species listed under the Endangered Species Act (ESA) is intended to be consistent with any subsequent evaluation of the action required by section 7 of the ESA.

Environmental impact analyses have four essential components: a description of the purpose and need for the proposed action, a set of alternatives that represent different ways of accomplishing the proposed action, a description of the human environment affected by the proposed action, and an evaluation of the expected direct, indirect, and cumulative impacts of the alternatives. (The human environment is interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment, 40 CFR 1508.14.) These elements allow the decision maker to look at different approaches to accomplishing a stated goal and understand the likely consequences of each choice or alternative. EAs are commonly organized around four chapters covering each of these topics. Based on this structure, the document is organized in 7 chapters:

- The rest of this chapter, Chapter 1, describes the purpose and need for the proposed action and considerations that went into the development of this EA.

- Chapter 2 outlines different alternatives that have been considered to address the purpose and need. The Council will choose their preferred alternative from among these alternatives, which is recommended to NMFS for implementation through granting an exempted fishing permit (EFP) and/or modifying federal regulations governing the DGN fishery.

- Chapter 3 describes the components of the human environment potentially affected by the proposed action (the “affected environment”). The affected environment may be considered the baseline condition, which will be potentially changed by the proposed action.

- Chapter 4 evaluates the effects to the alternatives on components of the human environment in order to provide the information necessary to determine whether such effects are significant, or potentially significant.

- Chapter 5 details how this action meets 10 National Standards set forth in the MSA (§301(a)). (To be completed after the Council chooses their preferred alternative.)

- Chapter 6 provides information on those laws and Executive Orders, in addition to the MSA and NEPA, that an action must be consistent with, and how this action has satisfied those mandates.

- Chapters 7 lists those who contributed to this EA; Chapter 8 is the bibliography.

1.2 The Proposed Action

The proposed action is to implement revised management measures for the California drift gillnet fishery. These management measures will be implemented by authorization of an exempted fishing permit (EFP) allowing participating vessels to fish in the area currently closed to drift gillnet fishing, subject to conditions established by NMFS; modifying regulations at 50 CFR 660.713(c)(1) establishing a protected resource area closure annually from August 15 to November 15 in waters in and around Monterey Bay, California, northward to the mid-Oregon coast; or a combination of both types of action. The federally-managed drift gillnet fishery occurring principally off the coast of California and within the U.S. Exclusive Economic Zone (EEZ) off the coasts of Washington, Oregon, and California establishes the geographic context for the proposed action.

The overall purpose of the proposed action is to restore fishing opportunity in the California drift gillnet fishery without jeopardizing the continued existence of species listed under the ESA. The primary species of concern motivating the establishment of the closed area described at 50 CFR 660.713(c)(1) is the leatherback sea turtle (*Dermochelys coriacea*). Other species listed under the ESA and/or the Marine Mammal Protection Act (MMPA) are known to have been taken in the drift gillnet fishery and must be considered in any authorization of fishing.

According to regulations, a NMFS Regional Administrator may authorize, "for limited testing, public display, data collection, exploratory, health and safety, environmental cleanup, and/or hazard removal purposes, the target or incidental harvest of species managed under an FMP or fishery regulations that would otherwise be prohibited" (50 CFR 600.745(b)). An EFP would authorize the harvest of management unit species in an area where fishing for those species by means of drift gillnet gear is currently prohibited, for the purpose of limited testing of measures and procedures intended to limit the incidental take of species listed under the ESA to a level that would not jeopardize their continued existence and determining if the resulting fishery is economically viable. Once sufficient information is gathered by means of the EFP to determine whether and how the fishery may be prosecuted in the closed area described at 50 CFR 660.713(c)(1), regulatory action may be proposed to effect a permanent change applicable to fishery participants as a whole, based on the measures applied as part of the EFP.

A regulatory action would immediately implement a permanent change in the configuration and/or timing of the closed area referenced above (subject to conditions imposed pursuant to any consultations as specified in section 7 of the ESA or any future re-initiation of such consultations), allowing access to currently closed areas by all permitted drift gillnet vessels.

1.3 Why the Proposed Action is Needed

Although managed under California statutory provisions, since 1984 management of the drift gillnet (DGN) fishery has been driven by Federal requirements to protect marine mammals and endangered species. The HMS FMP incorporates the existing Federal regulatory framework for the DGN fishery, which predated the FMP by several years, into their management program. Although an outstanding management issue, reevaluation of a time/area closure to protect leatherback sea turtles, was not considered by the Council prior to implementation of the HMS FMP, it remains an unresolved issue of high priority for the Council.

In 1996, prior to development of the FMP and under authority of the MMPA, NMFS convened the Pacific Offshore Cetacean Take Reduction Team to develop a Take Reduction Plan (TRP), which described management recommendations to reduce incidental entanglements of marine mammals in the DGN fishery. One of the TRP recommendations enacted by Federal regulations requires DGN fishermen to use net buoy extenders with a minimum length of 36 ft (to maintain the top of the net at that distance below the surface) when the gear is set. DGN fishermen contend that the 36-ft extenders reduced leatherback entanglement rates, but there are insufficient data to support this. Implementation of the TRP was a Federal action, so, in accordance with the ESA, a Biological Opinion (BiOp) on the action was issued.

However, a BiOp issued in 2000, triggered by the issuance of an MMPA permit authorizing the incidental take of ESA-listed marine mammals, used a worst-case scenario leatherback entanglement rate to estimate future takes, which resulted in an estimated level of leatherback entanglement and mortality in the DGN fishery that NMFS determined would jeopardize the continued existence of leatherbacks. As a reasonable and prudent alternative to avoid this jeopardy, NMFS proposed and implemented the current time/area closure found at 50 CFR 660.713 (c)(1).

Another section 7 consultation was conducted and BiOp written for the implementation of the HMS FMP. But because the FMP did not propose a modification to the time/area closure the BiOp did not reevaluate the basis for the closure. In both of those consultations, NMFS found that the take of three leatherbacks in the DGN fishery (of which two were expected to be mortalities) would not jeopardize the continued existence of leatherbacks.

The DGN fishery has declined substantially since the time/area closure was implemented, from 81 DGN vessels making 1,766 sets in 2000, the year before the time/area closure was implemented, to 36 vessels making 1,084 sets in 2004.

In keeping with the goals and objectives of the Magnuson Stevens Act, the Council and NMFS work collaboratively to develop underutilized fisheries to benefit U.S. citizens through employment, food supply, and revenue. As a Federal agency, NMFS is also responsible for managing the nation's marine fisheries in a manner that avoids or minimizes adverse effects to species listed as threatened or endangered under the Endangered Species Act, or that are otherwise protected by laws such as the Marine Mammal Protection Act and Migratory Bird Treaty Act.

The proposed action is needed to restore fishing opportunity, in terms of area fished, in order to stem the decline in fishery participation without additional, or at least significant, impacts to protected species, particularly leatherback sea turtles. This could be accomplished directly through a regulatory change or provisionally through the authorization of an EFP. As indicated above, the action could combine both regulatory action, by changing the configuration of the closed area by amending the regulations at 50 CFR 660 713(c)(1), and fishing within any such modified closed area as authorized by an EFP. The EFP would be a provisional arrangement in order to allow testing of measures and techniques that could allow prosecution of the fishery while limiting the anticipated take of protected species. Based on the results of the EFP, a future regulatory amendment could further modify the closed area while implementing other necessary measures to mitigate protected species impacts.

1.4 Council Decision-making and the Scoping Process

Scoping is "an early and open process for determining the scope of issues to be addressed and for identifying significant issues related to a proposed action" (40 CFR 1501.7). The scoping process described in NEPA regulations emphasizes public involvement, prioritization of issues so that the impact analysis may focus potentially significant impacts, and planning the impact analysis. The Council, as much as it is an organization, is a process for coordinating involvement of the public and interested State and Federal agencies in decision making related to federal fishery management. As such, it serves as an effective scoping mechanism. All Council meetings, and meetings of its various committees, are open to the public and opportunity for oral and written comment on issues brought before these bodies is provided.

As noted above, there has been interest in reconsidering the current DGN fishery management regime, principally voiced by participants in the fishery. With implementation of the HMS FMP in 2004 and the subsequent transition from planning to management the issue again arose in 2005. At their June 2005 meeting the Council directed its HMS Management Team (HMSMT), composed of State and Federal fishery managers, and its HMS Advisory Subpanel (HMSAS), composed of stakeholders, to begin developing proposals to change the Federal regulatory structure for the DGN fishery.

The HMSMT and HMSAS held a joint meeting August 3–5, 2005. Discussion initially focused on regulatory modification of the configuration of the time/area closure. However, it became evident that evaluating such changes could prove difficult because leatherback sea turtle takes are a rare occurrence; for this reason it is not possible to develop geographically discriminate estimates of sea turtle catch-per-unit-effort (CPUE) that are statistically meaningful. Without different area-based CPUE estimate, it is not possible to quantitatively assess the effects of different closed area configurations. For this reason, the two groups focused on the use of an EFP to gather additional information under more controlled conditions, in terms of the amount of fishing effort that would occur and the maximum impact to leatherback sea turtles.

The HMSMT met again October 3–4, 2005, to develop the range of alternatives evaluated in this EA. These alternatives were presented to the Council at their October 30–November 4 meeting. The Council adopted the range of alternatives for public review and the Management Team began work on this draft EA.

The Council is scheduled to choose a preferred alternative at their March 6–10, 2006, meeting. As noted above, the choice of a preferred alternative represents a recommendation to NMFS; this EA will then be finalized and used as a basis of whether a finding of no significant impacts (FONSI) can be made. At the same time, work necessary to address other requirements, such as a BiOp as part of a section 7 consultation, along with any other permits and determinations, will commence. The FONSI for this EA cannot be signed until after the BiOp is completed. For the proposed action to be relevant to the 2006 fishery it would need to be implemented by the August 15 start date of the time/area closure.

1.5 Determining the Scope of the Analysis

HMSMT members and staff began work on this EA by assessing the alternatives in order to identify likely environmental impacts and narrow the scope of the present analysis to the significant issues that will be analyzed in depth and to eliminate from detailed study the issues which are not significant (40 CFR 1501.7). The HMSMT used 16 factors enumerated in National Oceanic and Atmospheric Administration (NOAA) National Environmental Policy Act (NEPA) guidance (NAO 216-6) §6.01, which reproduces the factors defining “significant” listed at 40 CFR 1508.27, and §6.02, specific guidance on fishery management actions, in order to screen for potentially significant impacts and determine the scope of the analysis. The §6.02 criteria are listed first below and generally focus on components of the human environment potentially affected by a fishery management action. The §6.01 criteria are related to the intensity—or severity—of the impact, which were considered in the context of the environmental components listed in §6.02.

These factors can be used to determine whether a finding of no significant impact can be made or whether it is necessary to prepare an environmental impact statement to evaluate significant impacts in more detail. This EA provides the information and analysis on which to determine the appropriateness of a FONSI. For each factor listed below a brief discussion follows, indicating in general terms the types of effects that may be reasonably expected and an assessment of whether the potential effects are of sufficient magnitude or concern to justify analysis in this EA.

1-2) Can the proposed action be reasonably expected to jeopardize the sustainability of any target or non-target species that may be affected by the action?

Fishing mortality in the DGN fishery represents a tiny proportion of total fishing mortality on target and non-target finfish species. Swordfish landings in the 2004 DGN fishery represented less than 2 percent of the estimated stockwide catch in the EPO (see Table 5–2 in the 2005 HMS SAFE). In addition, the alternatives would likely result in only a modest increase in fishing effort. Authorization of an EFP would allow a constrained amount of fishing effort to be deployed, potentially resulting in a small increase from the effort seen in 2005. Alternatives proposing boundary changes to the closed area could stimulate increased participation in the fishery, increasing fishing effort. These increases would translate into a small change in total fishing mortality on the stocks. The HMS FMP includes harvest guidelines that indicate a maximum recommended harvest for all fisheries managed under the FMP. For common thresher shark the harvest guideline is 340 mt round weight and for shortfin mako shark the harvest guideline is150 mt round weight; both harvest guidelines are based on an estimate of local maximum sustainable yield. In 2004 the DGN fishery landed 66 mt of common thresher shark. Although the proposed action is unlikely to jeopardize the sustainability of any target and non-target species, this EA assesses the likely change in harvest levels as part of the impact analysis.

3) Can the proposed action be reasonably expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs?

Drift gillnets are pelagic fishing gear, deployed in open water and off bottom. Given the biophysical characteristics of the water column, the gear does not affect the biophysical habitat. For this reason, there is no likelihood that the proposed action will cause substantial damage to habitats or EFH and this EA does not further evaluate this category of impacts.

4) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

The proposed action may result in more fishing occurring under adverse sea conditions, to the degree that fishing occurs within the area currently closed from August 15–November 15. However, this represents part of the area of operation of the fishery prior to implementation of the time/area closure in 2001. Considered in the context of historical fishing activity the proposed action is unlikely to result in a substantial change in safety risks. Substantial adverse impacts on public health or safety are not expected and these effects are not further evaluated in this EA.

5) Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Historically, the DGN fishery had a substantial impact on protected species, resulting in the implementation of gear requirements to mitigate impacts to marine mammals and time/area closures to mitigate impacts to loggerhead and leatherback sea turtles. The proposed action would allow fishing to occur in the time/area closure established for the protection of leatherback sea turtles, with an increased risk of impacts to protected species. This EA evaluates impacts to protected species, included those listed under the ESA and the MMPA.

6) Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

The proposed action will primarily affect biodiversity and ecosystem function through the removal of target, non-target, and protected species. Fish removals represent a small proportion of the biomass of these species and have a remote likelihood of adversely affecting biodiversity and ecosystem function. Potential removals of protected species are considered under item #5.

7) Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

The proposed action is likely to have a beneficial socioeconomic impact, to the degree that it results in increases in fishery participation, exvessel revenue, and personal income. This EA evaluates socioeconomic impacts in order to assess the tradeoff with other biological impacts.

8) To what degree are the effects on the quality of the human environment likely to be highly controversial?

The proposed action is likely to be controversial. The Council has received written and oral public testimony opposing the proposed action.

9) Can the proposed action be reasonably expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

The DGN fishery operates in the marine environment and has little or no direct effect on the biophysical component of the environment. At the scale of fishing operations no unique areas are involved.

10) To what degree are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The risks are neither unique nor unknown; past evaluations of the fishery through BiOps and the EIS prepared for the HMS FMP provide an indication of the likely risks of the proposed action. The risks are to some extent uncertain in terms of their intensity, although mitigation measures (limits on fishing effort and leatherback sea turtle mortality) that are a feature of most of the alternatives will both reduce impacts and reduce uncertainty about their intensity.

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Cumulative effects are considered in this EA.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The proposed action will not affect historic places or result in the loss or destruction of significant scientific, cultural, or historical resources. As noted above, the primary adverse impact of the proposed action is the removal of target and nontarget finfish species and the incidental take of protected species. To the extent these may be construed as scientific or cultural resources, the proposed action is not expected to result in a significant level of loss or destruction.

13) Can the proposed action be reasonably expected to result in the introduction or spread of a non-indigenous species?

The proposed action does not involve the transport of non-indigenous species. Fishing vessels participating in the proposed action are located in local ports and will not increase the risk of introduction through ballast water or hull fouling.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

The EFP that is feature of most of the action alternatives is intended to gather information to allow changes in the management measures for the DGN fishery to keep participation at recent levels while not causing significant impacts, including jeopardizing the continued existence of endangered species. Choosing a preferred alternative that features an EFP would also presuppose a Council recommendation to NMFS to grant the permit. Furthermore, fishery managers anticipate that the EFP would have to be authorized over several years to gather sufficient information to determine what change, if any, may be made to the management regime. In these respects the proposed action represents a decision in principle about a future consideration, yet those decisions would be based on avoiding jeopardy to listed species.

15) Can the proposed action be reasonably expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Chapter 6 describes potentially applicable cross-cutting mandates; the proposed action will be implemented in such a way as to address applicable requirements of these laws and executive orders.

16) Can the proposed action be reasonably expected to result in beneficial impacts, not otherwise identified and described above?

The EA will evaluate both beneficial and adverse impacts of the proposed action.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

Based on direction from the Council, the HMSMT developed a range of alternatives to modify the existing management regime for the DGN fishery. The alternatives have two general features: the authorization of an EFP to allow limited fishing within the time/area closure and a regulatory amendment to change the southern boundary of the time/area closure. These features of the alternatives are discussed in the next section. These features can be combined in various ways, as identified by the HMSMT, to produce seven alternatives in addition to the No Action alternative. Within the alternatives that would authorize an EFP, additional suboptions allow further consideration of mitigation measures to limit the incidental take of leatherback sea turtles. Section 2.2 describes the alternatives and suboptions.

2.1 Features of the Alternatives

2.1.1 Exempted Fishing Permit to Allow Limited Fishing within the Closed Area

2.1.1.1 Rationale for Considering the Use of an Exempted Fishing Permit

As discussed in Chapter 1, there has been a substantial decline in participation, landings and exvessel revenue in the DGN fishery since 2000, when the time/area was implemented. Because of the population status of leatherback sea turtles and the relatively rare occurrence of incidental takes in the DGN fishery, it was not possible to tightly define the geographic area where incidental takes were most likely to occur, necessitating the implementation of a relatively large closure. By the same token, it is difficult to determine what kinds of modifications to the size of the closure could be made that would not increase the likelihood of incidental takes. An EFP is a relatively flexible management approach that allows limited testing of fishing and fishery management techniques. In this case it would serve as a vehicle for permitting a limited amount of fishing in the current time/area closure under restrictions intended to limit incidental takes of leatherback sea turtles. (These measures could also have a corollary effect of limiting impacts to other protected species to the degree that they directly or indirectly limit the amount of effort expended in the EFP fishery.) Under the alternatives considered in this EA, the EFP would apply to the fishery in 2006, and specifically the August 15–November time period when the closure is in effect. Depending on results, the EFP could be reissued annually until sufficient information has been gathered to either revert to the existing time/area closure or embark on the regulatory process of further modifying the management regime, particularly the configuration of the time/area closure. Several years of limited fishing under the EFP within the closed area could provide additional information about the geographic distribution of interactions with protected species. Since a condition of the EFP is that all participating vessels carry a fishery observer, direct monitoring of any interactions with protected species would occur, providing the kind of detailed information that could lead to modifying the management regime. Any such changes would be intended to allow the continued viability of the fishery at effort levels experienced in the recent past while not increasing the likelihood of jeopardy to leatherback sea turtles and other ESA-listed species and demonstrating no significant impact to other components of the human environment.

The EFP applicant is the Federation of Independent Seafood Harvesters (FISH), a member organization for fishery participants. This organization would determine which of its member vessels would participate under the EFP and any specific requirements of participants beyond the measures included in the preferred alternative, which would be administered by NMFS. According to the EFP application submitted by FISH (see Appendix A)[1] it is expected that between 10 and 25 vessels would be authorized to fish under the EFP.

[1] Not included in this draft document. Available at the March 2006 meeting as Agenda Item J.4.a, Attachment 1.

As discussed in more detail below, the alternatives would impose several conditions on the EFP fishery. As already noted, one is full observer coverage. The other conditions, which could be applied separately or in combination, are a limit on the total amount of leatherback mortality (estimated from observed takes), a limit on total effort (measured by sets) occurring in the fishery, and restriction of the area within the closed area where the EFH fishery could operate.

2.1.1.2 Observer Coverage and Real-time Reporting

As noted, all vessels participating in the EFP would have to carry a fishery observer. This is a much higher level of coverage than the target level for the current fishery, which is to cover 20 percent of total annual fishing effort determined at both the fleet and individual vessel level. In contrast, 100 percent observer coverage is an important condition of an EFP fishery, which allows full monitoring of catch and incidental take of protected species. Complete observer coverage for the EFP fishery also allows the use of the leatherback mortality limits.

Vessel eligibility is contingent on their certification to carry an observer. A certified vessel must possess a U.S. Coast Guard safety decal, indicating it has been inspected for proper safety equipment. The NMFS SWR observer program contractor also inspects the vessel to determine whether it has adequate crew space to accommodate an additional person on board and it meets other conditions suitable to accommodating an observer. Generally, smaller vessels may not be certified because of these constraints. A vessel would have to have this certification to participate in the EFP.

The EFP would end for the year if the identified leatherback mortality limit is reached. This would require a system of rapid reporting by the onboard observers. The response time needs to be short because there is such a narrow range of allowable mortality limits; if there is a lag between the time a leatherback take occurs and NMFS responds by shutting down the fishery there is a risk that additional takes could occur, exceeding the mortality/take limit. This could compromise the continuation of the EFP in future years because it would likely result in a re-initiation of the ESA section 7 consultation process to determine if a jeopardy condition is likely. The best solution is to set up a system by which onboard fishery observers could immediately report a take by satellite phone or high frequency marine single sideband radio (HF SSB radio), which has a range of up to 6,000 mi. Satellite phone would be the most convenient solution since it relies on existing commercial telephone infrastructure; in essence the observer could telephone a NMFS point of contact. However, either the vessel or the observer would have to carry a satellite phone, which is a relatively expensive service. On the other hand, almost all vessels have HF SSB radios for ship-to-ship and ship-to-shore communication. However, arrangements would have to be made so that the NMFS point of contact could be immediately notified through a shore-based receiver. This would involve using a ship-to-shore marine operator service; contracting with a commercial HF SSB radio service that could be on 24-hour standby; or identifying a government agency with such a facility. An alternative approach would be to require any vessel that has a leatherback take to immediately return to port so that the observer could use a landline to reach the point of contact. However, this could be problematic when the mortality cap is about to be reached if there is a time lag between reporting and when all EFP participants can be notified that the fishery is terminated. Furthermore, the affected vessel would have to cease fishing for the time it takes to transit from the fishing grounds to port, and if the fishery remains open, back to the grounds.

Because of the amount of funding available for observers, the observer requirement may impose a limit on the amount of fishing effort prosecuted under the EFP over and above the other limits discussed below. Any non-EFP portion of the DGN fishery must maintain its 20 percent observer coverage level. In the absence of additional funding, observers for the EFP would have to be reassigned from the regular fishery on an as-available basis.

2.1.1.3 Set Limits and Turtle Take/ Mortality Caps

As mentioned, the EFP would be subject to a limit on the total number of sets, a limit (cap) on leatherback mortalities, or a combination of these two measures. A set represents one deployment of the driftnet. DGN vessels typically soak their nets (leave them in the water) overnight, meaning that they make no more than one set in a 24-hour period.

The mortality cap would directly limit the impact of the fishery on leatherback sea turtles by requiring it to shut down when a pre-determined and observed number of takes occur. (Mortalities must be estimated from takes because of post-release mortality. The estimated post-release mortality rate that would be applied is 70 percent.) Three suboptions are considered under the alternatives for mortality caps: one, two, or three leatherback mortalities.

In practice, the EFP would be managed based on leatherback sea turtle takes, meaning any instance where a leatherback is observed entangled in the gillnet. Although observers may make an assessment of the condition of a sea turtle taken in the fishery, for management purposes there is not case-by-case determination of mortality. Instead, a standard mortality rate is applied to all takes to determine mortality. For this reason, in considering the alternatives it may be simpler to think in terms of the incidental take limit that would correspond to a given mortality cap. Given a mortality rate of 70 percent, at the low numbers being considered there is a small difference between the incidental take limit and the mortality cap:

Mortality Cap	Incidental Take (at 0.7 mortality)	Rounded Value for Incidental Take Limit
1	1.4	1
2	2.9	3
3	4.3	4

Defining this mitigation measure as a take limit instead of a mortality limit has the advantage that it is consistent with the evaluation used in the BiOp for this action, which is based on takes.

The use of take/mortality caps, in addition to defining the maximum impact of the proposed action in terms of leatherback mortalities, could provide a basis for EFP participants to take coordinated action to limit the likelihood of leatherback takes. For example, they might be motivated to share information on how to avoid sea turtles, based on past collective experience. In the event a take occurred, they might share information about the conditions under which it happened in the hope that this would prevent additional takes by other vessels.

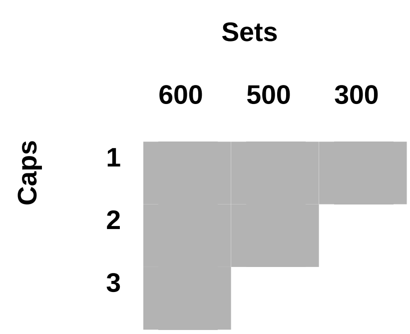
Establishing a take/mortality cap provides some assurance that as long as the cap is not breached there would be no re-initiation of consultations and the EFP could be reauthorized in succeeding years under the conditions identified in the preferred alternative. This approach emulates the current management regime for the high seas shallow-set longline fishery authorized under the Western Pacific Fishery Management Council's Pelagics FMP. Take and mortality limits are established for that fishery[2] in

[2] Separate take and mortality limits are established because different mortality rates are applied depending on the nature of the take in terms of hooking location.

Federal regulations for both leatherback and loggerhead sea turtles. These limits were derived directly from the BiOp. For the DGN fishery, the consideration of turtle caps as part of the proposed action could allow a similar outcome if, for example, the BiOp determines that a different (lower) take/mortality cap is required to avoid jeopardy. Any measures in the BiOp identified to prevent jeopardy could be applied as additional or superseding measures to those identified in the preferred alternative.

Three different possible set limits are identified that could be applied to the EFP fishery: 300, 500, and 600 sets. Historical data on leatherback takes in the DGN fishery provide a CPUE estimate, or an estimate of the likely number of turtles that would be killed in a given number of sets. These set limits correlate with the mortality caps; in other words, based on historical CPUE 300 sets is expected to result in one leatherback mortality (or one take), 500 sets in two mortalities (or three takes), and 600 sets in three mortalities (or four takes). Thus, a set limit could be applied as a proxy for directly limiting mortality through the use of a cap. Using a set limit by itself has few advantages over directly limiting mortality with caps. Foremost, if the actual CPUE is lower than expected fishing would cease before the equivalent mortality limit is reached, potentially foreclosing some level of fishing that could otherwise occur. Conversely, if the actual CPUE is higher than expected, the number of leatherbacks killed could lead to a re-initiation of consultation with the risk that continuation of the EFP in future years might be terminated. There may be an advantage to using sets from the fishermen's perspective in that it provides a defined amount of fishing activity. As with the caps, it could facilitate coordinated activity among EFP participants. For example, they could establish arrangements for the distribution of fishing opportunity, making it easier to plan an overall fishing strategy.

The third suboption considered under the alternatives with EFPs would be to apply both the take/mortality cap and corresponding set limit, with the EFP fishery shutting down when either of these limits is reached. As indicated above, the combinations would be a cap of one leatherback mortality and a set limit of 300, a cap of two leatherback mortalities and 500 sets, or a cap of three leatherback mortalities and 600 sets. Establishing a condition where these two limits operate in tandem would provide a high level of precaution. From the perspective of the EFP participants this approach is less advantageous than applying the mortality cap alone because it may limit the amount of effort more than would occur under a mortality cap alone. Establishing two constraints is likely to result in less overall fishing effort being expended under the EFP. If this reduces corresponding environmental impacts from fishing, the use of two constraints may be considered better from a strict conservation perspective. Another approach that could be considered, which would be more precautionary but might ensure more fishing opportunity, would be to combine a given set limit with a lower mortality cap than that associated with CPUE. The potential combinations that would result are indicated by the shaded cells in the following schematic:



For example, a mortality cap of two could be established along with a set limit of 600. Since the EFP would cease when either limit is reached there is assurance that no more than two mortalities would occur. But if the actual CPUE is lower than expected, potentially an additional 100 sets could be made (600 versus 500). If the set limit is reached before the mortality cap, this provides an overall limit on the impacts, to other protected species for example, in addition to the benefit of not having killed more than one leatherback sea turtle (since two mortalities would shut down the EFP before all the sets were expended).

2.1.1.4 Area Restrictions

The third condition that could be imposed on the EFP fishery under the alternatives is a limit on its area of operation within the closed area. Fishery-independent information, from turtle tagging programs for example, indicates that the central California region is an important foraging area for leatherback sea turtles. Two area restriction configurations are presented in the alternatives that would authorize the EFP.

Area Restriction Option 1 is an irregularly-shaped zone with a northern boundary running southwest from Pt. Arena, California and west of Pt. Sur, and a southern boundary that would also allow fishing under the EFP in a diamond-shaped area in the southern-most portion of the closed area. This area restriction is a feature of Alternatives 1 and 4. (As discussed below, under Alternative 4 the southern boundary of the closed area would be changed to exclude the aforementioned diamond-shaped area from the closed area.) This area restriction was proposed by a participant in the DGN fishery based on his assessment that it would allow fishing in areas of high target species abundance while preventing the EFP from operating in the area where leatherback sea turtle occurrence may be more common.

Area Restriction Option 2 simply prohibits fishing under the EFP in that portion of the closed area south of Pt. Arena. This is a feature of Alternative 2.

2.1.2 Regulatory Amendment to Change Southern Boundary of Closed Area

Alternatives 4–7 would permanently change the configuration of the closed area. This would require a regulatory amendment to change the regulations associated with the HMS FMP (50 CFR 660.713(c)). Alternatives 4 and 5 would open the diamond-shaped area west of Pt. Sur mentioned above. This is referred to as *Boundary Change Option 1*. Alternative 6 would change the southern boundary so that it is extended due west from Pt. Sur rather than trending in a southwesterly direction as under current regulations. This is referred to as *Boundary Change Option 2*. Finally, Alternative 7 would completely eliminate the closed area, allowing fishing throughout the area during all of the regular fishing season. (State regulations close the fishery February through April). A regulatory change to the boundary of the closed area represents a more permanent change to the DGN fishery management regime compared to fishing annually authorized under an EFP. It would also allow all DGN participants, who must possess a limited entry permit issued by the State of California, to fish in the resulting larger area outside of the closed area. The rationale for the regulatory changes proposed under Alternatives 4–6 is to open up some of the area in the southern portion of the closed area, which is considered productive with respect to target species. Obviously, Alternative 7 would substantially increase the area that would be fished by eliminating the closed area altogether.

2.1.3 Future Action to Amend the FMP to Permanently Limit Effort in the DGN Fishery

Although not part of the proposed action, amending the FMP to establish a Federal limited entry program would make it easier to apply the kind of management regime being tested under the EFP to the whole DGN fishery. Implementing a Federal program would allow the Council to more directly manage and limit effort in the fishery, in order to further address protected species impacts in the long term.

Although not part of the current proposed action, the Council could authorize the HMSMT and HMSAS to be begin developing a Federal limited entry program, which would then be implemented as a later action, likely requiring an amendment to the HMS FMP in addition to any regulatory changes.

There are potential advantages to establishing a Federal limited entry program. From a resource conservation perspective, Federal management would enhance the ability of the Council and NMFS to adopt measures to achieve conservation objectives. Such measures could include limiting access to the fishery based on protected species interactions (i.e., limiting effort at a level that would not jeopardize protected species) and other measures to reduce bycatch. Essentially, the provisions of the proposed EFP could be implemented at the Federal level, without going through an annual EFP process.

From a DGN fishery perspective, there are potential advantages as well. Since current state fishing permits are provided for under California statute, state legislative action is required to change the permitting structure, which can be a lengthy, complicated process. Federal permitting would allow for changes to be made through the Council process and Federal rulemaking. Therefore, in addition to supporting resource conservation objectives, a Federal limited entry program would promote stability in the fishery, provide an avenue for regulatory changes, and would likely reduce management costs both at the state and Federal levels.

2.2 Description of the Alternatives

2.2.1 No Action Alternative

Under the No Action Alternative, the current regulatory and management framework would remain in place. This is described in the HMS FMP and Federal regulations at 50 CFR 660.713. (See Appendix B for excerpts from the FMP, including a summary of state regulations, and Federal regulations). These include gear restrictions pursuant to the Pacific Offshore Cetacean Take Reduction Plan (net extenders and pingers) and other gear restrictions; protected resource area closures, which are the August 15–November 15 time/area closure plus an additional closed area put in place when an El Niño event is forecast; and a series of permanent closed areas along the mainland and in the Channel Islands.

There are additional management measures implemented by the State of California for this fishery. This includes a license limitation program. Permits must be renewed annually or they may be lost. Currently there are 88 permits, although only about half that number of vessels has been active in the fishery in recent years. State regulation also closes the fishery as a whole from February 1 to April 30, inclusive. The State of California also prohibits using DGN gear to take shark or swordfish before August 15 in ocean waters within 75 nmi from mainland coastline between the westerly extension of the California-Oregon boundary and the western extension of the U.S.-Mexican international boundary.

See Figure 2.1 shows the current August 15–November 15 time/area closure.

2.2.2 Action Alternative 1: EFP with Area Restriction 1 – No Boundary Change

Under Action Alternative 1 only an EFP would be authorized; no regulatory changes to the closed area are proposed. As noted in Section 2.1.1.2, the EFP would be subject to a set limit, leatherback take/mortality cap, or a combination of set limit and mortality cap.[3] In choosing a preferred alternative the Council could also combine a set limit with a mortality cap lower than that associated with historical CPUE, as discussed in Section 2.1.1.3.

[3] For Action Alternative 1–5 the combinations of set limits and take/mortality caps are presented as suboptions in Table 2-1. In each case there are nine suboptions representing these combinations (e.g., suboptions 1.1–1.9).

This alternative includes Area Restriction Option 1 (Pt. Arena-Pt. Sur closure). Figure 2.2 shows the configuration of this restriction and where the EFP fishery could occur.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 2a with Options 3–6 described as the suboptions.

2.2.3 Action Alternative 2: EFP with Area Restriction 2 – No Boundary Change

Action Alternative 2 only differs from Action Alternative 1 by including Area Restriction Option 2 (south of Pt. Arena) instead of Area Restriction Option 1 (Pt. Arena–Pt. Sur closure). Figure 2.3 shows the configuration of this restriction and where the EFP fishery could occur.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 2c with Options 3–6 described as the suboptions.

2.2.4 Action Alternative 3: EFP with No Area Restriction – No Boundary Change

Action Alternative 3 only differs from Action Alternatives 1 and 2 by not applying an area restriction to the EFP fishery; EFP participants could fish throughout the closed area. Figure 2-4 shows this configuration/

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 2b with Options 3–6 described as the suboptions.

2.2.5 Action Alternative 4: EFP with Area Restriction 1 – Boundary Change 1

This alternative combines the authorization of the EFP with a regulatory amendment to permanently modify the southern boundary of the time/area closure allowing all permit holders to fish in the resulting open area.

The EFP would be subject to the same type of set limit, cap on leatherback sea turtle mortality, or combination of set limit and mortality cap as described for Action Alternatives 1–3.

Area Restriction Option 1 (Pt. Arena–Pt. Sur closure) would be applied to the EFP fishery

The regulatory amendment would implement Boundary Change Option 1, opening a diamond-shaped area in the southern portion of the current closed area. Figure 2.5 shows this boundary change.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 3a with Options 3–6 described as the suboptions applicable to the EFP.

2.2.6 Action Alternative 5: EFP with No Area Restriction – Boundary Change 1

This alternative combines the authorization of the EFP with a regulatory amendment to permanently modify the southern boundary of the time/area closure allowing all permit holders to fish in the resulting open area.

The EFP would be subject to the same type of set limit, cap on leatherback sea turtle mortality, or combination of set limit and mortality cap as described for Action Alternatives 1–4.

No area restriction would be applied to the EFP.

The regulatory amendment would implement Boundary Change Option 1, opening a diamond-shaped area in the southern portion of the current closed area. Figure 2.6 shows where the EFP and regular (non-EFP) fisheries could occur with this boundary change.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 3b with Options 3–6 described as the suboptions applicable to the EFP.

2.2.7 Action Alternative 6: No EFP – Boundary Change 2

No EFP would be authorized under this alternative. A regulatory amendment would permanently modify the southern boundary of the closed area according to Boundary Change Option 2 (open all area south of Pt. Sur) allowing all permit holders to fish in the resulting open area. Figure 2.7 shows this change.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 3c.

2.2.8 Action Alternative 7: No EFP – Eliminate Closed Area

No EFP would be authorized under this alternative. A regulatory amendment would eliminate the closed area allowing all permit holders to fish throughout the EEZ, subject to other existing time and area restrictions on the DGN fishery.

In reference to the alternatives as originally developed by the HMSMT and presented to the Council at their November 2005 meeting, this alternative corresponds to Option 3d.

2.3 Recommended Approach to a Decision between EFP Alternatives

2.3.1 Backwards Induction Analysis of the EFP Decision

The large number of EFP alternatives poses a challenge to weighing which would best meet the mutual interests of the various affected parties. However, the structure of the alternatives is amenable to a decision process known as *backwards induction.* The strategy is to impose a hierarchical structure on the components of the decision process, then work backwards from the lowest level of the hierarchy up to the top. The advantage of this approach is that it enables comparisons at each step of the decision process across a small number of similar alternatives, thereby avoiding the information overload problem which might arise when trying to simultaneously compare all dimensions of all alternatives.

The branches of an EFP decision hierarchy are listed below from the highest to the lowest level; the decision process should be executed in reverse order:

1. The top level of the hierarchy requires a binary choice between alternatives implementing an EFP (Alternatives 1–5) and those only implementing a boundary change to the time/area closure (Alternatives 6–7).

2. The next level down the hierarchy splits the EFP alternatives into two subgroups: those with boundary changes (Alternatives 4–5) and those without (Alternatives 1–3).

3. The split at the next stage involves picking the best EFP alternative among the three without a boundary change (Alternatives 1–3), and picking the best EFP alternative between the two with a boundary change (Alternatives 4–5). A parallel split is made between the two non-EFP alternatives (Alternative 5–6).

4. The next level down divides the suboptions under each EFP alternative into three cases: (a) set limit only; (b) turtle take/mortality cap only; (c) combined take/mortality cap and set limit.

5. The bottom level of the decision process makes a choice between three similar suboptions, which differ only in terms of the applicable set limit or turtle cap.

2.3.2 Considerations in Carrying Out the Decision Process

With this hierarchical structure as a guide, the decision is taken in stages. The level 5 decision is made first; one approach would be to first determine the highest level of effort which would satisfy the regulatory requirements for leatherback protection, as it is safe to assume that short term economic opportunity will increase as effort constraints are relaxed. (Section 4.3 provides information on the impacts of the alternatives on leatherback sea turtles.)

The level 4 decision is especially problematic, because there are potential drawbacks to all three strategies for limiting EFP effort. Leatherback take is the primary protected species concern, and there is a significant risk that an effort limit alone could produce an unacceptably high level of leatherback take, or that the effort limit which is necessary to control take risk would be unacceptably low from the standpoint of fishing opportunity. There is further risk that fishing could hit the effort limit long before leatherback take reaches unacceptable levels, resulting in a potential unnecessary loss of fishing opportunity. The argument that an effort limit will protect against excessive take of other species of concern has been given; but under the principle of targeting, it might be more efficient to directly set take caps on these other species than to indirectly reduce take through an effort limit.[4]

A take/mortality cap alone might be the best choice of the three, because it directly targets the endangered species of central concern. However, using a take/mortality cap alone opens the risk that the policy will be construed as permitting or even encouraging the take of endangered species. It might also inadvertently spark a race by EFP participants to catch leatherbacks, unless penalties against leatherback take were imposed at the individual vessel level in addition to the cap.

The problem with a combined set limit and take/mortality cap is that two constraints on effort invariably reduce expected effort below the expected level under one or the other of the caps. While this policy is the most conservative from a species protection standpoint, it is also the most limiting on short-term economic opportunity.

The level 3 decision is made across EFP alternatives with boundary changes, and also across those without; a parallel choice is made between the two non-EFP alternatives. Then the level 2 decision is taken between the best EFP alternative with a boundary change and the best one without a boundary change. The top level decision is a binary choice of whether to implement an EFP or a non-EFP

[4] For illustration, note that one short fin pilot whale take would exceed Potential Biological Removal, but an effort cap alone would not require a cessation of effort at this point.

alternative. Finally, the baseline case is compared to the best decision coming out of the backwards induction analysis to decide whether any action should be taken.

Table 2.1. Summary of the action alternatives

Suboption	EFP Measures Set Limit	 Turtle Cap	 Area Restriction	Regulatory Amendment Boundary Change
Alternative 1				
1.1	300	None	Area Restriction Option 1	None
1.2	500	None	Area Restriction Option 1	None
1.3	600	None	Area Restriction Option 1	None
1.4	None	1	Area Restriction Option 1	None
1.5	None	2	Area Restriction Option 1	None
1.6	None	3	Area Restriction Option 1	None
1.7	300	1	Area Restriction Option 1	None
1.8	500	2	Area Restriction Option 1	None
1.9	600	3	Area Restriction Option 1	None
Alternative 2				
2.1	300	None	Area Restriction Option 2	None
2.2	500	None	Area Restriction Option 2	None
2.3	600	None	Area Restriction Option 2	None
2.4	None	1	Area Restriction Option 2	None
2.5	None	2	Area Restriction Option 2	None
2.6	None	3	Area Restriction Option 2	None
2.7	300	1	Area Restriction Option 2	None
2.8	500	2	Area Restriction Option 2	None
2.9	600	3	Area Restriction Option 2	None
Alternative 3				
3.1	300	None	None	None
3.2	500	None	None	None
3.3	600	None	None	None
3.4	None	1	None	None
3.5	None	2	None	None
3.6	None	3	None	None
3.7	300	1	None	None
3.8	500	2	None	None
3.9	600	3	None	None
Alternative 4				
4.1	300	None	Area Restriction Option 1	Boundary Change Option 1
4.2	500	None	Area Restriction Option 1	Boundary Change Option 1
4.4	600	None	Area Restriction Option 1	Boundary Change Option 1
4.3	None	1	Area Restriction Option 1	Boundary Change Option 1
4.5	None	2	Area Restriction Option 1	Boundary Change Option 1
4.6	None	3	Area Restriction Option 1	Boundary Change Option 1
4.7	300	1	Area Restriction Option 1	Boundary Change Option 1
4.8	500	2	Area Restriction Option 1	Boundary Change Option 1
4.9	600	3	Area Restriction Option 1	Boundary Change Option 1
Alternative 5				
5.1	300	None	None	Boundary Change Option 1
5.2	500	None	None	Boundary Change Option 1
5.3	600	None	None	Boundary Change Option 1
5.4	None	1	None	Boundary Change Option 1

Suboption	EFP Measures Set Limit	 Turtle Cap	 Area Restriction	Regulatory Amendment Boundary Change
5.5	None	2	None	Boundary Change Option 1
5.6	None	3	None	Boundary Change Option 1
5.7	300	1	None	Boundary Change Option 1
5.8	500	2	None	Boundary Change Option 1
5.9	600	3	None	Boundary Change Option 1
Alternative 6				
	No EFP			Boundary Change Option 2
Alternative 7				
	No EFP			No Closed Area

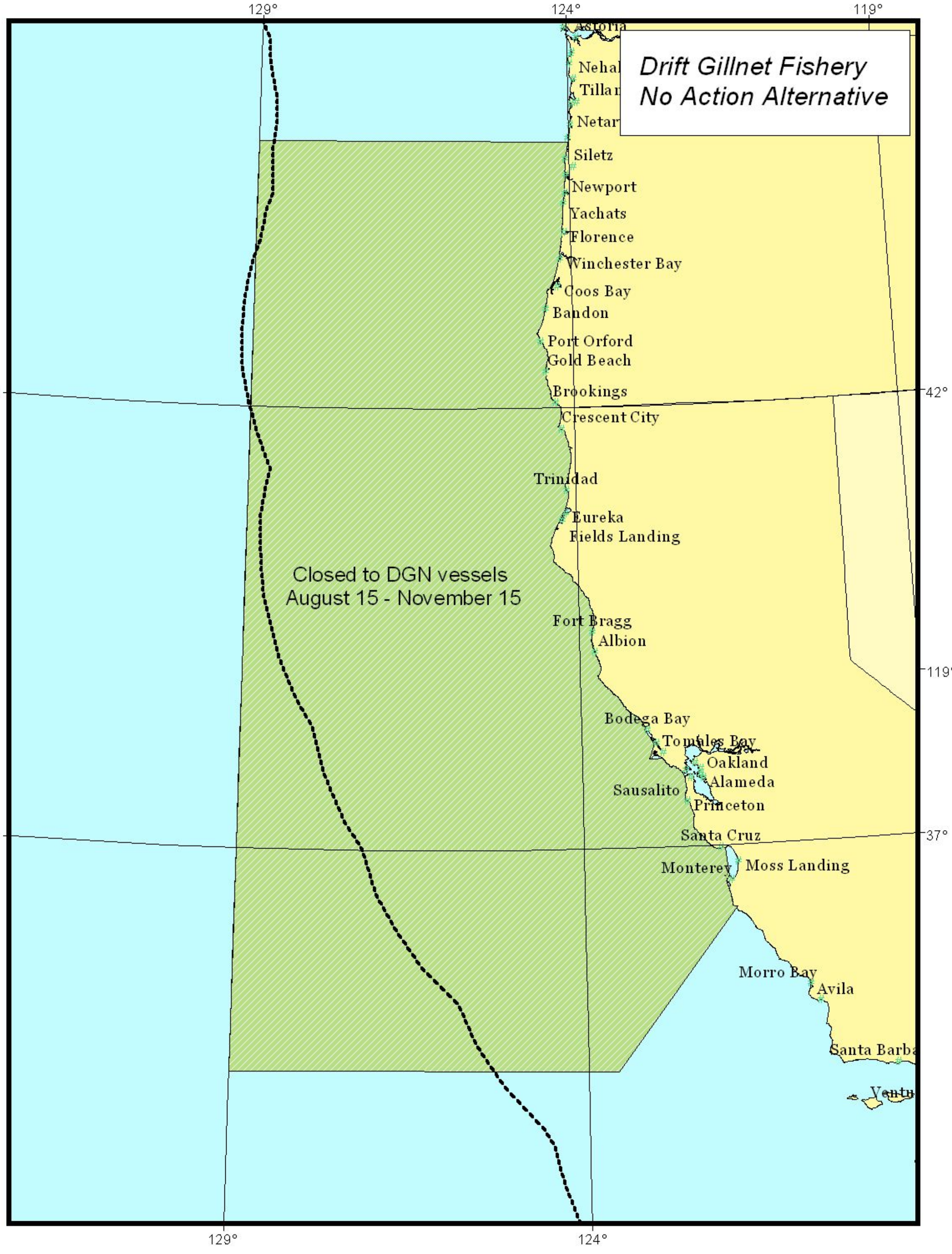


Figure 2.1. The No Action Alternative.

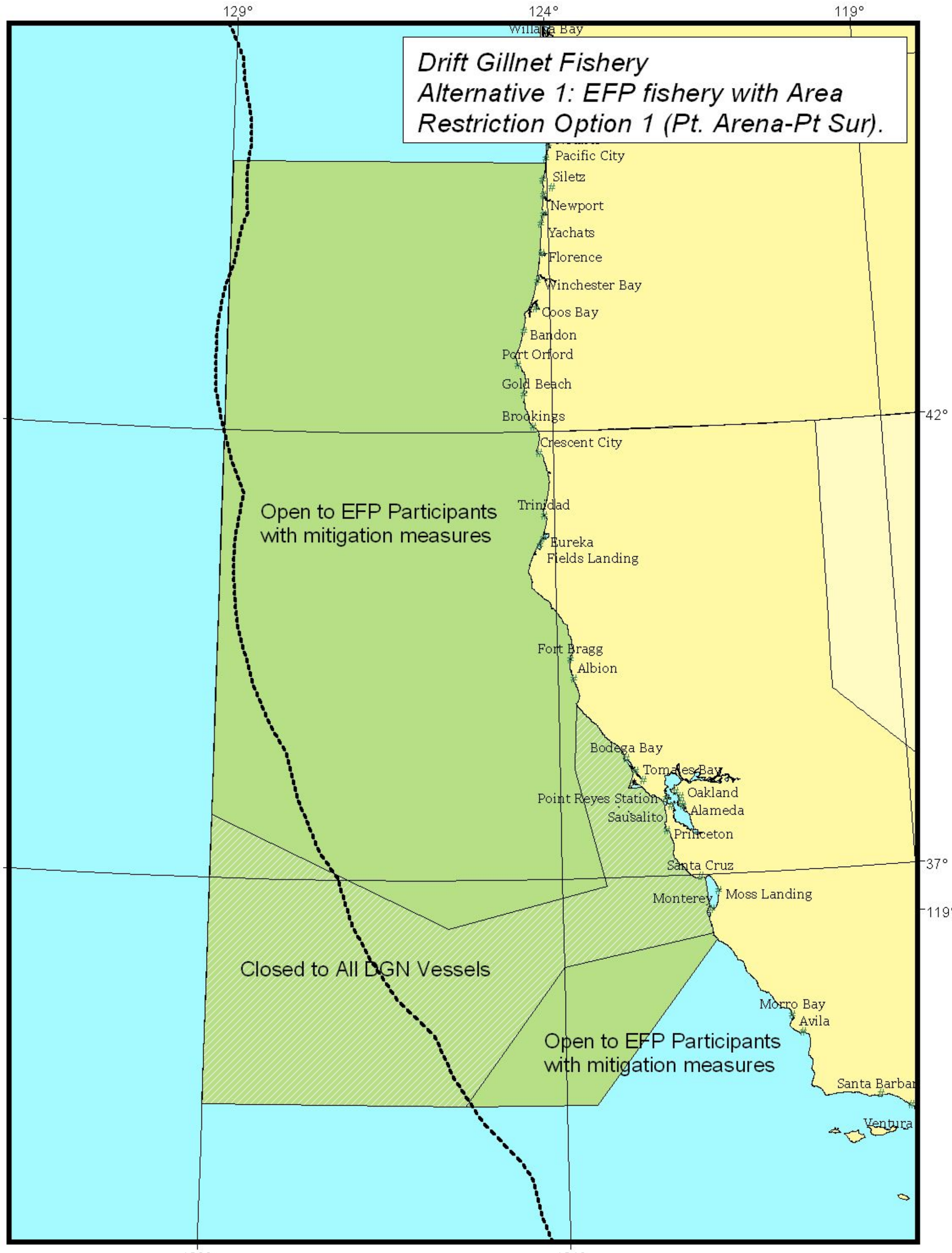


Figure 2.2. Action Alternative 1

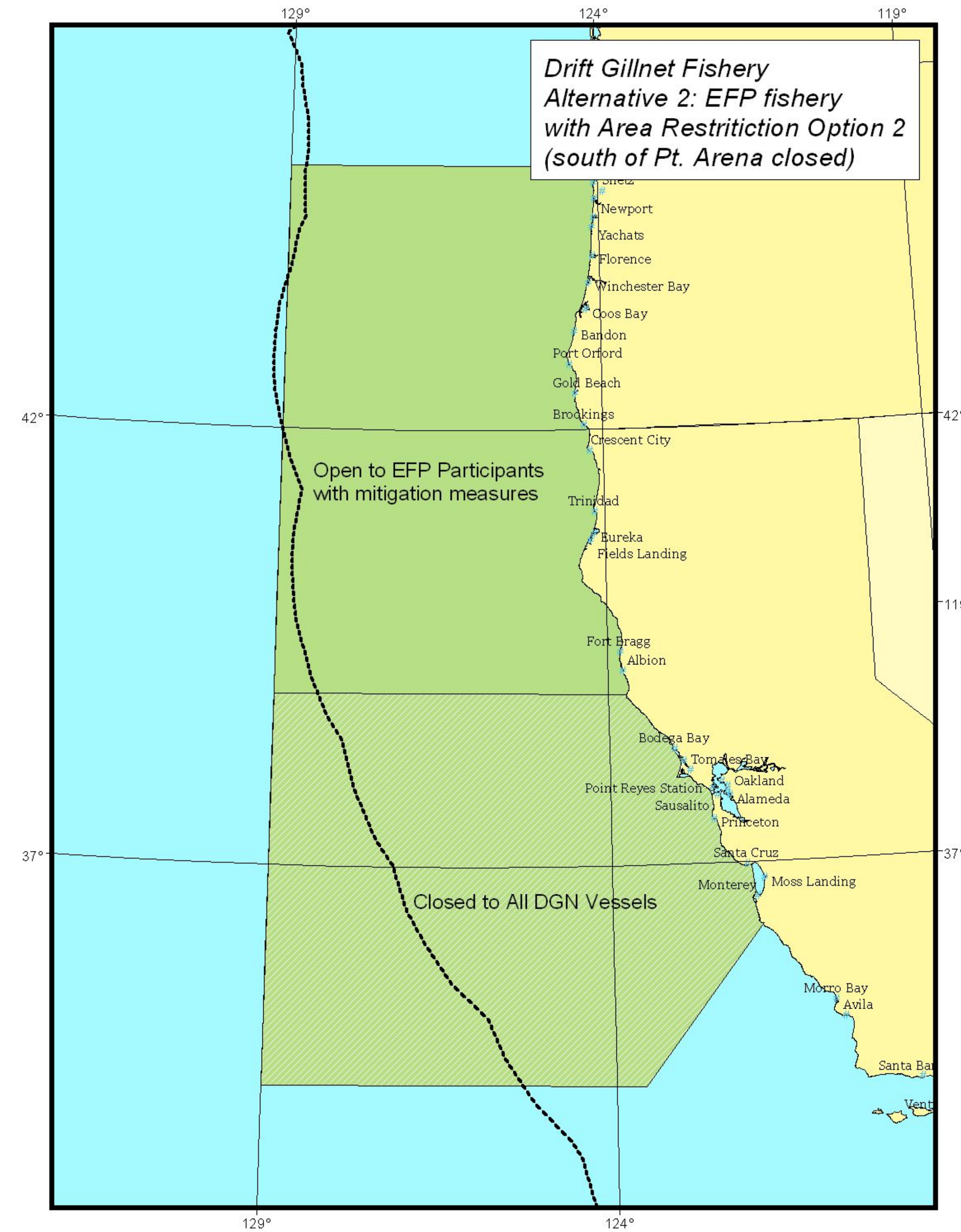


Figure 2.3. Action Alternative 2

Figure 2.4. Action Alternative 3

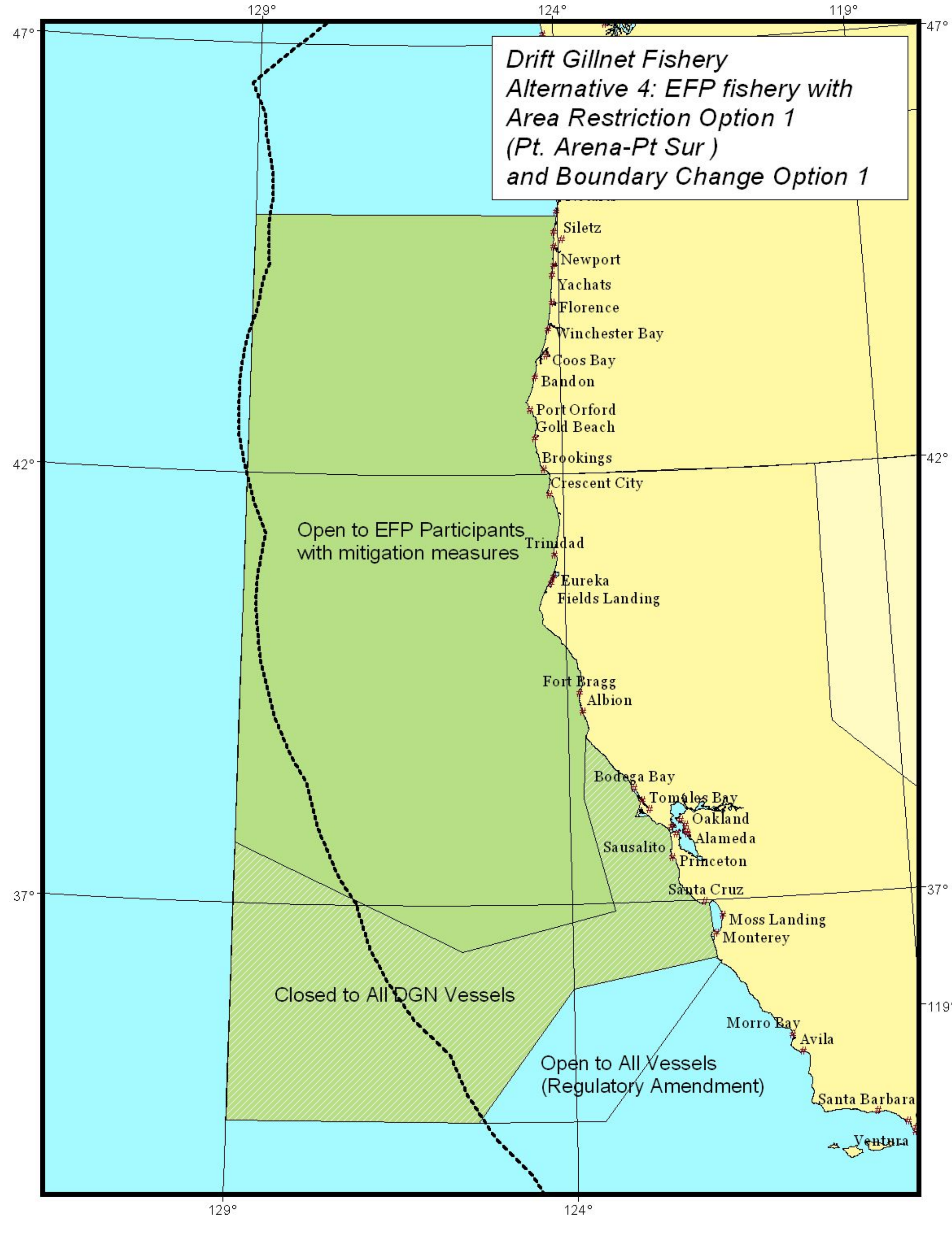


Figure 2.5. Action Alternative 4.

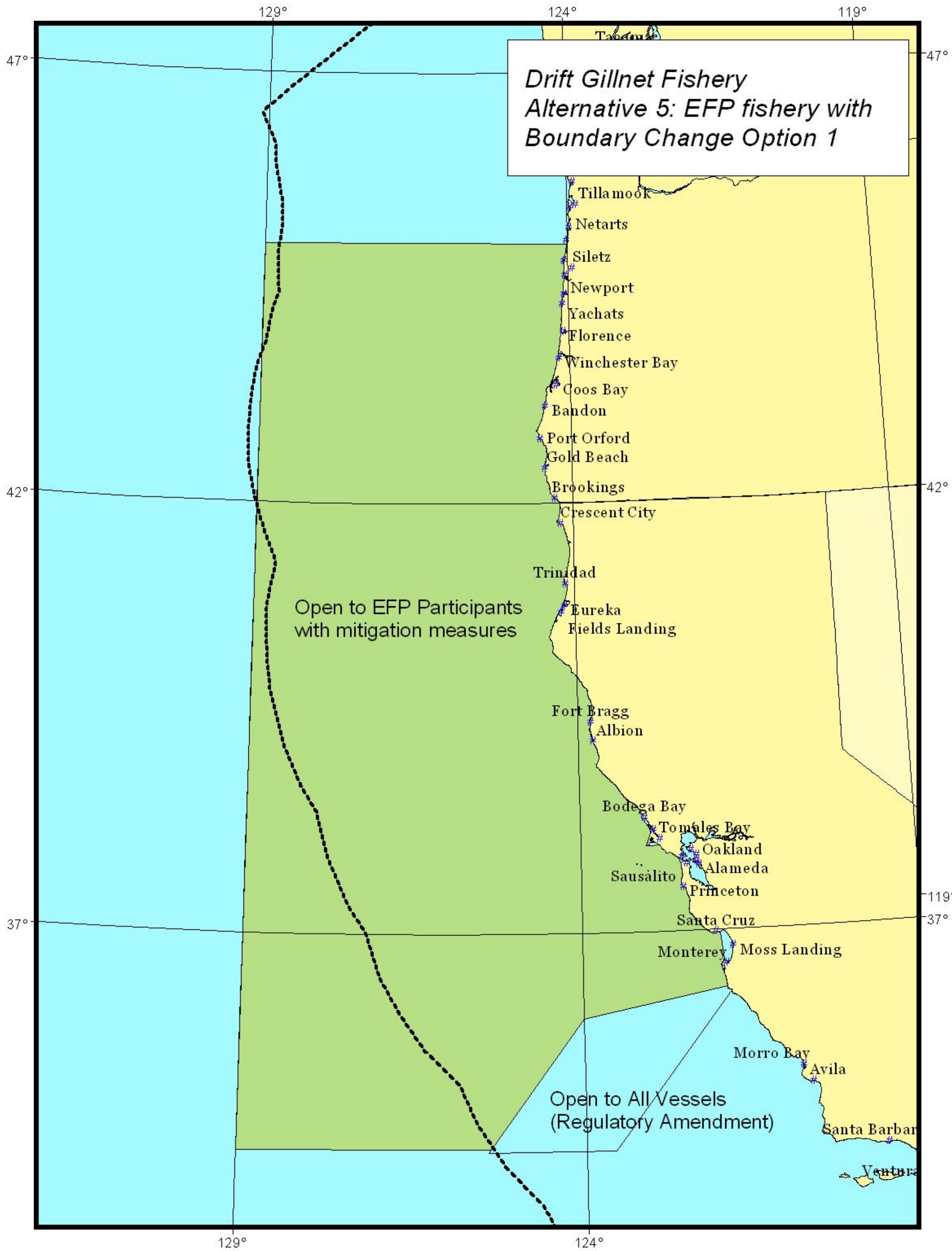


Figure 2.6. Action Alternative 5

Figure 2.7. Action Alternative 6

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This chapter describes the affected environment for the resource components affected by the proposed action. These components include target, non-target, and prohibited species captured in the California/Oregon pelagic drift gillnet (DGN) fishery; protected species; seabirds; and the socioeconomic environment. The purpose of describing the affected environment in this chapter is to establish a baseline, so the impacts of the proposed alternatives can be analyzed and compared to the baseline, providing the reader and decision-maker an idea of how conditions will differ if the action is taken.

3.1.1 Data Sources

A combination of state-derived fish landings data, fishing logbook records, and observer-based effort and catch-per-set estimators are used to describe the current conditions and dynamics of the DGN fishery. The DGN fishery typically begins in late May and continues through the end of January with a fishing season spanning two calendar years, although the majority of the catch is taken between August and the end of December. To assist in comparison among years, and based on the methodology for estimating annual fishing effort (see Section 4.1), data is based on calendar year unless otherwise noted.

3.1.2 Landings

Total landings of DGN target species were obtained from the Pacific Fisheries Information Network database (PacFIN). The PacFIN central database includes fish-ticket and vessel registration data provided by the Washington, Oregon, and California state fishery agencies.[5] The data sources supply reported species-composition and catch-by-area proportions developed from port sampling and logbook data systems.

3.1.3 Logbooks

Since 1980, DGN fishery participants have been required to record and maintain a daily logbook of fishing effort, most recently as part of the implementing regulations for the HMS FMP. Information from the DGN logbooks provide basic fisheries dependent estimates of catch and effort for target species but little, if any, reliable information on the interaction with non-target and prohibited species. Another confounding factor with the use of logbook data is the issue of under-reporting and non-reporting bias. To date, no attempts have been made to estimate quantitatively the percentage of the respective biases that exist in the logbook reporting for the DGN fishery, but it is assumed they may be large (J. Childers, personal communication). For the purposes of this EA, catch-per-set for non-target and prohibited species and annual estimates of total effort in number of sets were derived from NMFS Observer Program records and from dockside interviews and observations of DGN fleet dynamics.[6] Target species catch were based on PacFIN landings data with observer-generated estimates provided for comparison.

[5] (http://www.psmfc.org/pacfin/)

[6] The interviews and observations are conducted by NMFS Contractor Program Manager, Carolyn Parker, and her staff at Frank Orth & Associates.

3.1.4 Observer Records

The NMFS's Southwest Region has operated an at-sea observer program in the DGN fishery since July 1990 to the present, while CDFG had operated a DGN observer program from 1980–90. The objectives of the NMFS Observer Program are to record, among other things, information on protected species and bycatch interactions that are not typically nor accurately reported in the fishing logbooks.[7] Information regarding DGN fishery interactions with non-target and prohibited species were drawn from Observer Program records for the years 1997–2005, with comparative breakouts for the time series 2001–04 (baseline), and 1997–2005 (reflective of current DGN gear modification regulations in effect). Observer coverage of the DGN fleet targets 20 percent of the annual sets made in the fishery, with close to 100 percent of the net retrieval monitored on observed trips for, among other things, species identification and enumeration. Since 1990, approximately 7,200 DGN sets have been monitored by at-sea observers generating a database with in excess of 28,000 records.

3.1.2 Physical environment

The HMS FMP (PFMC 2003, Ch. 4 Pg. 14–Ch. 4 Pg. 17) presents a detailed description of the physical environment covering the geographic location of the DGN fishery. An abridged version of that description is presented here to assist in highlighting salient points with emphasis on variations and influences between El Niño and non El Niño years and to highlight differences in the physical environment north and south of Pt. Conception.

The west coast of North America from the Straight of Juan De Fuca to the tip of Baja California is part of an eastern boundary current complex known as the California Current System (Hickey 1988). The U.S. West Coast EEZ encompasses one of the major coastal upwelling areas of the world, where waters provide a nutrient-rich environment and high densities of forage for HMS species, especially from the Columbia River Plume south to the southern California Bight. The region is influenced by various currents and water masses, the shifting nature of which affects the occurrence and distribution of HMS at particular times of the year and from year to year. Large-scale currents within this region include the surface-flowing California Current and the Inshore Countercurrent (Davidson Current), and the subsurface California Undercurrent (Figure 3.1). The region includes two major river plumes (Columbia River and San Francisco Bay), several smaller estuaries, numerous submarine canyons, and the complex borderland of the Southern California Bight with its offshore islands, undersea ridges and deep basins.

Physical oceanographic features of the environment change seasonally and also during periods of large scale, oceanic regime shifts such as El Niño. The California Current generally flows southward year round, with strongest flows in spring and summer. Inshore, these flows may be reversed by the seasonal appearance in fall and winter of the subsurface poleward-flowing Inshore Countercurrent. The California Undercurrent primarily intensifies in late spring and summer as a narrow ribbon of high-speed flow which presses northward at depth against the continental slope, generally beneath the equator-ward flowing upper layers (Lynn and Simpson, 1987). Coastal upwelling of cold, salty and nutrient-rich water to the surface occurs primarily in spring and summer in California and into early fall off Oregon, driven by prevailing seasonal winds. Upwelling is often most intense near such promontories as Cape Mendocino and Pt. Conception. During El Niño events, flow in the California Current is anomalously weak, the California Undercurrent is anomalously strong, and the water in the upper 500 m of the water column is anomalously warm (Chelton and Davis 1982).

[7] http://swr.nmfs.noaa.gov/psd/codgftac.htm

The Southern California Bight (SCB) differs dramatically from the regions to the north and south. The shelves in this area are generally very narrow (<10 km) and the sea bed offshore is cut by a number of deep (>500m) basins (Figure 3.2). The ocean is generally warmer and more protected here than areas to the north, especially inshore of a line roughly drawn from San Miguel Island to San Clemente Island. From Pt. Conception northward to off Cape Flattery, Washington, the coastline is relatively unprotected from the force of the sea and prevailing northwest winds. In contrast to the SCB, rugged waters and sea state conditions are common north of Pt. Conception.

Episodic oceanographic events such as El Niño and La Niña may affect the occurrence and distribution of organisms and the short-term productivity of the system. During episodic or persistent warm periods, the more tropical species (such as striped marlin, pelagic thresher shark, dorado, tropical tunas) may become more abundant with the EEZ, along with some of the more tropical prey species upon which they feed (e.g., pelagic red crab).

3.2 Finfish

Both of the target species encountered in the DGN fishery, the broadbill swordfish, *Xiphias gladius,* and common thresher shark, *Alopias vulpinus*, as well as several of the non-target species, are included as management unit species under the HMS FMP (PFMC 2003, Ch. 3 Pg.2) and listed below in Table 3.1. The HMS FMP further designates a complex of fish species as "prohibited species" meaning that they cannot be retained, or can be retained only under specified conditions, by persons fishing for management unit species (PFMC 2003, Ch. 3 Pg.6).

Descriptions of the baseline conditions in the DGN fishery are presented below. Background information on the geographic area and extent of the DGN fishery, catch and effort levels for major target and non-target species and pertinent past and present management and regulatory actions that have shaped the fishery is presented in Section 3.5. The HMS FMP provides a detailed description of the baseline environment for all HMS fisheries, including the DGN fishery and the reader is referred to that reference for further insight (PFMC 2003, Ch.4 Pg.14).

3.2.1 Current Stock Status for Target Species

The 2005 HMS Stock Assessment and Fishery Evaluation Report (HMS SAFE) provides an updated status of the HMS management unit species, which includes the target species for the DGN fishery (HMSMT 2005, Ch. 5, p.103). Given the highly migratory nature of many of the HMS FMP management unit species, effective management can only be achieved with coordinated cooperation in the international arena. HMS stock assessments are periodically carried out by scientists from Pacific-based Regional Fisheries Management Organizations such as the Inter-American Tropical Tuna Commission (IATTC) and by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific (ISC).

Stock status refers to the condition or health of the species (or stock) in the management unit. Status is usually determined by estimating the abundance (or biomass or yield) of the stock throughout its range and comparing the estimate of abundance with an adopted acceptable level of abundance (reference point). The HMS FMP (PFMC 2003, Pg. ES-5), as required by the MSA, establishes a level of biomass (or proxy) below which a stock is defined as being in an "overfished" condition and a level of fishing mortality above which "overfishing" is occurring. If overfishing is occurring, fishing levels must be reduced. Stocks that are overfished must be rebuilt to certain biomass levels within a certain time period. As required by the Magnuson-Stevens Act, HMS stocks will be managed to achieve optimum yield (OY). None of the target species in the DGN fishery have been declared overfished or undergoing overfishing, although stock assessments have not been completed for several species taken incidentally in the DGN fishery.

Stocks of two species of pelagic sharks, including the common thresher shark, are being managed using precautionary harvest guidelines under the HMS FMP. Basic population dynamic parameters for these shark species are poorly known, and they are considered vulnerable given their life history characteristics (slow growth, late maturing, and low fecundity). A harvest guideline is a numerical harvest level that is a general objective and is not a quota. A quota is a specified numerical harvest objective, the attainment of which triggers the closure of the fishery or fisheries for that species. If a harvest guideline has been reached, NMFS will initiate review of the species' status according to provisions in the HMS FMP and in consideration of Council recommendations. Average DGN catch levels for common thresher shark during the time period 2001–04 did not surpass the established HMS FMP harvest guideline.

3.2.1.1 Swordfish (Xiphias gladius)

Swordfish occur throughout the Pacific Ocean between about 50° N latitude and 50° S latitude. They are caught mostly by the longline fisheries of Far East and Western Hemisphere nations. Lesser amounts are caught by gillnet and harpoon fisheries and they are seldom caught by recreational fishermen.

<u>HMS FMP Management Objective</u>: OY = MSY; however, no MSY has been estimated for the eastern Pacific stock.

Status

The stock structure of swordfish is not well known in the Pacific. There are indications that there is only limited exchange of swordfish between the eastern Pacific Ocean (EPO) and the central and western Pacific Ocean. Hinton (2003) concluded that there are northern and southern stocks of swordfish in the EPO, with the boundary between the stock distributions occurring at 5° S latitude, and that there may at times be some mixing of stocks from the central Pacific with the northeastern stock. The northeastern stock appears to be centered off California and Baja California, Mexico, recognizing that there may be movement of a northwestern Pacific stock of swordfish into the EPO at various times.

The lack of contrast in the standardized catch and effort series in the northern and southern regions of the EPO suggests that the fisheries that have been taking swordfish in these regions have not been of a magnitude sufficient to cause significant responses in the populations. As well, catches in the region have been fairly stable since 1989, averaging about 3,700 mt in the northern region and 8,400 mt in the southern region annually. Based on these considerations, it appears that swordfish are not overfished in the northern and southern regions of the EPO (Hinton, *et al.* 2004).

Recent ISC assessments of swordfish stocks in the North Pacific (north of 10° N latitude and west of 130° W longitude), based on catch-per-unit-effort indices from Japanese longline vessels, show declining trends (ISC 2004b). These trends are mainly driven by declines in the northwest portion of the study area (north of 10° N latitude and west of 170° E longitude) and their proximate cause is not known at present (e.g., changes in stock abundance, environmental variability, and/or fishing practices).

3.2.1.2 Common Thresher shark (Alopias vulpinus)

The common thresher shark is a pelagic species inhabiting both coastal and oceanic waters throughout the tropical and temperate Pacific. While individuals are typically caught in the upper water column, they are capable of periodic dives to 1,800 ft (550 m) in depth. Thresher sharks are most commonly observed offshore, but frequent coastal zones in search of food. Adults are common over the continental shelf, while juveniles predominantly reside in coastal bays and nearshore waters. Most West Coast commercial landings of common thresher are presently taken in the DGN fishery, but some are also caught by set nets and the small-mesh drift nets. Adults are predominantly taken in the DGN fishery while the inshore net fisheries landings are predominantly juveniles. Although temporal and regional closures have resulted in the take of fewer adults than in previous years, the common thresher remains an important component of the DGN fishery. Common thresher populations off Baja California are thought to be of the same population as those fished off the U.S. West Coast (Hanan, *et al.* 1993).

Common thresher sharks are harvested in California's recreational fishery, but are a relatively minor component of the overall total catch. Private boaters catch thresher sharks as they migrate from Baja California, Mexico, to Oregon and Washington in the spring and early summer months. From 1982 to 2004, private boaters have caught on average 2,000 fish annually. Since 2001, annual catch estimates have ranged from 4,000 to 6,000 fish (Table 3.2). However, catch estimates are considered indeterminate due to a low number of sampler contacts with fishers.

Thresher sharks are often hooked on the upper lobe of the caudal fin, which is used to stun prey. Catch-and-release mortality is assumed higher for sharks hooked and fought in this fashion (C. Sepulveda, personal communication). The estimates of fishing mortality or recreational landings for the common thresher shark in California are considered underestimated and additional monitoring is needed. Similarly, little is known about the take of common thresher shark in fisheries off Mexico because shark landings are not routinely reported by species, and the pelagic thresher shark is also common off Mexico.

<u>HMS FMP Management Objective</u>: For all sharks in the management unit, the HMS FMP establishes that OY be set at 75 percent of MSY, because these species have low productivities and are vulnerable to overfishing.

Status: The thresher shark is considered a "data deficient" species by the World Conservation Union (IUCN). A taxon is considered "data deficient" when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status.

With state-imposed time and area restrictions in place since 1990 (see timeline, Table 3.12), the population appears to be in recovery; however, because this stock is also harvested by the adjacent Mexican fishery, total annual landings are not well understood for this species. A regional harvest guideline of 340 mt is in place under the HMS FMP. Average annual DGN catch levels for the common thresher shark during the time period 2001–04 averaged 199 mt.

3.2.2 Non-Target Catch

3.2.2.1 Overview

For the purposes of this EA, non-target catch includes DGN incidental catch retained for personal use and/or sale, and DGN catch discarded, dead or alive, sometimes referred to as bycatch, which includes economic discards (e.g., blue sharks) and/or regulatory discards (e.g., protected species). The definitions currently in use for terms such as bycatch, discards, and incidental catch are not standardized for the most part across fisheries, hence the decision to use the umbrella term non-target catch to avoid confusion.

The stewardship responsibilities of NMFS to lead and coordinate the nation's collaborative effort to monitor and reduce the bycatch of living marine resources are identified in the MSA, the SA, the MMPA, the Migratory Bird Treaty Act, and in international agreements. As part of its efforts to meet these responsibilities, NMFS reported on the scope and complexity of bycatch in the United States, including the DGN fishery, and approaches to addressing bycatch problems. In early 2003, NMFS developed a

National Bycatch Strategy to monitor and mitigate bycatch within the Nation's fisheries. Within that strategy, a National Working Group on Bycatch was appointed to formulate procedures for monitoring bycatch, in particular to provide information that could be used to develop standardized bycatch reporting methodologies (NMFS 2004b).

As stated previously, NMFS has operated an at-sea observer program in the DGN fishery since July 1990,[8] which has enabled reliable estimates of non-target interactions and catch rates because the observers normally monitor 100 percent of the gear retrieval and catch. For the time period 1990–96, the annual DGN set coverage by observers ranged from 8 percent-11 percent while the coverage has averaged roughly 20 percent for the period of 1996-present.

3.2.2.2 Major vs. Minor Non-Target Catch

For the purposes of this EA, the assessment of catch rates and impacts are reported and analyzed for those species that were captured in quantities greater than 10 animals per 100 sets observed. These are referred to as major non-target species (Tables 3.3, 3.4, and 3.5). The species captured in quantities less than 10 per 100 sets observed did not, for the most part, involve species for which there are pressing resource conservation concerns, given their infrequent capture in the DGN fishery. These are referred to as minor non-target species. A tabulation of the minor non-target species that were excluded from the analysis for the purposes of this EA are included under the subheadings for tunas, sharks, and finfish in Chapter 4. The tabulation is based on observer records from 1997–2005, which include the baseline period under review here.

3.2.3 Current Status of Major Non-Target Species

3.2.3.1 Major Non-target Tunas

Three commercially important tuna species, albacore, skipjack, and bluefin, comprise the majority of the non-target tuna catch in the DGN fishery. Two other tuna species, bigeye and yellowfin, were captured infrequently in the DGN fishery and are considered, for the purpose of this EA, minor non-target species.

North Pacific Albacore (*Thunnus alalunga*) (Stocker 2005)

Stock status of North Pacific albacore is reviewed at one- to two-year intervals by the North Pacific Albacore Working Group of the ISC (formerly, the North Pacific Albacore Workshop) with participating members from U.S., Mexico, Canada, Japan, and Taiwan. The latest assessment was conducted in December 2004. Estimated stock biomass decreased from about 360,000 mt in 1975 to about 270,000 mt in the late 1980s. Stock biomass then increased to a peak of roughly 460,000 mt by the early 2000s and has remained at that level to date, likely due, in large part, to improved recruitment. The point estimate of the 2004 stock biomass was roughly 429,000 mt ranging from 329,000 to 563,000 mt. Spawning stock biomass had experienced slight fluctuations since the late 1970s but generally has remained relatively stable at roughly 90,000 mt over the last two decades. Since 1990, the population has been in a high productivity phase whereas in the late 1970s and throughout the 1980s it was experiencing low productivity. The estimated fishing mortality in 2004 was high relative to commonly used reference points, and may be cause for concern regarding the current stock status of North Pacific albacore.

Since the mid-1970s, the U.S. component of the overall pan-Pacific Ocean catch is estimated at roughly 15 percent. Albacore troll boats account for nearly all the West Coast catch, with DGN non-target catch a

[8] CDFG operated an observer program in the DGN fishery from 1980-1990 as required under state legislation.

mere fraction. The majority of the DGN caught albacore (>80 percent) is retained. Currently there are no quotas or harvest guidelines established for north Pacific albacore catch under the HMS FMP. The next formal assessment is scheduled for November/December 2006.

Pacific Bluefin *(Thunnus thynnus)* (ISC 2004a, as in 2005 SAFE)

Stock status of Pacific bluefin is reviewed at one- to two- year intervals by the Bluefin Working Group of the ISC. The latest assessment was conducted in January 2006, but the results were not sufficient to determine stock status. However, the fishery has been sustained for over 50 years while taking annual catches similar to those taken in recent years. Although stock status could not be estimated, biomass appeared to have recovered from a record low level in the late 1980s to a more intermediate level in recent years. The size of the 2001 cohort was estimated to be large enough to sustain the current fishery over the next few years; however, that estimate was uncertain. The high fishing mortality on young fish (ages 0–2) and older fish (ages 6+) was cause for concern with respect to maintaining a sustainable fishery over the long term. Subsequent meetings of the Bluefin Working Group are needed to address both data concerns and to improve assessment methods.

North Pacific bluefin probably constitute a single north Pacific-wide stock with trans-Pacific migratory patterns. Most of the Pacific-wide catch occurs in the western Pacific. The U.S. West Coast catch is taken primarily by purse seiners operating off southern California and Baja California, Mexico, mainly between spring and fall and within 100 mi of shore. In the eastern Pacific, bluefin taken are nearly always immature (ages 0–2). Catch by U.S. West Coast fisheries constitutes 2–3 percent of the Pacific-wide catch.

Skipjack *(Katsuwonus pelamis)* (Maunder and Harley 2004, as in 2005 SAFE)

Stock status of skipjack tuna in the eastern Pacific is assessed every 1–2 years by the IATTC. The latest assessment was conducted in 2004. The assessment was considered preliminary because of uncertainties about stock structure, the vulnerabilities of all age classes, and how well fishery catch/effort data tracks abundance. The analysis indicated that a group of relatively strong cohorts entered the fishery in 2002–03 (but not as strong as those of 1998) and that these cohorts increased the biomass and catches during 2003. There is an indication the most recent recruitments are average, which may lead to lower biomasses and catches. Unfortunately, it was not possible to estimate the status of the stock relative to AMSY (average maximum sustainable yield), a commonly used reference point for management, because of uncertainties in estimates of natural mortality and growth. Nontheless, the IATTC concluded that there was not a conservation concern for skipjack in the eastern Pacific and did not recommend that management was necessary.

Skipjack tuna are taken throughout the Pacific, primarily by purse seiners, but also by baitboat fishers. In the eastern Pacific, there are two major fisheries, one off Central and South America, and one off North America in the waters off Baja California, Mexico, the Revillagigedos Islands, and near Clipperton Island. The U.S. West Coast catch constitutes less than 1 percent of the total eastern Pacific catch.

3.2.3.2 Major Non-Target Sharks

As with the rationale presented for delineating between major and minor non-target tuna catch, a similar approach is applied here for the shark species taken in the DGN fishery. The focus of the analysis will be on the major non-target shark species, namely the blue shark and shortfin mako shark.

Blue Shark *(Prionace glauca)* (Kleiber, *et al.* 2001)

Blue sharks are found world wide in temperate and tropical waters. They are a pelagic species that rarely comes near shore but have been known to frequent inshore areas around oceanic islands and locations where the continental shelf is narrow. In the eastern Pacific, blue sharks range from the Gulf of Alaska to Chile, where they are known to migrate to higher latitudes during the summer and lower latitudes during the winter.

Recreationally blue sharks are considered a sport fish and larger individuals provide a challenge for fishermen using light tackle. Because most of the recreational shark trips are based out of Southern California, and the average blue shark size is small (7 lb), blue sharks are often caught and released in this fishery. Most commercially-caught blue sharks are considered undesirable bycatch, since the meat quickly ammoniates, reducing marketability. As with several other shark species, the fins of blue sharks are sold to Asian markets for use in shark-fin soup. Blue sharks are rarely landed or marketed in the DGN fishery. The blue shark is currently listed as "near threatened" by the IUCN.

For the north Pacific blue shark population, a range of examples of what might be considered "plausible" MSY was calculated in 2001 (Kleiber, *et al.* 2001). The data on which the production model analysis were based consisted of catch, effort, and size composition data collected during the period 1971 through 1998 from commercial fisheries in the North Pacific that catch significant numbers of blue sharks, primarily the Japan and Hawaii-based pelagic longline fisheries. The results indicated that the blue shark stock, under the fishing regime present at that time in the North Pacific, appeared to be in no danger of collapse. A second set of preliminary assessments were completed in 2005 and the results were similar to the previous production model results, namely that blue sharks in the North Pacific are not suffering "overfishing" nor approaching an "overfished" state. (P. Kleiber, personal communication).

Shortfin Mako Shark *(Isurus oxyrinchus)* (From PFMC 2003)

The shortfin mako occurs throughout the tropical and temperate Pacific but is not managed internationally. It is widely distributed in pelagic waters, and the population fished off the West Coast is likely part of a stock that extends considerably to the south and west. Although makos are most frequently found above the mixed layer, they have been recorded at depths 740 m. Tagging and fishery catch data show makos prefer water temperatures between 17–20° C, and it has been hypothesized this species migrates seasonally from the coast of California along the Baja peninsula following favorable seasonal water conditions (Cailliet and Bedford 1983). This movement pattern has been supported by tag and release studies. West Coast fisheries take mainly juveniles, with an average dressed weight of 34 lb. (Taylor and Bedford 2001). Shortfin mako constitutes an important incidental catch to the DGN fishery whose market quality and ex-vessel value are important components of the landed incidental catch (Cailliet and Bedford 1983; Holts and Sosa-Nishizaki 1998).

Shortfin mako is the leading HMS FMP shark species caught in California's recreational fishery. A majority are caught by anglers fishing with rod-and-reel gear from private vessels in the Southern California Bight from June through October, peaking in August. Historically, makos have been esteemed as a prized game fish along the East Coast of the U.S. During the early 1980s, they increased in prominence as a popular game fish, and annual catch estimates peaked in 1987 at 22,000 fish. Since 2001, annual catch estimates have ranged from 2,000 to 6,000 fish, with a percentage of sharks successfully released by Southern California fishermen favoring catch-and-release versus harvest.

<u>HMS FMP Management Objective</u>: OY at 75 percent of MSY.

Because basic population dynamic parameters for this species of shark are unknown, it is being managed under the HMS FMP with a precautionary harvest guideline of 150 mt. Clear effects of exploitation have not been shown, and the local stock tentatively is assumed to be not overfished. The World Conservation Union (IUCN) currently lists the shortfin mako as "Near Threatened" due to a lack of evidence that population levels have been sufficiently depleted to warrant a "Vulnerable" status.

3.2.3.3 Other Major Non-target Finfish

The major non-target catch of other finfish in the DGN fishery include the common mola, opah, louver, Pacific pomfret, Pacific mackerel, and during El Niño years, the bullet mackerel.

Common Mola *(Mola mola)*

Common mola, also known as ocean sunfish, are a seasonally common inhabitant of southern Californian waters. Presently, very little is known about the habitat preferences or behavior of ocean sunfish but prevailing thought is that molas associate with frontal and stratified water masses rather than in cooler, mixed water (Cartamil and Lowe 2004; Sims and Southall 2002). Key aspects of their biology are largely unknown, such as annual movements and the mode and location of breeding. With respect to mola migrations into the Southern California Bight, peak abundance occurs off of Catalina Island in late September and early October, coinciding with peak water temperatures (D.Cartamil 2006, personal communication).

Research in the Atlantic suggests that the larger part of their lives may be spent in deep water, although they are thought to undertake seasonal inshore migrations (Fraser-Bruner 1951; Lee 1986). This is especially important in some regions, like the Mediterranean, where molas can make up 70–95 percent by number of driftnet catches (Silvani, *et al.* 1999). Mola catches in the DGN fishery for the years 2001–04 make up 30 percent and 44 percent of the total catches by number, north and south of Pt. Conception respectively. There is scant information available on the population dynamics for this species.

Opah (*Lampris guttatus*) (From Taylor and Bedford 2001)

Opah occur worldwide in temperate and tropical seas. In the eastern Pacific, they occur from Chile to the Gulf of Alaska. All life stages of this species are pelagic and oceanic, occurring from the sea surface to a depth of 1,680 ft. Seasonal movements are not well known in the Pacific. Although not much is known about their basic reproductive habits, anecdotal evidence suggests a spring spawning window. The size of the opah population off the coast of California, nor whether local subpopulations exist, is not known at this time.

Between 1990 and 1999, over 660 mt of opah were landed in California, with annual landings ranging from 37 mt to112 mt. The highest landings of the decade occurred in 1998; associated the 1997–98 El Niño. Although the majority of opah landed in California since 1990 were landed from San Luis Obispo County south (about 50 percent from San Diego County alone), landings were reported as far north as Crescent City.

Sport fishermen targeting albacore from British Columbia to Baja California occasionally catch opah. Within California, many sport caught opah are taken from the northern Channel Islands south to the Coronado Islands, just below the U.S.-Mexico border.

Louvar (*Luvarus imperialis*) (From Taylor and Bedford 2001)

Louvar occur worldwide in temperate and tropical seas. In the eastern Pacific they are found from central Washington to Chile. Although generally uncommon, they are relatively abundant in southern California. All life stages of this species are pelagic and oceanic. Adults occur from the sea surface to a depth of 1,970 ft, but most are found at depths below 660 ft.

Off California, louvar tend to be seasonal transients associated with warm water currents late in the year. Although primarily taken in the DGN fishery, landings from other gear types such as set gillnet, hook-and-line, harpoon, trawl, and round haul nets have been recorded. The majority of catches occur off the Southern California Bight, with success being highest in the area encompassing Pt. Loma, San Clemente Island, and Cortez Bank. In as much as louvar are strongly associated with warmer water currents, catches of this species typically increase during the late summer through fall and show a dramatic rise during strong El Niño events. There is not a significant recreational fishery for louvar.

From 1990 through 1999, a total of 44 mt were landed in California. The size of the louvar population worldwide or off California is not known. Louvar are solitary fish and few are taken at any one time. Because the population is worldwide in tropical and temperate seas, the California fishery probably has little impact on the species as a whole. It is not known whether local subpopulations exist or how far individual louvar travel.

Bullet Mackerel *(Auxis rochei)*

Bullet mackerel are found worldwide in warm seas and in the eastern Pacific Ocean from the Southern California Bight south to Peru. Bullet mackerel frequent California waters in association with El Niño events. Bullet mackerel were caught in significant numbers in southern California in 1983–86 (Karpov and Albin 1995). Their northernmost and peak occurrence during the 1983–86 event was in the Santa Barbara/Ventura district in 1984.

Pacific Mackerel (*Scomber japonicus*)

Pacific mackerel range from Mexico to southeastern Alaska. They are most abundant south of Pt. Conception, California, and usually appear within 20 mi offshore. The "northeastern Pacific" stock of Pacific mackerel is harvested by fishers in the U.S. and Mexico. Pacific mackerel are an important prey item for a variety of fish, mammals and sea birds. Pacific mackerel are managed under the auspices of the Council as part of the Coastal Pelagic Species FMP.[9] The FMP establishes a Pacific mackerel harvest guideline for 2005–06 season of 17,419 mt. Of this total, 13,419 mt has been allocated for a directed fishery and the remainder of the harvest guideline (4,000 mt) has been set aside for incidental take following the closure of the directed fishery.

3.2.3 Prohibited Species

Any HMS stocks managed under the HMS FMP for which quotas have been achieved and the fishery closed are prohibited species. In addition, Table 3.6 lists the prohibited non-HMS species designated under the HMS FMP. In general, prohibited species must be released immediately if caught, unless other provisions for their disposition are established, including for scientific study.

[9] http://www.pcouncil.org/cps/cpsback.html

3.2.3.1 Salmon

The Chinook (king) and coho (silver) salmon are the main salmon species taken in the ocean fisheries off California and Oregon. Sockeye, chum and steelhead are rarely caught in these fisheries. Distribution of the prohibited salmon species range from Japan to the Bering Sea and south to San Diego, California, although most occur north of Santa Cruz, California. In recent years, because of the critically low population sizes of some salmon stocks and threats to their continued existence, certain stocks in California and Oregon have been listed as endangered or threatened species under the ESA.

There have been no recorded interactions of listed or non-listed salmon stocks with the DGN fishery.

3.2.3.2 Great White Shark

The great white shark is an oceanic and coastal inhabitant ranging in the eastern Pacific from the Gulf of Alaska to the Gulf of California, although it appears to prefer temperate waters (Eschmeyer, *et al.* 1983). As a large, true apex predator, this species is relatively rare. This shark commonly patrols small coastal archipelagos inhabited by pinnipeds (seal, sea lions and walruses); offshore reefs, bank, and shoals; and rocky headlands where deepwater lies close to shore. Its low productivity and accessibility in certain localized areas, make it especially vulnerable. Overall population estimates for this species are unknown and even regional and localized estimates are questionable.

Adult great whites cited off northern California most likely originate from Southern California. The northward migration may be triggered by a shift in dietary preference toward seals and sea loins as the sharks grow large (Klimley 1994). Large males and females tend to be captured along the northern coast, while juveniles as well as large females are generally found to the south. This species has been prohibited by the State of California since 1995, where it may not be taken except for scientific and educational purposes under permit. The HMS FMP adopts the state measures across the board. At present, the white shark is listed as “vulnerable” by the IUCN throughout its range, and is now protected in some regions.

In 2004, the Convention on International Trade in Endangered Species (CITES) placed this shark on its Appendix II list, which demands tighter regulations and requires a series of permits that will control the trade in white shark products.

There have been three recorded interactions with the DGN fishery (one in December 1996 and two in September, 1997). Two were retained as incidental catch and one was discarded dead.

3.2.3.3 Basking Shark

The basking shark is a coastal pelagic species inhabiting the eastern Pacific from the Gulf of Alaska to the Gulf of California. The basking shark is typically seen swimming slowly at the surface, mouth agape in open water near shore. This species is known to enter bays and estuaries as well as venturing offshore. Basking sharks are often seen traveling in pairs and in larger schools of up to a 100 or more. Basking sharks are highly migratory. Sightings of groups of individuals of the same size and sex suggest that there is pronounced sexual and population segregation in migrating basking sharks.

In the past, basking sharks were hunted worldwide for their oil, meat, fins, and vitamin-rich livers. Today, most fishing has ceased except in China and Japan. The fins are sold as the base ingredient for shark fin soup. A small fishery took place off Monterey Bay during the period from 1924 to the 1950s for fish meal and liver oil; it is still taken as bycatch in the area. Basking sharks occur in greatest numbers during the autumn and winter months off California, but may shift to northern latitudes in spring and summer, along the coasts of Washington and British Columbia. The harvest of this species has not been allowed by California since 2000, and the HMS FMP adopts the state measures across the board. It is thought to be the least productive of shark species. The basking shark is also currently categorized as “vulnerable” throughout its range and “endangered” in the northeast Atlantic Ocean and north Pacific Ocean regions by the IUCN.

There have been two recorded captures of basking shark in the DGN fishery (December 1993, May 2002); one was released alive and one was released assumed dead.

3.2.3.4 Megamouth Shark

The megamouth shark is a very unique animal that lives in the upper part of the water column in open ocean areas. There have been only a few sightings of megamouth, including a specimen that was tagged and followed for two days, allowing insight into its habitat preference and behavior. It remained at a depth of 15 m during the night, then dove to 150 m at dawn and returned to shallow waters at dusk. The megamouth is presumed to be a vertical migrator on a diel cycle, spending the daytime in deep waters and ascending to midwater depths at night. This vertical migration may be a response to the movements of the small animals on which it feeds. The krill that make up part of megamouth’s diet are known to migrate from deep waters to the surface.

The HMS FMP provides protection as a prohibited species because of extreme rarity and uniqueness. Due to the lack of information concerning distribution and population status, the megamouth is considered “data deficient” by the IUCN.

Incidentally-caught specimens that would not survive if released will be made available to recognized scientific and educational organizations for research or display purposes. Four specimens of this rare species have been taken in the DGN fishery; all but one was released alive (November 1984, October 1990, October 1999, and October 2001). (A review of world-wide megamouth captures, including the four DGN interactions, can be found at Florida Museum of Natural History 2006)

3.2.3.5 Pacific Halibut

Pacific halibut occur from the Sea of Japan to the Bering Sea and south to Santa Rosa Island, southern California. It is an important commercial and sport species in the Pacific Northwest, and fished commercially by longline fisheries.

There have been no recorded interactions of Pacific halibut in the DGN fishery.

Table 3.1 HMS FMP Management Unit Species.

Common Name	Scientific Name
Billfishes	
Striped marlin	*Tetrapturus audax*
Swordfish	*Xiphias gladius*
Sharks	
Common thresher shark	*Alopias vulpinus*
Pelagic thresher shark	*A. pelagicus*
Bigeye thresher shark	*A. superciliosus*
Shortfin mako shark	*Isurus oxyrinchus*
Blue shark	*Prionace glauca*
Tunas	
North Pacific albacore	*Thunnus alalunga*
Yellowfin tuna	*T. albacares*
Bigeye tuna	*T. obesus*
Skipjack tuna	*Katsuwonus pelamis*
Northern bluefin tuna	*T. thynnus*
Other Finfish	
Dorado	*Coryphaena hippurus*

Table 3.2. Estimated private boat catch of HMS shark species for the period 2001-2004. Source: RecFIN, includes landed and released catch.

	Shortfin mako (numbers of fish)	Thresher sharks (numbers of fish)
2001	5,000	2,000
2002	6,000	2,000
2003	4,000	2,000
2004	2,000	4,000
Total	17,000	10,000
Average	4,250	2,500

Table 3.3 Catch rates in numbers-per-100 sets for the major non-target species observed in the DGN fishery (North and South of Pt. Conception) for the period 2001-2004.

	Catch in numbers per 100 sets			
	All Years[a] North PC	All Years South PC	2001-2004[b] North PC	2001-2004 South PC
Bonito, Pacific	0.45	16.9	0	34.2
Fish, Unidentified	7.2	5.2	0	1
Hake, Pacific	7.9	0.69	1	0.3
Louvar	14.2	7	41.8	12.8
Mackerel, Bullet	1.8	66.1	0	4.5
Mackerel, Pacific	59.6	82.7	23.5	47.5
Marlin, Blue	0.04	1.1	0	1
Marlin, Striped	0.59	8.2	0	5.9
Mola, Common	453.8	664.3	878.6	745.6
Opah	36.7	64.9	30.6	61.8
Pomfret Pacific	15.2	1	39.8	1.4
Remora	2.5	0.9	0	0.8
Shark, Bigeye Thresher	7.1	6.1	0	6
Shark, Blue	461.4	176.6	312.2	129.5
Shark, Pelagic Thresher	0	1.8	0	0
Shark, Shortfin Mako	42.6	121	18.4	149.6
Stingray, Pelagic	1.5	6.3	0	6.5
Tuna, Albacore	487.6	49.5	1189.8	60.4
Tuna, Bigeye	0.3	0.3	0	0
Tuna, Bluefin	83.7	29.2	235.7	26.8
Tuna, Skipjack	121.8	122	27.6	149.4
Tuna, Yellowfin	1.2	10	0	19.4
Yellowtail	0.04	1.6	0	2.3

[a] For all years (1990-2005), the observed sets south of Pt. Conception equal 4,344 and north of Pt. Conception equal 2862.

[b] For the time series 2001-2004, the observed sets south of Pt. Conception equal 1,121 and north of Pt. Conception equal 98

Table 3.4. Total observed catch and fate for the major non-target species observed in the DGN fishery (South of Pt. Conception) for the period 2001-2004.

	Fate of Observed Catch 2001-2004 South Pt Conception[a]						
	Total Catch	Kept	% Kept	Returned Alive	Returned Dead	Returned Dead (%)	Returned Unknown
Bonito, Pacific	383	125	32.6	17	241	62.9	0
Fish, Unidentified	11	0	0.0	0	9	81.8	2
Hake, Pacific	3	0	0.0	0	3	100.0	0
Louvar	144	130	90.3	0	14	9.7	0
Mackerel, Bullet	51	25	49.0	1	25	49.0	0
Mackerel, Pacific	533	136	25.5	20	375	70.4	2
Marlin, Blue	11	0	0.0	0	11	100.0	0
Marlin, Striped	66	0	0.0	0	66	100.0	0
Mola, Common	8358	2	0.0	7819	516	6.2	21
Opah	693	655	94.5	0	38	5.5	0
Pomfret Pacific	16	9	56.3	1	6	37.5	0
Remora	9	0	0.0	8	0	0.0	1
Shark, Bigeye Thresher	67	40	59.7	0	27	40.3	0
Shark, Blue	1452	20	1.4	532	874	60.2	26
Shark, Pelagic Thresher	0	0	0.0	0	0	0.0	0
Shark, Shortfin Mako	1677	1528	91.1	45	103	6.1	1
Stingray, Pelagic	73	1	1.4	56	12	16.4	4
Tuna, Albacore	677	547	80.8	0	130	19.2	0
Tuna, Bigeye	0	0	0.0	0	0	0.0	0
Tuna, Bluefin	300	264	88.0	0	36	12.0	0
Tuna, Skipjack	1675	712	42.5	25	938	56.0	0
Tuna, Yellowfin	217	187	86.2	0	30	13.8	0
Yellowtail	26	26	100.0	0	0	0.0	0

[a] For the time series 2001-2004, the observed sets south of Pt. Conception equal 1,121

Table 3.5 Total observed catch and fate for the major non-target species observed in the DGN fishery (North of Pt. Conception) for the period 2001-2004.

	Fate of Observed Catch 2001-2004 North Pt. Conception[a]					
	Total Catch	Kept	% Kept	Returned Alive	Returned Dead	Returned Unknown
Bonito, Pacific	0	0	0.0	0	0	0
Fish, Unidentified	0	0	0.0	0	0	0
Hake, Pacific	1	0	0.0	0	1	0
Louvar	41	37	90.2	0	4	0
Mackerel, Bullet	0	0	0.0	0	0	0
Mackerel, Pacific	23	2	8.7	1	20	0
Marlin, Blue	0	0	0.0	0	0	0
Marlin, Striped	0	0	0.0	0	0	0
Mola, Common	861	0	0.0	853	5	3
Opah	30	30	100.0	0	0	0
Pomfret Pacific	39	21	53.8	0	18	0
Remora	0	0	0.0	0	0	0
Shark, Bigeye Thresher	0	0	0.0	0	0	0
Shark, Blue	306	0	0.0	98	198	10
Shark, Pelagic Thresher	0	0	0.0	0	0	0
Shark, Shortfin Mako	18	17	94.4	0	1	0
Stingray, Pelagic	0	0	0.0	0	0	0
Tuna, Albacore	1166	1031	88.4	0	134	1
Tuna, Bigeye	0	0	0.0	0	0	0
Tuna, Bluefin	231	207	89.6	0	14	0
Tuna, Skipjack	27	13	48.1	0	13	0
Tuna, Yellowfin	0	0	0.0	0	0	0
Yellowtail	0	0	0.0	0	0	0

[a] For the time series 2001-2004, the observed sets north of Pt. Conception equal 98.

Table 3.6 HMS FMP Prohibited Species.

Common Name	Scientific Name
Great white shark	*Carcharodon carcharias*
Basking shark	*Cetorhinus maximus*
Megamouth shark	*Megachasma pelagio*
Pacific halibut	*Hippoglossus stenolepis*
Pink salmon	*Onchorhynchus gorbuscha*
Chinook salmon	*O. tshawytscha*
Chum salmon	*O. keta*
Sockeye salmon	*O. nerka*
Coho salmon	*O. kisutch*

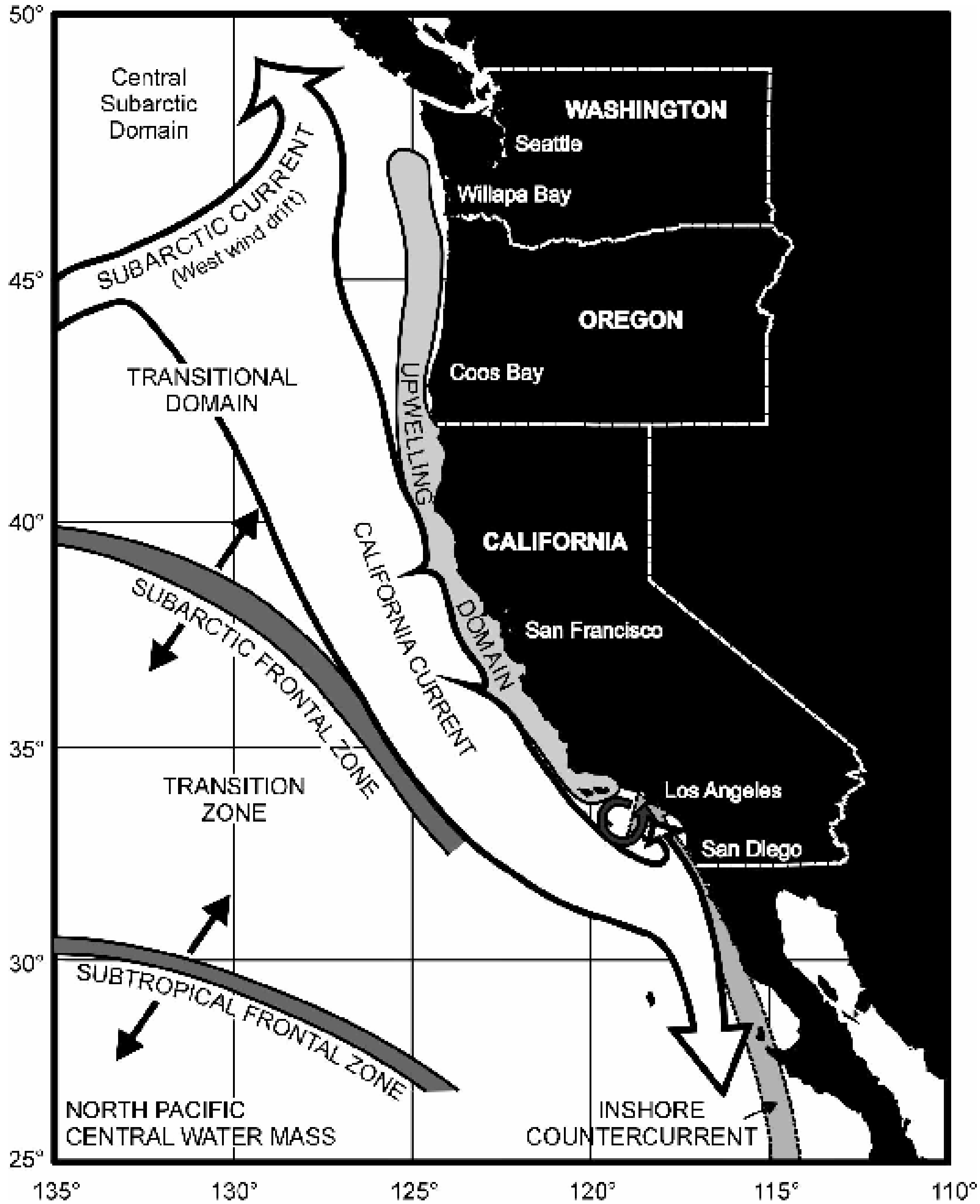


Figure 3.1. Major current and water mass systems that influence essential fish habitat of highly migratory management unit species in the U.S. West Coast EEZ.

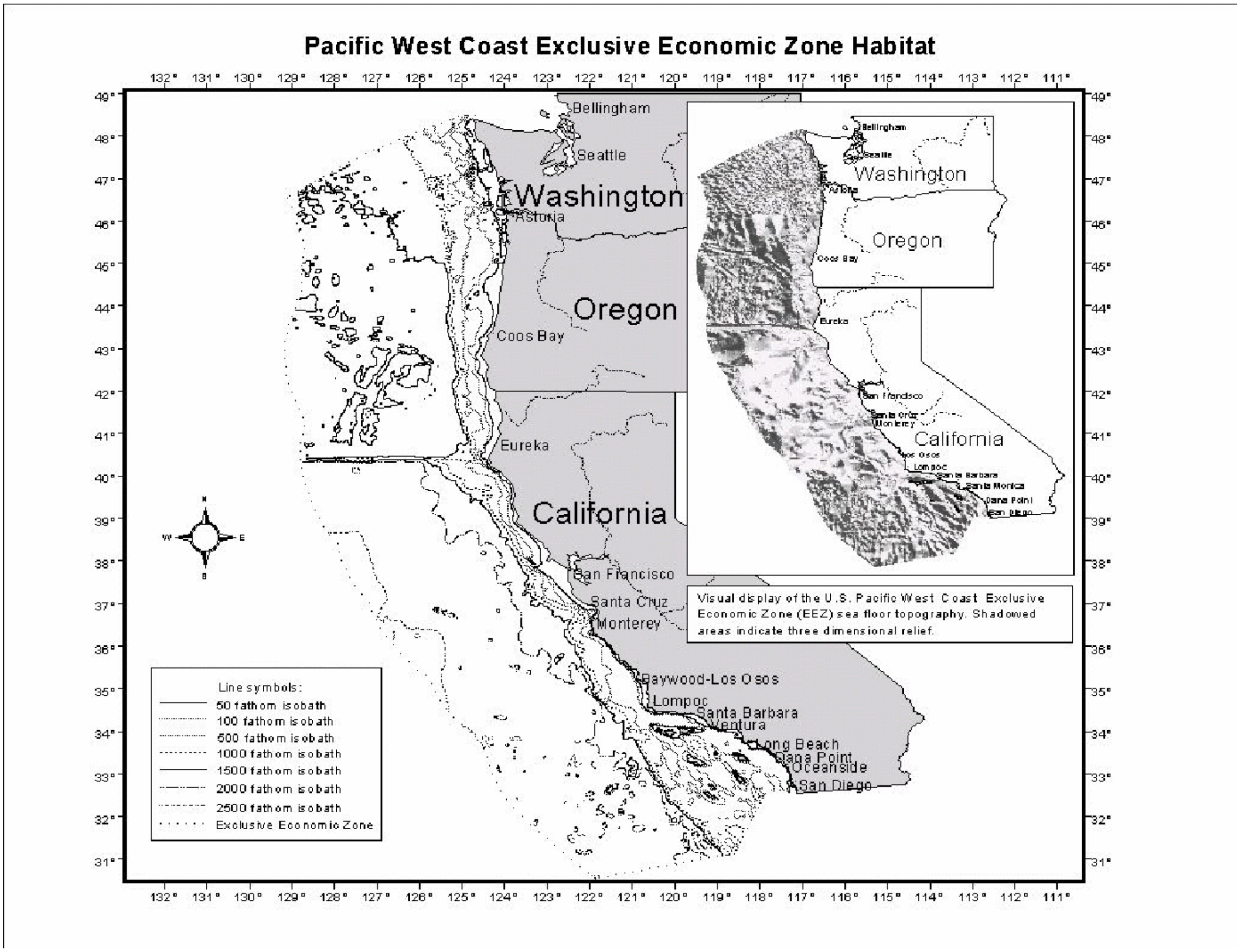


Figure 3.2. U.S. West Coast sea floor bathymetric features within the U.S. West Coast EEZ.

3.3 Protected Species

3.3.1 Marine Mammals

All marine mammals in the waters of the United States are protected under the Marine Mammal Protection Act (MMPA). The MMPA and its implementing regulations set out strict guidance for monitoring marine mammal stocks and estimating human impacts on these stocks. Marine mammals addressed within this EA include members of two distinct orders: *Cetacea*, which includes whales, dolphins and porpoises; and *Pinnipedia*, which includes seals and sea lions (the walrus [*Odobenus rosmarus*] is also included in this order, but is not relevant to this EA). Annually, NMFS is required to produce a Stock Assessment Report (SAR) that provides updated status and population estimates for each marine mammal stock in a region, based on the most recent available information. In addition to estimating the stock's population, NMFS must identify sources of human caused mortalities and calculate the maximum anthropogenic mortalities that can be sustained by the stock, if the stock is to persist at its current population or increase. Potential Biological Removal (PBR) is the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

This section provides natural history information on and describes the status of each marine mammal stock that may be found in the area where the proposed fishery may occur. Most of this information may be found in the most recent published U.S. Pacific marine mammal Stock Assessment Reports (SAR) (Carretta, *et al.* 2005a) and SARs currently in press. Under the MMPA, "strategic" stocks are those marine mammal stocks that are: (1) listed as endangered or threatened under the Endangered Species Act (ESA), (2) likely to become listed under the ESA, or (3) when annual human-caused mortality and serious injury is greater than sustainable levels.

3.3.1.1 Odontocetes

At least 22 species of odontocetes (toothed cetaceans) have been identified from sightings or strandings on the U.S. West Coast and are included in the Pacific SARs. Of this total, eight species can generally be found in moderate or high numbers either year-round or during annual migrations into or through the area. These include the Dall's porpoise (*Phocoenoides dalli*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), Risso's dolphin (*Grampus griseus*), bottlenose dolphin offshore stock (*Tursiops truncatus*), short-beaked and long-beaked common dolphins (*Delphinus delphis* and *D. capensis*), the northern right whale dolphin (*Lissodelphis borealis*), and the Cuvier's beaked whale (*Ziphius cavirostris*). Other species are represented by small and moderate numbers during part of the year, occasional sightings, or strandings. The following is a summary of the status of odontocetes in waters off California and Oregon.

<u>Baird's beaked whale</u> (*Berardius bairdii*): The Baird's beaked whale is distinguished by its large body size, a prominent melon and long beak. They have two pairs of teeth set at the lower jaw and feed on squid and deep-sea fish. They feed often near the sea floor in depths of 1,000–3,000 m. The usually travel in small close-knit groups of up to 10 individuals (maximum group size of 30) (Reeves, *et al.* 2002). Mature females are approximately 10 m long, while mature males are slightly shorter (Leatherwood, *et al.* 1983). The length of gestation is unknown, although records from Japanese whalers indicate that gestation could last either 10 or 17 months and females likely do not give birth more than once every three years (Reeves, *et al.* 2002). Typically, Baird's beaked whale is a deepwater species that occurs near shore only in areas where the continental shelf is very narrow. In the eastern North Pacific, Baird's beaked whale ranges from the southern half of the Bering Sea along the Aleutian Islands, and south off Baja California and it is known to occasionally enter the Gulf of California (Reeves, *et al.*

2002). The SARs designated Baird's beaked whales in the EEZ waters off the coasts of California, Oregon, and Washington (CA/OR/WA) as one stock. In this area, Baird's beaked whales are generally seen from late spring to early fall, primarily along the continental slope. During the colder winter and early spring months (November through April), they are seen less frequently and are presumed to spend most of their time further offshore. Sightings of Baird's beaked whale have been rare, even during ship and aerial transect surveys. The best population estimate currently available is 228 animals (coefficient of variation (CV= 0.51), with a minimum population estimate of 152. There is no information on trends in abundance, and the PBR for this stock is 1.5 animals per year. Mean annual take levels by U.S. commercial fisheries are estimated to be zero animals, based on data from 1997 through 2001. The total fishery and serious injury for this stock can be considered insignificant and approaching zero and it is not classified as a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Bottlenose dolphin—general: Bottlenose dolphins are found worldwide in temperate and tropical waters, absent only from 45° N latitude towards the poles in either hemisphere. They are frequently seen in harbors, bays, lagoons, estuaries, and river mouths. There are two ecotypes: a coastal form and an offshore form. The gestation period is 12 months and calving can take place year-round. Calves are often not fully weaned until 18–20 months of age, and may continue to associate with their mother for several more years post-weaning (Reeves, *et al.* 2002). Coastal animals tend to feed on fish and invertebrates that live on or near the bottom, while offshore animals eat pelagic or mesopelagic fish and squid.

Bottlenose dolphin (*Tursiops truncatus*)—California coastal stock: California coastal bottlenose dolphins are found within about 1 kilometer from shore, primarily from Pt. Conception south into Mexican waters, and at least as far south as Ensenada, though for management purposes, the SARs are restricted to U.S. waters. From tandem surveys conducted between 1990–94 and 1999–2000, (Carretta, *et al.* 2005a). Using the same methods as Caretta *et al.* (1998) the abundance estimate for this stock in southern California waters, based on the 1999–2000 survey, is 206 animals (CV = 0.12). Based on a minimum population estimate of 186, the PBR for this stock is 1.9 animals. Since no recent fishery takes have been documented, and the total fishery mortality and serious injury for this stock can be considered insignificant, coastal bottlenose dolphins are not considered a strategic stock under the MMPA (Carretta, *et al.* 1998).

Bottlenose dolphin (*Tursiops truncatus*)—offshore stock: The offshore bottlenose dolphin differs from the coastal bottlenose dolphin in that they have a larger body, are darker in color, and have smaller flippers. They generally have a wide head and body, long flippers, short to medium-length beak, and a moderately tall, falcate dorsal fin (Reeves, *et al.* 2002). Males are larger than females, ranging from 8 to over 12 ft in length, while females are slightly smaller. Offshore bottlenose dolphins prefer squid and are often found in association with pilot whales. They are found throughout temperate and tropical waters of the Pacific Ocean (and other oceans), and generally avoid only the very cold waters found in the higher latitudes (Leatherwood, *et al.* 1983). The SARs designated offshore bottlenose dolphins found in the waters off CA/OR/WA as one stock. While no seasonality in distribution is apparent from sighting records and ship surveys, offshore bottlenose dolphins have been found throughout the Southern California Bight and occasionally documented as far north at 41º N latitude. During periods of warm-water, they may also range into Oregon and Washington waters. The best population abundance estimate for this stock is 5,065 animals (CV=0.66), with a minimum population estimate of 3,053 animals. The calculated PBR level for this stock is 31 animals a year. The average annual estimated mortality of this stock in U.S. commercial fisheries is zero animals, based on data from 1997 through 2001. This stock is not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Common dolphin (*Delphinus sp.)*: Common dolphins off California are classified into two stocks, the short-beaked CA/OR/WA stock and the long-beaked California stock. Because the long-beaked common dolphin has been recognized as a different species from the short-beaked common dolphin only in the last decade (Heyning and Perrin 1994; Rosel, *et al.* 1994), much of the available information has not differentiated between the two. The two species are often found together making it difficult to distinguish the different stocks.

Long-beaked common dolphin (*Delphinus capensis*): The long-beaked common dolphin is generally found in nearshore tropical and warm temperate waters of the Pacific (among other oceans), and is typically not found north of Pt. Conception (Reeves, *et al.* 2002), but surveys have shown them north of this area (Carretta, *et al.* 2005a). They are typically found approximately 50 nmi off the coast from Baja California, Mexico, northward to central California. Off Southern California, they are often associated with seamounts (Leatherwood, *et al.* 1983). While the color pattern is similar to the short-beaked common dolphin, it is generally more muted, with a crisscross pattern on its sides, tan or yellowish tan forward of the dorsal fin, and pale gray on the flanks and caudal peduncle (Reeves, *et al.* 2002). They range in schools of tens of animals to as many as several thousand, and feed primarily on small schooling fish and squid in the late afternoon and evening (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Maximum length of mature adults is approximately 8 ft, with males larger than females (Reeves, *et al.* 2002). The best abundance estimate for the long-beaked common dolphin is 43,360 (CV=0.72) animals with a minimum population estimate of 25,163 animals and an estimated PBR of 242 animals. The estimated mean annual take (serious injury and mortality) for long-beaked common dolphins in U.S. commercial fisheries is 11 animals (CV=0.50), based on data from 1997–2001. This stock is not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Short-beaked common dolphin (*Delphinus delphis*): Short-beaked common dolphins are the most abundant cetacean off California, with abundance varying both seasonally and between years. They are distinguished in color from the long-beaked common dolphin by having a white abdominal area with a darker eye patch that is continuous with a dark stripe that extends forward and joins the blackness of the lips. Their preferred prey is small schooling fish and they often hunt at night in the deep scattering layer of vertically migrating prey (Reeves, *et al.* 2002). In more temperate waters of the higher latitudes, these dolphins tend to calf in the late spring and early summer and gestation lasts approximately 10–11 months, with a 10-month lactation period (Reeves, *et al.* 2002). Surveys show wide distribution from the coast and out to at least 300 nmi from shore. The best abundance estimates for the short-beaked stock is 449,846 animals (CV=0.25), with a minimum population estimate of 365,617 animals and an estimated PBR of 3,656 animals. The estimated mean annual take (serious injury and mortality) for short-beaked common dolphins in U.S. commercial fisheries is 93 animals. This stock is not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Cuvier's beaked whale (*Ziphius cavirostris*): Cuvier's beaked whales are the most widely distributed of all of the beaked whales and are found in deep offshore, tropical to cool temperate waters of the world. They seem to prefer slope waters with a steep depth gradient. They are rotund in shape with a steep melon and a short, thick beak. Adult males have a white head, while the lighter head coloration in females is less pronounced. Mature animals can reach up to 23 ft in length, with females larger than males. They usually travel alone or in small groups and feed mainly on squid on or near the ocean floor. Little is known of the reproduction of this species (Reeves, *et al.* 2002). The SARs designated the Cuvier's beaked whales in the EEZ waters off CA/OR/WA as one stock. Sightings of Cuvier's beaked whale off the U.S. West Coast have been infrequent, although they are the most commonly encountered beaked whale off the West Coast. Seasonal trends are not apparent from stranding records. Based on the best available data, the best population estimate for this stock of Cuvier's beaked whale is 1,884 animals (CV=0.68), with a minimum population estimate of 1,121 animals. The estimated PBR for this stock is 11 animals per year, and the average annual estimated take (serious injury and mortality) in the U.S. commercial fisheries is zero animals. Since the estimated annual average incidental mortality of this stock of Cuvier's beaked whale does not exceed its PBR level, it is not considered strategic under the MMPA (Carretta, *et al.* 2005a).

Dall's porpoise (*Phocoenoides dalli*): Dall's porpoise are only found in the cool temperate waters of the North Pacific and have a unique body form, compared to other porpoises, and even from other cetaceans. They have a thick robust body with a small head and are sharply demarcated with a white patch on the flanks and belly. It has little to no beak and the caudal peduncle is strongly keeled above and below. Males reach nearly 8 ft at maturity, while females attain lengths of nearly 7 ft. Dall's porpoise forage on small schooling fish and squid and generally feed at night, when the prey migrates to the surface in the deep scattering layer. They travel in small fluid groups, although loosely associated groups could form feeding aggregations of tens and up to hundreds of individuals (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). The SARs designated Dall's porpoise in CA/OR/WA as one stock. As oceanographic patterns change, both seasonally and annually, Dall's porpoise exhibit a north-south movement offshore of all three states and are endemic to cool temperate waters. They are commonly seen in waters of the continental shelf, slope, and offshore and frequent varied habitats, including sounds, inland passages, nearshore regions (usually near deepwater canyons), and the open ocean. The best estimate of population abundance for this stock is 99,517 (CV=0.33) animals, with a minimum population estimate of 75,915 Dall's porpoise. The estimated PBR for this stock is 729 animals per year. The average minimum estimated annual mortality for Dall's porpoise in U.S. commercial fisheries is seven animals, based on data from 1997 through 2001. This stock is not designated as a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Harbor porpoise (*Phocoena phocoena*) The harbor porpoise has a robust body and a short, poorly demarcated beak with a straight mouthline that tilts slightly upward. The medium-sized dorsal fin is triangular or slightly falcate and is set at midbody. Coloration is subtle, but variable and complex. A dark gray cape is overlaid on a much lighter gray dorsal field, with variable dark gray flecking in the light gray area. The throat and belly are white, and there may be gray streaking on the throat. At sea, harbor porpoise are usually seen only briefly as they roll at the surface to breathe. They are coastal animals, often found in fjords, bays, estuaries, and harbors. They are limited to northern temperate and subarctic waters. In their Pacific range, they occur from Monterey Bay and Japan, north to the Chukchi Sea, but they have been seen as far south as Pt. Conception. They are often encountered singly, in pairs, or in groups of five or ten. The principal mating season is reportedly summer, from June to possibly October, and gestation lasts for about 10–11 months (Leatherwood, *et al.* 1983). Most seasonal movements seem to be inshore-offshore rather than north-south. Schooling fish such as herring, capelin, sprat, and silver hake, form the bulk of their diet.

Regional differences demonstrate that harbor porpoise along the west coast of North America are not panmictic and migratory, and movement is sufficiently restricted that genetic differences have evolved (Chivers, *et al.* 2002). The stock boundaries for animals that occur in California/southern Oregon/Washington waters are: (1) a Monterey Bay stock, (2) a San Francisco-Russian River stock, (3) a northern California/southern Oregon stock, (4) an Oregon/Washington coast stock, and 5) an Inland Washington stock (Carretta, *et al.* 2005a). In addition to the above-referenced stocks, there are also three Alaska harbor porpoise stocks. A recent analysis of harbor porpoise trends including oceanographic data suggests that the proportion of California harbor porpoise in deeper waters may vary between years (Forney, 1999). Based on 1999 and 2002 aerial surveys, the estimate of abundance for the: (1) Morro Bay stock is 1,656 (CV=0.39) animals (Carretta and Forney 2004) with a minimum population estimate of 1,206 animals (Carretta, *et al.* 2005a); (2) 1,613 animals (CV=0.42) for the Monterey Bay stock (Carretta and Forney, 2004) with a minimum population estimate of 1,149 animals (Carretta, *et al.* 2005a); and (3) 8,521 animals (CV=0.38) for the San Francisco-Russian River stock (Carretta and Forney 2004) with a minimum population estimate of 6,254 animals (Carretta, *et al.* 2005a). The estimated PBR for the Morro Bay stock is 10 animals per year. The minimum estimated annual mortality for the Morro Bay stock of harbor porpoise in U.S. commercial fisheries is 4.5 animals, based on 1998–2002 data. The estimated PBR for the Monterey Bay stock is 10 animals per year. The minimum estimated annual mortality for Monterey Bay stock of harbor porpoise in U.S. commercial fisheries is 9.5 animals, based on 2001–02 data. The estimated PBR for the San Francisco-Russian River stock is 63 animals per year. The minimum estimated annual mortality for the San Francisco-Russian River stock of harbor porpoise in U.S. commercial fisheries is $\geq$ 0.8 animals, based on 1998–2002 data. Since the known human-caused mortality or serious injury is less than the PBR for all of these stocks, none are considered strategic under the MMPA (Carretta, *et al.* 2005a).

Sperm whale (*Physeter macrocephalus*): An extremely large boxlike head dominates the sperm whale's body. The lower jaw is narrow and rod-like, with the mouth underslung and barely visible. The blowhole is set forward on the head and skewed strongly to the left. They are an even dark gray, but may appear brown in the sunlight (Reeves, *et al.* 2002). While sperm whales are widely distributed across the north Pacific and into the Bering Sea during the summer months, the majority are generally thought to be south of 40º N latitude during the winter months. Sperm whales are found off California year-round; however, they generally peak in abundance from April through mid-June and then from the end of August through mid-November. There is a marked difference in migratory behavior between adult males and females. Only adult males move into the high latitudes for feeding, while all age classes and both sexes range throughout tropical and temperate seas (Reeves, *et al.* 2002). The SARs divided sperm whales into three discrete groups for management purposes, including waters off CA/OR/WA, Hawaii, and Alaska. The SARs designated that the most precise estimate of population abundance size for the CA/OR/WA sperm whale stock is 1,233 (CV=0.41) animals, with a minimum population abundance estimate of 885 sperm whales. PBR for this stock is estimated to be 1.8 animals. The mean annual serious injury and mortality in commercial fisheries is 1.0 (CV=0.89) sperm whale, based on data collected from 1997–2001. This stock is considered a strategic stock under the MMPA because it is listed as endangered under the ESA (Carretta, *et al.* 2005a).

Dwarf sperm whale (*Kogia sima*): Dwarf sperm whales are generally found more coastally, inhabiting shelf-edge and slope waters. Pygmy and dwarf sperm whales both have a spermaceti organ, a feature they share with the sperm whale, but unlike the sperm whale, the dwarf and pygmy sperm whales also have a sac located on the lower intestine containing a brown syrupy liquid that it can expel into the water when startled. They tend to lie motionless at the surface of the water with the back of their head exposed and travel solo or in small groups, foraging on cephalopods (squid) and crustaceans such as shrimp and crabs. Gestation lasts approximately one year, with weaning taking place generally when the calf is approximately one year old (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). The SARs designated the dwarf sperm whales offshore CA/OR/WA as one stock, and it was distinguished from the pygmy sperm whale in 1966. The species is distributed in deep waters throughout ocean basins and along the continental slopes of the North Pacific. No information is available to estimate the population size of this stock, and thus a PBR level is not possible to estimate. This stock is not listed as strategic under the MMPA, and no incidental taking of dwarf sperm whales have been observed in U.S. fisheries, based on information from 1997 through 2001 (Carretta, *et al.* 2005a).

Pygmy sperm whale (*Kogia breviceps*): Pygmy sperm whales are rarely observed at sea, since rafting animals can generally only be seen during flat seas and excellent visibility (Leatherwood and Reeves, 1983). Like the dwarf sperm whale, they have a small but very robust body, tapering rapidly from the dorsal fin to the flukes. The dorsal fin is falcate and positioned more posteriorly than the dwarf sperm whale. They are difficult to distinguish at sea from the dwarf sperm whale, but they are thought to be distributed primarily seaward of the continental slope and feed on cephalopods and crustaceans. Pygmy sperm whales travel alone or in small groups (Reeves, *et al.* 2002). For the purpose of the SARs, pygmy sperm whales found within the EEZ off the coasts of CA/OR/WA are considered one stock. At-sea sightings of *Kogia* species are very rare, so seasonality and distribution have not been identified. The best estimate of population abundance for this stock, given that likely many are missed because they are submerged, is 247 (CV= 1.06) animals, with a minimum population estimate of 119. PBR for this stock of pygmy sperm whales is 1.2 animals per year. The mean annual serious injury and mortality in U.S. commercial fisheries is estimated to be zero animals. Since the average annual incidental take is not greater than the PBR for this stock of pygmy sperm whale, it is not classified as strategic under the MMPA (Carretta, *et al.* 2006).

Killer whale (*Orcinus orca*): Killer whales are genuinely cosmopolitan, occurring in a range of habitats, depending on prey abundance and seasonality. Some of their prey items include sea turtles, otters, sharks, rays, seals, sea lions, salmon, tuna, or herring. (Reeves, *et al.* 2002). They are easy to identify, with a distinctive black and white pattern and a tall erect dorsal fin, which is very prominent in males. Adult males and females can attain lengths of 30 and 26 ft, respectively. While adult males sometimes travel alone, females associate with one or more pods. Some of these matrilineal groups can consist of two to four generations of two to nine related individuals. Calving occurs year-round in the Northwest, with gestation taking approximately 15–18 months (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Killer whale pods in the northeastern Pacific Ocean have three distinct forms: residents, transients, and offshore. While there are genetic differences between the three forms, they also vary in ecology, behavior, morphology and communication (acoustics). While residents occur in large stable pods and feed primarily on fish, transients occur in smaller groups and have a diet consisting primarily of other marine mammals. Less information is available on the offshore form, but they appear to be more closely related to residents and are presumed to feed primarily on fish (NMFS 2005).

The SARs designated killer whales that may occur in the West Coast EEZ to be of two stocks: the eastern north Pacific offshore stock, which occurs from southeast Alaska through California; and the eastern north Pacific transient stock, which is found from Alaska through California. While there is no reliable way to distinguish the two stocks of killer whales from sightings at sea, photographs of individual animals can provide a rough proportion. The best estimate of abundance of both stocks combined is 1,340 (CV=0.31) animals, with 466 comprising the offshore stock and 874 comprising the transient stock. The estimated PBR for the eastern north Pacific offshore stock is 3.6 animals. There have been zero killer whales of this stock observed taken in U.S. commercial fisheries, based on data from 1997–2001. Because the estimated mean annual takes is less than this stock's PBR and thus, this killer whale stock is not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Off the coast of California, 105 transient whales have been identified (Black, *et al.* 1997). Of the 105 transient whales identified, 10 whales were matched to photos of transients in other catalogs and the remaining 95 were linked by association. Combining the counts of cataloged transient whales gives a minimum number of 314 killer whales (the 95 referenced above are included) belonging to the West Coast Transient Stock and a minimum number of 346 killer whales (the 95 referenced above are included) belonging to the Eastern North Pacific Transient stock (Angliss and Outlaw 2005).

Mesoplodont beaked whales (*Mesoplodon* spp.): There are least 14 species in the genus *Mesoplodon*, but due to the difficulty in identifying the six species of Mesoplodont beaked whales found in the area, including Hubbs' (*M. carlhubbsi*), pygmy beaked whale or lesser beaked whale (*M. peruvianus*), gingko-toothed (*M. gingkodens*), Blainville's (*M. densirostris*), Perrin's (*M. perrini*) and Stejneger's (*M. stejnegeri*) beaked whales and the rarity of sightings, little species-specific information is currently available. All Mesoplodont species have spindle-shaped bodies tapering at both ends and laterally compressed. Their heads are small, with well-defined beaks. Their melons range from convex or slightly bulbous to low and flattened (Reeves, *et al.* 2002). Usually the tip of the jaw extends beyond the upper jaw and functional teeth protrude regularly above the gumline in adult males (not in females, however). All species have a triangular or falcate dorsal fin positioned behind the center of the back, and most have linear scars or scratch marks on their bodies, with males having more than females (Leatherwood, *et al.* 1983).

Hubbs' beaked whales are known only to occur in temperate waters of the North Pacific, and at least off the west coast of North America, they have been sighted as far south as San Diego and as far north as Prince Rupert, British Columbia (Reeves, *et al.* 2002). Adult males have a white "beanie" on their melon, a white beak and tusks, and extensive scarring that are acquired over time. Adults reach up to 18 ft and their preferred prey is mesopelagic squid and fish (Reeves, *et al.* 2002). Calving is thought to take place mainly in summer.

The gingko-toothed whale is known to range off southern California, preferring mainly tropical and warm temperate waters. They have a robust body and the dorsal fin is small, often falcate, and positioned about two-thirds of the way back from the beak tip (Reeves, *et al.* 2002). Adult males usually have many white spots on the ventral surface of their body and generally lack the linear scars characteristic of male mesoplodonts. They presumably eat mesopelagic squid and fish. Little is known about the reproduction in this species.

Stejneger's beaked whales can be identified by their dark cranial "cap" and a prominent arch in the back half of the mouthline. The melon is notably flat or depressed in comparison to most other mesoplodonts and slopes smoothly onto the pointed beak. In addition, adult males have large, exposed tusk-like teeth. They generally range in the temperate waters of the North Pacific and southwestern Bering Sea and occur in groups of three or four to up to 15 animals. Their overall coloration darkens with age and the white, light pigmented, circular or oval-shaped scars (typical of cookie cutter sharks) that are usually present on the posterior half of the body increase in density with age (Reeves, *et al.* 2002). They feed by suction, primarily on squid and often at great depths.

The Blainville's beaked whales are the most widely distributed of the mesoplodonts, ranging in warm temperate and tropical waters throughout the world. They are distinguished by having a distinctive mouthline, with an abrupt rising step at the midpoint. When males reach maturity, the pointed crown of a huge tooth can be seen on each side of the lower jaw. Clusters of single-stalked barnacles frequently attach to exposed portions of their teeth. They appear in small groups of three to seven animals and forage on squid and small fish (Reeves, *et al.* 2002). Little is known about reproduction in this species.

The pygmy beaked whale or lesser beaked whale has a typical spindle-shaped form with a small, triangular, slightly falcate dorsal fin. The common name is based on the fact that this is the smallest known mesoplodont. Adults are generally dark gray on the back and sides and much lighter ventrally with a dark gray dorsal fin, flippers, and flukes. The pygmy beaked whale is known to occur in the waters off Peru and Chile, in the southwestern Gulf of California, off the central west coast of Mexico, and southern California. Almost nothing is known about the social organization of this species. Analysis of stomach content of stranded animals indicated that this species may prey on fish in addition to squid (Reeves, *et al.* 2002).

Dalebout *et al.* (2002) describe Perrin's beaked whale, a new species of beaked whale, on the basis of five animals stranded on the coast of California (between 33°55' N latitude, 117°15' W longitude and 36°37' N latitude, 121° 55' W longitude) from May 1975 to September 1997. Although similar morphologically, the genetic data do not support a close evolutionary relationship between Perrin's beaked whale and Hector's beaked whale. Dalebout *et al.* (2002) suggest that Hector's beaked whale is confined to the Southern Hemisphere, while Perrin's beaked whale is known to date only from the North Pacific. Descriptions of color pattern in this species are difficult due to the fact that until very recently, this species was thought to belong to a different species.

Due to the difficulties involved with identifying different species, as well as the rarity of these species, the SARs designated all Mesoplodont beaked whales as one stock in the EEZ waters off the coasts of CA/OR/WA. The best available population estimate is 1,274 animals (CV=0.92), with a minimum population estimate of 645 beaked whales. The estimated PBR for this group of species is 6.5 mesoplodont beaked whales per year and the average serious injury and annual mortality of mesoplodont beaked whales in U.S. commercial fisheries is estimated to be zero animals, based on data from 1997–2001. This group of species is not classified as a strategic stock under the MMPA ((Carretta, *et al.* 2005a).

Northern right-whale dolphin (*Lissodelphis borealis*): Northern right-whale dolphins are generally seen in shelf and slope, cool temperate waters, ranging on the west coast of North America from the Gulf of Alaska and the state of Washington, south to Baja California (Reeves, *et al.* 2002), depending on prey availability. They are distinguished by their slim, graceful body and the absence of a dorsal fin or any trace of a dorsal ridge. They are primarily black, but with a striking white lanceolate pattern of varying extent on the ventral surface. The melon slopes gently forward into a small distinct beak (Leatherwood, *et al.* 1983). They travel in schools of several hundred to thousands of animals and often associate with Pacific white-sided dolphins. Primary prey species include small fish, including lanternfish and squid. Peak calving occurs in the summer months, and the gestation period is a little over a year, with a calving interval of at least two years (Reeves, *et al.* 2002). The SARs designated northern right-whale dolphin found in the waters of CA/OR/WA as one stock. The estimated population abundance for this stock is 20,362 (CV=0.26) animals and the estimated PBR is 164 animals. The mean annual serious injury and mortality of northern right whale dolphins in U.S. commercial fisheries is estimated to be 23 animals. This is not classified as a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Pacific white-sided dolphin (*Lagenorhyncus obliquidens*): The Pacific white-sided dolphin is commonly seen in the temperate waters of the North Pacific. They have a robust body, light gray “suspenders” along their back, and a prominent light gray patch on their foresides. There is a short, but distinct beak clearly demarcated from the forehead with black lips. The dorsal fin is hooked and usually black on the front and pale gray on the rear portions. They are most often seen in the deep inshore waters of Alaska, British Columbia, and the states of Washington and Oregon during the late spring, while during the winter months (November through April), they are often seen off southern California. Pacific white-sided dolphins are opportunistic feeders, and forage on available small schooling fish, squid, and other species associated with the nightly deep scattering layer. They are often seen in groups of between 10 to 50 animals, but thousands have been seen traveling together on occasion (Reeves, *et al.* 2002). There appears to be a north-south seasonal migration in the eastern North Pacific, and although there is clear evidence that two forms of Pacific white-sided dolphins occur along the U.S. West Coast, it is not currently possible to distinguish animals without genetic or morphometric analyses. Thus, the SARs have grouped Pacific white-sided dolphins into two discrete, non-contiguous areas, waters off CA/OR/WA and Alaskan waters. The population abundance estimate for the CA/OR/WA stock is 59,274 (CV=0.50) animals, with a minimum population estimate of 39,822 animals. The calculated PBR is 382 animals per year. The mean annual serious injury and mortality in U.S. commercial fisheries for this stock is estimated to be 5.2 animals per year, based on data from 1997–2001. This is not classified as a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Risso’s dolphin (*Grampus griseus*): Risso’s dolphins are found world-wide in tropical and warm-temperate waters. Seasonal distribution patterns have been seen from aerial and boat surveys and it is thought that Risso’s dolphins move northward into Oregon and Washington during the late spring and summer, while they are found generally off California during the cold water months (Carretta, *et al.* 2005a). They have a distinctive, beakless head shape and body that is noticeably more robust in the front half than in the back, a blunt snout, and prominent appendages, with long pointed flippers and a tall, slender, and falcate dorsal fin. Adults have extensive linear scarring concentrated on the back and sides, which makes many adults appear almost completely white except for the dark dorsal fin and flippers (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Risso’s dolphins travel in groups of on average 25 individuals and feed most often on squid, primarily at night (Reeves, *et al.* 2002). Risso’s dolphins in

CA/OR/WA waters are considered one stock in the SARs. The best estimate of population abundance for this stock is 16,066 (CV=0.28), with a minimum population estimate of 12,748 animals. PBR for this stock is estimated to be 115 animals per year. The mean annual serious injury and mortality in commercial fisheries for this stock is estimated to be 3.6 animals (CV=0.63), based on data from 1997 through 2001. This stock is not considered a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Short-finned pilot whale (*Globicephala macrorhynchus*): Short-finned pilot whales have a thick and bulbous head with no discernible beak. They are primarily black or dark brown but have a large light-gray saddle on its back behind the dorsal fin. They are generally widespread in range, and prefer tropical and warm temperate waters throughout the world. Groups of a few to several hundred are common, following prey or warm water, consisting of different age classes and sex, and are often found in association with other cetaceans, including bottlenose dolphins and tuna preying on squid (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). They routinely dive to depths greater than 1,000 ft and tend to remain offshore, but may move to inshore areas if their main prey of squid is spawning. For the purposes of the SARs, short-finned pilot whales in the EEZ of CA/OR/WA are considered one stock. Short-finned pilot whales were once common off the coast of southern California. However, since a strong El Niño event in 1982–83, few sightings were made between 1984–92, despite increased survey efforts. Sightings still remain rare. The best estimated population abundance is 304 (CV=1.02) animals, with a minimum estimated population of 149 short-finned pilot whales. The PBR for this stock is 1.2 animals/year (Carretta, *et al.* 2006). The mean annual estimated serious injury and mortality of short-finned pilot whales in commercial fisheries is 1.0 animals (CV=??), based on data from 1999–2003. The average annual human-caused mortality is less than the PBR; therefore, this stock is not classified as strategic under the MMPA (Carretta, *et al.* 2006).

Striped dolphin (*Stenella coeruleoalba*): Striped dolphins have a striking coloration pattern of bluish gray and white, but the boldness of the markings varies regionally and individually. They have a gray beak, appendages, and back, while their throats and bellies are white, and they have bold narrow black stripes from their eye to the anus and from the eye to the flipper. They are found worldwide, primarily in tropical and warm-temperate pelagic waters. The SARs designated the CA/OR/WA striped dolphin as one stock. Recent ship surveys off the U.S. West Coast found striped dolphins off California, but there were no sightings off Oregon or Washington waters (Carretta, *et al.* 2005a). Reeves *et al.* (2002) reported that striped dolphins are not known to make strong migrations, but are common in deeper slope waters. They travel in dense schools averaging around 100 animals, although schools of 500 animals have been sighted, and there is marked segregation by age and sex among schools. Striped dolphins feed on a wide variety of shoaling fish and cephalopods (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). The most recent estimate of stock abundance is 13,934 (CV=0.53) striped dolphins, with a minimum population estimate of 9,165 animals. The PBR for this stock is 92 animals per year. Data from 1997–2001 revealed that no striped dolphins were observed taken in U.S commercial fisheries. This stock is not classified as strategic under the MMPA, because the annual removal level is lower than its PBR (Carretta, *et al.* 2005a).

3.3.1.2 Mysticetes

Of the total number of cetaceans that have been identified from strandings and sightings off central California and Oregon, there are seven species of mysticetes. Only one of these species, the gray whale (*Eschrichtius robustus*) has been found in moderate to high numbers and is the only one of the mysticetes that is not listed as a strategic stock under the MMPA. The following is a summary of the current status of stocks of mysticetes off the coast of California and Oregon.

Blue whale (*Balaenoptera musculus*): The blue whale is the largest living animal. It has a huge body which is a mottled, blue-gray color, which is highly variable. The blue whale's rostrum is broad, flat, and nearly "U" shaped, with a single ridge extending from the raised area in front of the blowholes almost reaching the tip of the snout. The tiny dorsal fin is set far back on the body and the triangular flukes are often raised during a dive. Females are slightly larger than males (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Calving takes place in the winter and females usually give birth to a single calf every two to three years. The eastern North Pacific stock of blue whale feeds in California waters from June through November and then migrates south to foraging areas off Mexico and as far south as the Costa Rica Dome during winter and spring. Blue whales feed almost exclusively on krill and are occasionally reported taking pelagic crabs (Reeves, *et al.* 2002). The best estimate of population abundance for this stock of blue whales is the average of estimates made from line transect surveys and mark-recapture and is 1,744 (CV = 0.28) animals, with a minimum population estimate of 1,384 blue whales. PBR for this stock is estimate of 2.8 animals per year. However, because this stock spends approximately 50 percent of its time outside of the U.S. EEZ, the PBR allocated for U.S. waters is half this total, or 1.4 whales per year (Carretta, *et al.* 2005a). The mean annual serious injury and mortality in known commercial U.S. fisheries is zero blue whales, based on data from 1998 through 2002 (Carretta, *et al.* 2005a). The blue whale is listed as endangered under the ESA; therefore, this stock is classified as strategic under the MMPA (Carretta, *et al.* 2005a).

<u>Fin whale</u> (*Balaenoptera physalus*): The fin whale is very large and sleek, with a sharp, variably shaped dorsal fin that is often pointed and falcate. They are typically dark gray above and white or cream-colored below, while the flukes are bordered with gray. The rostrum is narrower and more "V" shaped than the blue whale, and it has a more prominent median ridge. Along the back of many individuals, just behind the head, is a grayish white chevron, sometime referred to as a "blaze." Fin whales occur in all major oceans, usually in temperate or polar latitudes and less common in the tropics (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). They are found year-round off southern and central California, in the summer off Oregon and in the summer and fall months in the Shelikof Strait and Gulf of Alaska. The fin whale feeds on krill and various amounts of schooling fish, notably herring, capelin, and sandlance (Reeves, *et al.* 2002). The SARs recognized three stocks of fin whales in the North Pacific: the CA/OR/WA stock; the Hawaii stock; and the Alaska stock. The best estimate of the population size of the CA/OR/WA stock of fin whales is 3,279 (CV=0.31), with a minimum population estimate of 2,541 animals. The PBR for this stock is 15 animals. The mean annual serious injury and mortality in known commercial U.S. fisheries is 1.0 fin whales, based on data from 1997 through 2001 (Carretta, *et al.* 2006). Fin whales are listed as endangered under the ESA; therefore, this stock of fin whales is considered strategic under the MMPA (Carretta, *et al.* 2005a).

<u>Gray whale (*Eschrichtius robustus*):</u> The gray whale has a large body with a mottled gray color pattern. The head is narrow and triangular and is often encrusted with barnacles. They have no dorsal fin, but rather a hump followed by "knuckles" along the top of the caudal peduncle. The gray whale makes one of the longest annual migrations of any mammal, traveling from its northern summer feeding grounds in Bering, Chukchi, and western Beaufort seas, to winter calving areas off the coast of Baja California and mainland Mexico. Females calve at intervals of two to three years with an estimated gestation period of 12–13 months (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). During the late autumn and early winter, they migrate south along predominantly nearshore migration routes to the central California coast. South of Pt. Conception, the majority of the animals take a more direct offshore route across the Southern California Bight (through the Channel Islands) to northern Baja California. The gray whales principal pray item is benthic amphipods (Reeves, *et al.* 2002). The most recent abundance estimates, noted in parentheses, are based on counts made during the 1997–98 (19,448), 2000–01 (19,448), and 2001–02 (18,178) southbound migrations (Angliss and Outlaw 2005). Using the mean of the 2000–01 and 2001–02 abundance estimates of 18,813 (CV=0.069), the minimum population number for this stock is 17,752. PBR for this stock is 442 animals. The mean annual serious injury and mortality in known commercial U.S. fisheries is 7.4 gray whales, based on data from 1996 through 2003 (Angliss and Outlaw 2005). The gray whale was removed from the ESA list in 1994 due to its strong recovery, and it is not considered a strategic stock under the MMPA (Angliss and Outlaw 2005).

Humpback whale (*Megaptera novaeangliae*): Humpback whales are widely distributed in all oceans, ranging from their tropical wintering grounds to the edges of the polar ice zones. They have a large robust body with long narrow flippers that are approximately one-third the length of the body. The dorsal fin is highly variable, from almost absent to high and falcate. The trailing edge of the fluke is noticeably serrated and humpbacks often raise the fluke when beginning a dive. The body is black above and black, white, or mottled below. The flippers are typically white ventrally and have a variable dorsal surface ranging from white to mostly black. The breeding behavior is largely confined to winter in low latitudes where males sing long complex songs to attract a mate (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Humpbacks in the north Pacific are divided into three management units, as described in the most recent SARs. Humpbacks that mate and calf in coastal central America and Mexico during winter/spring migrate north in the summer and fall to the coast of California and southern British Columbia. Humpback whales feed on krill and a variety of small schooling fish, notably herring, capelin, and sandlance (Reeves, *et al.* 2002). This stock is referred to as the eastern North Pacific stock. The most precise and least biased estimate of this stock's population abundance is based on mark-recapture estimates based on photo-identification collections in adjacent pairs of years. The population estimate for 2002–03 was 1,391 animals (CV=0.22) (Calambokidis, *et al.* 2003), with a minimum population estimate of 1,158 humpback whales. This stock's PBR is 4.6 whales per year; however, because this stock spends approximately 50 percent of its time outside U.S. waters, the PBR allocation for U.S. waters is 2.3 humpback whales per year. The mean annual estimated serious injury and mortality in U.S. commercial fisheries is at least 1.2 animals per year (Carretta, *et al.* 2006). Because the humpback whale is listed as an endangered species under the ESA, the stock is classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Minke whale (*Balaenoptera acutorostrata*): The minke whale is small and sleek, with a sharply pointed V-shaped head. They have a falcate dorsal fin and a sharp longitudinal ridge that runs along the top of the rostrum. The body is black or dark gray above, often with a gray chevron crossing the back behind the head. A white band across the flippers aids in distinguishing minke whales from other whales. However, very little is known about their reproduction. Minke whales are among the most widely distributed of all the baleen whales. They occur in the North Atlantic and North Pacific, from tropical to polar waters (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). They are found year-round in California waters and in the Gulf of California. Unlike stocks further north (Alaska), minke whales off California, Oregon and Washington appear to establish home ranges and are less migratory, often found over continental shelves. Minke whales in the northern hemisphere feed on a variety of small schooling fish, including herring, capelin, and sandlance (Reeves, *et al.* 2002). The SARs designated minke whales offshore CA/OR/WA as one stock. The population abundance for this stock of minke whales is 1,015 (CV=0.73), based on ship surveys, with a minimum population estimate of 585 whales. PBR for this stock is 5.9 whales/year. The mean annual take (serious injury and mortality) of minke whales due to known U.S. commercial fisheries is zero animals, based on data from 1997–2001. Minke whales are not considered strategic under the MMPA due to the low estimated number of ship strikes and takes in commercial fisheries (Carretta, *et al.* 2005a).

Northern right whale (*Eubalaena glacialis*): Northern right whales occur mostly in coastal and shelf waters, but they have also been found offshore. The body is rotund with a large head, about one-fourth or more of the body length, no dorsal fin, and large paddle-like flippers. They are black with varying amounts of white on the underside. Northern right whales have a strongly arched mouthline and callosities—raised rough patches of skin—that usually appear white or cream colored because of the infestation of whale lice. Females usually give birth to a single calf once every three to five years after a gestation period of about 12 months (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). The historic range of the northern right whale includes the entire North Pacific, from as far south as central Baja California Mexico and the Yellow Sea and as far north as the Bering Sea and the Okhotsk Sea. Northern right whales are exclusively plankton feeders, subsisting on copepods and krill (Reeves, *et al.* 2002). In general, there have been very few sightings, and the species is considered to be extremely rare. At this time it is not possible to produce a reliable population estimate for this stock, but it is certainly very small, therefore, the PBR level for this stock is considered zero animals (Angliss and Outlaw 2005). The low population estimates and the scarcity of sightings have contributed to the northern right whale being listed as endangered under the ESA and strategic under the MMPA (Angliss and Outlaw 2005).

<u>Sei whale</u> (*Balaenoptera borealis*): The sei whale occurs worldwide from subtropical or tropical waters to high latitudes and inhabits both shelf and oceanic waters. However, its distribution is poorly understood. The sei whale has a large, sleek body that is dark gray dorsally and often white or cream-colored on the underside. Oval scars often cover the body, presumably caused by bites from cookie-cutter sharks. Calves are born in winter, presumably in tropical waters, after a gestation of 11 to 12 months (Leatherwood, *et al.* 1983; Reeves, *et al.* 2002). Sei whales are distributed in deeper offshore waters in all temperate seas and do not appear to be associated with coastal features. Like most balaenopterids, sei whales migrate long distances north-south from high latitude summer feeding grounds to lower latitude winter areas. The sei whale feeds on small fish, squid, krill, and smaller zooplankton (Reeves, *et al.* 2002). The SARs have divided sei whales in the North Pacific into two stocks: the eastern North Pacific stock (east of longitude 180°) and the western North Pacific stock (Carretta, *et al.* 2005a). Since sightings are so rare, there have been no direct estimates of sei whale abundance in the North Pacific based on sighting surveys (Carretta, *et al.* 2005a). Only two confirmed sightings and five possible sightings of sei whales were made in California, Oregon, and Washington waters during extensive ship and aerial surveys from 1991–2001. Based on shipboard surveys conducted in 1996 and 2001, the population of this stock of sei whales is estimated to be 56 animals (CV=0.61), with a minimum population estimate of 35. PBR for this stock is 0.1 per year. The sei whale is listed as an endangered species under the ESA and it is considered strategic under the MMPA (Carretta, *et al.* 2005a).

3.3.1.3 Pinnipeds

Five pinniped species are found regularly in waters off central and northern California and Oregon, and one additional species, the Guadalupe fur seal (*Arctocephalus townsendi*), is seen occasionally in southern California waters. Of the five regularly-occurring species, only one species, the California sea lion, is common throughout offshore waters throughout the year. Large numbers of northern elephant seals (*Mirounga angustirostris*) pass through offshore waters four times a year as they travel to and from breeding, pupping, and molting areas on the Channel Islands. Northern fur seals (*Callorhinus ursinus*) may also be found in offshore waters during the winter and spring when animals from northern populations may feed there. During the rest of the year, moderate numbers of fur seals are found in offshore waters and include only the animals that breed and raise their young on San Miguel Island. Moderate numbers of harbor seals (*Phoca vitulina richardsi*) are found hauled out on land and in coastal waters, but because of their preference for shallow coastal waters, few are found in offshore waters. Steller sea lions (*Eumetopias jubatus*) have declined in southern California waters, but are found in northern California, in moderate numbers. The following is a summary of the current status of stocks of pinnipeds off the coast of central and northern California and Oregon.

<u>Steller sea lions</u> (*Eumetopias jubatus*): The Steller sea lion is large, with a robust body and head and it is the largest member of the eared seals. The snout is short, blunt, and broad. Adult males are substantially larger than females, especially in the head, neck, and chest regions. Adults are light brown to blond and are generally darker ventrally than dorsally. Females are often lighter than males. Steller sea lions are restricted to the North Pacific Ocean and southern Bering Sea (Reeves, *et al.* 1992). They occur in coastal waters when feeding and migrating and haul out on rocky reefs, ledges, and beaches (Reeves, *et al.* 2002). The SARS divides the Steller sea lion population into two stocks, the Eastern and the Western

U.S. Stocks. The Eastern stock is listed as threatened under the ESA and the Western stock is listed as endangered under the ESA. For purposes of this EA, only the Eastern stock of Steller sea lions will be further considered.

The Eastern stock breeds on rookeries located in southeast Alaska, British Columbia, Oregon, and California. Using the most recent (2002) pup counts from across the range of the eastern stock, the total population is estimated to be 44,996 with a minimum population estimate of 33,728 (Angliss and Outlaw 2005). Steller sea lion numbers in California, especially in southern and central California, have declined from historic numbers. However, overall counts of non-pups at trend sites in California and Oregon have been relatively stable since the 1980s. The PBR for this stock is calculated to be 1,967 animals per year. Estimated mean annual take in commercial fisheries is 3.62 (CV=0.64), based on data from 1997–2001 (Angliss and Outlaw 2005). The Eastern stock of Steller sea lions is currently listed as threatened under the ESA, and therefore designated as "depleted" under the MMPA. As a result, this stock is classified as a strategic stock under the MMPA (Angliss and Outlaw 2005).

<u>California sea lion (*Zalophus californianus*):</u> California sea lions are perhaps the most familiar pinnipeds in the world. Adult females and juveniles are slender-bodied, whereas adult males are robust at the shoulder, chest, and neck, and slender at the hind end. The snout is long, straight, and narrow. They have broad foreflippers with hair on the upper surface and short hindflippers with short claws. Adult males have a pronounced forehead and are mostly dark brown to black, with areas of light tan on their face. Females and juveniles are lighter in color than males (Reeves, *et al.* 2002). The U.S. stock of California sea lions population ranges between the U.S./Mexico border and extends northward into Canada. Population estimates are made from pup counts and the proportion of pups in the population, since not all age classes of sea lions are ashore at the same time. California sea lions breed at the Channel Islands, off southern California, at islands along the northern Pacific coast of Baja California, and on the east coast of Baja California in the middle and southern Gulf of California (Reeves, *et al.* 1992). After the breeding season, large numbers, particularly males, migrate north along the Pacific coast. The population abundance estimate for this stock is between 237,000 to 244,000 animals, with a minimum population estimate of 138,881. The PBR for this stock is calculated to be 8,333 animals per year. Estimated mean annual take in commercial fisheries is 1,476 animals, based on data from 1997–2001. California sea lions have a diverse diet, feeding on northern anchovy, market squid, sardines, Pacific and jack mackerel, and rockfish (Reeves, *et al.* 2002). Takes have been documented during those years in the CA/OR drift gillnet fishery, the CA set gillnet fishery for halibut and angel shark, the CA/OR/WA groundfish trawl fishery, the WA/OR salmon net pen fishery, and the salmon pen fishery operating out of British Colombia. Other threats to this stock include shooting, entrainment in power plants, marine debris, and boat collisions. The stock is not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

<u>Guadalupe fur seal (*Arctocephalus townsendi*):</u> The Guadalupe fur seal has a slender pelvis and hind end relative to the rest of the body. The snout is long, narrow, and pointed. The hindflippers are short relative to other fur seals and the foreflippers are broad. Adult males are considerably longer and larger-bodied than adult females. The pelage of both sexes ranges from uniform dark brown to black. The Guadalupe fur seal's current breeding range is limited almost exclusively to Guadalupe Island, Mexico; a recent discovery was made of a rookery at Benito del Este, in Baja California (Carretta, *et al.* 2005a; Reeves, *et al.* 2002; Reeves, *et al.* 1992). A pup was also born at San Miguel Island, off Southern California (Melin and DeLong 1999). Individuals have been sighted in the Channel Islands and central California and in the Gulf of California, but sightings of Guadalupe fur seals in Southern California are rare. In 1993, the abundance of Guadalupe fur seals estimated to be 7,408 animals; there are no recent estimates of this stock found in the SARs. Incidental take in Mexican fisheries is unknown. The estimated PBR level is 91 animals per year, where the vast majority of the estimate would apply towards mortality in Mexico. There has been no reported taking of Guadalupe fur seals in commercial fisheries in the United States,

based on data from 1994 through 1998. This species is listed as a threatened species under the ESA and it is therefore considered strategic under the MMPA (Carretta, *et al.* 2005a).

Harbor seal (*Phoca vitulina richardsi*): Harbor seals range widely in coastal areas of the North Pacific and North Atlantic. Five subspecies are recognized, based on geographic distribution. Two stocks of harbor seals are found off the U.S. West Coast EEZ and defined in the SARs: the California stock and the Oregon and Washington outer coast stock. Both stocks inhabit nearshore coastal and estuarine waters and although they do not migrate extensively, they have been documented traveling 300–500 km on extended foraging trips or to find suitable breeding areas. There are approximately 400–600 harbor seal haulout sites in California, and include both the mainland and offshore islands. The harbor seal is a medium-sized phocid; however, harbor seals in Alaska and the western Pacific are larger than those in the Atlantic. The head is robust and the snout is broad and long. The flippers are relatively short with sturdy claws on the foreflippers. There are two basic color patterns in harbor seals, white or light gray to silver with dark spots, or black or dark gray to brown with white rings. Harbor seals eat a varied diet, consisting of fish, octopus, and squid (Reeves, *et al.* 2002; Reeves, *et al.* 1992). The best estimate of abundance is 34,233 harbor seals in California based on recent harbor seal counts (May-July 2004) and a revised correction factor. Given a minimum population estimate of 31,600 animals in the California stock, the PBR for this stock is 1,896 harbor seals per year (Carretta, *et al.* 2006). Estimated mean annual take in commercial fisheries is 388 animals, based on data from 1999–2003. The best estimate of abundance is 24,732 animals for the Oregon/Washington coast stock of harbor seals. Given a minimum population estimate of 22,380 harbor seals, the PBR for the Oregon/Washington stock is 1,343 animals (Carretta, *et al.* 2005a). Estimated mean annual take in commercial fisheries is greater than 14.6 animals, based on data from 1997–2001. Both stocks are not classified as strategic under the MMPA (Carretta, *et al.* 2005a).

Northern elephant seal (*Mirounga angustirostris*): The northern elephant seal is the largest phocid in the northern hemisphere. They have a robust torso that tapers to narrow hips with short foreflippers, with slightly longer outer digits and long broad claws. Males begin to develop an elongated fleshy nose (proboscis) at about puberty which they inflate during the winter breeding season to resonate sound when threatening other males. Adult males can be about three to four times the mass of adult females. Adult females and juveniles are mostly lighter to chocolate brown, whereas males are uniformly dark brown except for their chest which are heavily calloused and scarred and thus appear white and light brown (Reeves, *et al.* 2002; Reeves, *et al.* 1992). The California breeding population of northern elephant seals is considered one stock in the SARs, separate from the breeding population in Baja California, Mexico. Generally, northern elephant seals breed and pup from December to March. Males then forage further north in Alaskan waters, while females forage off Oregon and Washington waters, typically south of 45º N latitude. Adults return to land to molt between March and August, with males beginning their molt later than females. Northern elephant seals eat mesopelagic fish and squid, though some may forage on the sea bottom and continental shelf for skates, rays, sharks, and rockfish (Reeves, *et al.* 2002). The best estimate of population abundance for the California breeding stock is 101,000 from 2001, with a minimum population estimate of 60,547 animals. PBR for this stock is calculated to be of 2,513 animals per year. Threats to this stock include mortality and injury in fishing gear (greater than 86 mean annual takes per year, based on data from 1996 through 2000). Takes have been documented in the CA/OR drift gillnet fishery, the California set gillnet fishery for halibut and angel shark, and the CA/OR/WA groundfish trawl fishery. Other threats include boat collisions, collisions with automobiles, shootings, and entanglement in marine debris. The stock is not considered a strategic stock under the MMPA (Carretta, *et al.* 2005a).

Northern fur seal: (*Callorhinus ursinus*): The northern fur seal is one of only two fur seals that live in the Northern hemisphere, the other being the Guadalupe fur seal. The Northern fur seal has a stocky body and a small head with a very short snout. The hindflippers are the largest of the otariid pinnipeds with relatively broad foreflippers. Adult males are longer and heavier than females, and males develop massive chests, shoulders and necks. The northern fur seal is limited to the North Pacific Ocean, the Bering Sea, and the Sea of Okhotsk (Reeves, *et al.* 2002; Reeves, *et al.* 1992). Two separate stocks of northern fur seals are recognized within U.S. waters: (1) an Eastern Pacific stock, mostly found on the Pribilof Islands in the Bering Sea, and (2) a San Miguel Island stock. In general, females are found ashore from June through November, while males occur on shore from May through August. Adults spend approximately 7–8 months at sea, while pups may spend 22 months at sea before returning to their natal rookery. Northern fur seals have a large foraging range, with animals from the Pribilof Islands (primarily adult females and pups) ranging as far south as California offshore waters. Males from this area generally do not migrate further south than the Gulf of Alaska. Northern fur seals eat a variety of nearshore and pelagic squid and fish (Reeves, *et al.* 2002). The most recent estimate of population abundance of the San Miguel Island stock is 7,784 northern fur seals, with a conservative minimum population estimate of 4,190 animals. The PBR for this stock is 180 animals per year. While northern fur seals taken incidentally in commercial fisheries off California, Oregon, and Washington could have originated from the Pribilof Islands, NMFS considers any takes of this species to be from the San Miguel Island stock. There have been very few documented takes in U.S. commercial fisheries (one self-report of a take in the CA/OR/WA groundfish trawl fishery) and few mortalities due to other human causes. This stock is not listed as strategic under the MMPA (Carretta, *et al.* 2005a).

3.3.2 Sea Turtles

Numerous human-induced factors have adversely affected sea turtle populations in the North Pacific and resulted in their threatened or endangered status (Eckert 1993; NMFS and USFWS 1998a; NMFS and USFWS 1998b; NMFS and USFWS 1998c; NMFS and USFWS 1998d; Wetherall, *et al.* 1993). For instance, on their nesting beaches, sea turtles are vulnerable to exploitation for their meat, eggs, hides, and other products for commercial and subsistence purposes. Coastal development, dredging, vessel traffic, erosion control, sand mining, vehicular beach traffic, and artificial beach lighting have resulted in degradation or destruction of sea turtle nesting, breeding, and/or foraging habitats. Human-induced changes in natural predators' feeding behaviors may also contribute to increased predation on sea turtle nests and eggs. Chemical pollution may adversely affect sea turtles in their terrestrial or marine habitats. Fibropapilloma disease has increased in recent years and poses a threat to some sea turtle populations. Fibropapilloma tumors eventually grow large enough to obstruct vision, become extensive in the mouth or throat, or affect internal organs (Balazs 1982). Sea turtles that encounter and ingest ocean debris (e.g., plastics) have been adversely affected. Finally, documented incidental capture and mortality by purse seines, gillnets, trawls, longline fisheries, and other types of fishing gear also adversely affect sea turtles. Currently, the relative effect of each of these sources of impact on sea turtles is difficult to assess, although threats due to U.S. fisheries (and lately foreign fisheries) have been well documented in the last decade.

The following is a brief presentation of the information on the status of the sea turtle populations in the Pacific Ocean that may encounter the DGN fishery in central and northern California and Oregon under the proposed action.

3.3.2.1 Green Turtles (Chelonia mydas)

Green turtles are found throughout the world, occurring primarily in tropical, and to a lesser extent, subtropical waters. They are globally listed as threatened under the ESA, except for breeding populations found in Florida and the Pacific coast of Mexico, which are listed as endangered. Using a precautionary approach, Seminoff (2002) estimates that the global green turtle population has declined by 34 percent to 58 percent over the last three generations (approximately 150 years) although actual declines may be closer to 70 percent to 80 percent. Causes for this decline include harvest of eggs, subadults and adults, incidental capture by fisheries, loss of habitat, and disease.

The genus *Chelonia* is composed of two taxonomic units at the subspecies/subspecific level: the east Pacific green turtle (also known as the "black turtle," *C. mydas agassizii*), which ranges (including nesting) from Baja California south to Peru and west to the Galapagos Islands, and the nominate *C. m. mydas* in the rest of the range (insular Pacific, including Hawaii).

Green turtles are distinguished from other sea turtles by their smooth carapace with four pairs of lateral scutes, a single pair of prefrontal scales, four post-orbital scales, and a serrated upper and lower jaw. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed one meter in carapace length and 200 kg in body mass.

Green turtles appear to prefer waters that usually remain around 20° C in the coldest month. During warm spells (e.g., El Niño), green turtles may be found considerably north of their normal distribution. Stinson (1984) found green turtles to appear most frequently in U.S. coastal waters with temperatures exceeding 18° C. Green turtles foraging in San Diego Bay and along the Pacific coast of Baja California originate primarily from rookeries of the Islas Revillagigedos (Dutton 2003).

Although most green turtles appear to have a nearly exclusive herbivorous diet, consisting primarily of sea grass and algae (Wetherall, *et al.* 1993), those along some areas of the east Pacific coast seem to have a more carnivorous diet. The maximum recorded dive depth for an adult green turtle was 110 m (Berkson 1967 cited in Lutcavage and Lutz 1997), while subadults routinely dive 20 m for 9–23 minutes, with a maximum recorded dive of 66 minutes (Brill et al. 1995 cited in Lutcavage and Lutz 1997).

Based on age-specific growth rates, green turtles are estimated to attain sexual maturity beginning at age 25 to 50 years (Limpus and Chaloupka, 1997, Bjorndal et al. 2000, Chaloupka et al. in press cited in Seminoff 2002; Zug, *et al.* 2002). Eastern Pacific green turtles have reported nesting between two and six times during a season, laying a mean of between 65 and 86 eggs per clutch, depending on the area studied (Michoacán, Mexico and Playa Naranjo, Costa Rica) (Eckert 1993; NMFS and USFWS 1998a).

The northernmost reported resident population of green turtles occurs in San Diego Bay, where about 50–60 mature and immature turtles concentrate in the warm water effluent discharged by a power plant (McDonald, *et al.* 1994). These turtles appear to have originated from east Pacific nesting beaches and the Revillagigedo Islands (west of Baja California), based on morphology, genetic analyses, and tagging data (NMFS and USFWS 1998a, P. Dutton, NMFS, personal communication, March, 2002); however, the possibility exists that some are from Hawaii (P. Dutton, NMFS, personal communication, January, 2001).

Central Pacific – Hawaii

Green turtles in Hawaii are considered genetically distinct and geographically isolated, although a nesting population at Islas Revillagigedos in Mexico appears to share the mtDNA haplotype that commonly occurs in Hawaii. In Hawaii, green turtles nest on six small sand islands at French Frigate Shoals, a crescent-shaped atoll situated in the middle of the Hawaiian Archipelago (Northwestern Hawaiian Islands) (Balazs 1995). Researchers have monitored East Island since 1973 and have collected information on numbers of females nesting annually, and have conducted tagging studies (Balazs 2002). Since the establishment of the ESA in 1973, and following years of exploitation, the nesting population of Hawaiian green turtles has shown a gradual but definite increase (Balazs and Chaloupka 2003; Balazs 1996). In three decades the number of nesting females at East Island increased from 67 nesting females in 1973 to 467 nesting females in 2002.

Important resident areas of green turtles have been identified and are being monitored along the coastlines of Oahu, Molokai, Maui, Lanai, Hawaii, and at nesting areas in the reefs surrounding the French Frigate

Shoals, Lisianski Island, and Pearl and Hermes Reef (Balazs 1982; Balazs, *et al.* 1987). Unfortunately, the green turtle population in the Hawaiian Islands area is afflicted with a tumor disease, fibropapilloma, which is of an unknown etiology and often fatal, as well as spirochidiasis, both of which are the major causes of stranding of this species (G. Balazs, NMFS, personal communication, 2000).

Mexico

In the Mexican Pacific, the two main nesting beaches for female green turtles occur in Michoacán and include Colola, which is responsible for 70 percent of total green turtle nesting in Michoacán (Delgado and Alvarado 1999), and Maruata. These nesting beaches have showed a dramatic decline, particularly in the early 1980s (Eckert 1993).

Since their decline in the 1980s from about 5,500 nesting females per year, the number of nesting females arriving at Colola Beach in Mexico has fluctuated widely between lows of 171 and highs of 880, until recently when about 2,100 female turtles returned to nest in 2001. Although the increases in nesting females in 2000 and 2001 provide cause for optimism, historical numbers of this species nesting during the 1960s show that the population is still below its natural level (Alvarado-Diaz and Trejo 2003).

Ecuador

There are few historical records of abundance of green turtles from the Galapagos. Investigators documented nesting females during the period 1976–82 and recorded an annual average of 1,400 nesting females. After nearly twenty years of limited data, a field study commenced in 2002 to assess the status of green turtles nesting in the main nesting sites of the Galapagos Archipelago. The most important nesting beaches are protected as either national parks, tourist sites, or are under military jurisdiction. During the season, a total of 2,756 females were tagged, with the highest numbers in Las Bachas (925 females). This total outnumbers the highest values recorded in previous studies (1,961 females tagged in 1982). Researchers observed few feral pigs and they were only observed in Qunita Playa. There were few documented beetle observations, although feral cats were observed predating on hatchlings as they emerged from the nest (Zárate 2005). Researchers monitored four beaches during the 2004–05 nesting season. During the second half of the season (Feb. 16-April 16, 2005), 267 females were documented as marked (Quinta Playa: 105; Bahía Barahona: 96; Las Salinas: 23; and Las Bachas: 43) (Zárate 2005).

Costa Rica

Green turtles also nest sporadically on the south Pacific coast of Costa Rica, and have been monitored in Caña Blanca and Punta Banco. The total number of nests recorded in Caña Blanca from 1998–2001 ranged from 47 to 106 annually, while the total nests recorded in Punta Banco from 1996 to 2001 ranged from 73 to 233 nests (López and Arauz 2003). At Playa Naranjo, the population of nesting green turtles was estimated to be between 125 and 175 (Cornelius 1976 cite in NMFS and USFWS 1998a).

Genetic analyses conducted on the one green turtle observed taken in the CA/OR drift gillnet fishery was found to originate from eastern Pacific stock, most likely a Mexican nesting beach (P. Dutton, personal communication, January, 2000).

3.3.2.2 Leatherback Turtles (Dermochelys coriacea)

The leatherback turtle is listed as endangered under the ESA throughout its global range. Spotila *et al.* (1996) estimated the *global* population of female leatherback turtles to be only 34,500 (confidence limits: 26,200 to 42,900) nesting females; however, the eastern Pacific population has continued to decline since that estimate, leading some researchers to conclude that the leatherback is now on the verge of extinction in the Pacific Ocean (e.g., Spotila, *et al.* 1996; Spotila, *et al.* 2000).

Leatherback turtles are the largest of the marine turtles, with a curved carapace length often exceeding 150 cm and front flippers that are proportionately larger than in other sea turtles and may span 270 cm in an adult (NMFS and USFWS 1998b). These large turtles have the most extensive range of any living reptile and have been reported circumglobally from 71°N to 47°S latitude in the pelagic Pacific and in all other major pelagic ocean habitats (NMFS and USFWS 1998b). They lead a completely pelagic existence, foraging widely in temperate waters except during the nesting season, when gravid females return to tropical beaches to lay eggs. Leatherbacks are also highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998; Eckert 1999; Morreale, *et al.* 1994).

Satellite telemetry studies indicate that adult leatherback turtles follow bathymetric contours over their long pelagic migrations and typically feed on cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps), and their commensals, parasites and prey (NMFS and USFWS 1998b). The maximum dive depths for post-nesting female leatherbacks in the Carribean have been recorded at 475 m and over 1,000 m, with routine dives recorded at between 50 and 84 m. The maximum dive length recorded for such female leatherback turtles was 37.4 minutes, while routine dives ranged from 4–14.5 minutes (Lutcavage and Lutz 1997). Migrating leatherback turtles also spend a majority of time at sea submerged, and they display a pattern of continual diving (Standora et al., 1984 cited in Southwood, *et al.* 1999).

Using a small sample size of leatherback sclerotic ossicles, analysis by Zug and Parham (1996) suggested that mean age at sexual maturity for leatherback turtles is around 13 to 14 years, giving them the highest juvenile growth rate of all sea turtle species. On the Pacific coast of Mexico, female leatherback turtles lay an average of four clutches per season, with clutch size averaging 64 yolked eggs per clutch (García and Sarti 2000). Each clutch is laid within a 9.3 day interval (García and Sarti 2000). Clutch sizes in Terengganu, Malaysia, and in Pacific Australia were larger, averaging around 85–95 yolked eggs and 83 yolked eggs, respectively (Eckert 1993). Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically two or four years (García and Sarti 2000).

Migratory routes of leatherback turtles originating from eastern and western Pacific nesting beaches are not entirely known. However, satellite tracking of post-nesting females and foraging males and females, as well as genetic analyses of leatherback turtles caught in U.S. Pacific fisheries or stranded on the west coast of the U.S. present some strong insight into at least a portion of their routes and the importance of particular foraging areas. Aerial surveys conducted during the late summer and fall months of 1990–2001 reveal that leatherbacks forage off central California, generally at the end of the summer, when upwelling relaxes and sea surface temperatures increase. Leatherbacks were most often spotted off Pt. Reyes, south of Pt. Arena, in the Gulf of the Farallones, and in Monterey Bay. These areas are upwelling "shadows," regions where larval fish, crabs, and jellyfish are retained in the upper water column during relaxation of upwelling. Researchers estimated an average of 170 leatherbacks (95 percent CI = 130–222) were present between the coast and roughly the 50 fathom isobath off California. Abundance over the study period was variable between years, ranging from an estimated 20 leatherbacks (1995) to 366 leatherbacks (1990) (Benson, *et al.* 2003).

In the last five years, researchers have discovered two important migratory corridors of leatherback turtles originating from western Pacific nesting beaches. Initially, genetic analyses of stranded leatherbacks found along the West Coast determined that the turtles had originated from western Pacific nesting beaches. Furthermore, genetic analysis of samples from leatherback turtles taken off California and Oregon by the CA/OR drift gillnet fishery and in the northern Pacific, taken by the California-based longline fishery, revealed that all originated from western Pacific nesting beaches (i.e., Indonesia/Solomon Islands/Malaysia; P. Dutton, NMFS, personal communication, December, 2003).

Observations of tracked leatherbacks captured and tagged off the West Coast have revealed an important migratory corridor from central California, to the south of the Hawaiian Islands, leading to western Pacific nesting beaches. Researchers have also begun to track female leatherbacks tagged on western Pacific nesting beaches, both from Jamursba-Medi and War-mon, Papua, and from the Morobe coast of Papua New Guinea. Most of the females that have been tagged in Jamursba-Medi, Papua, which primarily nest during the late spring and summer, have been tracked heading on an easterly pathway, towards the West Coast or heading north toward foraging areas off the Philippines and Japan. In addition, one female that was captured in central California in 2005 still had a tracking device that had been attached to her on Jamursba-Medi, confirming this trans-Pacific migration (P. Dutton, NMFS, personal communication, 2005). Meanwhile, leatherbacks tagged off the nearby nesting beach of War-mon, which is primarily a winter-time nesting beach, have either continued to forage locally or began migrating in a southeasterly direction (i.e. not towards the California coast). In addition, all the leatherbacks tagged off Papua New Guinea have traveled on a southeasterly direction, in the south Pacific Ocean (S. Benson, NMFS, personal communication, 2006). Leatherbacks nesting in PNG, the Solomon Islands, and Vanuatu exhibit peak nesting during the winter months (P. Dutton, in review, and personal communication, 2006). From this information, researchers have concluded that female leatherbacks that forage off the west coast of the U.S. and that are likely to interact with the proposed fishery have likely originated from the Jamursba-Medi nesting beach.

Genetic markers in 16 of 17 leatherback turtles sampled to date from the central North Pacific (captured in the Hawaii-based longline fishery) have identified those turtles as originating from nesting populations in the southwestern Pacific; the other specimen, taken in the southern range of the Hawaii fishery, was from nesting beaches in the eastern Pacific (Dutton and Eckert 2005). All three leatherbacks taken in the California-based longline fishery were found to originate from western Pacific nesting beaches, based on genetic analyses. All leatherbacks captured off central California (n=40) have been found to originate from western Pacific nesting beaches (P. Dutton, NMFS, personal communication, 2006).

Pacific Ocean – general status

Based on published estimates of nesting female abundance, leatherback populations are declining at all major Pacific basin nesting beaches, particularly in the last two decades (NMFS and USFWS 1998b; Spotila, *et al.* 1996; Spotila, *et al.* 2000). Declines in nesting populations have been documented through systematic beach counts or surveys in Malaysia (Rantau Abang, Terengganu), Mexico, and Costa Rica. In other leatherback nesting areas, such as Papua New Guinea, Indonesia, and the Solomon Islands, there have been no systematic consistent nesting surveys, so it is difficult to assess the status and trends of leatherback turtles at these beaches. In all areas where leatherback nesting has been documented, however, current nesting populations are reported by scientists, government officials, and local observers to be well below abundance levels of several decades ago. The collapse of these nesting populations was most likely precipitated by a tremendous overharvest of eggs coupled with incidental mortality from fishing (Eckert 1997; Sarti, *et al.* 1996).

Eastern Pacific nesting populations of Leatherbacks

Leatherback nesting populations are declining at a rapid rate along the Pacific coast of Mexico and Costa Rica. Three countries are important to leatherbacks nesting in the eastern Pacific: Costa Rica, which has the highest abundance and density in this area; Mexico, with several important nesting beaches; and Nicaragua, with two important nesting areas. Leatherbacks have been documented nesting as far north as Baja California Sur and as far south as Panama, with few areas of high nesting (Sarti 2002).

Costa Rica

During the 1980s researchers realized that the beaches of Playa Grande, Playa Ventanas, and Playa Langosta collectively hosted the largest remaining Pacific leatherback populations in Costa Rica. Since 1988, leatherback turtles have been studied at Playa Grande (in Las Baulas), the fourth largest leatherback nesting colony in the world. During the 1988–89 season (July-June), 1,367 leatherback turtles nested on this beach, and by the 1998–99 season, only 117 leatherback turtles nested (Spotila, *et al.* 2000). The 1999–2000 and 2000–01 season showed increases in the number of adult females nesting here, with 224 and 397 leatherbacks nesting, respectively. The last four nesting seasons have shown continued declines, with only 69 nesting females during the 2001–02 season, and 55 nesting females during the 2002–03 season. Scientists speculate that the low turnout during 2002–03 may be due to the "better than expected season in 2000–01 which temporarily depleted the reproductive pool of adult females in reproductive condition following the El Niño/La Niña transition" (R. Reina, Drexel University, personal communication, September, 2003). The number of females nesting in 2003–04 was 159 turtles, while during 2004–05, only 49 females nested. As of February 3, 2006, 107 individual leatherbacks had nested at Playa Grande (P. Tomillo, Drexel University, personal communication, 2006). There have also been anecdotal reports of leatherbacks nesting at Playa Caletas and Playa Coyote.

Mexico

The decline of leatherback subpopulations is even more dramatic off the Pacific coast of Mexico. Surveys indicate that the eastern Pacific Mexican population of adult female leatherback turtles has declined from 70,000[3] in 1980 (Pritchard 1982; Spotila, *et al.* 1996) to approximately 60 nesting females during the 2002–03 nesting season, the lowest seen in 20 years (L. Sarti, UNAM, personal communication, June, 2003). Monitoring of the nesting assemblage at Mexiquillo, Mexico has been continuous since 1982. During the mid-1980s, more than 5,000 nests per season were documented along 4 km of this nesting beach. By the early 1990s (specifically 1993), less than 100 nests were counted along the entire beach (18 km) (Sarti 2002). According to Sarti *et al.* (1996), nesting declined at this location at an annual rate of over 22 percent from 1984 to 1995. Censuses of four index beaches in Mexico during the 2000–01 nesting season showed a slight increase in the numbers of females nesting compared to the all-time lows observed from 1996 through 1999 (Sarti *et al.* in prep). However, the number of nestings during the last two nesting seasons (2001–02 and 2002–03) is the lowest ever recorded, as shown in Table 3.7.

A summary of total leatherback nestings counted and total females estimated to have nested along the Mexican coast from 1995 through 2003 is shown in Table 3.8.

Nicaragua

In Nicaragua, small numbers of leatherbacks nest on Playa El Mogote, and Playa Chacocente, both beaches within 5 km of one another and located in the Rio Escalante Chacocente Wildlife Refuge. Similar to many of the leatherback nesting beaches along the eastern Pacific, the abundance of nesting females has decreased (Arauz 2002).

---

[3] This estimate of 70,000 adult female leatherback turtles comes from a brief aerial survey of beaches by Pritchard (1982a), who has commented: "I probably chanced to hit an unusually good nesting year during my 1980 flight along the Mexican Pacific coast, the population estimates derived from which (Pritchard, 1982b) have possibly been used as baseline data for subsequent estimates to a greater degree than the quality of the data would justify" (Pritchard, 1996).

Western Pacific Nesting Populations of Leatherback Turtles

Similar to their eastern Pacific counterparts, leatherback turtles originating from the western Pacific are also threatened by poaching of eggs, killing of nesting females, human encroachment on nesting beaches, incidental capture in fishing gear, beach erosion, and egg predation by animals. In May, 2004, researchers, managers and tribal community members with extensive knowledge of local leatherback nesting beach populations and activities in Papua (Indonesia), Papua New Guinea, the Solomon Islands, and Vanuatu assembled in Honolulu, Hawaii to identify nesting beach sites, and share abundance information based on monitoring and research, as well as anecdotal reports. Dutton, *et al.* (Dutton, *et al.* In review and personal communication, January 2006) report that there may be a minimum of 2,000 females nesting annually at 25 nesting sites in the western Pacific. Calculations using the same methods used by Spotila *et al*. (1996) yields a minimum total estimate of nesting females in this area of 5,000 animals (taking into account an estimated re-nesting interval of approximately 2.5 years, Spotila *et al*. (1996) multiplied the number of females nesting annually by 2.5).

It is important to note (and discussed further in the beginning description of leatherback migratory behavior), however, that not all leatherbacks found in the north Pacific or off central/northern California and Oregon are composed of all leatherback nesting subpopulations in the western Pacific. Nesting female leatherbacks in the western Pacific exhibit varying seasonal, migratory, and behavioral differences, depending on the rookery. Therefore, a female leatherback found off the U.S. West Coast likely did not originate from nesting beaches in Papua New Guinea, or even particular beaches in Papua (e.g., War Mon beach) (P. Dutton, NMFS, personal communication, 2006). Most (if not all) of the female leatherbacks found off central California originate from the Jamursba-Medi nesting beach. The migratory routes of males are not as well known (S. Benson, NMFS, personal communication, 2006). Dutton, *et al.* (In review) also report that, based on genetic analyses from limited samples from Malaysia, the haplotype freqencies for Terrengganu, Malaysia were significantly different from the four western rookeries, which indicates that this Indo-Pacific stock is distinct from the western Pacific stocks of Papua, PNG, Solomon Islands, and Vanuatu.

Malaysia

The decline of leatherback turtles is severe at one of the most significant nesting sites in the western Pacific region–Terengganu, Malaysia, with current nesting representing less than 2 percent of the levels recorded in the 1950s, and the decline is continuing. The nesting population at this location has declined from 3,103 females estimated nesting in 1968 to two nesting females in 1994 (Chan and Liew 1996). With one or two females reportedly nesting each year, this population has essentially been eradicated (P. Dutton, personal communication, 2000).

Indonesia

The largest leatherback rookery can be found on the north coast of Papua. Here, leatherback nesting generally takes place on two major beaches, located 30 km apart, on the north Vogelkop coast of the State of Papua: Jamursba-Medi (18 km) and War-Mon beach (6 km) (Starbird and Suarez 1994) (Hitipeuw *et al.*, in review). In 1984, the World Wildlife Fund (WWF) began a preliminary study to assess the status of the leatherback nesting population and found at least an estimated 13,000 nests on Jamursba Medi. A subsequent survey undertaken in 1992 reported a decline of nesting levels to 25 percent of the 1984 levels. Since then, the trend appears to be slightly declining; however, the number of nests estimated in 2004 is similar to the number estimated in the early 1990s (Hitipeuw *et al.*, in review). A near total collection of eggs during this time period may have contributed to this decline. Commercial exploitation of turtle eggs on this beach was intense for a long time. Out of concern for the rapid declines in nestings, the WWF proposed the designation of five beaches as protected areas. These beaches are monitored for leatherback nesting activities and patrolled for potential poaching activities (Hitipeuw and Maturbongs 2002).

Leatherbacks nest on Jamursba-Medi during April through September, with a peak in July and August (Suárez, *et al.* 2000). A summary of data collected from leatherback nesting surveys from 1981 to 2004 for Jamursba-Medi has been compiled, re-analyzed, and standardized and is shown in Table 3.9 (Hitipeuw 2003; Hitipeuw and Maturbongs 2002) (Hitipeuw *et al*., in review). Current threats to this nesting population include egg predation by wild pigs (*Sus scrofa*), hatchling predation by ghost crabs, birds, sharks and fish, beach erosion, logging activities, and entanglement in fishing gear and marine debris (Hitipeuw *et al*., in review).

Nesting of leatherbacks on War-Mon beach takes place during October through February, with a peak in December (Suárez *et al*., 2000). Recently, the beach was monitored during the nesting season and documented 1,442 nests (Hitipeuw, 2003), which may equate to several hundred females (249–328 females, given 4.4 to 5.8 nests per female). Given shorter monitoring periods in past studies, it is difficult to analyze any trends for this nesting beach (see Table 3.10).

Papua New Guinea

The Kamiali nesting beach (also in the Morobe Province and within the Kamiali Wildlife Management Area [WMA]) is approximately 11 km long and is an important nesting area for leatherbacks. While no long-term trend data are available, locals report declines over generations (Benson *et al*., in review). It has been estimated that at Kamiali nesting beach, approximately 150 nesting females producing 500–600 clutches per season (Philip 2002). Due to increasing awareness and concern about the local declines in nesting leatherbacks, the Kamiali community agreed to a 100 meter no-take zone in 1999, increased to a 1 km no-take zone in 2000, and 0.5 km was added in 2001 (1.5 km total). The entire 8 km beach is now considered the Kamiali Wildlife Management area. The no-take zone is effective from December to February (nesting season) (Rei, *et al.* 2004). Recent surveys were conducted from 2000–04 in the Kamiali WMA, and the number of nesting females ranged from 41 to 71 animals (2000–01: 54 females; 2001–02: 41 females; 2002–03: 46 females; and 2003–04: 71 females (Benson *et al*., in review). Identified threats to the nesting beaches in this area include egg harvest in the areas outside of the Kamiali WMA and wave-induced erosion (Benson *et al*., in review).

Aerial surveys in Papua New Guinea have been flown for the last three years (2004–06) during the peak of the leatherback nesting season (January). The 2004 survey found that 50 percent of all nests were found at beaches within the Huon Gulf. Results from the January, 2005 survey estimated 1,195 leatherback nests in an area covering 2,692 km of coastline, including the Madang, Morobe and Oro provinces (north coast of mainland Papua New Guinea), New Britain, Bougainville, Buka, and the southwestern coast of New Ireland (Benson 2005).

Solomon Islands

In the Solomon Islands, the rookery size has been estimated to be less than 100 females nesting per year (D. Broderick, personal communication cited in Dutton, *et al.* 1999); however recent reports indicate considerable scattered nesting around the islands and that there may be on the order of hundreds of females, rather than tens of females (Dutton, *et al.* In review). Past studies have identified four important nesting beaches in Isabel Province: Sasakolo, Lithoghahira, Lilika, and Katova. While Leary and Laumani (1989 cited in Ramohia, *et al.* 2001) reported that leatherback nesting throughout Isabel Province doubled since 1980, there have been few monitoring studies to substantiate this reported trend. From November 28, 2000, through January 21, 2001, a monitoring study was conducted on one of the nesting beaches, located on Sasakolo Beach. This period represented approximately two-thirds of the known peak-breeding season. During this time, leatherbacks appeared 192 times, with 132 clutches laid. A total of 27 nesting turtles were encountered: 26 were new nesting individuals and 1 had been tagged in 1995. Egg harvest by humans has been reported in the past and recently (Dutton, *et al.* In review). In addition, lizards and iguanas have been documented predating on leatherback eggs (Ramohia, *et al.* 2001), and wave erosion, and logging have also been identified as threats (Dutton, *et al.* In review).

Vanuatu

There are very rare reports of leatherback nesting activities in Vanuatu; however, this country consists of over eighty islands, many remote, so there is still much to be learned regarding the importance of the beaches Vanuatu to western Pacific leatherbacks. A village-based monitoring system was initiated in 1995 with the support of the "Wan Smolbag" theatre group. Small nesting populations have been reported by residents of different islands, from Espirito Santo in the north, through Ambae, Aneityum, and Efate to Tanna in the south. Locals report that nesting has declined significantly since the 1980s, primarily due to human encroachment and subsistence on nesting females and eggs. Currently, Epi Island has the largest number of nests, with approximately 20–30 nesting females on the southwestern beaches and a smaller number on the east coast. There is scattered nesting on the other islands, based on survey data and anecdotal reports. Leatherbacks are still consumed by locals (Petro, *et al.* 2004).

3.3.2.3 Loggerhead Turtles (Caretta caretta)

The loggerhead turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. Loggerheads are circumglobal, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters. Major nesting grounds are generally located in temperate and subtropical regions, with scattered nesting in the tropics (NMFS and USFWS 1998c). In the Pacific Ocean, loggerhead turtles are represented by a northwestern Pacific nesting aggregation (located in Japan), which may be comprised of separate nesting groups (Hatase, *et al.* 2002), and a smaller southwestern nesting aggregation that occurs in Australia (Great Barrier Reef and Queensland), New Caledonia, New Zealand, Indonesia, and Papua New Guinea.

The loggerhead is characterized by a reddish brown, bony carapace, with a comparatively large head, up to 25 cm wide in some adults. Adults typically weigh between 80 and 150 kg, with average CCL measurements for adult females worldwide between 95–100 cm CCL (Dodd 1988) and adult males in Australia averaging around 97 cm CCL (Limpus 1985 cited in Eckert 1993). For their first years of life, loggerheads forage in open ocean pelagic habitats. Both juvenile and subadult loggerheads feed on pelagic crustaceans, mollusks, fish, and algae. The large aggregations of juveniles off Baja California have been observed foraging on dense concentrations of the pelagic red crab, *Pleuronocodes planipes* (Nichols, *et al.* 2000; Pitman 1990). Data collected from stomach samples of turtles captured in North Pacific driftnets indicate a diet of gastropods (*Janthina* sp.), heteropods (*Carinaria* sp.), gooseneck barnacles (*Lepas* sp.), pelagic purple snails (*Janthina* sp.), medusae (*Vellela* sp.), and pyrosomas (tunicate zooids). Other common components include fish eggs, amphipods, and plastics (Parker, *et al.* 2000). The maximum recorded dive depth for a post-nesting female was 211–233 m, while mean dive depths for both a post-nesting female and a subadult were 9–22 m. Routine dive times for a post-nesting female were between 15 and 30 minutes, and for a subadult, between 19 and 30 minutes (Sakamoto, et al. 1990 cited in Lutcavage and Lutz 1997). A recent study (Polovina, *et al.* 2004) found that tagged turtles spent 40 percent of their time at the surface and 90 percent of their time at depths shallower than 40 m.

For loggerheads, the transition from hatchling to young juvenile occurs in the open sea, and evidence from genetic analyses and tracking studies show that this part of the loggerhead life cycle involves trans-Pacific developmental migration. In addition, large aggregations (numbering in the thousands) of mainly juveniles and subadult loggerheads are found off the southwestern coast of Baja California, over 10,000 km from the nearest significant nesting beaches (Nichols, *et al.* 2000; Pitman 1990). Genetic studies have shown these animals originate from Japanese nesting subpopulation (Bowen, *et al.* 1995), and their presence reflects a migration pattern probably related to their feeding habits (Cruz, et al. 1991 cited in Eckert 1993). While these loggerheads are primarily juveniles, carapace length measurements indicate that some of them are 10 years old or older.

Based on skeletochronological and mark-recapture studies, mean age at sexual maturity for loggerheads ranges between 25 to 35 years of age, depending on the subpopulation (Chaloupka 1997). Dobbs (2002) reports that loggerheads originating from Australian beaches mature at around age 25, although Frazer *et al*. (1994 cited in NMFS and USFWS 1998c) determined that maturity of loggerheads in Australia occurs between 34.3 and 37.4 years of age.

Upon reaching maturity, adult female loggerheads migrate long distances from resident foraging grounds to their preferred nesting beaches. Clutch size averages 110 to 130 eggs, and one to six clutches of eggs are deposited during the nesting season (Dodd 1988). The average re-migration interval is between 2.6 and 3.5 years (*in* NMFS and USFWS, 1998c), and adults can breed up to 28 years (Dobbs 2002).

Distribution and Abundance of Nesting Females in the Pacific Ocean

In the Pacific Ocean, loggerhead turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) and a smaller southwestern nesting aggregation that occurs in eastern Australia (Great Barrier Reef and Queensland) and New Caledonia (NMFS SEFSC, 2001). There are no reported loggerhead nesting sites in the eastern or central Pacific Ocean basin.

Japan

In the western Pacific, the only major nesting beaches are in the southern part of Japan (Dodd 1988). From nesting data collected by the Sea Turtle Association of Japan since 1990, the latest estimates of nesting females on almost all of the rookeries are as follows: 2,479 nests in 1998, 2,255 nests in1999, and 2,589 nests in 2000. Considering multiple nesting estimates, Kamezaki *et al*. (2003) estimates that approximately less than 1,000 female loggerheads return to Japanese beaches per nesting season. In general, during the last 50 years, loggerhead nesting populations have declined 50–90 percent. Recent genetic analyses on female loggerheads nesting in Japan suggest that this “subpopulation” is composed of genetically distinct nesting colonies (Hatase, *et al.* 2002) with precise natal homing of individual females. As a result, Hatase, *et al.* (2002) indicate that loss of one of these colonies would decrease the genetic diversity of Japanese loggerheads; recolonization of the site would not be expected on an ecological time scale.

Australia

In eastern Australia, Limpus and Riemer (1994) reported an estimated 3,500 loggerheads nesting annually in during the late 1970s. Since that time, there has been a substantial decline in nesting populations at all sites. Currently, less than 500 female loggerheads nest annually in eastern Australia, representing an 86 percent reduction within less than one generation (Limpus and Limpus 2003).

New Caledonia

Although loggerheads are the most common nesting sea turtle in the Île de Pins area of southern New Caledonia, there is no quantitative information available, and surveys in the late 1990s failed to locate regular nesting. However, anecdotal information from locals indicates that there may be more substantial loggerhead nesting occurring on peripheral small coral cays offshore of the main island. Limpus and Limpus (2003) estimate that the annual nesting population in the Île de Pins area may be in the "tens or the low hundreds."

Loggerhead mortality from human activities in the Pacific Ocean is not well-documented except for estimates based on NMFS observer data in the Hawaii-based longline fishery, CA/OR drift gillnet fishery, and recent ongoing studies in Baja California, Mexico (Nichols 2002; Nichols, *et al.* 2000). Mortality of loggerheads in the East China Sea and other benthic habitats of this population are a concern and thought to be "high," but have not been quantified (Kamezaki, personal communication cited in Tillman 2000).

Of the loggerheads taken in the California-based longline fishery and the CA/OR drift gillnet fishery, all were determined to have originated from Japanese nesting beaches, based on genetic analyses (P. Dutton, NMFS, personal communication, December, 2003).

3.3.2.4 Olive Ridley (Lepidochelys olivacea)

Although the olive ridley is regarded as the most abundant sea turtle in the world, olive ridley nesting populations on the Pacific coast of Mexico are listed as endangered under the ESA; all other populations are listed as threatened. Olive ridley turtles occur throughout the world, primarily in tropical and sub-tropical waters. Nesting aggregations in the Pacific Ocean are found in the Marianas Islands, Australia, Indonesia, Malaysia, and Japan (western Pacific), and Mexico, Costa Rica, Guatemala, and South America (eastern Pacific).

Olive ridleys are the smallest living sea turtle, with an adult carapace length between 60 and 70 cm, and rarely weighing over 50 kg. They are olive or grayish green above, with a greenish white underpart, and adults are moderately sexually dimorphic (NMFS and USFWS 1998d). Olive ridleys feed on tunicates, salps, crustaceans, other invertebrates, and small fish. Montenegro *et al.* (1986 cited in NMFS and USFWS 1998d) found a wide variety of prey in olive ridleys from the eastern Pacific. Olive ridleys have been caught in trawls at depths of 80–110 m (NMFS and USFWS 1998d), and a post-nesting female reportedly dove to a maximum depth of 290 m. The average dive length for an adult female and adult male is reported to be 54.3 and 28.5 minutes, respectively (Lutcavage and Lutz 1997; Plotkin, *et al.* 1993).

Olive ridleys are famous for their synchronized mass nesting emergences, a phenomenon commonly known as "arribadas." While arribadas occur only on a few beaches worldwide, the olive ridley's nesting range is far-reaching and is also comprised of solitary nesters. Thus, there are two clearly distinct reproductive behaviors within the species—some females are solitary nesters, while others are arribada nesters (Plotkin and Bernardo 2003). Olive ridleys are considered to reach sexual maturity between 8 and 10 years of age, and approximately three percent of the number of hatchlings recruit to the reproductive population ((Marquez 1982 cited in Salazar, *et al.* 1998). The mean clutch size for females nesting on Mexican beaches is 105.3 eggs; in Costa Rica, clutch size averages between 100 and 107 eggs (NMFS and USFWS 1998d). Females generally lay 1.6 clutches of eggs per season in Mexico (Salazar, *et al.* 1998) and two clutches of eggs per season in Costa Rica (Eckert 1993). Data on the remigration intervals of olive ridleys in the eastern Pacific are scarce; however, in the western Pacific (Orissa, India), females showed an annual mean remigration interval of 1.1 years. Reproductive span in females of this area was shown to be up to 21 years (Pandav and Kar 2000).

Like leatherback turtles, most olive ridley turtles lead a primarily pelagic existence (Plotkin, *et al.* 1993), migrating throughout the Pacific, from their nesting grounds in Mexico and Central America to the north Pacific. While olive ridleys generally have a tropical to subtropical range, with a distribution from Baja

California, Mexico, to Chile (Silva-Batiz, *et al.* 1996), individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000).

Declines in olive ridley populations have been documented in Playa Nancite, Costa Rica; however, other nesting populations along the Pacific coast of Mexico and Costa Rica appear to be stable or increasing, after an initial large decline due to harvesting of adults. Historically, an estimated 10 million olive ridleys inhabited the waters in the eastern Pacific off Mexico (Cliffton, et al. 1982 cited in NMFS and USFWS 1998d). But human-induced mortality led to declines in this population. In the Indian Ocean, Gahirmatha (Orissa, India) supports perhaps the largest nesting population; however, this population continues to be threatened by nearshore trawl fisheries. Direct harvest of adults and eggs, incidental capture in commercial fisheries, and loss of nesting habits are the main threats to the olive ridley's recovery.

Eastern Pacific Ocean

In the eastern Pacific Ocean, nesting occurs all along the Mexican and Central American coast, with large nesting aggregations occurring at a few select beaches located in Mexico and Costa Rica. Few turtles nest as far north as southern Baja California, Mexico (Fritts, *et al.* 1982) or as far south as Peru (Brown and Brown 1982). The largest known arribada*s* in the eastern Pacific are off the coast of Costa Rica (~475,000–650,000 females estimated nesting annually) and in southern Mexico (~800,000+ nests/year at La Escobilla, in Oaxaca) (Millán 2000).

Mexico

The nationwide ban on commercial harvest of sea turtles in Mexico, enacted in 1990, has improved the situation for the olive ridley. Surveys of important olive ridley nesting beaches in Mexico indicate increasing numbers of nesting females in recent years (Arenas, *et al.* 2000; Márquez, *et al.* 1995). Annual nesting at the principal beach, Escobilla Beach, Oaxaca, Mexico, averaged 138,000 nests prior to the ban, and since the ban on harvest in 1990, annual nesting has increased to an average of 525,000 nests (Salazar, *et al.* 1998). At a smaller olive ridley nesting beach in central Mexico, Playon de Mismalayo, nest and egg protection efforts have resulted in more hatchlings, but the population is still "seriously decremented and is threatened with extinction" (Silva-Batiz, *et al.* 1996). Still, there is some discussion in Mexico that the species should be considered recovered (Arenas, *et al.* 2000).

Costa Rica

In Costa Rica, 25,000 to 50,000 olive ridleys nest at Playa Nancite and 450,000 to 600,000 turtles nest at Playa Ostional each year (NMFS and USFWS 1998d). In an 11-year review of the nesting at Playa Ostional, Ballestero, *et al.* (2000) report that the data on numbers of nests deposited is too limited for a statistically valid determination of a trend; however, there does appear to be a six-year decrease in the number of nesting turtles. Under a management plan, the community of Ostional is allowed to harvest a portion of eggs. Between 1988 and 1997, the average egg harvest from January to May ranged between 6.7 and 36 percent, and from June through December, the average harvest ranged from 5.4 to 20.9 percent (Ballestero, *et al.* 2000). At Playa Nancite, concern has been raised about the vulnerability of offshore aggregations of reproductive individuals to "trawlers, longliners, turtle fishermen, collisions with boats, and the rapidly developing tourist industry" (Kalb, *et al.* 1996). The greatest single cause of olive ridley egg loss comes from the nesting activity of conspecifics on *arribada* beaches, where nesting turtles destroy eggs by inadvertently digging up previously-laid nests or causing them to become contaminated by bacteria and other pathogens from rotting nests nearby. At a nesting site in Costa Rica, an estimated 0.2 percent of 11.5 million eggs laid during a single *arribada* produced hatchlings (NMFS and USFWS

1998d). In addition, some female olive ridleys nesting in Costa Rica have been found afflicted with the fibropapilloma disease (Aguirre, *et al.* 1999).

Guatemala

In Guatemala, the number of nesting olive ridleys nesting along their Pacific coast has declined by 34 percent between 1981 and 1997. However, this is only based on two studies conducted 16 years apart: in 1981, the estimated production of olive ridley eggs was 6,320,000, while in 1997, only 4,300,000 eggs were estimated laid (Muccio 1998). Villagers also report a decline in sea turtles; where collectors used to collect 2–3 nests per night during the nesting season 15 years prior, now collectors may find only two to four nests per year due to fewer turtles and more competition. This decline most certainly can be attributed to the collection of nearly 95 percent of eggs laid, and the incidental capture of adults in commercial fisheries (Muccio 1998).

Nicaragua

In Nicaragua, there are two primary *arribada* beaches: Playa La Flor and Playa Chacocente, both in the southern Department of Rivas. At Playa La Flor, the second most important nesting beach for olive ridleys on Nicaragua, Ruiz (1994) documented six *arribadas* (defined as 50 or more females nesting simultaneously). The main egg predators were domestic dogs and vultures (*Coragyps atratus* and *Cathartes aura*). During the largest *arribada*, 12,960 females nested from October 13–18, 1994, at Playa La Flor (NMFS and USFWS 1998d). Von Mutius and Berghe (2002) reported that management of this beach includes a six-month open season for egg collection, during a time when the *arribadas* is small. During this time, all eggs are taken by locals, and during the "closed period," approximately 10–20 percent of eggs are given to the locals to consume or sell. At Playa Chacocente, approximately 5,000 to 20,000 females may nest over the course of five days (Camacho y Cáceres 1994 cited in Arauz 2002). Here, the harvest and commercialization of sea turtle eggs is allowed and somewhat controlled. During a monitoring project conducted on nearby Playa El Mogote from October 2001 through March 2002, researchers documented olive ridleys nesting 327 times. Of these, 99.7 percent of the nests were poached (Arauz 2002).

Indian Ocean

In the eastern Indian Ocean, olive ridleys nest on the east coast of India, Sri Lanka, and Bangladesh.

India

In India, a few thousand olive ridleys nest in northern Tamil Nadu, Andhra Pradesh, and the Andaman and Nicobar Islands (Shanker and Choudhury 2003). However, the largest nesting aggregation of olive ridleys in the world occurs in the Indian Ocean along the northeast coast of India (Orissa). Not surprisingly then, olive ridleys are the most common sea turtle species found along the east coast of India, migrating every winter to nest *en masse* at three major rookeries in the state of Orissa: Gahirmatha, Devi River mouth, and Rushikulya (Shanker and Choudhury 2003). Sporadic nesting occurs between these mass nesting beaches.

The Gahirmatha rookery, located along the northern coast of Orissa, hosts the largest known nesting concentration of olive ridleys. Shanker *et al*. (2003) provide a comprehensive report on the status and trends of olive ridleys nesting in Orissa since monitoring began in 1975. Current population sizes are estimated to be between 150–200,000 nesting females per year. Based on analyses of the data, while there has been no drastic decline in the nesting population at Gahirmatha in the last 25 years, there are differences in trends between decades. For example, trend analyses suggest stability or increase in the size of the 1980s *arribadas*, which may be due to enforcement of legislation in the late 1970s, stopping the directed take of turtles. However, the 1990s data show that the population is declining or on the verge of a decline, which may be consistent with the recent increase in fishery-related mortality and other threats (see below). No *arribadas* occurred on this nesting beach in 1997, 1998, and 2002, which is the highest documented incidence of failure since this rookery has been monitored (Shanker and Choudhury 2003).

Uncontrolled mechanized fishing in areas of high sea turtle concentration, primarily illegally-operated trawl fisheries, has resulted in large-scale mortality of adults during the last two decades. Records of stranded sea turtles have been kept since 1993. Since that time, over 90,000 strandings (mortalities) of olive ridleys have been documented (Shanker and Choudhury 2003), and much of it is believed to be due to illegal gillnet and shrimp trawl fishing in the offshore waters. Threats to these sea turtles in this area also include artificial illumination from coastal development and unsuitable beach conditions, including reduction in beach width due to erosion (Pandav and Choudhury 1999). Genetic studies indicate that olive ridleys originating from the east coast of India are distinct from other ridleys worldwide, increasing the conservation importance of this particular population (Shanker, et al. 2000 cited in Shanker and Choudhury 2003).

Western Pacific Ocean

In the western Pacific, olive ridleys are not as well documented as in the eastern Pacific, nor do they appear to be recovering as well. There are a few sightings of olive ridleys from Japan, but no report of egg-laying. Similarly, there are no nesting records from China, Korea, the Philippines, or Taiwan. No information is available from Vietnam or Kampuchea (Eckert 1993). There are small documented nesting sites in Indonesia, Thailand, and Malaysia. In Indonesia, extensive hunting and egg collection, in addition to rapid rural and urban development, have reduced nesting activities, and locals report daily trading and selling of sea turtles and their eggs in the local fish markets (Putrawidjaja 2000). The main threats to turtles in Thailand include egg poaching, harvest and subsequent consumption or trade of adults or their parts (i.e., carapace), indirect capture in fishing gear, and loss of nesting beaches through development (Aureggi, *et al.* 1999).

Based on genetic analyses, an olive ridley taken in the CA/OR drift gillnet fishery originated from an eastern Pacific stock (i.e., Costa Rica or Mexico) (P. Dutton, NMFS, personal communication, October 2002). The one olive ridley observed taken in the California-based longline fishery was found to originate from the eastern Pacific (P. Dutton, NMFS personal communication, December, 2003). Research cruises in the ETP have involved information on sighted olive ridleys and genetic analyses determined those turtles originated from eastern Pacific nesting beaches.

Table 3.7. Annual number of leatherback nestings from 2000-2003 on primary and secondary nesting beaches.

Index beach	2000-2001	2001-2002[1]	2002-2003[2]
Primary Nesting Beaches (40-50% of total nesting activity)			
Mexiquillo	624	20	36
Tierra Colorada	535	49	8
Cahuitan	539	52	73
Barra de la Cruz	146	67	3
Secondary Nesting Beaches			
Agua Blanca	113	no data	no data
Total - all index beaches	1,957	188	120
Total - Mexican Pacific	4,513	658	not available yet

[1]Source: Sarti, pers. comm, March, 2002 – index beaches; Sarti *et al.*, 2002 for totals;
[2]Source: Sarti, pers. comm, December, 2003 – index beaches, totals.

Table 3.8. Total leatherback nestings counted and total number of females estimated to nest along the Mexican Pacific coast per season. Sources: Sarti et al. 2000 (1995-1999 data), Sarti et al, 2002 (2001-02 data), Sarti, personal communication, June, 2003 (2002-03 data).

Season	Nestings	Females
1995-1996	5,354	1,093
1996-1997	1,097	236
1997-1998	1,596	250
1998-1999[1]	799[1]	67[2]
1999-2000	1,125	225
2000-2001	4,513	991
2001-2002	658	109-120

[1]Value corrected for E1 (error due to track and bodypit aging) and E2 (error due to difficulty of observation from the air) only.
[2]Number of females only includes tagged females at the key beaches.

Table 3.9. Estimated numbers of female leatherback turtles nesting on Jamursba-Medi Beach, along the north coast of the State of Papua. (Summarized by Hitipeuw and Maturbongs, 2002 and Hitipeuw, 2003; Hitipeuw et al., in review.)

Survey Period	# of Nests	Adjusted # Nests[1]	Estimated # of Females[3]
September, 1981	4,000+	7,143	1,232 - 1,623
April - Oct. 1984	13,360	13,360	2,303 - 3,036
April - Oct. 1985	3,000	3,000	658 - 731
June - Sept. 1993	3,247	4,091[2]	705 - 930
June - Sept. 1994	3,298	4,155[2]	716 - 944
June - Sept. 1995	3,382	4,228[2]	729 - 961
June - Sept., 1996	5,058	6,373[2]	1,099 - 1,448
May - Aug., 1997	4,001	4,481[4]	773 - 1,018
May - Sept. 1999	2,983	3,251	560 - 739
April - Dec., 2000	2,264	2,194	390 - 514
April - Oct., 2001	3,056	3,056	527 - 695
March - Aug., 2002	1,865	1,921	331 - 437
March – Nov., 2003	3,601	2,904	621 – 818
March – Aug., 2004	3,183	3,871	667 – 879

[1]The total number of nests reported during aerial surveys were adjusted to account for loss of nests prior to the survey. Based on data from other surveys on Jamursba-Medi, on average 44% of all nests are lost by the end of August.

[2]The total number of nests have been adjusted based on data from Bhaskar's surveys from 1984-85 from which it was determined that 26% of the total number of nests laid during the season (4/1-10/1) are laid between April and May.

[3]Based on Bhaskar's tagging data, an average number of nests laid by leatherback turtles on Jamursba-Medi in 1985 was 4.4 nests per female. This is consistent with estimates for the average number of nests by leatherback turtles during a season on beaches in Pacific Mexico, which range from 4.4 to 5.8 nests per female (Sarti et al., unpub. report). The range of the number of females is estimated using these data.

[4]Number adjusted from Bhaskar (1985 in Hitipeuw and Maturbongs, 2002), where percentage of nests laid in April and September is 9% and 3%, respectively, of the total nests laid during the season.

Table 3.10. Number of leatherback turtle nests observed along War-Mon Beach

Monitoring Period	# nests	Source
Nov. 23-Dec. 20, 1984 and Jan. 1-24, 1985	1,012	Starbird and Suárez, 1994; Suárez *et al*., 2000
Dec. 6-22, 1993	406	Starbird and Suárez, 1994; Suárez *et al*., 2000
Nov., 2002 - June, 2003	1,442	Hitipeuw, 2003
Nov., 2003 – May, 2004	3,054	Hitipeuw *et al*., in review

3.4 Seabirds

3.4.1 Introduction

Due to the nature of drift gillnetting operations, the only potential impact of this proposed fishery to seabirds would be to those seabirds that forage by diving. The seabirds off California comprise about 15 families and 80 species, all of which have a wide array of body forms, life history patterns, and strategies for obtaining food, reproducing, and avoiding predation. Seabirds tend to be of two types: those that spend most of their time near the shore (e.g., pelicans, cormorants, and most gulls), and those which come to land only during the breeding season or sometimes intermittently during other times of the year, often referred to as pelagic seabirds (e.g., storm petrels and alcids) (Sowls, *et al.* 1980).

The only seabirds that are likely to interact with the fishery are terns, cormorants, pelicans, and gulls. Of these seabirds, gulls generally do not dive for their prey so they will most likely not be impacted by the fishery. Therefore, the following is a brief description of terns, cormorants, and pelicans that are may be found in the area of the proposed fishery.

3.4.2 Terns

Terns, subfamily Sterninae, are graceful water birds, which often hover and plunge head first for fish. They normally do not swim, like gulls, and eat small fish, marine life, and large insects. The royal tern (*Sterna maxima*) is a strictly marine bird and a colonial breeder, sometimes breeding in San Diego, and an irregular visitor to Morro Bay, California. The elegant tern (*S. elegans*) breeds near San Diego and wanders irregularly from August through September north to San Francisco. Forster's tern (*S. Forsteri*) is the most widespread tern in the west, wintering off California and spending time around the open ocean, rocky coasts, and islands (Harrison 1987; Peterson 1990). The California least tern (*S. antillarum browni*) migrates to San Diego yearly between April and September. They feed on small baitfish by diving from low heights into ocean waters (e.g. local bays, lagoons, and nearshore ocean waters). The California least tern is listed as endangered under the ESA (Peterson 1990).

3.4.3 Cormorants

Cormorants, family Phalacrocoracidae, are large, blackish water birds that often stand erect on rocks or posts. They swim low like loons, but with their bill tilted up at an angle, and feed on fish and crustaceans. The double-crested cormorant (*Phalacrocorax auritus*) is the least abundant of the cormorants in California and are strong swimmers which prey on shallow-water fish. Brandt's cormorant (*P. penicillatus*) feed in large flocks, often in the company of other seabirds and are found all year in southern California (Sowls, *et al.* 1980). The pelagic cormorant (*P. pelagicus*) is exclusively marine, and less gregarious than the double-breasted cormorant, but breeds colonially, from May to August (Harrison 1987). Cormorants currently have no special status.

3.4.4 Pelicans

Pelicans, family Pelecanidae, are huge water birds with long flat bills and great throat pouches. They have long necks, a robust body, and feed on fish and crustaceans (Peterson 1990). California brown pelicans (*Pelecanus occidentalis*) are plunge feeders that forage mostly within 20 km of the coast; however, a few individuals have been recorded over waters deeper than 3,000 m and at distances of 88 km off central California (MMS 1992)). Tens of thousands migrate from Mexico after the breeding season, returning in early winter. The populations tend to fluctuate in response to environmental conditions, appearing to favor warm periods. They feed primarily on menhaden but also prey on herring, sheepshead, silversides and sometimes crustaceans. They are conspicuous and easily identifiable, dark and bulky with a white head with a pale yellow wash on the crown (Harrison 1987; Peterson 1990). This species is listed as endangered under the ESA.

3.4.5 Cassin's Auklet (Ptychoramphus aleuficu)

Cassin's auklet occur in marine pelagic waters from Alaska to Baja, California. Auklets are abundant throughout their range, with an estimated 88,000 birds (Seattle Audubon Society 2006). In California, the auklet occurs year round, where 80 percent of the breeding population is found on the Farallon Islands; 17 percent are found on Prince Island and elsewhere in the Channel Islands; and 3 percent are found on Castle Rock, off Del Norte County and Green Rock, off Humboldt County (California Interagency Wildlife Task Group 2006).

The auklet is a small seabird, approximately seven to nine inches in length with a wingspan of about 13 inches. The auklet has slate-gray upperparts fading to light gray toward the underparts and a solid white belly (USGS 2006), white eyebrows, and blue ft (Triangle Island Seabird Research and Monitoring Program 2006). Physically, juvenile auklets are similar to adults, but are slightly paler in color and have a white throat. Auklets have pale yellow eyes and a short bill which is white at the base of its lower mandible. Male and females are similar in appearance (USGS 2006).

Auklets mainly forage on krill crustaceans of the Family Euphausiidae, but their diets may also include amphipods, copepods, squids, crabs, and small fish (Briggs, *et al.* 1988). Auklets primarily feed during the day, where they form large social flocks at the ocean surface. Auklets dive for prey using their wings to "fly" underwater in pursuit of prey (USGS 2006).

Auklets rarely come to shore, except to breed and only at night to avoid the predatory western gull (CA.gov, 2006). Once on shore auklets stay in their burrows to avoid predators (Triangle Island Seabird Research and Monitoring Program 2006). Auklets breed in large, dense colonies on undisturbed island; have a clutch size of one, annually; and rear their young from mid-May through July (Sydeman, *et al.* 2001). Nests are dug by the breeding pair in sandy soil or turf, or in rock crevices and debris piles. Adults transport krill to young by means of a sublingual gular pouch.

Cassin's auklet is not listed as either threatened or endangered by the States of California, Oregon, or Washington or with the Federal government. The State of Washington has listed the auklet as a species of concern, which "Include fish and wildlife species that the Department will review for possible listing as State Endangered, Threatened, or Sensitive. A species will be considered for designation as a State Candidate if sufficient evidence suggests that Its status may meet the listing criteria defined for State Endangered, Threatened, or Sensitive" (Washington Department of Fish and Wildlife 2006).

3.4.6 Northern Fulmar (Fulmarus glacialis)

The northern fulmar occurs globally (Phillips, *et al.* 1999) from the Aleutians and the coasts of Alaska and Canadian Arctic to southern California and in the north Atlantic south to North Carolina, as well as northern Eurasia (U.S. Geoglocial Survey 2006). Fulmars are a pelagic species, coming to shore only to breed. Fulmars are an abundant seabird, with a world population approximated at 15 to 20 million breeding pairs (Phillips, *et al.* 1999) of which an estimated 1.4 million breeding individuals occurring in the North Pacific (Nevins and Harvey 2003).

The Northern fulmar is a large gull-like species approximately 18 inches in length with a 42-inch wingspan (U.S. Geoglocial Survey 2006). They are polymorphic with geographic variations consisting of light to dark morphs depending on the range (Nevins and Harvey 2003). Light colored fulmars have a white head and underparts with gray back, upperwings, rump, and tail. A gray colored fulmar has a gray head, body, wings, and tail with a pale underside. The fulmar's bill is short, thick, and yellow with a tube on top. Male and female fulmar are similar in appearance (U.S. Geoglocial Survey 2006).

The fulmar can be seen feeding at the surface (Seattle Audubon Society 2006), diving for its prey, or commonly behind fishing vessels foraging on fish waste thrown over board (Phillips, *et al.* 1999). Prey consists of crustaceans, fish, small squid, and jellyfish. Studies have suggested that commercial fishing may have contributed to the expansion in breeding numbers and range of the northern fulmar over the last two centuries (Phillips, *et al.* 1999).

Fulmars establish pair bonds which persist for many years unless death of one of the pair occurs. Fulmars exhibit site fidelity, returning annually to specific breeding colonies (Hatch, 1991). Nests occur on open sea cliffs or in a hollow on a bank or slope. The female has one clutch per year, and both parents incubate for about seven weeks. Once the egg hatches, both parents feed the chick by regurgitation. Chicks fledge approximately seven weeks after hatching (Seattle Audubon Society 2006).

3.5 Socioeconomic Environment: Drift Gillnet Fleet

3.5.1 Overview

The socioeconomic characteristics of the DGN fishery are described in section 2.2.4.1 of the HMS FMP (PFMC 2003). Historical measures of economic performance for the DGN fishery are provided in Section 2.1.1.4 of the 2005 SAFE (HMSMT 2005). Relevant portions of this description are incorporated below as background on the socioeconomic environment in which the EFP would operate.

California's swordfish industry transformed from primarily a harpoon fishery to a DGN fishery in the late 1970s, and landings soared to a historical high of 286 mt by 1984. The DGN fishery is a limited entry fishery, regulated through various gear, season, depth closures, and logbooks reporting requirements. The limited entry program was established in 1984. Each permit is linked to an individual fisherman, not a vessel.

The permits are transferable under limited conditions and they are linked to the individual and not the vessel; however, no new permits are issued. The number of permits has declined over time from 251 in 1986 to 96 in 2004 (Table 3.11). To keep a permit active, current permittees are required to purchase a permit from one consecutive year to the next; however, they are not required to make landings using DGN gear. In addition, a general gill and trammel net permit, a resident or non-resident commercial fishing license and a current vessel registration are required to catch and land fish caught in DGN gear. As of 2005, there were only 92 active permits in the entire DGN fleet.

Historically, the California DGN fleet has operated within EEZ waters adjacent to the state and as far north as the Columbia River, Oregon during El Niño years. Fishing activity is highly dependent on seasonal oceanographic conditions that create temperature fronts that concentrate feed for swordfish. Because of the seasonal migratory pattern of swordfish and seasonal fishing restrictions, about 90 percent of the fishing effort occurs August 15 to December 31.

Table 3.11 summarizes the annual number of vessels, limited entry permits, landings (round mt), and ex-vessel revenues for swordfish and common thresher shark landed in California by the drift gillnet fishery, 1981–2004. The table suggests the effect of leatherback time/area closure on the fleets' fishing activities, contributing to a reduction in fleet size from 78 in 2000 to 39 remaining active vessels in 2004.

The DGN fishery traces its origin to the late 1970s when incidental catches of pelagic sharks in a Southern California coastal set net fishery motivated a group of 15 fishing vessel owners to experiment with large-mesh nets targeting thresher shark. The initial results proved successful thereby attracting additional vessels to join the developing fishery, and by 1984 a total of 265 vessels were conducting fishing operations in the DGN fishery; thresher shark landings peaked at more than 900 mt in 1981. After 1981, swordfish became the primary target species for the fleet, because it commands a higher price-per-pound than thresher shark, resulting in a decline in reported thresher shark landings[10] to lows of the late 1980s and early 1990s. However, common thresher is still a target species of the DGN fishery and is commonly landed with swordfish. Since 1990, annual landings and ex-vessel revenue for thresher shark have averaged 169 mt and $500,179, respectively. The number of DGN vessels landing swordfish declined from 228 in 1985 to 43 in 2004. Since 1984, annual landings and ex-vessel revenues have been declining in general, averaging 354 mt and $2.5 million, respectively. Table 3.12 chronicles pertinent fishery development and management actions from the initial experimental fishery in 1976 to the present state of affairs in the DGN fishery.

The evidence presented above suggests the West Coast DGN fishery has undergone a pattern of long-term economic decline since the middle 1980s, punctuated by a brief resurgence in the early 1990s. The advent in 2001 of the leatherback turtle time/area closure apparently exacerbated the decline by reducing opportunity in a productive area during the peak fishing season.

3.5.2 Geographic Location

The DGN fishery has historically operated outside of state waters to about 150 mi offshore, ranging from the U.S.-Mexico border in the south to northward of the Columbia River (Figure 3.6). The majority of the current DGN fishing effort is concentrated in the southern California bight due in part to a leatherback turtle time/area closure (shaded in red in Figure 3.3).

There are three general fishing areas targeted by the DGN fishery 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 of San Francisco is in deep waters in depths of 1,500 to 2,000 fathoms, with the northern area off the California/Oregon border in moderate depths of 1,600 fathoms.

The DGN fishery typically begins in late May and continues through the end of January, although 90 percent of the fishing effort typically occurs from mid-August to the end of December. Effort in the fishery 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. However, the majority of fishing effort is concentrated south of Pt. Conception due to the aforementioned turtle closure limitations. Some limited effort does take place to the south and west of the closure, in international waters off of Mexico and the U.S. EEZs, and north of the north of the closure (Figure 3.6). The number of DGN authorized permits ranged from 114 in 2001 (69 active, made landings) to 96 in 2004 (43 active).

The highest catch of target swordfish occurs 15 to 150 km off the California coast. Fishing effort within 15 km of the coast or near the Channel Islands usually target pelagic sharks. In higher latitudes swordfish catch and effort tend to be further offshore based on logbook and observer data.

[10] The decline in thresher shark landings also reflected the effects of overgrowth fishing and regulations to protect thresher sharks during the pupping period.

There are various time and area restrictions in place that limit the geographic extent of the fishery including, in addition to the leatherback time/area closure. These include the Council-designated Rockfish Conservation Areas,[11] state and Federal marine sanctuary boundaries,[12] and nearshore coastal zone restrictions. The nearshore restrictions address catches of species of concern, such as thresher sharks and gray whales, and mitigate recreational fishing industry concerns of excessive marlin bycatch in the DGN fishery (see timeline, Table 3.12).

At the present time, the California drift gillnet season is closed within 200 nmi of the coastline from February-April 30, inclusive, and drift gillnets shall not be used to take swordfish and shark within 75 nmi of the California coastline from May 1-August 14 between the westerly extension of Oregon-California boundary and the western extension of the U.S.-Mexico boundary. From August 15-January 31, swordfish can be taken within 75 nmi, pursuant to area restrictions specified in the California Fish and Game Code (sections 8575 and 8575.5) and respective of any Federal protected species closures in place.

3.5.3 Management of the Drift Gillnet Fishery

Currently, the DGN fishery is managed by the Council as one of six West Coast HMS fisheries under the HMS FMP, with many of the existing state regulations and laws pertaining to the fishery adopted into the Plan (see Appendix B). The Final Environmental Impact Statement produced in tandem with the HMS FMP provides a detailed comparison and chronology of state fisheries regulations (PFMC 2003, Appendix B). This is a limited entry fishery and the numbers of permits are limited by statute (see timeline, Table 3.12). In addition to the federally-required HMS FMP gear-endorsed permit, fishers are required to possess a valid general gill and trammel net permit and a limited entry drift gillnet permit. Other requirements include the mandatory submission of logbooks and the possession of a current resident or non-resident commercial fishing license. The drift gill net permit is renewed annually and is transferable only under limited conditions.

In 2001, NMFS implemented two Pacific sea turtle conservation areas on the West Coast with seasonal drift gillnet restrictions to protect endangered leatherback and loggerhead sea turtles. The larger of the two closures is the area subject to the proposed action (see Chapter 1). The smaller closure implemented to protect Pacific loggerhead sea turtles from drift gillnet gear during a forecasted, or occurring, El Niño event, is located south of Pt. Conception, California and west of 120° W from January 1 through January 31, and from August 15 to August 31.

3.5.4 Description of Fishery

Detailed descriptions of the DGN fishery can be found in the HMS FMP (PFMC 2003, Ch. 2 Pg. 13–Ch. 2 Pg. 17), in the Environmental Assessment for the Implementation of the Reasonable and Prudent Alternative on the Issuance of the Marine Mammal Permit under section 101(a)(5)(e) of the Marine Mammal Protection Act for the California/Oregon Drift Gillnet Fishery, and in the Biological Opinion on the Authorization to Take Listed Marine Mammals Incidental to Commercial Fishing Operations.[13] The following abridged description of the DGN fishery relied, in part, on information from these sources.

---

[11] http://www.pcouncil.org/statefedregs.html

[12] http://channelislands.noaa.gov/drop_down/reg.html

[13] Available at: http://swr.nmfs.noaa.gov/psd/codgftac.htm

Vessel size in the DGN fishery currently ranges from 30–85 ft, with 60 percent of the vessels less than 50 ft in total length (see Figure 3.4). Fishers use nets constructed from 3-strand twisted nylon, tied to form meshes that range from 16 to 22 inches stretched, and average 19 inches stretched (see Figure 3.5). The depth of a drift gillnet is measured in meshes. They usually range from 95 to 155 meshes deep with the majority between 125 and 140 meshes deep. Nets are hung with the apex of the square meshes oriented vertically. Although termed "gillnets," the nets actually entangle fish, rather than trap them by the gills. Nets are also size selective; large fish such as swordfish get entangled while smaller fish pass through the mesh. Net length ranges from 4,500 ft to 6,000 ft and averages 5,760 ft and net depth ranges from 145 ft to 165 ft and averages 150 ft. The top of the net is attached to a float line and the bottom to a weighted lead line.

Since the implementation of the Pacific Offshore Cetacean Take Reduction Plan (NMFS 1997), the float line must be at least 36 ft below the surface of the water to allow marine mammals to swim over the net and the use of acoustic pinger deterrents became mandatory in the fishery (50 CFR 229.31). The lines that attach the buoys to the floatline, and dictate the depth the net is fished, are referred to as buoy lines or extenders. Nets are often set perpendicular to currents, or across temperature, salinity or turbidity fronts. Nets are typically set in the evening, allowed to soak overnight, and then retrieved in the morning. The average soak time is around 10 hours. The vessel remains attached to one end of the net during the soak period, drifting with the net. During retrieval, the net is pulled over the stern by a hydraulic net reel. As the net is pulled, anything caught in the net can usually be seen coming to the surface, at which point the reel is slowed and stopped if the catch is too large. The catch is either pulled aboard in the net, or if too large, tied with a line, so as not to be lost, and winched aboard. Once onboard, entangled fish are removed from the net using routine procedures.

Table 3.11. Annual number of vessels, limited entry permits, landings (round mt), and ex-vessel[a] value for swordfish and common thresher in the DGN fishery (source: HMSMT 2005).

			Swordfish		Common Thresher	
Year	Vessels (number)	Permits (number)	Landings (mt)	Ex-vessel Revenues[1]	Landings (mt)	Ex-vessel Revenues[1]
1981	118	-	270	1,609,959	917	1,302,515
1982	166	-	208	1,450,243	650	1,147,990
1983	193	-	242	1,381,237	421	283,782
1984	214	226	286	1,590,026	915	245,463
1985	228	229	197	1,150,726	1,095	304,391
1986	204	251	78	546,727	451	105,229
1987	185	218	6	53,901	393	9,245
1988	154	207	1	4,820	393	444
1989	144	189			460	1,430
1990	134	183			335	
1991	114	165	51	524,282	569	20,214
1992	119	149	60	349,626	285	4,672
1993	123	117	162	1,331,728	245	42,645
1994	138	162	760	6,568,631	272	831,132
1995	117	185	682	5,889,173	207	586,845
1996	111	167	708	5,495,001	241	760,720
1997	108	120	655	4,511,924	249	744,913
1998	98	148	847	5,322,810	281	811,912
1999	84	136	585	3,954,968	152	470,793
2000	78	127	631	3,957,374	155	486,827
2001	69	114	351	2,234,670	273	764,804
2002	50	106	298	2,173,786	216	626,306
2003	43	99	198	1,483,895	241	664,460
2004	39	96	175	1,300,805	66	186,256

[a] Ex-vessel revenues are nominal values (not adjusted for inflation). Source: PacFin, extracted August 2005.
Additional processing information: significant swordfish and shark landings by drift gillnet gear prior to 1994 have been mis-assigned to California entangling net, trammel net, several trawl, encircling net, set gillnet, and unknown gears, and therefore are not reported here.

Table 3.12 Timeline of events leading up to current DGN fishery regime

Year	Action
1977	About 15 vessels conduct exploratory large mesh drift gillnet operations in nearshore waters of the Southern California Bight (SCB) for pelagic sharks, primarily threshers. Results suggest viable fishery exists, so additional vessels began fishing and by 1985 approximately 230 vessels were conducting DGN operations.
1980	The California Legislature enacted AB (2564) which directed CDFG to implement a non-transferable limited entry program (target=150 permits), establish mandatory observer and logbook programs, authorize DGN fishers to retain incidental caught swordfish, and order a study to determine impacts on shark resources. 165 permits were issued, 94 using dual gear, harpoon and DGN. Established maximum DGN length of 6,000 ft.
1981	PFMC develops a Fishery Management Plan for billfish and oceanic sharks. Council elects to delay further development of the FMP noting, among other things, the small percentage of overall Pacific HMS harvest taken in waters under Council jurisdiction and the need for effective international management efforts.
1982	The California Legislature enacted SB (1537) placing a moratorium on the issuance of new DGN permits, which had increased to 230 and directed the CDFG to monitor the DGN fishery and document bycatch. From May 1 to September 15, each gill net vessel could land, during one month, no more swordfish, by weight, than shark (50-50 quota). Amendments establish a closed season from February 1 through April 30, and time/area closures around portions of Channel Islands to protect pinnipeds, and off mainland portions of southern California to mitigate conflicts with harpoon and sport fishermen.
1983	Oregon (OR) and Washington (WA) issue experimental DGN permits for thresher shark fishery, limited catch and effort through 1985.
1984	California Legislature approves an additional 35 permits to be issued for DGN operations north of Point Arguello, resulting in a ceiling of 265 permits (AB 3387). Fleet fishing as far north as San Francisco. Closure established in wide area off San Francisco, and within 12 miles of the mainland shore.
1985	The shark-swordfish quota (50-50) quota was removed from regulations. Final report "Shark/Swordfish Drift Gillnet Fishery Management Information Document" submitted to the Legislature (Bedford 1985) describing the DGN fishery, other fisheries competing for the same target species, bycatch in DGN fishery, and biological and status of some stocks.
1986	Beginning 1986, the DGN season closed June 1-August 15 within 75 miles of California mainland to protect thresher sharks, and from December 15-January 31 within 25 miles to protect gray whales. The DGN fishery for swordfish opens August 15. Vessel permits peak at ~250, larger vessels move offshore and north to fish distant seamounts, edge of continental shelf.
1986-1988	OR and WA experimental fishery ends in 1988, vessel participation and catch decline from high of 37 vessels landing 293 tons of thresher shark in 1986 to a low of 6 vessels landing 50 tons in 1988.
1988	NMFS contracts Pacific States Marine Fisheries Commission (PSMFC) to draft coastwide management plan for sharks pursuant to the Interjurisdictional Fisheries Act of 1986. (cite?).
1989	OR and WA shut down experimental DGN fishery over marine mammal and sea turtle bycatch concerns.
1990	PSMFC coastwide management plan finalized (Stick et al., 1990), establishes harvest guidelines for thresher shark (340 tons) and recommends management efforts to discourage harvest of juvenile sharks. DGN annual effort ~4,000 sets. NMFS establishes Fisheries Observer Program under authority of the MMPA to record information on protected species interaction rates. California Legislature prohibits DGN fishing within 75 miles of mainland from May 1 through August 14 and continued the previously enacted prohibition from February 1 through April 30 to conserve the thresher shark resource.
1994	CA caps new entrants to fishery, only permit transfers allowed.
1995	OR lifts ban on swordfish DGN landings and issues up to 10 permits per year. No fishing within 75 miles of coast from May 1 – August 14 and in depths less than 1000 meters the remainder of the year.

Year	Action
1996	Pacific Offshore Cetacean Take Reduction Team (TRT) convened to recommend methods to reduce marine mammal mortalities in the DGN fishery to levels below the Potential Biological Removal level for each stock within 6 months, and to levels approaching a Zero Mortality Rate Goal in 7 years. Take Reduction Plan (TRP) developed.
1997	Implementation of the TRP measures require the float line to be at least 36 feet below the surface of the water to allow marine mammals to swim over the net and call for mandatory skipper workshops and use of acoustic pingers. 20% observer coverage of total DGN annual sets instituted.
1998	CA combines north and south permits into one overall state permit with 148 permits in place.
1999	OR prohibits direct targeting of thresher shark with DGN gear but allows incidental catches to be landed at ratio of one shark per every two swordfish landed.
2000	WA adopts regulations to prohibit fishing for thresher shark in waters adjacent to WA coast, and to require thresher shark landings to be consistent with the ratio (1 thresher:2 swordfish) that OR adopted earlier. The DGN fishery continues to decline as a result of increasing regulations and laws, and a decrease in the number of active permittees (140 permit holders, ~70 active). Logbook effort estimates 1,936 sets.
2001	NMFS issues an MMPA permit to the DGN fishery to authorize the take of ESA listed marine mammals. An ESA section 7 consultation was conducted and two closures were required and implemented to protect ESA listed sea turtles. To protect leatherback sea turtles, NMFS closed the DGN fishery from Aug 15 – Nov 15 in area north of Pt. Sur, including an offshore area extending to Pt Conception, north to 45 degrees N. latitude (in Oregon). A closure to protect loggerheads in the area south of Pt. Conception and west of 120 degrees W. longitude from June through August can be implemented during forecasted or occurring El Nino events.
2002	CA eliminates minimum annual landings requirement for renewal of DGN permit. Current permittees are required to purchase a permit from one consecutive year to the next to keep it active, (FGC 8568 and 8568.5).
2004	The Fishery Management Plan for US West Coast Fisheries for Highly Migratory Species (HMS FMP) is approved and implementing regulations established. State management of DGN fishery, including most existing regulations (e.g. time/area closures), are adopted into HMS FMP. Fishery continues contraction with 1084 sets estimated from observer data.
2005	PFMC adopts interim Exempted Permit Fishing (EFP) protocols for HMS fisheries. DGN fishery continues in decline, DGN industry group (Federation of Independent Seafood Harvesters) submits Exempted Permit Fishing (EFP) application to open up all or portions of the current leatherback turtle time/area closure. Council directs HMS Mgmt Team to prepare documentation, including this EA, to analyze impacts of alternatives in the EFP proposal for consideration at March 2006 meeting.

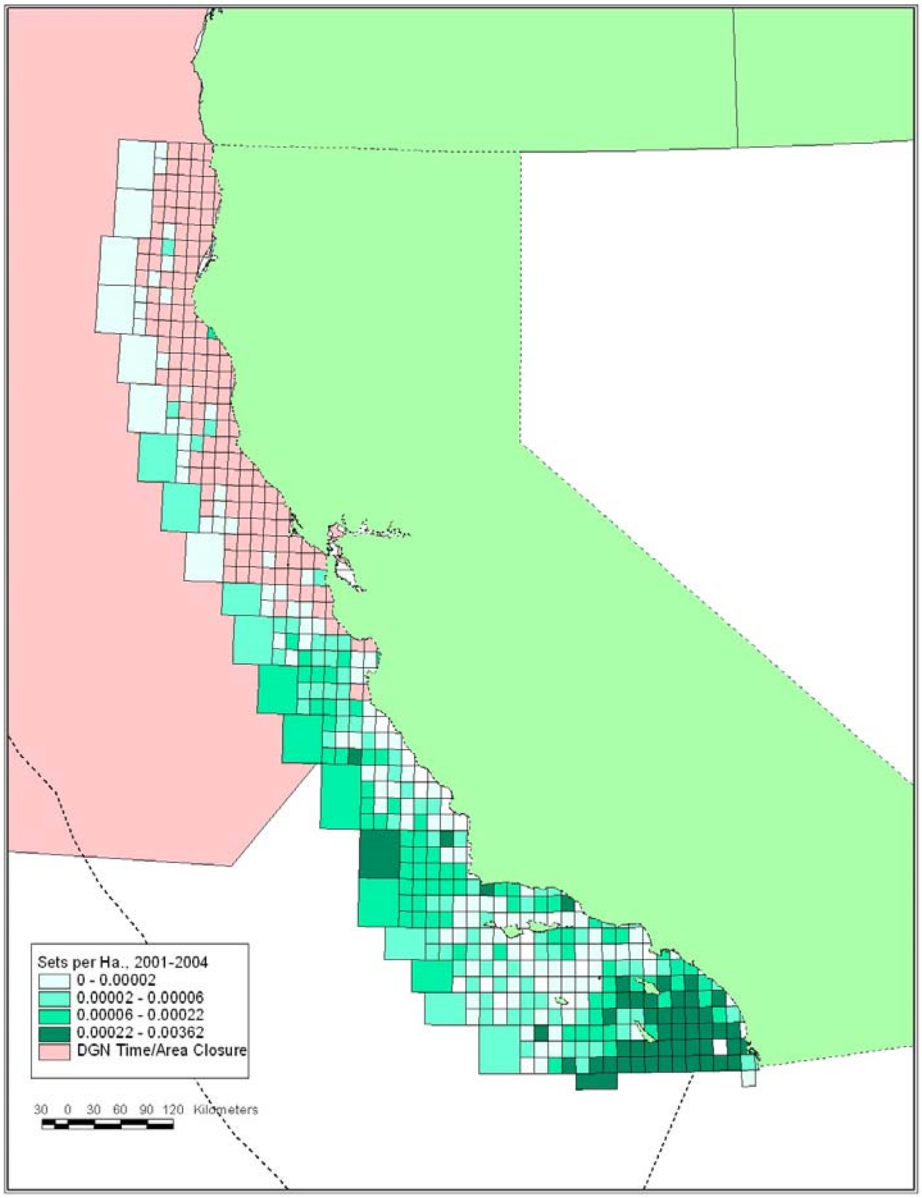


Figure 3.3. Spatial distribution of average annual DGN fishing effort (sets) for the years 2001-2004.

Source: CDFG fishing logbooks standardized by fishing blocks (sets/hectare). NOTE: The logbook data presented this figure shows only California fishing location information; however, there was some limited fishing effort north of CA in OR and WA during this time period (~7% of total sets).

Figure 3.4. A southern California DGN vessel showing net reel and stern grate. (Photo: NOAA Fisheries Photo Library.)

Figure 3.5. Drift gillnet showing mesh and twine size and vertical alignment. (Photo credit: Carolyn Parker, Frank Orth & Associates.)

3.6 Socio-economic Environment: Fishing Communities Involved in the Drift Gillnet Fishery (Including Buyers/Processors)

The socio-demographic characteristics of fishing communities involved in HMS Fisheries, including the DGN fishery, are described in Section 2.4 of the HMS FMP (PFMC 2003, Ch. 2 Pg. 33–Ch 2 Pg. 153).

Table 3.13 describes the relative importance of the DGN fishery to different West Coast geographic communities by showing the number and the percentage of DGN observer sets which were landed by community over the observation period from 1990–2004.

Communities that would primarily benefit from any increase in commercial catch due to EFP effort would include Monterey, San Pedro, Santa Barbara, and San Diego. Any increase in DGN revenues would create an economic impact through the local economies.

The fishing community most directly impacted by the EFP would be a group of DGN fishermen who are interested in EFP participation. These fishermen generally invested a great deal of past time, money, and lost value of alternative employment opportunity in acquiring the human capital (fishing skills) and gear (boats, nets, etc.) whose value may be adversely affected by the turtle closure. In particular, fishing skills may include specialized knowledge of the fishing grounds in the turtle closure area, while gear includes large boats (over 50 ft in length), which are more valuable for fishing the area north of Pt. Conception than are smaller vessels.

Table 3.13. Port of landing for observed DGN sets. (Source: NMFS CA DGN Database.)

Return Port	Abbreviation	No of Sets	% of Sets
San Diego	SD	2396	39.8%
Morro Bay	MOR	743	12.3%
Crescent City	CC	672	11.2%
Moss Landing	MOS	539	8.9%
Los Angeles	LA	498	8.3%
San Francisco	SF	284	4.7%
Ventura	VEN	165	2.7%
Monterey	MON	119	2.0%
San Pedro	SP	114	1.9%
Fort Bragg	FB	105	1.7%
Bodega Bay	BOD	77	1.3%
Santa Barbara	SB	73	1.2%
Oakland	OAK	68	1.1%
Other	N/A	171	2.8%
Total		6024	100.0%

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Estimating Changes in Effort under the Action Alternatives

The impact analysis in this EA is based on estimates of the change in effort from a baseline level, or the No Action Alternative, that would occur under each of the action alternatives. Effort estimates can then be applied to estimates of CPUE for finfish and protected species in order to estimate the expected catch or take of various species. Effort estimates are also used as a basis for evaluating the socioeconomic effects of fishing under the alternatives. The various EFP alternatives all include a set limit, a take/mortality cap, or both as measures to mitigate leatherback take risk. Alternatives other than Alternative 3 and Alternative 7 further impose a restriction on the portion of the current time/area closure area that would be reopened, as seen in Table 2.1 and the figures in Chapter 2. The alternatives include cases that restrict the EFP area or change the boundary of the open area. The approach to estimating effort under the various alternative combinations of constraints is described below.

For all alternatives under consideration, we estimated that effort South of Pt. Conception would not be affected by implementation of any of the EFP alternatives. There are three reasons for taking this approach: (1) The approach is conservative, in the sense that the direction of the effect of any change in effort South of Pt. Conception under EFP alternatives is likely to be negative, due to a transfer of effort into the turtle conservation area (due to either participation in the EFP or a change in the boundary of the closed area); (2) Different gear is normally used for fishing North of Pt. Conception than for fishing to the South, resulting in a high degree of independence between effort levels across this boundary; (3) We have no way to reliably predict any shift in effort that would take place to the south of Pt. Conception in response to the various EFP alternatives.

For EFP alternatives, we assumed that effort would continue until the first of a set limit or a take/mortality cap was reached. For suboptions with only set limits, the set limit was directly used to estimate effort. Effort subject to a take/mortality cap was estimated using a probability model that delivers an estimate of the expected number of sets which could be fished until a specified number of turtle takes occurred. Based on a conservative 70 percent mortality rate assumption,[14] we translated leatherback mortality caps of one, two, and three into corresponding take limits of one, three and four, then calculated the expected effort up to the point the take limit would be reached in order to estimate the turtle cap constraint on effort.[15] Effort under alternatives with both turtle caps and set limits were estimated as the expected take until the first of the turtle cap or the set limit is reached.

For alternatives with area restrictions on EFP effort or boundary changes in the current turtle conservation area, we first used an analysis of logbook effort to determine the historic proportion of all DGN effort over the period from 1991–2000 which occurred in the turtle closure area and in each of the more restrictive areas under consideration. We next estimated potential new effort under Alternative 7 based

[14] The observed leatherback mortality rate North of Pt. Conception was 0.0077, but due to the small number of observed takes, statistical variation plus uncertainty regarding future environmental conditions makes this figure an unreliable estimate of the mortality rate which will govern future take experience. The 80 percent figure takes into account the risk that the observed mortality rate is an unrepresentatively low estimate of the future mortality rate.

[15] The estimation of the expected level of effort subject to a turtle cap is based on the assumption that fishing will continue until a turtle cap is reached. This assumption is made in order to obtain a conservative estimate of likely effort, and should not be construed to imply that fishing will continue to this point in any given season, as logistical constraints, economic considerations, limited entry, and three-month limit on the period under consideration will pose additional limits on effort.

on an assumption that effort in the turtle closure area would revert from the baseline (discussed below) level in proportion to its historic share of total logbook effort. The calculation used was (Alternative 7 Effort) = (Baseline Effort) X [p / (1-p)], where p = 25.7 percent was the historic proportion of logbook effort in the turtle conservation area. Alternative 6 effort was estimated by scaling down the Alternative 7 estimate by the ratio of historic effort in the Boundary Change Option 2 area to the amount of historic effort in the entire turtle conservation area. For EFP alternatives that include a boundary change (Alternatives 4 and 5), the estimate effect of Boundary Change Option 1 was added to the estimated EFP effort subject to turtle or set caps.

Area restriction effects for EFP alternatives with area restrictions were estimated in a similar fashion to the effects of Boundary Changes 1 and 2, taking into consideration historic effort within the applicable restricted area as a share of historic effort in the entire turtle conservation area. The estimated effect of area restrictions was only included for comparison purposes under EFP alternatives where the area restriction estimate of effort exceeded the expected effort subject to the turtle cap – set limit constraints; in cases where effort subject to the area restriction was estimated to be lower than effort subject to only a turtle cap–set limit combination, EFP effort was estimated at the average of area restriction constrained effort and turtle cap–set limit constrained effort. Other approaches might arguably be more used to estimate effort when all three types of constraint apply; for instance, we could either apply the estimated effort change subject to the area restriction as an additional binding limit on estimated effort for EFP alternatives with area restrictions, or chose to ignore the area restriction effect on EFP effort. While using the averaging approach is *ad hoc*, due to the unknown effect on effort of combining area restrictions with set limits and turtle caps, it at least consistent in direction with the known qualitative effects of area restrictions on the level of effort, thereby facilitating comparison of alternatives where the area restriction is the only difference between them (i.e., Alternatives 1–3, and Alternatives 4–5).

The baseline level of effort anticipated to occur in the DGN fishery in 2006 also represents the No Action alternative; the level of effort that would occur whether or not any action alternative is implemented. The impacts of the action alternatives are presented as the added or incremental level of effort that would occur. Thus, the overall environmental impact of the DGN fishery would be the sum of effects of the baseline or No Action level of effort and any additional effort occurring under one of the action alternatives. It is anticipated that the DGN fishery would operate in much the same manner as it has since 2001, the year in which the current time/area closure was implemented. NMFS SWR observer program data and CDFG logbook data were reviewed to determine the best source of information for calculating estimated 2006 baseline effort in the DGN fishery.

It was decided for the purposes of this EA to use the observer program data (see Table 4.1) due to the fact that compliance with logbook requirements is assumed to be less than 100 percent; therefore, effort may not be fully represented in the existing CDFG logbooks. The logbook data was, however, very useful in identifying the relative distribution of effort in the DGN fishery. The observer program infrastructure and protocols have been in place and applied consistently since 1990, and the selected contractor has established expertise and relationships with the DGN fleet that support the observer-generated estimates of effort in the fishery. These estimates include information gathered from dockside interviews and observations of DGN fleet dynamics.

The estimated baseline effort in 2006 used in this EA is the average of the annual effort in the DGN fishery from the observer program from 2001 to 2004, which is 1,463 sets (see Figure 4.1). Observer program data were chosen for three primary reasons: (1) The observer program has been in place since 1990 and the company responsible for the program has expertise and relationships with the DGN fleet that support their estimates of effort in the fishery. (2) Compliance with logbook requirements is believed to be less than 100 percent, and therefore effort may be underestimated in the existing CDFG logbooks. (3) The 20 percent observer coverage requirement is carefully administered to ensure the number of observed sets is very close to exactly one-fifth of total effort per calendar year. The logbook data are, however, very useful in identifying the relative distribution of effort in the DGN fishery and has been used for that purpose in this EA. Based on the proportion of fishing effort from the CDFG logbooks, it is estimated that approximately 7 percent of the DGN effort between 2001 and 2004 occurred north of Pt. Conception, with the rest to the south. These proportions were applied to the total number of anticipated sets, resulting in 102 sets expected to be made north of Pt. Conception and 1,361 sets expected to be made south of Pt. Conception. These rates are used throughout this EA.

According to observer data, the number of sets in the DGN fishery has declined since 2001. However, with such a small data set, it is not possible to determine whether this trend will continue. There are a sufficient number of DGN permits issued from CDFG to allow an expansion of effort beyond the current level. Also, DGN fishers that may have switched to other fisheries (e.g., salmon) may re-enter the DGN fishery if regulations lead to decreased fishing opportunities in other fisheries. For these reasons, using an average of the 2001–2004 time period, rather than trying to project the recent declining trend to estimate 2006 baseline effort, is considered precautionary, because it may result in forecasting a higher level of impacts than may actually occur.

Given the inherent uncertainty in regulating a fishery contingent on variation in a small number of leatherback takes, the estimates under the various alternatives are not intended to provide a precise forecast of what effort will actually occur, but rather a reasonable estimate of potential effort which orders the estimates to agree with the theoretical effects of the various constraints under each alternative, and which reflects historical information about the distribution of DGN effort. The approach taken is intended to be conservative, reflecting a lack of prior knowledge about how the combined impact of overlapping constraints will affect EFP effort. Several other known factors which might further reduce effort are not taken into consideration, including permit limits on the number of potential EFP participants, limits in the number of available observers to satisfy the 100 percent observer coverage requirement, and potential transfer of effort from the currently open area into either the EFP or into the part of the area open to all fishing under alternatives with boundary changes.

Table 4.2, which is patterned after the alternative summary table, Table 2.1, shows the effort estimates for each alternative and suboption (mortality caps, set limits, and combination of the two).

Table 4.1. Observer Program generated estimates of fishing effort and coverage for DGN fishery years 2001-2004.

Year	# Vessels active[a]	Annual effort (sets)	Observed effort (sets)	Observer coverage (%)
2001	65	1,665	339	20.1%
2002	56	1,630	360	22.1%
2003	45	1474	298	20.2%
2004	36	1084	223	20.6%
Total	202	5,853	1,220	
Average	51	1,463	305	20.8%

DGN coverage levels ranged from 8-11% for years 1990-1996 when NMFS was managing the program, and 20% coverage running from 1997-present under contract management and with mandatory coverage levels set by MMPA and ESA regulations.

[a] Estimates for 2001-2002 generated by Bob Read, CDFG; 2003-2004 estimates generated by Contract Manager Carolyn Parker of Frank Orth & Associates

Table 4.2. Estimated change in effort (in sets) under the alternatives.

Suboption	Set Limit	Turtle Cap	Area Restriction	Boundary Change	Estimated Sets[a]
No Action[b]	NA	NA	NA	NA	1463
Alternative 1					
1.1	300	NA	Option 1	NA	300
1.2	500	NA	Option 1	NA	436
1.3	600	NA	Option 1	NA	486
1.4	NA	1	Option 1	NA	137
1.5	NA	2	Option 1	NA	392
1.6	NA	3	Option 1	NA	461
1.7	300	1	Option 1	NA	100
1.8	500	2	Option 1	NA	289
1.9	600	3	Option 1	NA	378
Alternative 2					
2.1	300	NA	Option 2	NA	246
2.2	500	NA	Option 2	NA	346
2.3	600	NA	Option 2	NA	396
2.4	NA	1	Option 2	NA	137
2.5	NA	2	Option 2	NA	302
2.6	NA	3	Option 2	NA	371
2.7	300	1	Option 2	NA	100
2.8	500	2	Option 2	NA	241
2.9	600	3	Option 2	NA	288
Alternative 3					
3.1	300	NA	NA	NA	300
3.2	500	NA	NA	NA	500
3.3	600	NA	NA	NA	553
3.4	NA	1	NA	NA	137
3.5	NA	2	NA	NA	412
3.6	NA	3	NA	NA	528
3.7	300	1	NA	NA	100
3.8	500	2	NA	NA	289
3.9	600	3	NA	NA	384

Alternative 4					
4.1	300	NA	Option 1	Option 1	382
4.2	500	NA	Option 1	Option 1	482
4.3	600	NA	Option 1	Option 1	532
4.4	NA	1	Option 1	Option 1	229
4.5	NA	2	Option 1	Option 1	438
4.6	NA	3	Option 1	Option 1	507
4.7	300	1	Option 1	Option 1	192
4.8	500	2	Option 1	Option 1	377
4.9	600	3	Option 1	Option 1	424
Alternative 5					
5.1	300	NA	NA	Option 1	392
5.2	500	NA	NA	Option 1	549
5.3	600	NA	NA	Option 1	599
5.4	NA	1	NA	Option 1	229
5.5	NA	2	NA	Option 1	504
5.6	NA	3	NA	Option 1	574
5.7	300	1	NA	Option 1	192
5.8	500	2	NA	Option 1	381
5.9	600	3	NA	Option 1	476
Alternative 6	NA	NA	NA	Option 2	119
Alternative 7	NA	NA	NA	NA	506

[a] Estimated sets = minimum of (set limit, estimated turtle cap effort limit) plus any area restriction effect for EFP fishery and the effect of boundary changes on effort for the non-EFP fishery (Alternatives 4–7)

[b] The No Action alternative represents 2006 baseline effort; effort under the action alternatives is additional to this baseline effort.

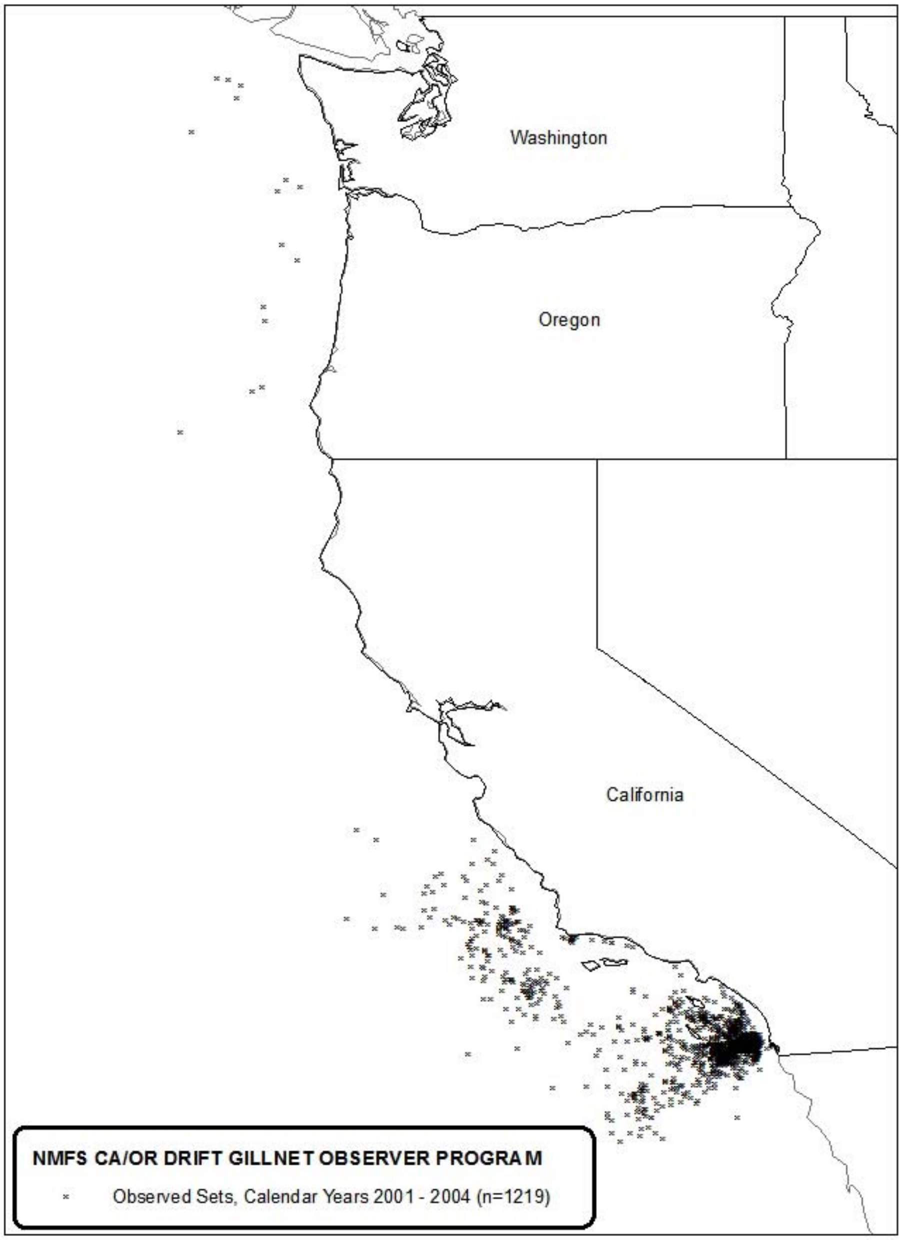


Figure 4.1. Distribution of observed sets for baseline years 2001-2004.

4.2 Finfish

Impacts to target, non-target, and prohibited species are principally reflected in increased catches of these species, which are a function of the estimates of change in effort discussed in Section 4.1. As noted, baseline effort principally occurs south of Pt. Conception; under the action alternatives there would be expanded fishing opportunities north of Pt. Conception. The available data are analyzed for the fishing zones north and south of Pt. Conception but do not allow a finer scale interpretation of area impacts within these zones. Evaluation of the consequences of the alternatives includes the entire affected environment, as described in Chapter 3 of this document.

4.2.1 Evaluation criteria

In order to evaluate the potential impact of the alternatives on the resources in question, a set of criteria were developed to help determine whether any of the alternatives are likely to result in significant adverse impacts to finfish. For the target, non-target, and prohibited species interactions under the various alternatives, the following criteria are used:

- Would the alternative likely result in catch levels that would create an “overfished” or “overfishing” condition for any of the HMS FMP management unit species?
- Would the alternative likely result in catch levels that would exceed any of the management objectives of the HMS FMP?
- Would the alternative likely result in catch levels that would contribute to a substantially elevated conservation concern for prohibited species under the HMS FMP?
- Would the alternative provide sufficient monitoring to ensure that management objectives of the HMS FMP are being adhered to?

For each criterion above, the effects are measured in terms of estimated effort in number of sets (as discussed in Section 4.1) for the alternatives and the corresponding catch, based on the catch-per-set estimates from the observer data. Table 4.2 lists the proposed alternatives and the associated effort estimates in number of sets.

4.2.2 Discussion Direct and Indirect Impacts of the Alternatives Based on Changes in Fishing Effort

Direct and indirect impacts to finfish species result from the additional fishing mortality estimated to result from the action alternatives. This can be represented by multiplying catch-per-set estimates by the effort estimates (number of sets) derived for each alternative. Catch-per-set estimates are based on NMFS observer program records for the time period 1997–2005 during which a total of 3,495 DGN sets were observed, based on ~20 percent coverage of total annual DGN sets (Figure 4.2). The observer catch estimates for the 1997–2005 time period were selected as representative of the DGN fishery in its current and future operational state based on gear modifications that are, and will most likely remain, in place for the foreseeable future (e.g., post 1996 TRP 36 ft net depth extension requirement, acoustic pinger use).

Table 4.3 presents different CPUE estimates for the fishery as a whole and north and south of Pt. Conception for the 1997–2005 time period. For the time period 1997–2000, logbook estimates show approximately 29 percent of the annual fishing effort took place north of Pt. Conception (prior to the leatherback time/area closure). For the time period 2001–05 (time/area closure in place), 93 percent of the annual fishing effort took place south of Pt. Conception with 7 percent of the sets occurring north of Pt. Conception outside the time/area constraints of the closure (Figure 4.3). This distinction is useful because the action alternatives would allow an increased fishing opportunity north of Pt. Conception. Table 4.4 provides a summary of estimated catches of target and major non-target species (in numbers of fish) under the alternatives by applying the CPUE estimates in Table 4.3 to the effort estimates in Table 4.1.

As discussed in Chapter 3, minor non-target species are infrequently caught in the DGN fishery and the contribution to overall fishing mortality is likely to be modest. Similarly, catches of prohibited species, namely the great white, basking, and megamouth sharks, are extremely rare in the DGN fishery. Effects to these species are evaluated qualitatively below.

Of all the alternatives, Alternative 5 is likely to result in the largest impacts in terms of fishing mortality on finfish, based on effort expended. Depending on the choice of suboption, which represent constraints imposed on the EFP fishery, effort estimates range from 574 to 1,790 sets with corresponding estimates of catch (Table 4.3) in addition to the baseline level of 1,463 sets. The estimated increase in catch of swordfish ranges from 574 to 1,790 fish and the estimated increase in catch of common thresher ranges from 122 to 382 fish. This alternative imposes no area constraint on the EFP fishery and also would move the southern boundary of the closed area northward. The effort estimate is partitioned between the EFP fishery and the non-EFP fishery occurring in the area opened by the boundary change, with the latter accounting for 92 sets out of the total effort under each suboption. Alternative 2 results in the least impact among the action alternatives, based on the effort estimates and corresponding estimates of catch. It is estimated that between 100 and 396 sets would occur under this alternative, depending on the suboption chosen, resulting in an estimated increase in the swordfish catch of between 299 and 1,184 fish and between 64 and 253 common thresher. Alternative 2 would only authorize an EFP fishery and constrain it to the area north of Pt. Arena. Alternatives 3 and 4 have the next highest range of effort (again depending on the suboption chosen). Alternative 3, under which the EFP fishery would not be geographically constrained, has a range of effort (depending on suboption) of 100 to 553 sets. Alternative 4 would modify the southern boundary of the closed area and authorize a geographically constrained fishery, resulting in an estimated increase in effort of between 192 and 532 sets, depending on the suboption chosen.

Alternatives 6 and 7 would not authorize an EFP fishery but would entail regulatory changes to the closed area alone. Of these two alternatives Alternative 7, elimination of the closed area, would result in the greater increase in effort and corresponding catches of target and non-target species. For example, using the computation outlined above, and estimated additional 1,512 additional swordfish would caught over the 2,428 swordfish estimated for the baseline, No Action, fishery. Alternative 6 is estimated to result in a relatively modest increase in fishing effort; at 119 sets it is slightly higher than the most constrained options under the EFP alternatives (100 sets).

4.2.2.1 Target Species

The target species in the DGN fishery are the broadbill swordfish, *Xiphias gladius*, and common thresher shark, *Alopias vulpinus*. These two species represent 12 percent by number of the total observed catch (target, major non-target) in the DGN fishery north of Pt. Conception, and 14 percent by number of the catch south of Pt. Conception for the period 1997–2005 (Table 4.5). The U.S. swordfish fishery landings account for approximately 43 percent of the north Pacific swordfish landings (north of 5° S latitude), based on 2000–02 data compiled by the IATTC (Hinton, *et al.* 2004). The DGN fishery contributes roughly 19 percent of the U.S. catch component based on PacFIN records for the same time period (HMSMT 2005). No such regional estimates are available for the common thresher shark but it is assumed that the DGN catch of common thresher likewise comprises a small fraction of the total landings by commercial fisheries operating in the Pacific. For all of the alternatives proposed, the fairly small incremental increases in DGN fishing effort would most likely continue to be a minor fraction of the composite regional effort targeting swordfish and common thresher stocks.

4.2.2.2 Non-Target Tunas

The observer-based CPUE estimates show a roughly a ten-fold increase in the catch of albacore north of Pt. Conception versus south of Pt. Conception for the time series 1997–2005. Likewise, bluefin tuna catch is higher north of Pt. Conception, reflecting the preferred habitat of these more temperate water tuna species versus the more sub-tropical and tropical preferences of yellowfin and bigeye tunas.

4.2.2.3 Major Non-Target Sharks

The observer-based CPUE estimates show a marked increase in the DGN catch rate of blue shark north of Pt. Conception versus south of Pt. Conception for the time series 1997–2005 (663 sharks/100 sets north vs. 167 sharks/100 sets south). The shortfin mako catch rate, however, decreased north of Pt. Conception (48 sharks/100 sets to the north versus 130 sharks/100 sets to the south), reflecting the habitat preference of that species for water conditions typically found in the Southern California Bight. Blue shark catch north of Pt. Conception was discarded over 99 percent of the time (alive 45 percent, dead 64 percent), while shortfin mako catch was retained approximately 97 percent of the time (Table 4.4).

The anticipated catch of blue sharks north of Pt. Conception, at 600 sets of effort is equal to 3,977 animals. The average round whole weight for blue shark, derived from length-weight conversion formula (Kohler, *et al.* 1996), and utilizing at-sea observer measurements for blue sharks captured north of Pt. Conception,[16] is estimated to be 7 kg. Multiplying the average weight of 7 kg. by 3,977 blue sharks gives an estimated catch of approximately 28 mt. Blue shark landed catch in the DGN fishery averages less than 0.5 mt with the majority of the catch discarded at sea (HMSMT 2005).

4.2.2.4 Other Major Non-target Finfish

The observer-based CPUE estimates (Table 4.2) show no significant differences in common mola catch north or south of Pt. Conception versus for the time series 1997–2005 (628 molas/100 sets to the north and 650 molas/100 sets to the south). Close to 95 percent of common molas captured in the DGN fishery north of Pt. Conception, and 97 percent south, were released alive.

A recent study on mola biology and migratory habits conducted by Cartamil and Lowe (2004), conclude that an unknown percentage of molas may not survive the interaction with DGN gear. Many of the released fish show obvious signs of fishery-induced trauma, including loss of protective mucus coating, abrasions, bleeding, and gill discoloration resulting from air exposure (D. Cartamil, personal communication).

For opah, the CPUE's were lower north of Pt. Conception (45 opah/100 sets) versus south (74 opah/100 sets) with 97 percent of opah captured in the DGN fishery retained for sale.

4.2.2.5 Prohibited Species

---

[16] Length estimates are based on at-sea observer measurements for the period 1997-2005, n=3039 (S. Kohin, pers.comm.).

A review of all 7,721 DGN sets that have been monitored by observers for the years 1990–2005 in all areas, demonstrate very low interaction rates with prohibited shark species. There have been a total of three great white sharks, two basking sharks, and two megamouth sharks captured by DGN gear during that time span. (A total of 4 megamouth sharks have been reported captured, two of which were taken outside of the monitored time period of standardized observer coverage.) Catch-per-100 set values equal 0.0422 for the great white, 0.028 for basking, and 0.028 for megamouth sharks. Under Alternative 5.3, which has the greatest increase in estimated sets, applying these CPUE values suggests one additional great white shark caught every four years and one basking shark and one megamouth shark every six years.

4.2.3 Cumulative Effects

Factors that may cumulatively affect finfish are sources of fishing mortality other than the change in catch due to the alternatives and environmentally-driven changes in stock productivity. The target species in the DGN fishery have a Pacific-wide distribution and are subject to fishing mortality from other U.S. domestic fisheries and to a greater degree, distant water fleets from various Pacific Rim and insular nations.

4.2.4 Summary Evaluation

The evaluation criteria identified in Section 4.2.1 are used below to summarize the overall impacts of the alternatives on finfish.

4.2.4.1 Risk of Overfishing

Target Species

Based on the status summary for the most recent EPO swordfish stock assessments presented in Chapter 3, coupled with the relatively small increase in total effort and catch on a regional basis, the increase in swordfish catch anticipated under the proposed alternatives would most likely not trigger either an overfished nor an overfishing condition. This assessment could change as more information and updated stock assessment work becomes available. This includes elucidation on the two-stock determination for the EPO Pacific swordfish stocks referenced in Chapter 3, as well as incorporation of improved catch and effort data from regional large-scale commercial fisheries operating outside the U.S.

A similar conclusion is reached for common thresher shark, although the absence of a current regional stock assessment does not allow for a quantitative comparison at this time. If an accepted stock assessment indicated an overfished or overfishing condition (based on available status determination criteria) for these target species in the DGN fishery, the Council and NMFS would take action as required by the MSA. In the case of overfishing, such action would seek to reduce fishing mortality below an identified threshold (the default being F_{MSY}). If the stock is overfished, then stock biomass must be rebuilt to a target, such as B_{MSY} through the implementation of a stock rebuilding plan. Because these stocks have a wide distribution and the majority of catches are made outside of U.S. waters by vessels from other nations, management measures intended to end overfishing and rebuild the stock would likely have to be implemented through a regional fishery management organization such as the IATTC.

Non-target Tunas

Based on the most recent stock assessments, coupled with the relatively small increase in total effort and catch on a regional basis, the increase in major non-target tuna catch under the action alternatives would not trigger either an overfished nor an overfishing condition. If and when an overfished or overfishing condition were to occur for any of the major non-target tuna species in the DGN fishery measures pursuant to the MSA would be taken by the Council and NMFS, as described above..

Non-target Sharks

Based on the available stock status and summary information presented in Chapter 3 of this EA, coupled with the relatively small increase in total effort and catch on a regional basis, the increase in major non-target shark catch under the proposed alternatives would not trigger either an overfished nor an overfishing condition.

Other Non-target Finfish

None of the major non-target finfish species are regularly monitored for stock status except for the Pacific mackerel. The Pacific mackerel is managed under the Coastal Pelagic Species FMP and the minor levels of non-target Pacific mackerel catch in the DGN fishery is irrelevant in comparison to the major West Coast fisheries harvesting Pacific mackerel (e.g., coastal purse seine). Bullet mackerel non-target catch is mainly associated with El Niño years with higher catch rates south of Pt. Conception. Very little is known about Pacific pomfret population dynamics, but there does not seem to be a resource conservation concern at this time and given the low interaction rates in the DGN fishery.

These factors would suggest that the major non-target finfish catch under the action alternatives would not trigger either an overfished nor an overfishing condition.

4.2.4.2 Failure to Meet HMS FMP Management Objectives

Target Species

A harvest guideline of 340 mt has been established under the HMS FMP for common thresher shark catch. The anticipated catch of common thresher shark north of Pt. Conception, under Alternative 5.3, with the greatest increase in estimated effort (599 sets) is equal to 382 sharks (see Table 4.4). The average round whole weight for common thresher shark, derived from length-weight conversion formula (Kohler, *et al.* 1996), and utilizing at-sea observer measurements for threshers captured north of Pt. Conception,[17] is estimated to be 84 kg. Multiplying the average landed weight of 84 kg. by 382 thresher sharks, the maximum expected catch under the action alternatives, gives an estimated catch of approximately 32 mt. The average DGN catch of common thresher for the baseline period 2001–04 is approximately 199 mt (HMSMT 2005). Alternatively, using the 2006 baseline effort estimate (the No Action Alternative) would yield an estimate of 90 mt (1,067 thresher sharks multiplied by 84 kg). Adding the maximum catch under the action alternatives (Alternative 5.3) to the higher of these two baseline values results in an estimate of the maximum total catch across the full range of action alternatives as 231 mt.

Based on the catch estimates projected for the action alternatives, the HMS FMP harvest guideline of 340 mt would not be exceeded by the estimated catch of common thresher shark under Alternative 5.3, the most liberal action alternative. It is therefore assumed that the other action alternatives, resulting in smaller increases in effort, would likewise not exceed the harvest guideline of 340 mt. Additionally, the EFP application proposes to limit the thresher shark catch by instituting a cap of landing two thresher sharks for every swordfish landed, thereby providing a conservative buffer in that regard.

---

[17] Length estimates are based on at-sea observer measurements for the period 1997-2005, n=227 (S. Kohin, pers.comm.).

If, however, the estimated private boat recreational catch of thresher shark is factored into the equation, the overall harvest guideline could be exceeded for all the proposed alternatives under consideration. These private boat catch estimates, however, must be used with caution due to the high variances and potentially biased catch estimates (HMSMT 2005, p.20).

With the above disclaimer in mind, the average private boat recreational catch (in numbers) of common thresher for the baseline period 2001–04 is approximately 2,500 sharks (HMSMT 2005). The average weight for thresher shark captured in the recreational fishery during the 2001–04 time period was estimated to be 68 kg (C. Sepulveda, personal communication). Therefore, the estimated take of thresher shark by the recreational fishery could be as high as 170 mt (2,500 sharks x 68 kg./shark). A growing catch-and-release ethic has been practiced amongst private boat anglers and an unknown number of sharks are released alive back to the water. Estimates of post-release mortality are not known. Additional research and monitoring efforts are needed and proposals are in the works to address these shortcomings so effective management measures can be instituted if warranted.

Non-target Tunas

The HMS FMP management objectives for albacore, bluefin, and skipjack tuna stocks are, among others, those embodied in the goal of the Magnuson-Stevens Act, namely to ensure the long term sustainability of fisheries and fish stocks by halting or preventing overfishing and by rebuilding overfished stocks. A detailed description of the control rules for these HMS FMP management objectives are presented in Ch.3, Pg. 9 and will not be repeated here. Based on stock status and summary information presented in Section 3.2.3.1, the alternatives proposed would not at this point conflict with any HMS FMP management objectives.

Non-target Sharks

A harvest guideline of 150 mt has been established under the HMS FMP for shortfin mako shark catch. The anticipated catch of shortfin mako shark north of Pt. Conception under Alternative 5.3, estimated to result in the largest increase in effort, 599 sets, is equal to 288 animals. The average round whole weight for shortfin mako shark, derived from length-weight conversion formula (Kohler, *et al.* 1996), and utilizing at-sea observer measurements for makos captured north of Pt. Conception,[18] is estimated to be approximately 37 kgs. Multiplying the average weight of 37 kg. by 288 mako sharks gives an estimated catch of approximately 11 mt.

The average DGN catch of shortfin mako shark for the baseline period 2001–04 is approximately 42 mt (HMSMT 2005). Using the baseline (No Action) effort estimate to represent the remainder of the fishery yields a much higher estimate of 67 mt (1,816 fish multiplied by 37 kg). Summing the estimated catch under Alternative 5.3 and either of these two estimates of baseline catch results in range of 53 mt to 78 mt. This does not exceed the HMS FMP harvest guideline of 150 mt. The other alternatives would result in lower estimated catches, ranging from and increase from the baseline of less than 2 mt under alternatives 1.7, 2.7, and 3.7 to the second-highest estimated catch under Alternative 3.3 (10 mt).

As noted in regards to the common thresher and blue sharks estimates, private recreational boat catch is not well documented but could contribute a significant component of the overall shortfin mako catch. These private boat catch estimates, however, must be used with caution due to the high variances and potentially biased catch estimates (HMSMT 2005).

[18] Length estimates are based on at-sea observer measurements for the period 1997-2005, n=444 (S. Kohin, pers.comm.).

The average recreational catch (numbers) of shortfin mako shark for the baseline period 2001–04 is approximately 4,250 sharks (HMSMT 2005). Of this total, it is estimated that roughly half were released alive with an unknown survival rate. For the purposes of this EA, a conservative catch-and-release mortality estimate of 20 percent was applied to derive a total estimated take in the recreational fishery. For the time period 2001–04, an average of 2,250 mako sharks per year were released alive (RecFIN data, HMSMT 2005). Applying a 20 percent mortality factor results in an estimate of take equal to 450 animals. The average weight for mako shark captured in the recreational fishery during the 2001–04 time period was estimated to be approximately 20 kgs (C. Sepulveda, personal communication).

The estimated tonnage of mako shark taken by the California recreational fishery will therefore be reported as the sum of the landed tonnage (2,250 animals x 20 kgs. = 45 mt) and the estimate of take in the released catch (450 animals x 20 kgs. = 9 mt) for a total of 54 mt. When added to the estimates discussed above for the maximum impact of the DGN fishery under the action alternatives, the total is 110 mt, based on historic catch as the baseline, or 121 mt using the effort estimate under the No Action alternative. These estimates re below the HMS FMP harvest guideline of 150 mt.

Other Non-target Finfish

There are no HMS FMP management objectives for the major non-target finfish at this time. There are, however, objectives related to bycatch and bycatch reduction. For the DGN fishery, the implementation of the Pacific Offshore Cetacean Take Reduction Plan in 1997 that, among other things, lowered the minimum net depth fished to 36 ft, has been effective in reducing the catch rates for several of the non-target species under review. The TRP mitigation measures will continue to be employed to assist in minimizing bycatch in any of the proposed alternatives under consideration. Current regulations in the DGN fishery limiting the soak time during fishing operations aid in keeping bycatch levels down. In addition, the existing time/area closures in effect to protect gray whales and thresher shark nursery areas are no doubt effective bycatch reduction measures for other non-target DGN catch as well.

4.2.4.3 Elevated Conservation Concern for HMS FMP Prohibited Species

Given the low interaction rates and catch probabilities presented above, coupled with the limited number of vessels and sets proposed under the proposed alternatives, the impacts on prohibited species are not likely to substantially elevate conservation concerns for the species in question. In addition, three of the five prohibited sharks captured in DGN gear were released alive.

4.2.4.4 Sufficient Monitoring

The EFP monitoring protocol requires 100 percent observer coverage for all trips and sets in the current time/area closure. Observer protocols require monitoring the entire net haul-back. As such, there will be more than an adequate amount of monitoring in place to ensure that HMS FMP management objectives are adhered to for those alternatives, or components of alternatives, involving an EFP fishery. The existing fishery, represented by the No Action Alternative, and the changes in non-EFP effort under Alternatives 4–7, would be subject to the current 20 percent observer coverage target. Although the sampling frame for partial observer coverage is intended to allow statistically accurate expansion of data, there is greater uncertainty about the amount and disposition of the component of the catch that is not landed in this component of the fishery.

However, target species and some non-target species are generally retained and landed (see Table 4.6), allowing effective monitoring of this component of catch dockside.

Table 4.3 DGN CPUE estimates (number of fish per 100 sets) for various species (including target, major non-target, and minor non-targets) in all areas and years, and north and south of Pt. Conception, 1997-2005. Target species in boldface, major non-target in italics. Source: NMFS Observer program records 1997-2005.

	Catch in numbers per 100 sets			
	All Years North PC[a]	All Years South PC[b]	1997-2005 North PC[c]	1997-2005 South PC[d]
Bonito, Pacific	0.45	16.9	0.11	22.7
Fish, Unidentified	7.2	5.2	8.2	3.2
Hake, Pacific	7.9	0.69	0.76	0.47
Louvar	14.2	7	15.9	8.9
Mackerel, Bullet	1.8	66.1	5.1	92.9
Mackerel, Pacific	59.6	82.7	3.4	60.1
Marlin, Blue	0.04	1.1	0	1.2
Marlin, Striped	0.59	8.2	0.11	6.3
Mola, Common	*453.8*	*664.3*	*628*	*650.7*
Opah	36.7	64.9	45.2	74
Pomfret Pacific	15.2	1	23.8	1.6
Remora	2.5	0.9	2.8	1.1
Shark, Bigeye Thresher	7.1	6.1	3.1	5.5
Shark, Blue	*461.4*	*176.6*	*662.9*	*167.1*
Shark, Common Thresher	**53.1**	**84.5**	**63.8**	**73.6**
Shark, Pelagic Thresher	0	1.8	0	2.9
Shark, Shortfin Mako	*42.6*	*121*	*48.1*	*129.8*
Stingray, Pelagic	1.5	6.3	1.8	7.1
Swordfish, Broadbill	**292**	**142.5**	**298.9**	**156**
Tuna, Albacore	*487.6*	*49.5*	*807.4*	*80.9*
Tuna, Bigeye	0.3	0.3	0.3	0.19
Tuna, Bluefin	*83.7*	*29.2*	*146.1*	*30.9*
Tuna, Skipjack	*121.8*	*122*	*242.4*	*106.4*
Tuna, Yellowfin	1.2	10	1.5	14
Yellowtail	0.04	1.6	0.11	2

[a] 2,862 sets observed
[b] 4,344 sets observed
[c] 916 sets observed
[d] 2,579 sets observed

Table 4.4. Catch estimates of target and major non-target species based on effort estimates and historical CPUE values from Table 4.3.

	Sets	Target		Major non-target					
		Swordfish	Common Thresher	Mola	Blue Shark	Albacore	Bluefin	Skipjack	Shortfin mako
CPUE N. Pt. Conception		2.989	0.638	6.28	6.629	8.074	1.461	2.424	0.481
CPUE S.. Pt. Conception		1.56	0.736	6.507	1.671	0.809	0.309	1.064	1.298
Baseline									
N Pt. Conception	102	305	65	641	676	824	149	247	49
S Pt. Conception	1361	2,123	1,002	8,856	2,274	1,101	421	1,448	1,767
Total	1,463	2,428	1,067	9,497	2,950	1,925	570	1,695	1,816
Alternative 1									
1.1	300	897	191	1,884	1,989	2,422	438	727	144
1.2	436	1,303	278	2,738	2,890	3,520	637	1,057	210
1.3	486	1,453	310	3,052	3,222	3,924	710	1,178	234
1.4	137	409	87	860	908	1,106	200	332	66
1.5	392	1,172	250	2,462	2,599	3,165	573	950	189
1.6	461	1,378	294	2,895	3,056	3,722	674	1,117	222
1.7	100	299	64	628	663	807	146	242	48
1.8	289	864	184	1,815	1,916	2,333	422	701	139
1.9	378	1,130	241	2,374	2,506	3,052	552	916	182
min	100	299	64	628	663	807	146	242	48
max	486	1,453	310	3,052	3,222	3,924	710	1,178	234
Alternative 2									
2.1	246	735	157	1,545	1,631	1,986	359	596	118
2.2	346	1,034	221	2,173	2,294	2,794	506	839	166
2.3	396	1,184	253	2,487	2,625	3,197	579	960	190
2.4	137	409	87	860	908	1,106	200	332	66
2.5	302	903	193	1,897	2,002	2,438	441	732	145
2.6	371	1,109	237	2,330	2,459	2,995	542	899	178
2.7	100	299	64	628	663	807	146	242	48
2.8	241	720	154	1,513	1,598	1,946	352	584	116
2.9	288	861	184	1,809	1,909	2,325	421	698	139
min	100	299	64	628	663	807	146	242	48
max	396	1,184	253	2,487	2,625	3,197	579	960	190
Alternative 3									
3.1	300	897	191	1,884	1,989	2,422	438	727	144
3.2	500	1,495	319	3,140	3,315	4,037	731	1,212	241
3.3	553	1,653	353	3,473	3,666	4,465	808	1,340	266
3.4	137	409	87	860	908	1,106	200	332	66
3.5	412	1,231	263	2,587	2,731	3,326	602	999	198
3.6	528	1,578	337	3,316	3,500	4,263	771	1,280	254
3.7	100	299	64	628	663	807	146	242	48
3.8	289	864	184	1,815	1,916	2,333	422	701	139
3.9	384	1,148	245	2,412	2,546	3,100	561	931	185
min	100	299	64	628	663	807	146	242	48
max	553	1,653	353	3,473	3,666	4,465	808	1,340	266
Alternative 4									
4.1	382	1,142	244	2,399	2,532	3,084	558	926	184
4.2	482	1,441	308	3,027	3,195	3,892	704	1,168	232
4.3	532	1,590	339	3,341	3,527	4,295	777	1,290	256
4.4	229	684	146	1,438	1,518	1,849	335	555	110
4.5	438	1,309	279	2,751	2,904	3,536	640	1,062	211

	Sets	Target		Major non-target					
		Swordfish	Common Thresher	Mola	Blue Shark	Albacore	Bluefin	Skipjack	Shortfin mako
4.6	507	1,515	323	3,184	3,361	4,094	741	1,229	244
4.7	192	574	122	1,206	1,273	1,550	281	465	92
4.8	377	1,127	241	2,368	2,499	3,044	551	914	181
4.9	424	1,267	271	2,663	2,811	3,423	619	1,028	204
min	192	574	122	1,206	1,273	1,550	281	465	92
max	532	1,590	339	3,341	3,527	4,295	777	1,290	256
Alternative 5									
5.1	392	1,172	250	2,462	2,599	3,165	573	950	189
5.2	549	1,641	350	3,448	3,639	4,433	802	1,331	264
5.3	599	1,790	382	3,762	3,971	4,836	875	1,452	288
5.4	229	684	146	1,438	1,518	1,849	335	555	110
5.5	504	1,506	322	3,165	3,341	4,069	736	1,222	242
5.6	574	1,716	366	3,605	3,805	4,634	839	1,391	276
5.7	192	574	122	1,206	1,273	1,550	281	465	92
5.8	381	1,139	243	2,393	2,526	3,076	557	924	183
5.9	476	1,423	304	2,989	3,155	3,843	695	1,154	229
min	192	574	122	1,206	1,273	1,550	281	465	92
max	599	1,790	382	3,762	3,971	4,836	875	1,452	288
Alternative 6	119	356	76	747	789	961	174	288	57
Alternative 7	506	1,512	323	3,178	3,354	4,085	739	1,227	243

Table 4.5 DGN catch-per-set estimates for target swordfish and common thresher shark taken north and south of Pt. Conception. Source: NMFS Observer program records 1997-2005.

	North of Pt. Conception			South of Pt. Conception		
	Catch in numbers per 100 sets	Catch per 300 sets	Catch per 600 sets	Catch in numbers per 100 sets	Catch per 300 sets	Catch per 600 sets
Swordfish	298.9	896.7	1793.4	156	468	936
Common thresher shark	63.8	191.4	382.8	73.6	220.8	441.6

Table 4.6. Total catch and disposition of DGN major non-target species south of Pt. Conception for the years 1997-2005. Source: NMFS Observer Program records

	All Years South Pt Conception						
Common Name	Total Catch	Kept	% Kept	Returned Alive	Returned Dead	% Returned Dead	Returned Unknown
Bonito, Pacific	734	330	45.0	21	367	50.0	16
Fish, Unidentified	224	8	3.6	7	195	87.1	14
Hake, Pacific	30	1	3.3	12	17	56.7	0
Louvar	306	267	87.3	1	38	12.4	0
Mackerel, Bullet	2,870	883	30.8	6	1,830	63.8	101
Mackerel, Pacific	3589	1,053	29.3	71	2,443	68.1	22
Marlin, Blue	49	2	4.1	0	46	93.9	1
Marlin, Striped	356	58	16.3	4	282	79.2	12
Mola, Common	28,856	95	0.3	26,949	1,146	4.0	666
Opah	2,820	2,711	96.1	4	103	3.7	2
Pomfret Pacific	42	26	61.9	1	15	35.7	0
Remora	39	0	0.0	36	1	2.6	2
Shark, Bigeye Thresher	263	228	86.7	1	34	12.9	0
Shark, Blue	7,672	85	1.1	,2491	4,613	60.1	483
Shark, Common Thresher	3,671	3,654	99.5	10	5	0.1	2
Shark, Pelagic Thresher	77	75	97.4	0	2	2.6	0
Shark, Shortfin Mako	5,254	5,001	95.2	99	152	2.9	2
Stingray, Pelagic	272	2	0.7	207	49	18.0	14
Swordfish, Broadbill	6,188	6,013	97.2	0	174	2.8	1
Tuna, Albacore	2,152	1,716	79.7	0	435	20.2	1
Tuna, Bigeye	12	12	100.0	0	0	0.0	0
Tuna, Bluefin	1,270	1,111	87.5	0	157	12.4	2
Tuna, Skipjack	5,301	2,478	46.7	29	2,791	52.7	3
Tuna, Yellowfin	433	370	85.5	0	62	14.3	1
Yellowtail	71	69	97.2	0	1	1.4	1
Total	72,551	26,248		29,949	14,958		1346
Percent		36.2		41.3	20.6		1.9

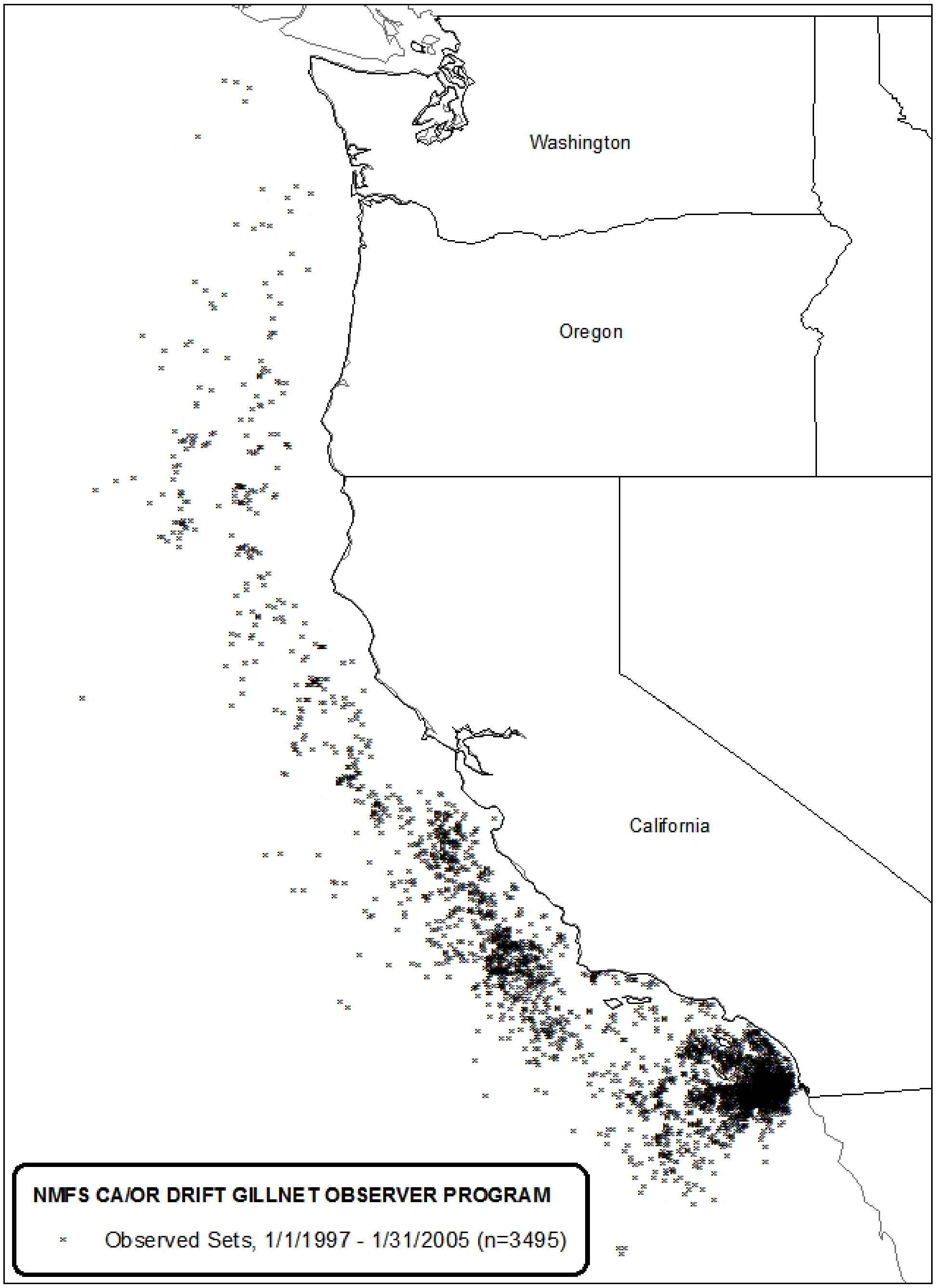


Figure 4.2. Distribution of observed sets for the time period 1997-2004.(Source: NMFS Observer Program DGN set position records.)

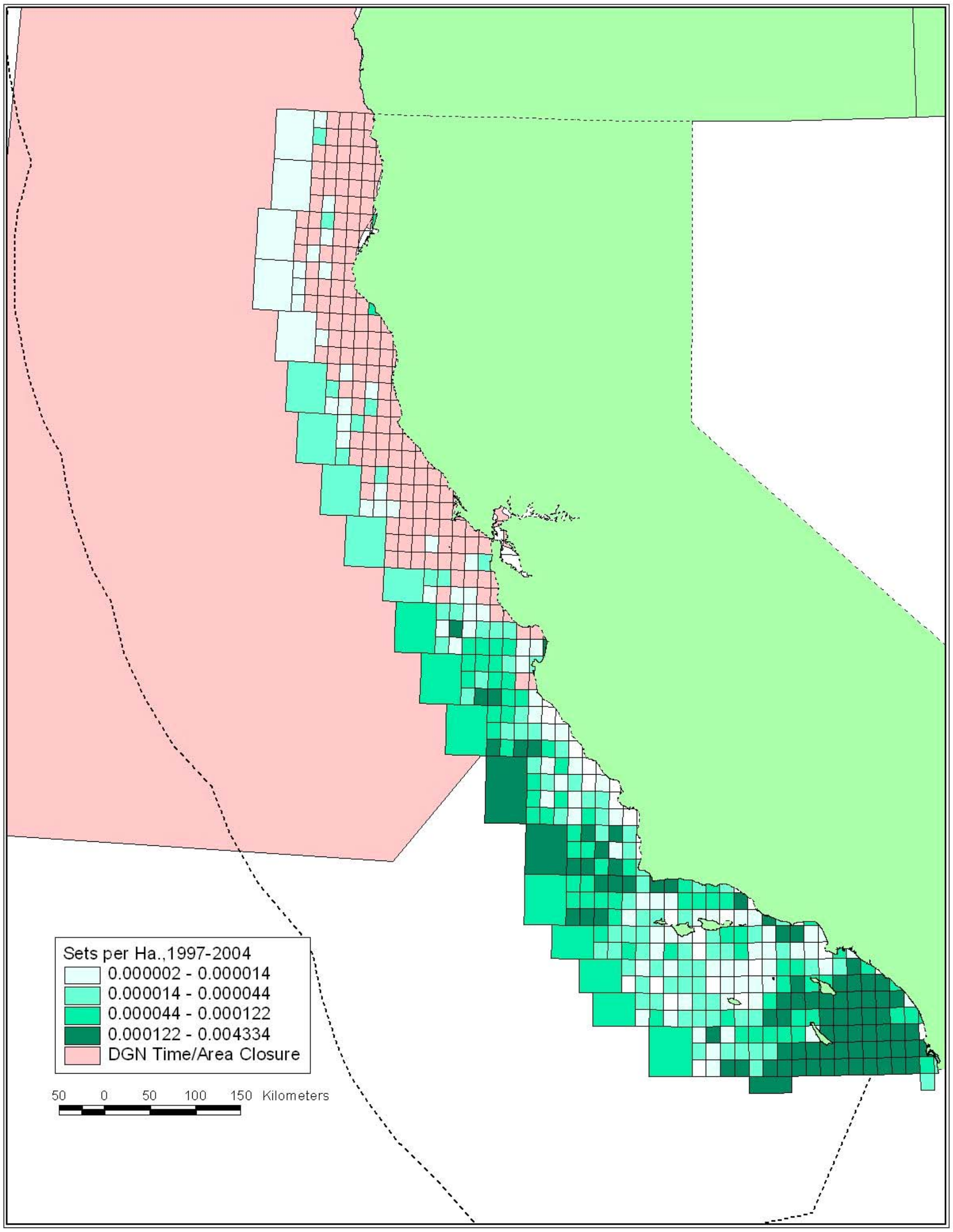


Figure 4.3. Spatial distribution (north and south of Point Conception) of average annual DGN fishing effort (sets) for the years 1997-2004. Source: CDFG fishing logbooks standardized by fishing blocks (sets/hectare)

4.3 Protected Species

This section evaluates the impacts of the alternatives on non-fish species protected under the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA).

4.3.1 Evaluation Criteria

As with finfish, a set of criteria were developed to evaluate the potential impact of the alternatives on protected species, to help determine whether any of the alternatives are likely to result in significant adverse impacts. In evaluating the impacts of the alternatives on protected species the following criteria are used:

- Would the alternative likely result in mortality or serious injury that may exceed the marine mammal stock's potential biological removal (PBR)?

- Does the alternative reduce the likelihood of marine mammals being exposed to DGN gear?

- Would the alternative likely result in the take of leatherback turtles that would significantly adversely affect the population from which they are removed?

- Does the alternative reduce the likelihood of sea turtles being exposed to the DGN gear?

In order to evaluate the impacts of the alternatives on protected species using these criteria, the available information was extensively reviewed. Because much of the information used in this analysis is unpublished, scientists knowledgeable about Pacific leatherback sea turtle biology and ecology were queried, to ensure that the best available information was used, and if available, data relevant to the impact analysis were obtained directly from these scientists. New information from the SWFSC's sea turtle research program considered in this evaluation includes tracks from leatherbacks captured and equipped with satellite tags in and around Monterey Bay and preliminary distribution and migration patterns, based on these tags and other data.

Based on this review, the SWR and SWFSC determined that there is insufficient information about the geographic variation in the occurrence, abundance, and migration patterns of leatherbacks to discriminate between different configurations of the current time/area closure. Given the continued uncertainty about leatherback distribution, the risk of adverse impacts to leatherback sea turtles and other species resulting from DGN fishing within the current time/area closure cannot be fully evaluated or predicted with certainty.

As discussed previously, a quantitative assessment of impacts is based on applying effort estimates to past catch rates (CPUEs) to estimate the take of selected protected species under the alternatives. However, several shortcomings of this approach should be reiterated. First, as acknowledged in Section 4.1, there is uncertainty surrounding the effort estimates developed as a basis for evaluating the impacts of the alternatives. Second, these estimates are based on historic fishing patterns and the distribution of effort under the action alternatives may differ from historical patterns. Third, catch rates have been developed using very small data sets (e.g., one take in 3,000 observed sets); thus there is considerable uncertainty in the predictive power of the catch rates used here. In addition, these catch rates do not take into account environmental variability, such as the effects of oceanographic changes (e.g., El Niño), whose effects are not fully understood. Overall, it is important to recognize the limitations of making predictions based on information on past conditions, especially leatherback abundance and distribution, and likewise the magnitude and distribution of DGN fishing activity.

For these reasons, in addition to presenting estimates of takes of protected species, based on estimated efforts and past CPUEs of protected species, the geographic components of the alternatives—EFP fishery area restrictions and regulatory boundary changes—are assessed qualitatively. In addition, where warranted, a qualitative assessment is also made of the expected level of fishing effort. This qualitative evaluation is framed by the question, would the alternative increase the likelihood of protected species being exposed and potentially incidentally taken in the DGN fishery? Environmental conditions that may affect the environmental consequences on protected species are also addressed qualitatively.

For marine mammals, the projected takes are compared to the most recent PBR estimates to determine whether the alternatives may result in significant adverse effects to marine mammal populations. For leatherbacks, takes are considered in terms of likely mortalities and the proportion of adult females. The importance of these adult female mortalities is evaluated in terms of the impact on her likely nesting population and her meta-population.

For Alternatives 1–3, which would implement an EFP fishery, the impacts are analyzed primarily in terms of the mitigation measures and project marine mammal and sea turtles takes under the mitigation measures. Alternatives 4–6 include both a regulatory change to the existing closure in addition to DGN fishing under an EFP; thus impacts on protected species are estimated for both areas and added to determine projected takes and evaluate the likelihood of significant adverse impacts. Alternatives 6–7, which are solely regulatory amendments, are considered in terms of potential takes based on anticipated levels of effort.

4.3.2 Direct and Indirect Effects

Direct effects on marine mammals and sea turtles are the incidental take of these animals through entanglement in the drift gillnet nets themselves. The nets used in this fishery are at least 14 inches, stretched mesh, although meshes of at least 18 inches are more common. Stretched mesh of this size is effective at entangling large swordfish, which are the primary target species of this fishery. Unfortunately, the large mesh also entangles the bodies, flippers and fins of a variety of marine mammals and sea turtles, particularly leatherbacks, the largest of the sea turtle species. Drift gillnet are set and left in the water overnight, so most animals that are observed entangled in the nets are not alive when the nets are hauled hours later.

The direct effects of the DGN fishery on protected species will be the focus of this section. Indirect effects are defined as effects cause by the action but later in time or father removed in distance (40 CFR 1508.8(b)). For renewable resources indirect effects relate to the sustainability of the population and are generally accounted for in the models and methods developed in pursuant to the statutes referenced above. For this reason direct and indirect effects are considered together.

4.3.2.1 Overview of Impacts to Protected Species

Marine Mammals

A stock's PBR and levels of take related to the PBR have been used to initiate protective measures in fisheries; as noted above, it is used here as a threshold for evaluating the likelihood of significant adverse impacts resulting from any of the alternatives. Under the MMPA, if the total average annual human-related mortalities for a stock exceeds its PBR, then NMFS is required to take measures to reduce human caused mortalities, to the extent possible, to levels below PBR. Most often, anthropogenic takes are the result of fishery interactions. NMFS will convene a Take Reduction Team (TRT), responsible for developing a Take Reduction Plan (TRP) for applicable fisheries, which is then implemented by NMFS.

In 1996, the Pacific cetacean offshore TRT was formed and developed a TRP for the DGN fishery which was implemented in late 1997.

For marine mammals, the No Action Alternative and action alternatives are reviewed based on anticipated effort and the number of marine mammals that may be taken as a result. Anticipated takes are added to the baseline (No Action) fishery (the DGN fishery operating outside the current time and area closure and expected to occur whether or not the proposed action is implemented) and compared to the stock's most recent PBR. For the DGN fishery, the primary species of concern are sperm whales, short-finned pilot whales, and humpback whales. These are the only three species for which levels of take in the DGN fishery may cause the estimated annual mortality to approach PBR. The MMPA requires that takes of marine mammals in fisheries reach a zero mortality rate goal (ZMRG), to the extent that reaching ZMRG is economically and technologically possible in the fishery. The ZMRG has been defined by NMFS as 10 percent or less of a stock's PBR. The following species currently exceed 10 percent of PBR based on the draft 2005 SAR: sperm whales, short-finned pilot whales, humpback whales, California sea lions, and northern right whale dolphin.

Estimating the anticipated impacts of the alternatives on marine mammals is complicated, given the limited information available for many species. For large species, such as humpback whales and fin whales, takes are very rare. The highest numbers of marine mammals caught in the DGN from 1990 to 2004 were short beaked common dolphins, California sea lions, and northern elephant seals. The rates of bycatch of these species and others declined substantially following the implementation of regulations recommended by the TRT, which include longer extender lines on all DGN nets as well as acoustic pingers (Barlow and Cameron 2003), although the take rate of California sea lions has increased in the past few years (Carretta, *et al.* 2005b). See Table 4.7 for a comparison on species caught and take rates for the entire observed period (1990–2004) and after implementation of the Take Reduction Plan in 1997. (Species in italics are listed on the ESA.)

For the purposes of this analysis, it is assumed that the marine mammal take rates after implementation of the TRP most accurately reflect future rates of marine mammal take in the DGN. This assumes that the DGN gear will be set with extenders of at least 36 ft long and that pingers will be properly configured and functioning during fishing operations.

The observed take of marine mammals in the historic DGN is fairly rare; thus it is impossible to discern trends in take rates based on small geographical areas. Trying to do so with such limited data may lead to a conclusion that can not be supported given the available data. Therefore, for most marine mammal stocks, a CPUE was developed based on past observer records in the entire DGN fishery. Sperm whales, northern right whale dolphins and Dall's porpoise do have different distributions, so different CPUEs north and south of Pt. Conception are calculated to reflect this. It is important to note that marine mammal stocks are dynamic and therefore past takes and rates of take may not precisely predict future impacts. However, past observed takes are the best available information for this analysis.

A short review of PBR and estimated annual mortalities is provided to inform the reader. It is important to note that the PBR is based on the number of marine mammals that may be either killed or seriously injured (e.g., major wounds or trailing gear). The PBR is compared to the estimated annual mortality (include serious injured), which NMFS determines based on observed takes in commercial fisheries. Strandings are also included when it is clear that it was the result of anthropogenic effects (e.g., fishing gear found on the animal or propeller injuries). The annual estimated mortality is based on a five year-average, and thus changes over time. Similarly, PBR is dynamic and dependent upon the known mortalities, minimum population estimates, and natural mortality and growth trends

In estimating the annual mortality of stocks, extrapolations and averaging are necessary. For example, in the DGN fishery, one short-finned pilot whale was observed taken and was recorded as dead by the observer. The DGN fishery has 20 percent observer coverage (i.e., one of every five boats has an observer on board); therefore one observed short-finned pilot whale is extrapolated to five for the entire fleet in that year. Thus, in the five years 2000–2004, one short-finned pilot whale was taken in 2003; based on the observer coverage rate this was extrapolated to five takes. Averaged over the five year period, this results in an estimate of an average take of one pilot whale per year. Conversely, in a fishery with 100 percent observer coverage, any and all takes would be directly observed, avoiding the need to extrapolate to project the level of take. This principal is key when considering whether a stock has or may exceed PBR.

Table 4.8 provides projected mortalities of marine mammals under the baseline (No Action) level of effort in 2006 (1,463 sets). (See Section 4.1 for a discussion of how this baseline effort level was estiamated.) The CPUEs are based on DGN observed sets with pingers (as required through the TRP). The CPUEs for each species are calculated by dividing the total number of observer individuals taken by the total number of observer sets (3,390). It is assumed that the CPUE for individual species calculated using observer data is consistent with CPUEs for the entire fishery. That is, that the CPUE calculated from observed sets, approximately 20 percent of the fleet, can be applied to the entire fleet.

A few species have distribution and observed takes that differ north and south of Pt. Conception, thus different CPUEs are calculated. For example, northern right whale dolphins are more commonly observed taken north of Pt. Conception than in the south. This is also true of leatherback sea turtles, for which a substantially higher CPUE was calculated for north and south of Pt. Conception due to differences in oceanographic conditions and habitat utilization. It has been suggested that the distribution of northern right whale dolphins may be affected by ocean temperature, since observed takes decline during El Niño conditions (Carretta, *et al.* 2005a), suggesting that this is a stock more common in cold water. Therefore, two CPUEs are calculated for this stock for the areas north and south of Pt. Conception based on the observed takes in these respective areas divided by the total number of observer trips in the respective areas. The CPUEs are then used to project mortalities in the two regions and pooled to determine the coastwide mortalities relative to PBR. Sperm whales and Dall's porpoise, which are rare south of Pt. Conception, have CPUEs based on calculations of take and observed sets north of Pt. Conception only.

This EA includes alternatives that would impose set limits and take/mortality caps on the DGN fishery operating under an EFP. The set limits and the associated marine mammal mortalities are shown in Table 4.8. The projected mortalities can be compared to the PBR to consider impacts to the individual marine mammal stocks. The mortalities projected under the DGN alternatives do not capture all sources of annual mortality for all species—thus it is not a precise comparison—however, this exercise does identify set limits that are likely to cause the stock to exceed PBR.

The take/mortality caps are used to estimate the mean and range of sets that could be fished before the caps aree met. For example, under a take/mortality cap of three, an average of 412 sets could be made before three leatherbacks are taken, with a 95 percent confidence bound of 113 to 810 sets. The 95 percent confidence interval (CI) shown in the table is a range of sets bracketing the expected number of sets, assuming that effort continues until either a set limit or turtle cap is reached. The range is chosen so there is a 95 percent probability that the actual number of sets that will fall within this range, taking into consideration the chance the turtle cap may limit effort. The average and range of sets that may be made under the various take/mortality caps are used in Table 4.9 to show the projected marine mammal mortalities that the additional sets may cause, in addition to baseline conditions, and associated PBRs.

The third set of suboptions under the EFP alternatives is a combination of a turtle cap and set limit. Under these constraints, the anticipated additional effort ranges from 100 sets to 384 sets. Table 4.9 shows a range of projected marine mammal mortalities under set limits and turtle caps.

Sperm whale

The PBR for sperm whales is 1.8 (Carretta, *et al.* 2005a), the average annual mortality is one whale. It is worth noting that this one take (and a previous lethal take in 1996) occurred in a DGN net that was not properly configured with required pingers (Carretta, *et al.* 2005a). Prior to the TRP, six sperm whale takes were observed between 1990 and 1996, with 50 percent mortality rate. The reduction in sperm whale take may be related to the use of pingers and longer extenders lines, which have reduced take of some cetaceans in DGN in experiments (Barlow and Cameron 2003) but given the rarity of events this is not a certainty. A conservative CPUE is used in this analysis, although it is possible that nets that are properly equipped with pingers will not interact with sperm whales.

Calculating the number of sperm whales that may be taken under No Action and an additional 300 sets indicates that the annual take in the DGN fishery is not likely to exceed PBR. Increasing set levels over 300 or using a take/mortality cap of more than three would likely be over PBR. The current incidental take statement (ITS) for sperm whales is four takes in three years and two mortalities in three years.

Northern Right Whale Dolphins

The current PBR for this stock is 164. Takes of northern right whale dolphins appear to decrease during El Niño years, thus there may be an increase in the take rate during the current cold water period. Utilizing the take rate developed using observed takes in the DGN since 1997 (a period of both warm and cold water regimes) and applying this to the No Action and alternatives indicates that additional takes of northern right whale dolphins are unlikely to cause the stock to reach its PBR of 164. However, adding more than 300 sets to the baseline results in takes over the ZMRG.

California Sea Lion

After an initial period of a decline in takes of California sea lions after implementation of the TRP, levels of catch per set have increased in recent years (Carretta, *et al.* 2005b). The most recent SAR indicates that the annual mortality of 1,562 sea lions exceeds ZMRG, although the 2005 PBR is 8,333. The estimated take rate is approximately 24 California sea lions per 1,000 sets. Assuming that this past take rate can be used to estimate future takes, it is unlikely that the number of takes under any of the alternatives would cause this stock to approach its PBR. Additional takes in the DGN will cause the stock to move away from its ZRMG.

Fin Whale

A review of the complete observer records for the DGN fishery, 1990–2004 indicate that only one fin whale was observed taken, on November 29, 1999. The animal died as a result of the encounter. Takes of other large whales (blues and sei whales) have not been observed in the DGN fishery. These large species (up to 100 ft long) may swim through the nets and therefore may not be observed entangled (Carretta, *et al.* 2005b), although this is speculative. Based on known observed interactions, anticipated levels of take in the DGN fishery are quite low for this species. If a take were to occur, it may cause the stock to exceed ZMRG, but takes are unlikely to exceed the PBR of 15 fin whales. The current ITS for fin whales is four takes in three years and two mortalities in three years.

Short-finned Pilot Whale

Only one short-finned pilot whale has been observed taken and killed in the DGN since the implementation of the TRP; the take occurred south of Pt. Conception. Prior to that, from 1990 through September 1997, eleven pilot whales were observed taken in the DGN, all recorded as dead and all north of Pt. Conception, the area under consideration in this EA. These takes appear to coincide with warmer than usual ocean conditions on the West Coast. Eight of the short-finned pilot whales were observed taken in 1993, with multiple animals (two and four) observed taken in single hauls. Observed takes also occurred in 1992 and 1997, years identified as either El Niño years or part of a prolonged warm-water period (from 1991 to 1993) (Pacific Marine Environmental Labratory 2006). Short-finned pilot whales are a tropical and warm water species and their range appears to be primarily restricted to the waters south of Pt. Conception during normal or cold water ocean conditions (K. Forney, NMFS SWFSC, 2006, personal communication.). During warm water or El Niño periods short-finned pilot whales more commonly move north of Pt. Conception. As noted above, this stock has generally been seen in deeper water. Pilot whales are known to be capable of diving to deep depths (below most DGN nets) presumably in search of squid, their primary known prey. It is not known precisely how warmer water conditions may affect their offshore distribution or where in the water column they feed. However, under normal conditions, the observed takes and biology of this stock suggests that the likelihood of interactions with the DGN is quite rare.

The most recent SAR indicates that the estimated annual mortality of short-finned pilot whales is over ZMRG, and approaching PBR. The estimated annual mortality is one, the PBR is 1.2. The take, either a mortality or serious injury, of one short-finned pilot whale could cause the annual estimated take to exceed PBR. There has been one observed mortality of a short-finned pilot whale in the DGN fishery (October 2003). This one take, at 20 percent observer coverage, is extrapolated to five takes and averaged over five years resulting in the estimated annual mortality of one short-finned pilot whale. If one additional short-finned pilot whale were taken in the fishery with 100 percent observer coverage, this take would be added to the extrapolated five takes. Adding these figures equals six whales; divided by five years, this yields an estimated annual mortality of 1.2, the current PBR. If one short-finned pilot whale is observed killed or seriously injured in the DGN fishery observed at 20 percent, this take would be extrapolated to five animals. These five animals would be added to the extrapolated five animals (from 2003 observed take) resulting in 10 short-finned pilot whales taken in the DGN. Averaging this over five years results in the annual estimated take of two short-finned pilot whales, over the current PBR of 1.8. As noted above, the short-finned pilot whale stock believed to be in the area of the DGN is primarily a warm water species and during periods of cold water they may have a very limited distribution in southern California. The current year, 2006, is not predicted to be an El Niño year (National Weather Service Climate Prediction Center 2006); therefore, it is unlikely that the alternatives will result in an increase in short-finned pilot whale takes. However, if El Niño conditions were to occur the likelihood of short-finned pilot whales may increase.

Exceeding PBR is not a mechanism for closing a commercial fishery. However, exceeding PBR does require that NMFS re-engage the TRT to determine if actions can be taken in the fishery to further reduce the likelihood of take. Also, NMFS guidance on concluding a NEPA finding of no significant impact related to MMPA standards is that actions that would cause a marine mammal stock to exceed its PBR cannot be considered insignificant.

Humpback Whale

Humpback whale takes are rare occurrences in the DGN fishery. Since 1997, there have been two observed takes and in both cases the animals were released alive and were reported as uninjured. There was one take in 1994, but again the animal was released alive and uninjured. The status of humpbacks was updated in the draft 2005 SAR and thus provides updated estimates of human-caused mortalities. Humpbacks have been recorded taken in the California angel shark/halibut large-mesh set gillnet fishery, although the limited observer records make it difficult to quantify the takes. Humpbacks mortalities or serious injuries have also been reported in the California troll fishery and from unidentified fisheries (from strandings) (Carretta, *et al.* 2006). The current mean annual takes is greater than 1.2 and the PBR is 2.3. The level of mortality projected under the various alternatives is unlikely to result in an increase in the estimated annual mortality that would exceed the PBR. The ITS for humpback whales in the DGN is four takes in three years, with two mortalities in three years.

Marine Turtles

Sections 1.3 and 6.1.2 describe the ESA consultation history for the DGN fishery, including the implementation of the current time/area closure for leatherbacks. Since 2001, new information about leatherbacks has become available and there have been changes in the DGN fishery. One of the most important pieces of information regarding leatherbacks is a change in the estimated catch per unit effort (CPUE) of leatherbacks per DGN set. Staff at the NMFS SWFSC considered the observed leatherback takes (23 in 6,961 observed sets between 1990 and 2004) in terms of oceanographic conditions and differences in distribution of leatherbacks north and south of Pt. Conception and developed different CPUEs for these areas. A bootstrap analysis was performed and a CPUE value was calculated for the two areas; north of Pt. Conception the mean CPUE is 7.7 leatherbacks per 1,000 sets (95 percent CI of 4.5–10.8) and south of Pt. Conception the mean CPUE is 0.5 leatherbacks per 1,000 sets (95 percent CI of 0–1.4) (Carretta, *et al.* 2005b). These values are used to estimate take under various set levels for alternatives considered in this EA, including No Action.

The SWR and SWFSC reviewed the observer records from the DGN fishery to estimate mortality rate of leatherbacks taken in drift gillnet gear. According to the observer field manual, to the extent possible, observers are required to record the condition of protected species (sea turtles, marine mammals, and seabirds) that are removed from the net. "Dead" is a condition assigned to an animal that has been removed from the net in a postmortem state. "Animals will show a lack of muscular activity and may float passively at or below the water's surface." "Alive" is a condition assigned to an animal released from the net that can swim or fly normally, even though it may have minor cuts or abrasions from being entangled. "Injured" is a condition assigned to an animal removed from the net with "obvious physical injury or with attached netting. An injured animal may lie at the surface, breathing irregularly or swim or fly in an abnormal manner." Observers also describe the condition of the animal by taking notes on their observations.

Of the 23 leatherbacks observed captured incidentally in the DGN fishery from 1990 through the present, 13 were assigned a condition of "Dead" (57 percent), nine were assigned a condition of "Alive" (39 percent), and one was "Unknown." Since the leatherback with unknown condition was likely to be dead, based on the observer's notes, the 2000 biological opinion assumed 10 leatherbacks were dead, indicating a 61 percent mortality rate in this fishery.

Upon further review of the observer records, which was not done for either the 2000 or 2004 opinions, it appears that some of the leatherbacks released alive (and assigned a condition of "Alive") may have been severely compromised by their interaction with the gear and being forcibly submerged for a period of time. The descriptions for three of the leatherbacks included the following:

1. "Turtle was alive—it lifted its head out of the water twice. Seemed dazed and lethargic. Once released, it sank out of sight. Was not seen swimming away."

2. “I could not notice any injuries other than exhaustion and disorientation. The turtle swam to the net twice after being released. On the third attempt to direct the turtle away from the net and boat we were successful. The turtle swam about 60 m away from the boat, turned and came back to the boat. After reaching the boat, the turtle turned and swam straight off the bow and never returned.”

3. “Turtle was moving its flippers but very sluggishly as it drifted along the hull. I did not see it lift its head to breathe. I had to return my attention to the net pull as turtle drifted to bow of vessel.”

Sea turtles forcibly submerged for extended periods of time show marked, even severe metabolic acidosis as a result of high blood lactate levels. With such increased lactate levels, lactate recovery times are long (even as much as 20 hours) (Lutcavage and Lutz 1997). Therefore, sea turtles need to have an adequate rest interval at the surface in order to successfully recover from forcible submergence. While one of the leatherbacks may have recovered from its initial disorientation (#2), it appears from the observers’ notes that the other two leatherbacks may not have had the strength to remain at the surface of the water and recover. Thus, there is a strong possibility that two of the leatherbacks, assigned a condition of “Alive,” later died as a result of being forcibly submerged. This would change the mortality rate to 70 percent. The EA will use this mortality rate in order to determine the likely mortality of leatherbacks incidentally captured in this fishery.

The potential effects leatherback mortality caps and set limits are summarized below. The evaluation of each alternative in Section 4.3.2.2 draws on this information about mortality caps and set limits and the discussion of mortality rates, above.

<u>Leatherback Take/Mortality Caps</u>

For each of the take limits, the following assumptions are made: (1) The mortality rate for incidentally taken leatherbacks is 70 percent. (2) The ratio of females to males is based on tagged animals in central California. This ratio has been inconsistent over the years; therefore, both a 2:1 and 1:1 female to male sex ratio is used here. The results are shown in Table 4.10.

As described in Section 3.3.2.2, most of the leatherbacks that utilize the California coast as a foraging area are from the Jamursba-Medi nesting beach population. The nesting beach counts for Jamursba-Medi are given in Table 3.9. Using the most recent five year counts of nesting females in Jamursba-Medi and multiplying by 2.5 (the average inter-annual nesting period) gives an average of 1,268 nesting females utilizing this beach. While this may be a coarse estimate, it is likely a minimum population since the numbers of nesting females used is the lower bound of the range.

The significance of the adverse affect of removing one or two adult and sub-adult females can be considered on two levels, the impact on the Jamursba-Medi population and the impacts on the entire western Pacific adult females. Because so little is known about the distribution and number of males Pacific leatherbacks, the only possible analysis is on females. The utilization of a leatherback cap of one or two takes results in a 0.079 percent reduction of the total Jamursba-Medi population, while a cap of three or four takes results in a reduction of 0.158 percent. At this level, impact of the loss would be unlikely to adversely affect this nesting population. When considered across the entire western Pacific meta-population (as described in Section 3.3.2.2), the impacts become undetectable; a loss of one nesting female would reduce the western Pacific population by 0.02 percent, while two mortalities would result in a decline of 0.04 percent. Considered on a meta-population scale for the entire western Pacific population, these takes are not considered significantly adverse.

It is important to note the uncertainties in any analysis of impacts to Pacific leatherback sea turtles. As described in Section 3.3.2.2, the overall number of leatherback sea turtles has declined in the Pacific over the past few decades. While early surveys may not have precisely calculated the number of leatherbacks, it is clear that number of leatherbacks has been reduced through a variety of primarily anthropogenic effects including directed harvest, harvest of eggs, loss of nesting habitat, and incidental take in fisheries. For the western Pacific leatherbacks, very little trend data is available. Jamursba-Medi is the only beach for which monitoring of nesting females has regularly occurred (since 1993) and this is insufficient time to provide population trend for a long-lived species like leatherbacks.

In the eastern Pacific more extensive and long-term studies have been carried out and trend data are available. Unfortunately, the status of eastern Pacific leatherbacks appears to substantially worse than their counterparts in the western Pacific. Published estimates of time to extinction of eastern leatherbacks suggest that this population may be lost within the next 50 years (Spotila, *et al.* 2000). The level of take (no more than four leatherbacks) is sufficiently low that it is unlikely that any of the turtles taken will be from the eastern Pacific population. It has been estimated that western Pacific leatherbacks off the West Coast outnumber Eastern Pacific leatherbacks by 40:1 (P. Dutton, NMFS SWFSC, 2006, personal communication).

In consideration of the uncertainties regarding Pacific leatherbacks, it is still reasonable to conlcude that the take limits currently being proposed of take/mortality caps for leatherbacks are unlikely to significantly adversely affect the nesting population at Jamursba-Medi or significantly adversely affect the western Pacific meta-population.

Set Limits

Similar to the leatherback take/mortality caps, the EFP fishery component of the alternatives include limits on the number of DGN sets, in order to minimize impacts on leatherback sea turtles and other protected species. The set limits are 300, 500, and 600 sets.

In order to determine the effects of the projected takes in the DGN fishery under various set limits shown in Table 4.11, the takes were multiplied by 0.7, the estimated leatherback mortality in the DGN fishery. It is important to note that the leatherback takes listed here include the existing fishery and the anticipated take of two turtles in that component of the fishery. To determine the number of females, the 2:1 and 1:1 sex ratio of females to males was applied to the total mortalities. Because the precise proportion of females and males is not known, using both ratios provides the range of possible effect on females. Finally, the projected mortalities were rounded to the next whole number to estimate the likely loss of females from the various set cap (see Table 4.12).

Set limits over 300 may result in the take of more than six leatherback sea turtles. This level of take would result in the mortality of more than four leatherbacks sea turtles in the DGN fishery which would likely be a significant effect on the nesting population when considered within the context of other impacts.

4.3.2.2 Impacts of the Alternatives

The No Action Alternative

<u>Marine Mammals</u>

To analyze the possible effects of the No Action Alternative on marine mammals, estimates of takes of marine mammal species were calculated based on the fishery as it currently operates, using the estimate of baseline effort described in Section 4.1.

As discussed above, one species of concern in the DGN fishery is the short-finned pilot whale. The take of short-finned pilot whales under No Action is estimated to be 0.4 whales annually. It is important to note that observed takes of short-finned pilot whales are very rare and that the take rate used in this EA is based on one observed take in 3,390 observed sets. Estimating a take rate from only one observed take may not reflect the likelihood of this event occurring again. Also, distribution of short-finned pilot whales may be strongly affected by ocean temperatures and El Niño—or warm water—periods. During periods of warm water off the West Coast, short-finned pilot whales have been observed north of Pt. Conception and north of Pt. Arena. However, during cold periods or normal water conditions, short-finned pilot whale distribution appears to be primarily limited to the waters off of Mexico and southern California (K. Forney, NMFS SWFSC, 2006, personal communication). The available data do not make it possible to determine the anticipated take rate of short-finned pilot whales during periods of warm water since the onset of cold water conditions coincided with TRP regulations designed to reduce marine mammal interactions with the DGN fishery (i.e., pingers, longer extenders, and skipper workshops). The reduction in the take of short-finned pilot whales since 1997 may be due to the TRP or may be due to cold oceanographic conditions that limited their northward distribution or a combination of both.

The calculated number of humpback whales that may be taken under No Action appears to exceed ZMRG. However, this take rate is based on two observer takes in which the animals were released alive unharmed and therefore do not contribute to the estimated average mortality or be counted against the stock's PBR.

<u>Marine Turtles</u>

As described elsewhere, the BiOps on the DGN fishery and HMS FMP determined that the DGN fishery, as currently prosecuted with the existing closure, is not likely to result in jeopardy for leatherback sea turtles. The BiOps also concluded that the level of take in the DGN fishery is not likely to result in jeopardy to ESA listed fin whales, humpback whales, sperm whales, green turtles, loggerhead turtles, or olive ridley turtles. No new information suggests that the DGN under No Action would result in jeopardy to these species.

Utilizing the new CPUEs developed by the SWFSC and anticipated DGN effort, the projected take of leatherbacks under No Action, north and south of Pt. Conception, was calculated. It is estimated that 1.5 leatherback sea turtles would be taken in the DGN fishery (see Table 4.13). Rounding this up to two turtles is consistent with the ITS for the 2004 BO. That is, if it is assumed that 70 percent of the leatherbacks taken in the DGN will be die as a result of the encounter, then two takes would result in 1.4 mortalities and rounding this number up results in two anticipated leatherbacks mortalities in the exiting DGN fishery under No Action. Under section 7, any fraction is rounded up to the next whole number, thus 1.4 is rounded to two.

All observed takes of loggerheads in the DGN occurred south of Pt. Conception and most occurred during El Niño events or during a period of unusually warm water (El-Niño-like conditions) on the West Coast.

NMFS implemented a loggerhead protection regulation that allows the agency to close the DGN fishing in the area south of Pt. Conception during the months of June, July, and August when an El Niño is forecasted or occurring. Since its implementation, this regulation has not been utilized because conditions have not met the criteria for a fishery closure. There has not been an observed take of a loggerhead sea turtle in the DGN fishery since 1999. This may be due in part to the cold water conditions on the West Coast since 2000. Loggerheads may not be moving into the areas currently fished by the DGN fleet.

No hawksbill turtles have been observed taken in the DGN fishery and they are very unlikely to occur in the waters in which the DGN occurs; therefore, they will not be considered further in this EA.

There has been only one observed take of a green turtle in the DGN fishery. Generally, green turtles are found in warm waters, greater than 18° C; therefore, it is possible that the fishery operating under No Action, with the majority of the effort in warmer waters, may take a green turtle. However, based on the observed rarity of takes, it seems that the probability is low.

Only one olive ridley turtle has been observed in the DGN fishery, south of Pt. Conception. This species is usually only found in tropical and sub-tropical waters and does not appear to be common along the West Coast. Based upon the one observed take, the DGN fishery under No Action may encounter an olive ridley, but the probability is quite low, particularly during normal or cold water periods.

Action Alternative 1

This alternative implements an EFP fishery with a range of possible take/mortality caps and set limits (reviewed above) and would restrict the EFP fishery area of operation under Area Restriction Option 1 to provide a corridor for migrating leatherbacks.

<u>Marine Mammals</u>

Area Restriction Option 1, a feature of this alternative, would prevent DGN fishing in an area where northern right whale dolphins, risso's dolphins, and a sperm whale were observed entangled in DGN gear between 1996–2002 in pingered nets (Carretta, *et al.* 2005b). Average annual mortality of risso's dolphins is below PBR and ZRMG and any additional takes in the DGN would not cause this stock to exceed either of those thresholds. The projected mortality of northern right whale dolphins and sperm whales does exceed the ZMRG, but not the stock's PBR at low levels of effort (300 sets). At over 300 sets, the sperm whale PBR may be exceeded. This alternative may reduce exposure of northern right whale dolphins to the DGN fishery. The one sperm whale that was observed taken in this area was taken in a net that was improperly configured with required pingers, although the overall take rate of sperm whale takes in the DGN has declined since the TRP was implemented. It is difficult to determine if this decline is based solely on the measures required by the TRP or if the decline in take reflects the decline in effort north of Pt. Conception where sperm whales are more common than in the southern fishery area. This alternative may slightly lower exposure of marine mammals to DGN gear. Effort levels of less than 300 sets or an incidental take cap of three leatherbacks would likely not cause take that would exceed the PBR for marine mammals.

<u>Marine Turtles</u>

With regard to the area restriction on the EFP fishery, there is insufficient data to support stratifying leatherback CPUE by area, particularly an area as small of the EFP area restriction proposed under this alternative. However, qualitative analysis can be provided based on past observed takes of leatherbacks in the DGN fishery and the available information on leatherback distribution and life history.

Based on review of past observed takes of leatherbacks, three of 23 observed leatherback turtle takes were within the area proposed to be closed by this alternative. However, only two occurred between August 15th and November 15th. (One take occurred in December; therefore the closure would not have affected that take.) No leatherbacks were observed taken in the largest western portion of the area restriction, although this may reflect the level of effort in the area, rather than leatherback distribution. Although no takes were observed in the nearshore off central California, this may again be an effect of low effort in the area and not turtle distribution and abundance. If patterns of fishing effort were to shift, with more effort moving closer to shore, this closure may provide some protection to leatherbacks foraging in central California.

Recent surveys by researchers at the SWFSC suggest that the area between Pt. Arena and Pt. Sur is an important feeding area for leatherbacks (S. Benson, NMFS SWFSC, 2006 personal communication). This is an area in which high abundances of leatherbacks have been observed from aerial surveys (Benson, *et al.* 2003), although the surveys were flown within 15 mi of shore and therefore do not overlap the usual area of the DGN fishery. The use of this area is likely tied to the dietary needs of this species. Leatherbacks are large animals, up to 2,000 lb, and feed on relatively small prey (jellyfish, salps, etc.). It is reasonable to assume that they must find large concentrations of these relatively low energy prey items to sustain themselves. Because of the low nutritive value of jellyfish and tunicates, it has been estimated that an adult leatherback would need to eat about 50 large jellyfish (equivalent to approximately 200 liters) per day to maintain its nutritional needs (Duron, 1978, *in* Bjorndal, 1997). Compared to greens and loggerheads, which consume approximately 3 percent–5 percent of their body weight per day, leatherback turtles may consume perhaps 20 percent–30 percent of their body weight per day (Davenport and Balazs, 1991).

Oceanographic conditions off the central coast of California cause large, dense blooms of jellyfish in the nearshore areas, and consequently, large numbers of leatherbacks have been observed in central California, between Pt. Sur and Pt. Arena, during August and through October, presumably feeding upon the seasonal abundance of prey. Leatherbacks appear to stay near the surface and feed during this time (Benson, NMFS, 2006, personal communication). However, as food density begins to decline, leatherbacks appear to move out of the area. Based on limited tagging, the animals appear to move away from the coast in a southwesterly direction, presumably heading towards western Pacific nesting beaches.

The current habitat use studies being carried out by NMFS are in early their stages and the entire coast has not yet been studied. Preliminary work indicates that the area between Pt. Sur and Pt. Arena is an important feeding area for leatherbacks due to the high concentration of prey, particularly in the late summer and early fall. Observer records from the DGN fishery indicated that twelve leatherbacks were observed taken between Pt. Sur (36° N latitude) and Pt. Arena (39° N latitude). Of these twelve takes, eight occurred in October, two in November, one in September, and one in December. The takes in the relatively small area may be due to leatherbacks moving away from their nearshore coastal foraging areas between Pt. Sur and Pt Arena in early fall. However, it is reasonable to believe that leatherbacks utilize other foraging areas with high prey abundance and concentration. Evidence of utilization of other areas may come from the DGN observer program. There were six leatherbacks observed captured in the DGN fishery in September and October from just north of Pt. Arena (at 39°48.6' N latitude) up to northern California and southern Oregon (three takes observed north of 42° N latitude). Expansion of the existing habitat use studies may yield additional insights into leatherback distribution along the West Coast, but at this time a complete picture is unavailable.

In conclusion, this closure may result in a minor reduction of exposure of leatherbacks to DGN gear. The closure may provide some protection to leatherbacks in the late summer and early fall; however, it does not provide a large area of protection for leatherbacks migrating from their forage areas in central

California. This alternative will not reduce exposure to DGN gear for the unknown number of leatherbacks that forage north of Pt. Arena.

If this alternative is implemented with a turtle cap of no more than three incidental takes, of which no more than two are mortal takes, the Jamursba-Medi nesting population is not likely to be significantly adversely affected. If this alternative is implemented with a set limit of up to 300 sets, the level of take of leatherbacks is expected to result in no more than two adult mortalities, consistent with a turtle cap of three incidental takes.

Action Alternative 2

This alternative would implement an EFP fishery, with a leatherback take/mortality cap and/or set limit as described above with Area Restriction Option 2.

Marine Mammals

This area would prohibit DGN fishing in an area where marine mammal stocks of concern have been observed taken (northern right whale dolphins and sperm whale). As noted previously, the take of a sperm whale in the DGN fishery may have been related to the lack of compliance with pinger requirements, thus properly pingered nets may be less likely to take a sperm whale. Northern right whale dolphins have been observed taken in the DGN fishery north of the proposed close area; therefore any increase in fishing effort in that area could cause an increase in the annual mortality of this stock. The area under consideration for closure under this alternative is not an area of high marine mammal bycatch; therefore while this alternative may slightly reduce the risk of marine mammal exposure to the DGN fishery, the effects are likely minor.

The mortality of two sperm whales in the DGN EFP would cause the stock to exceed its PBR and an increase in DGN effort of 500 sets may cause the mortality of almost two sperm whales. At a set limit of 300, or a turtle incidental take cap of three leatherbacks, this alternative is unlikely to cause the sperm whale PBR to be exceeded.

Marine Turtles

Area Restriction Option 2, a feature of this alternative, would reduce exposure to DGN fishery for leatherbacks that forage between Pt. Sur and Pt. Arena in the late summer and early fall and appear to migrate through this area, heading southwest and offshore (Benson, NMFS, 2006 personal communication). However, there is uncertainty about leatherback habitat use north of Pt. Arena. There is evidence from DGN observer records that this area is utilized by leatherbacks in September and October (six observed takes in September and October). There is insufficient information on coastwide foraging areas at this time to determine how this may affect leatherbacks in areas north of Pt. Arena.

As in Action Alternative 1, if this alternative is implemented under an EFP with a turtle cap of no more than three incidental takes (or two mortalities) or no more than 300 sets it is unlikely to significantly adversely affect leatherback sea turtles or marine mammals.

Action Alternative 3

This alternative would implement an EFP fishery, with a leatherback take/mortality cap and/or set limit as described above, but with no area restriction.

Marine Mammals

This alternative would open an area in which marine mammal takes have been observed; however, the rate of take for most marine mammals is the same north and south of Pt. Conception. Northern right whale dolphins are seen more commonly north of Pt. Conception and the CPUE for the DGN fishery in this area is an order of magnitude higher than south of Pt. Conception. Increasing DGN effort in this area may cause an increase in take of Northern right whale dolphins, but given the constraints imposed on the EFP through the mitigation measures, it is unlikely that the projected northern right whale dolphin takes will exceed the stock's PBR. Overall, takes of marine mammals declined in the DGN fishery after the implementation of the TRP, although this is based on only four years of data. No discernable patterns of exposure north of Pt. Conception can by found in the observed takes of marine mammals. Prior to the implementation of the TRP, marine mammal takes were most common south of Pt. Reyes. Short-finned pilot whales, northern right whale dolphins, and sperm whales were all observed taken in this area. In the case of short-finned pilot whales, the level of take may be been associated with warm water conditions and El Niño years. As noted above, the stock of short-finned pilot whales exposed to the DGN fishery are believed to occur primarily off the coast of Mexico, in warmer waters than are typical off the California coast. If an El Niño were to occur, the distribution of short-finned pilot whales may expand and increase the likelihood of exposure to a level that may cause the mortalities to exceed PBR.

While this alternative may not affect the likelihood of marine mammal exposure to the DGN fishery, the DGN EFP would allow real-time monitoring of the fishery to determine take levels of marine mammals. This level of monitoring may help ensure that the fishery does not exceed marine mammal mortality or serious injury thresholds that would be detrimental to the species.

Marine Turtles

This alternative could potentially increase exposure of leatherbacks to EFP fishery; however, given the current information it is not possible to quantify effects. The observed takes of leatherbacks (23) in the DGN fishery have been studied and correlations sought between takes and oceanographic conditions (e.g., El Niño and La Niña events, areas of high primary production) but none could be found. As described in Section 3.3, leatherbacks utilize areas of high production, such as upwelling shadow and relaxation events, which occur along the central coast of California, where large numbers of leatherbacks (50–227) have been sighted feeding on seasonally abundant jellyfish in the nearshore area between Pt. Sur and Pt. Arena. The scientists conducting research on leatherbacks off the California coast are continuing to seek correlations between oceanographic conditions and seasonal abundance of leatherbacks as a means of providing guidance to fishery managers measures, including potential "hotspots" (areas to avoid because of high relative abundance) to limit leatherback exposure. For these reasons it is not possible to state conclusively how the lack of an area restriction on the operation of the EFP fishery would affect leatherback takes. However, if this alternative were implemented under an EFP with either a take/mortality cap of three incidental takes, of which two would result in mortalities, or a set limit of 300, the anticipated effects on leatherbacks would not likely be significant (see Table 4.12 for projected number of nesting females that would be removed from the population).

Action Alternative 4

This alternative would implement both an EFP fishery, with Area Restriction Option 1, and a regulatory amendment that would open a diamond-shaped portion of the fishery along the southern boundary of the existing closure (Boundary Change Option 1). It has been estimated that the effort in the small diamond-shaped area would be 92 additional sets.

Marine Mammals

The estimated increase in takes of marine mammals of concern is low, from 0.1 short-finned pilot whale to 4.5 northern right whale dolphins. However, these projected takes must be added to the EFP effort. As noted above, if the EFP effort is limited by an effort cap of 300 sets or a turtle cap of three takes, then mortalities or serious injuries to marine mammal stocks are not likely to exceed PBR. However, it should be noted that re-opening the currently closed area under 20 percent observer coverage would mean that any observed takes would be extrapolated to five takes. If a single mortality or serious injury of a short-finned pilot whale, humpback whale, or sperm whale were to occur in the non-EFP fishery, which has only 20 percent observer coverage, the extrapolated five mortalities would exceed PBR for these species.

As noted previously, short-finned pilot whales are rarely observed north of Pt. Conception except during El Niño periods or during periods of unusually warm water off the West Coast. Water conditions off the West Coast in 2006 are expected to be consistent with the current La Niña conditions, during which sea temperatures are colder than normal; therefore, the likelihood of short-finned pilot whales occurring in the opened area is low. This is not an area where humpback whales have been observed taken in the DGN fishery. Also, the humpbacks that have been observed entangled in drift gillnets have been reported as released alive without serious injury. A sperm whale was observed taken in the area, although this may have been a random event. Sperm whales have been seen across the entire California coast during the months of the DGN fishery, September through November; thus the proposed open area is not a place where the probability of sperm whale entanglements is particularly high or low.

Marine Turtles

The diamond-shaped area opened to the regular DGN fishery under Boundary Change Option 1 has been identified as an area of transit by leatherback sea turtles. Leatherbacks have been tracked from the Monterey Bay area using satellite tags. Although the sample size is small, the general movement of leatherbacks is in a southwestern direction. It must be noted that these tracks may be biased and may not precisely represent the likely movements of all leatherbacks. The animals tagged may have been from only one known foraging area in central California between Pt. Sur and Pt. Arena. Leatherbacks utilizing other areas along the West Coast may not move into this same area. Also, the activity of capturing, retaining, and handling the turtles on a boat, and release may affect the leatherback behavior, perhaps triggering a more rapid movement out of the area and away from the area of capture. Nonetheless, this area may be an important foraging area for leatherbacks (S. Benson, NMFS, SWFSC, personal communication, February 2006).

The estimated 2006 effort in the diamond-shaped area opened by regulatory amendment is 92 sets. As discussed in the marine mammal section above, there are caveats associated with estimating effort in this area. Estimated effort is based on historic effort in this area when the entire area was open (before 2001) and therefore may not accurately reflect the actual effort that may occur. This area is north of Pt. Conception; therefore the CPUE used is 7.7 per 1,000 sets (C.I.: 4.5–10.8). Adding 100 sets would result in the take of 0.77 (CI 0.45–1.08) leatherbacks. This number can be rounded to one incidental take or one mortality. This mortality would need to be considered in terms of take allowed in the EFP. That is, the effort limit or take/mortality cap would have to be adjusted to account for the one projected mortality. If a leatherback take/mortality cap were to be used in the EFP, the incidental take would likely need to be adjusted to two takes, of which one would be a mortal take. This would keep the projected take under this alternative at no more than three incidentally-taken leatherbacks with two mortalities (including baseline impacts). An effort limit in the EFP would need to be similarly constrained.

If the diamond-shaped area is re-opened at a 20 percent observer coverage, there is a degree of uncertainty about the impacts of this alternative on leatherbacks. One observed take or mortality of a leatherback could be extrapolated to five, which, when combined with takes anticipated in the EFP and in the baseline (No Action) fishery, may result in a level of take (10) that may adversely affect the female population on Jamursba-Medi (if all of the animals came from one beach).

Action Alternative 5

Alternative 5 is the same as Alternative 4, except no area restriction would be placed on the EFP fishery.

Marine Mammals

The likelihood of take and impacts from projected marine mammal mortalities is essentially the same for this alternative as it is for Action Alternative 4.

Marine Turtles

The possible effects of this alternative on leatherback sea turtles is essentially the same as Action Alternative 4. The closed area proposed within Action Alternative 4 is unlikely to result in a substantial decline in leatherback takes within the EFP area and would have no effect on probabilities of take in the opened diamond-shaped area under Boundary Change Option 1.

Action Alternative 6

This alternative would open the currently closed area between Pt. Conception and Pt. Sur under a regulatory amendment and would retain the existing time and area closure north of Pt. Sur. The opened area would be subject to the same 20 percent observer coverage applied in the current DGN fishery. It is estimated that effort will increase by 119 sets over the baseline (see Table 4.1).

Marine Mammals

The actual change in effort in the Pt. Conception-Pt. Sur area is difficult to predict in part because the fishery follows the movements of swordfish, the target species. Swordfish generally move north to south in the late summer and fall and during the months of October through December are caught in the waters being considered for re-opening through this alternative. Based on the estimated increase in effort, the projected marine mammal takes are likely to be minimal, with no increase in likelihood of reaching or exceeding PBR. Furthermore, to the degree that management changes stimulate increased participation, there could be a long-term increase in effort not captured in this estimate. If the majority of the fishing remains closed, the effort in this relatively small area may increase over what historic effort levels would suggest. Also, the fishery itself shifts from north to south as the target species move in response to oceanographic changes, from late summer through early winter.

The area being considered for re-opening is an area in which short-finned pilot whales, northern right whale dolphins and sperm whales have been observed taken in the DGN fishery before the TRP. Takes of these species have been observed post-TRP, but at lower rates.

The impact of this alternative on marine mammals is difficult to assess, but if the estimate of effort is correct, then impacts are likely to be minimal and similar to Alternatives 1–5. However, if the effort is higher than anticipated, higher—but unquantified—takes may occur.

Marine Turtles

The precise movements of leatherbacks along the West Coast is not known, although it is known that this species seeks large aggregations of jellyfish and have been observed in areas of upwelling shadows and relaxation events. Leatherbacks that have been tagged in the general Monterey Bay area in September by the SWFSC sea turtle research team have been tracked moving through the area between Pt. Conception and Pt. Sur from September through November.

Based on the estimated additional 119 sets in the Pt. Conception-Pt. Sur area, then the projected take would be one leatherback equal to one mortality using the 0.7 mortality rate. As with Action Alternatives 4 and 5, this projected mortality would have to be added to any projected takes and mortalities in the baseline (No Action) fishery, estimated at two takes, both of which are likely to be mortalities.

Action Alternative 7

This alternative would open up the entire area currently closed to DGN fishing, with an estimated increase in effort of 506 sets. The estimated number of sets is based on historic effort in the area and may or may not reflect the actual fishing activity.

Marine Mammals

The estimated 506 set increate in effort may cause take of sperm whales to exceed PBR. This alternative would likely adversely affect northern right whale dolphins, because this species is more common north of Pt. Conception than south, with a CPUE of nearly an order of magnitude higher. As noted under Action Alternative 6, because of the 20 percent observer coverage rate, any mortality or serious injury of a humpback whale, short-finned pilot whale, or sperm whale would be extrapolated by five, resulting in an estimated mortality that exceeds PBR. If effort were to shift from south of Pt. Conception to the north, this may benefit California sea lions. Takes and take rates of California sea lions have increased in recent years. They are more commonly observed south of Pt. Conception, thus a decrease of effort in that area may be beneficial to this stock.

Marine Turtles

Eliminating the current time/area closure increases exposure of leatherbacks to DGN gear in all of the habitats they utilize from Pt. Conception to central Oregon. As has been stated earlier, habitat use studies on leatherbacks off the West Coast are just beginning, but based on surveys, leatherbacks are distributed across the entire region that would be affected by this alternative.

At the estimated level of effort, the project leatherback takes are two to six leatherbacks, with an average of four; mortalities would range from two to five, with an average of three. Adding these takes to the baseline (No Action) impacts, it is estimated that five to eight leatherbacks would be taken with an average of six. Mortalities would be projected at four to seven, with an average of five. The number of female mortalities would be at least two to four, with an average of three.

If this fishery were to operate at only 20 percent observer coverage, then any takes or mortalities would be extrapolated by five; thus, two leatherback mortalities could be extrapolated to 10 mortalities. This level of take may cause a re-initiation of consultation and could result in an emergency closure of the fishery.

4.3.3 Cumulative effects

Marine mammals may be affected both by past actions and current anthropogenic mortalities. All large species, and some odontecetes, have been captured in whaling operations. Historically, whaling occurred at much higher levels than at the present time. The monitoring of whaling is closely monitored by the International Whaling Commission to ensure sustainable level of harvest, although illegal whaling is still reported. The marine mammal stocks likely to be affected by this action are not likely to be still affected by whaling, although persistent effects from past reductions in the population are difficult to quantify.

Marine mammals may also be affected by ship strikes in the Pacific Ocean. These effects are impossible to quantify, because many animals are likely never seen with and injury or may be killed and disappear.

Marine mammals are also incidentally taken in commercial fisheries, although generally, take along the U.S. West Coast is fairly rare, particularly for large species. A review of the draft 2005 SAR indicates that none of the marine mammal stocks off the coast of Washington, Oregon and California have total annual mortalities and serious injuries that exceed the stock's PBR.

External factors affecting leatherback sea turtles and all turtles are described in Section 3.3.2.2. In the case of leatherbacks, a number of actions have occurred in recent years to provide better protection of females at nesting beaches, to protect eggs and hatchlings from poaching, and limit directed take of leatherbacks as food.

Leatherback sea turtles are subject to take in U.S. based fisheries and international fisheries. The following U.S. fisheries are known to take leatherbacks: the Hawaii longline fishery, (shallow and deep set); the Hawaii handline, troll, pole and line fishery; and the west coast DGN fishery. For each of these fisheries, section 7 consultations have been conducted and the cumulative anticipated takes under the current incidental take statements is 33 takes, of which there are projected to be 10 mortalities.

Very few international fisheries have observer programs; therefore, take of sea turtles in most fisheries is speculative. It is difficult to quantify effects since so little in known about the leatherback takes, including which populations, eastern Pacific or western Pacific, these takes may be affecting. A complete review of fisheries that are known to take, or may take, leatherback sea turtles is provided in the NMFS 2004 biological opinion on the HMS FMP (NMFS 2004a). The Japanese tuna longline and the Coastal setnet and gillnet fisheries in Taiwan are known to incidentally take a low number of leatherbacks include, cumulatively less than 30 animals. . The Eastern Tropical Pacific tuna fishery has a requirement of 100 percent observer coverage on large vessels, which make up 66 percent of the fleet. Observer records indicate that only one leatherback was observed taken in this fishery (J. Kondel, NMFS, SWR, personal communication, 2006).

Perhaps the biggest fishery impact on Pacific sea turtles comes from various tuna longline fisheries. It is difficult to quantify the impacts on leatherbacks of the foreign tuna longline fleet in the central and western Pacific. Observer levels are very low, less than 1 percent) and there are no observers on Japanese, Korean, or Australian distant water fishery (NMFS 2004a). From these low observer rates, it has been estimated that 2,182 sea turtles are taken, and 500–600 turtles killed, annually in the various tuna longline fisheries in the central and western Pacific (NMFS 2004a). The species taken, in order of highest to lowest occurrence, are: olive ridley, green, leatherback, loggerhead, and hawksbill (NMFS 2004a).

FPast takes by fisheries, some of which may no longer be operating (such as the West Coast high seas longline fishery) may have continued effects because the removing animals from the population can alter the age structure of a population. This type of effect can be especially persistent for animals that are late to mature, such as leatherback sea turtles. They are late to mature (early teens); therefore, the offspring of turtles captured and removed from the population were not born and are not contributing to the population by reaching sexual maturity now and reproducing.

4.3.4 Summary Evaluation

For marine mammals, evaluating whether significance impacts may occur is based on projected mortalities under the action alternatives and comparing this to the stock's most recent PBR. Alternatives that result in levels of effort and projected mortalities over PBR are considered likely to have a significant adverse effect on the stock.

NEPA regulations (40 CFR 1502.22) state that an agency must disclose incomplete or unavailable information it could not reasonably obtain, and assess the relevance of the incomplete information to the assessing reasonably foreseeable significant adverse impacts. For marine mammals, there are considerable uncertainties regarding the likely effects of the alternatives. These have been described above and are very briefly reviewed here. The observed take of marine mammal is relatively rare in the DGN fishery; however, this provides the best means of producing a CPUE for each stock that can be used to project future takes. For some stocks, a CPUE was developed based on only one observed take in over 3,000 observed sets. Marine mammals are dynamic and respond to oceanographic changes. There is evidence that some marine mammals will move into or out of an area based on El Niño conditions. There is also evidence that some marine mammal stocks may change their feeding strategies to adjust to differences in prey availability or distribution. These types of effects can not by easily quantified in a CPUE; thus the results here must be viewed with some caution.

The uncertainties regarding leatherbacks are many and are described above, but are very briefly reviewed here. The scientific community's knowledge of Pacific leatherbacks, particularly western Pacific leatherbacks, has increased substantially in the past five years. In large part, due to the cooperation of researcher in western Pacific countries, a much more complete picture is emerging. However, much is still to be learned. For example, over the past few years, nesting beaches previously unknown to much of the scientific community have been identified, although much research is yet to be done to learn more about the beaches and the turtles that use them. Much of the necessary information will take years to accumulate. For example, it is not known if the western Pacific population trend is stable, increasing, or decreasing. The only beach for which studies have been ongoing is Jamursba-Medi, and this beach may not reflect the trends at all beaches. Furthermore, nest counts are only available for Jamursba-Medi since 1992 and at least 25 years of monitoring are necessary to detect a trend. Thus, while the population at Jamursba-Medi appears stable, there is insufficient information to state this with certainty.

As noted previously, it is assumed that the turtles exposed to the DGN fishery are from the Jamursba-Medi population, estimated to be approximately 1,368 nesting females. However, it is not clear if this is a separate distinct population, or if these females are also from War-Mon. It is not known if females will move into a new nesting area. Leatherbacks show a fairly high site fidelity and there is just too little information to suggest that the loss of one nesting population (or reduction in its numbers) will be compensated by immigration of new females. Therefore, it is assumed that impact on the leatherbacks exposed to the DGN fishery will be primarily to the nesting population of Jamursba-Medi.

Table 4.14 summarizes the effects of the alternatives according to the evaluation criteria outlined in Section 4.3.1. Generally, authorizing an EFP fishery alone, managed by a take/mortality cap and/or set limit that would not result in more than three leatherback sea turtles is not expected to result in significant impacts, based on the evaluation criteria used here. Area restriction options imposed on the EFP fishery may have an additional mitigative effect, but it is not possible to determine what specific beneficial effect such geographic restrictions would have. Alternatives 4–6, which include a regulatory amendment to modify the southern boundary of the current time/area closure have an increased risk of incurring significant adverse impacts to protected species. Alternative 7, which would eliminate the current time/area closure altogether, is likely to result in significant adverse impacts to protected species.

Table 4.7. Catch rates for marine mammal species before and after TRT implementation.

Species	Total observed takes 1990-2004		Take in pingered nets	
	Total caught	CPUE	Total caught	Catch/set
Beaked Whale, Baird's	1	0.0001		
Beaked Whale, Cuviers	21	0.0029		
Beaked Whale, Hubbs'	5	0.0007		
Beaked Whale, Mesoplodont	2	0.0003		
Beaked Whale, Stejneger's	1	0.0001		
Beaked Whale, Unidentified	3	0.0004		
Dolphin, Bottlenose	3	0.0004		
Dolphin, Long-Beaked Common	14	0.0019	6	0.0018
Dolphin, Northern Right Whale	65	0.0090	*22*	*0.0080*
Dolphin, Pacific White-sided	28	0.0039	7	0.0021
Dolphin, Risso's	33	0.0046	9	0.0027
Dolphin, Short-Beaked Common	327	0.0454	112	0.0330
Dolphin, Striped	1	0.0001		
Porpoise Dall's	22	0.0031	1	0.0015
Pinniped, Unidentified	2	0.0003		
Sea Lion, California	153	0.0212	84	0.0248
Sea Lion, Steller	2	0.0003		
Seal, Northern Elephant	112	0.0155	17	0.0050
Whale, Fin	1	0.0001	1	0.0003
Whale, Gray	3	0.0004	3	0.0009
Whale, Humpback	3	0.0004	*2*	*0.0006*
Whale, Killer	1	0.0001		
Whale, Minke	3	0.0004	1	0.0003
Whale, Pygmy Sperm	2	0.0003		
Whale, Short-finned Pilot	12	0.0017	*1*	*0.0003*
Whale, Sperm	8	0.0011	2	0.0031

Table 4.8. Projected marine mammal mortalities in the DGN fishery under the baseline (No Action), baseline plus additional increments of effort, and under the action alternaties. ESA-listed species shown in italics.

	Sets	Odontocetes						Mysticetes					Pinnepeds	
		Long-beaked common dolphin	Short-beaked common dolphin	Dall's porpoise	*Norhtern right-whale dolphin*	Pacific white-sided dolphin	Risso's dolphin	*Fin whale*	Gray whale	Humpback whale	*Minke whale*	*Sperm whale*	California sea lion	Northern elephant seal
PBR		242	3653	729		382	115	15	442	2.3	5.8	1.8	8333	2513
ZMRG		24.2	365.3	72.9		38.2	11.5	1.5	44.2	0.23	0.58	0.18	833.3	251.3
CPUE N.. Pt. Conc.		0.0018	0.033	0.0015	0.034	0.0021	0.0027	0.0003	0.0009	0.0006	0.0003	0.0031	0.0248	0.005
CPUE S.. Pt. Conc.		0.0018	0.033	0	0.0018	0.0021	0.0027	0.0003	0.0009	0.0006	0.0003	0	0.0248	0.005
Baseline (No Action)														
N. Pt. Conc	102	0.18	3.37	0.15	3.47	0.21	0.28	0.03	0.09	0.06	0.03	0.32	2.53	0.51
S Pt. Conc.	1361	2.45	44.91	0.00	2.45	2.86	3.67	0.41	1.22	0.82	0.41	0.00	33.75	6.81
Total	1,463	2.63	48.28	0.15	5.92	3.07	3.95	0.44	1.32	0.88	0.44	0.32	36.28	7.32
Baseline+set increments														
	100	2.81	51.58	0.30	9.32	3.28	4.22	0.47	1.41	0.94	0.47	0.63	38.76	7.82
	200	2.99	54.88	0.45	12.72	3.49	4.49	0.50	1.50	1.00	0.50	0.94	41.24	8.32
	250	3.08	56.53	0.53	14.42	3.60	4.63	0.51	1.54	1.03	0.51	1.09	42.48	8.57
	300	3.17	58.18	0.60	16.12	3.70	4.76	0.53	1.59	1.06	0.53	1.25	43.72	8.82
	400	3.35	61.48	0.75	19.52	3.91	5.03	0.56	1.68	1.12	0.56	1.56	46.20	9.32
	500	3.53	64.78	0.90	22.92	4.12	5.30	0.59	1.77	1.18	0.59	1.87	48.68	9.82
	600	3.71	68.08	1.05	26.32	4.33	5.57	0.62	1.86	1.24	0.62	2.18	51.16	10.32
Alternative 1														
1.1	300	0.54	9.90	0.45	10.20	0.63	0.81	0.09	0.27	0.18	0.09	0.93	7.44	1.50
1.2	436	0.78	14.39	0.65	14.82	0.92	1.18	0.13	0.39	0.26	0.13	1.35	10.81	2.18
1.3	486	0.87	16.04	0.73	16.52	1.02	1.31	0.15	0.44	0.29	0.15	1.51	12.05	2.43
1.4	137	0.25	4.52	0.21	4.66	0.29	0.37	0.04	0.12	0.08	0.04	0.42	3.40	0.69
1.5	392	0.71	12.94	0.59	13.33	0.82	1.06	0.12	0.35	0.24	0.12	1.22	9.72	1.96
1.6	461	0.83	15.21	0.69	15.67	0.97	1.24	0.14	0.41	0.28	0.14	1.43	11.43	2.31
1.7	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
1.8	289	0.52	9.54	0.43	9.83	0.61	0.78	0.09	0.26	0.17	0.09	0.90	7.17	1.45
1.9	378	0.68	12.47	0.57	12.85	0.79	1.02	0.11	0.34	0.23	0.11	1.17	9.37	1.89
min	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
max	486	0.87	16.04	0.73	16.52	1.02	1.31	0.15	0.44	0.29	0.15	1.51	12.05	2.43
Alternative 2														
2.1	246	0.44	8.12	0.37	8.36	0.52	0.66	0.07	0.22	0.15	0.07	0.76	6.10	1.23
2.2	346	0.62	11.42	0.52	11.76	0.73	0.93	0.10	0.31	0.21	0.10	1.07	8.58	1.73

	Sets	Odontocetes						Mysticetes					Pinnepeds	
		Long-beaked common dolphin	Short-beaked common dolphin	Dall's porpoise	*Norhtern right-whale dolphin*	Pacific white-sided dolphin	Risso's dolphin	*Fin whale*	Gray whale	Humpback whale	*Minke whale*	*Sperm whale*	California sea lion	Northern elephant seal
2.3	396	0.71	13.07	0.59	13.46	0.83	1.07	0.12	0.36	0.24	0.12	1.23	9.82	1.98
2.4	137	0.25	4.52	0.21	4.66	0.29	0.37	0.04	0.12	0.08	0.04	0.42	3.40	0.69
2.5	302	0.54	9.97	0.45	10.27	0.63	0.82	0.09	0.27	0.18	0.09	0.94	7.49	1.51
2.6	371	0.67	12.24	0.56	12.61	0.78	1.00	0.11	0.33	0.22	0.11	1.15	9.20	1.86
2.7	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
2.8	241	0.43	7.95	0.36	8.19	0.51	0.65	0.07	0.22	0.14	0.07	0.75	5.98	1.21
2.9	288	0.52	9.50	0.43	9.79	0.60	0.78	0.09	0.26	0.17	0.09	0.89	7.14	1.44
min	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
max	396	0.71	13.07	0.59	13.46	0.83	1.07	0.12	0.36	0.24	0.12	1.23	9.82	1.98
Alternative 3														
3.1	300	0.54	9.90	0.45	10.20	0.63	0.81	0.09	0.27	0.18	0.09	0.93	7.44	1.50
3.2	500	0.90	16.50	0.75	17.00	1.05	1.35	0.15	0.45	0.30	0.15	1.55	12.40	2.50
3.3	553	1.00	18.25	0.83	18.80	1.16	1.49	0.17	0.50	0.33	0.17	1.71	13.71	2.77
3.4	137	0.25	4.52	0.21	4.66	0.29	0.37	0.04	0.12	0.08	0.04	0.42	3.40	0.69
3.5	412	0.74	13.60	0.62	14.01	0.87	1.11	0.12	0.37	0.25	0.12	1.28	10.22	2.06
3.6	528	0.95	17.42	0.79	17.95	1.11	1.43	0.16	0.48	0.32	0.16	1.64	13.09	2.64
3.7	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
3.8	289	0.52	9.54	0.43	9.83	0.61	0.78	0.09	0.26	0.17	0.09	0.90	7.17	1.45
3.9	384	0.69	12.67	0.58	13.06	0.81	1.04	0.12	0.35	0.23	0.12	1.19	9.52	1.92
min	100	0.18	3.30	0.15	3.40	0.21	0.27	0.03	0.09	0.06	0.03	0.31	2.48	0.50
max	553	1.00	18.25	0.83	18.80	1.16	1.49	0.17	0.50	0.33	0.17	1.71	13.71	2.77
Alternative 4														
4.1	382	0.69	12.61	0.57	12.99	0.80	1.03	0.11	0.34	0.23	0.11	1.18	9.47	1.91
4.2	482	0.87	15.91	0.72	16.39	1.01	1.30	0.14	0.43	0.29	0.14	1.49	11.95	2.41
4.3	532	0.96	17.56	0.80	18.09	1.12	1.44	0.16	0.48	0.32	0.16	1.65	13.19	2.66
4.4	229	0.41	7.56	0.34	7.79	0.48	0.62	0.07	0.21	0.14	0.07	0.71	5.68	1.15
4.5	438	0.79	14.45	0.66	14.89	0.92	1.18	0.13	0.39	0.26	0.13	1.36	10.86	2.19
4.6	507	0.91	16.73	0.76	17.24	1.06	1.37	0.15	0.46	0.30	0.15	1.57	12.57	2.54
4.7	192	0.35	6.34	0.29	6.53	0.40	0.52	0.06	0.17	0.12	0.06	0.60	4.76	0.96
4.8	377	0.68	12.44	0.57	12.82	0.79	1.02	0.11	0.34	0.23	0.11	1.17	9.35	1.89
4.9	424	0.76	13.99	0.64	14.42	0.89	1.14	0.13	0.38	0.25	0.13	1.31	10.52	2.12
min	192	0.35	6.34	0.29	6.53	0.40	0.52	0.06	0.17	0.12	0.06	0.60	4.76	0.96
max	532	0.96	17.56	0.80	18.09	1.12	1.44	0.16	0.48	0.32	0.16	1.65	13.19	2.66
Alternative 5														
5.1	392	0.71	12.94	0.59	13.33	0.82	1.06	0.12	0.35	0.24	0.12	1.22	9.72	1.96
5.2	549	0.99	18.12	0.82	18.67	1.15	1.48	0.16	0.49	0.33	0.16	1.70	13.62	2.75

	Sets	Odontocetes						Mysticetes					Pinnepeds	
		Long-beaked common dolphin	Short-beaked common dolphin	Dall's porpoise	*Norhtern right-whale dolphin*	Pacific white-sided dolphin	Risso's dolphin	*Fin whale*	Gray whale	Humpback whale	*Minke whale*	*Sperm whale*	California sea lion	Northern elephant seal
5.3	599	1.08	19.77	0.90	20.37	1.26	1.62	0.18	0.54	0.36	0.18	1.86	14.86	3.00
5.4	229	0.41	7.56	0.34	7.79	0.48	0.62	0.07	0.21	0.14	0.07	0.71	5.68	1.15
5.5	504	0.91	16.63	0.76	17.14	1.06	1.36	0.15	0.45	0.30	0.15	1.56	12.50	2.52
5.6	574	1.03	18.94	0.86	19.52	1.21	1.55	0.17	0.52	0.34	0.17	1.78	14.24	2.87
5.7	192	0.35	6.34	0.29	6.53	0.40	0.52	0.06	0.17	0.12	0.06	0.60	4.76	0.96
5.8	381	0.69	12.57	0.57	12.95	0.80	1.03	0.11	0.34	0.23	0.11	1.18	9.45	1.91
5.9	476	0.86	15.71	0.71	16.18	1.00	1.29	0.14	0.43	0.29	0.14	1.48	11.80	2.38
min	192	0.35	6.34	0.29	6.53	0.40	0.52	0.06	0.17	0.12	0.06	0.60	4.76	0.96
max	599	1.08	19.77	0.90	20.37	1.26	1.62	0.18	0.54	0.36	0.18	1.86	14.86	3.00
Alternative 6	119	0.21	3.93	0.18	4.05	0.25	0.32	0.04	0.11	0.07	0.04	0.37	2.95	0.60
Alternative 7	506	0.91	16.70	0.76	17.20	1.06	1.37	0.15	0.46	0.30	0.15	1.57	12.55	2.53

Table 4.9. Projected marine mammal mortalities under baseline (SQ) and turtle mortality cap alternatives.

			Levels of DGN EFP fishing (by sets) and takes													2005 Draft SAR PBR	ZRMG
Species		**CPUE**	**SQ =1463**	**cap of 1**	**CI (sets)**		**cap of 2**	**CI (sets)**		**cap of 3**	**CI (sets)**		**cap of 4**	**CI (sets)**			
risso's dolphin	9	0.003	**3.9**	**4.2**	3.9	5.0	**4.6**	4.0	5.6	**5.0**	4.2	6.0	**5.3**	4.4	6.7	**115**	11.5
Pac white dol	7	0.002	**3.0**	**3.3**	3.0	3.9	**3.6**	3.1	4.4	**3.9**	3.3	4.7	**4.2**	3.4	5.2	**382**	38.2
N elephant seal	17	0.005	**7.3**	**8.0**	7.4	9.5	**8.7**	7.6	10.6	**9.4**	7.9	11.4	**10.1**	8.3	12.7	**2,513**	251.3
minke	1	0.000	**0.4**	**0.5**	0.4	0.6	**0.5**	0.4	0.6	**0.6**	0.5	0.7	**0.6**	0.5	0.7	**5.8**	0.58
humpback	*2*	*0.001*	**0.9**	**0.9**	0.9	1.1	**1.0**	0.9	1.2	**1.1**	0.9	1.3	**1.2**	1.0	1.5	***2.3***	0.23
gray whale	3	0.001	**1.3**	**1.4**	1.3	1.7	**1.5**	1.3	1.9	**1.7**	1.4	2.0	**1.8**	1.5	2.2	**442**	44.2
fin whale	*1*	*0.000*	***0.4***	***0.5***	*0.4*	*0.6*	***0.5***	*0.4*	*0.6*	***0.6***	*0.5*	*0.7*	***0.6***	*0.5*	*0.7*	***15***	*1.5*
common dol, sb	112	0.033	**48.3**	**52.9**	48.6	62.6	**57.4**	50.0	69.8	**61.9**	52.1	75.1	**66.5**	54.6	83.4	**3,656**	365.6
common dol, lb	6	0.002	**2.6**	**2.8**	2.6	3.4	**3.1**	2.7	3.7	**3.3**	2.8	4.0	**3.6**	2.9	4.5	**242**	24.2
CA sea lions	84	0.025	**36.3**	**39.6**	36.5	47.0	**43.1**	37.5	52.4	**46.5**	39.1	56.3	**49.9**	40.9	62.6	**8,333**	833.3
sf pilot whale	1	0.000	**0.4**	**0.5**	0.4	0.6	**0.5**	0.4	0.6	**0.6**	0.5	0.7	**0.6**	0.5	0.7	**1.2**	0.12
							Sorting by area										
North of Pt Conception			**SQ=102**	**cap of 1**	**CI**		**cap of 2**	**CI**		**cap of 3**	**CI**		**cap of 4**	**CI**			
Number of sets, added to SQ			**102**	**137**	**9**	**432**	**275**	**50**	**651**	**412**	**113**	**810**	**550**	**189**	**1062**		
Sperm whale	*2*	*0.003*	***0.3***	***0.7***	*0.3*	*1.7*	***1.2***	*0.5*	*2.3*	***1.6***	*0.7*	*2.8*	***2.0***	*0.9*	*3.7*	***1.8***	0.18
Dall's	1	0.002	***0.2***	***0.4***	*0.2*	*0.8*	***0.6***	*0.2*	*1.2*	***0.8***	*0.3*	*1.4*	***1.0***	*0.4*	*1.8*	**729**	72.9
N. RW dol	22	0.034	**3.5**	**8.1**	3.8	18.2	**12.8**	5.2	25.6	**17.5**	7.3	31.0	**22.2**	9.9	40.6	**164**	16.4
south of Pt Conception			**SQ=1361**														
N. RW dol	5	0.002	**2.5**														
Total for N RW dolphin			**SQ**	**cap of 1**		**CI**	**cap of 2**		**CI**	**cap of 3**		**CI**	**cap of 4**		**CI**		
				137	9	432	**275**	50	651	**412**	113	810	**550**	189	1062		
total N RW dol			**5.9**	**10.6**	6.3	20.6	**15.3**	7.6	25.6	**17.5**	7.3	31.0	**22.2**	9.9	40.6	**164**	16.4

Table 4.10. Effect of incidental takes on female leatherback sea turtle mortality.

Incidental Takes	Mortalities	2 to 1 sex ratio	Female Mortality	1 to 1 sex ratio	Female mortality
4	2.8	1.848	2	1.4	2
3	2.1	1.386	2	1.05	2
2	1.4	0.924	1	0.7	1
1	0.7	0.462	1	0.35	1

Table 4.11. Anticipated leatherback takes by area, with set limits.

		CPUE (95% CI)	Baseline # Sets and Leatherback Takes	Additional Sets and Leatherback Takes		
				300	500	600
N. of Pt Conception	21	0.0077 (0.0045-0.0108)	102 0.8	2.31 (1.35, 3.24)	3.85 (2.25, 5.40)	4.62 (2.7, 6.48)
S. of Pt Conception	2	0.0005 (0–1.4)	1,361 0.7			
Total leatherbacks			2.0	5 (4,6)	6 (5,8)	7(5,9)

Table 4.12. Effect of set limits on female leatherback sea turtle mortality.

Leatherback Takes	Mortalities	Females (2:1)	Rounded	Females (1:1)	Rounded
4	2.8	1.848	2	1.4	1
5	3.5	2.31	3	1.75	2
6	4.2	2.772	3	2.1	3
7	4.9	3.234	4	2.45	3
8	5.6	3.696	4	2.8	3
9	6.3	4.158	5	3.15	4

Table 4.13. Observed sea turtle takes and anticipated take under status quo

N. of Conception	Number taken	Rate of take	Anticipated take by region
Leatherbacks	21	0.0077	*0.8*
Loggerheads	0	0	*0.0*
Olive Ridley	0	0	0
Hawksbill	0	0	0
S. of Conception			
Leatherbacks	2	0.0005	0.7
Loggerheads[a]	15	0.0035	4.7
Olive Ridley	1	0.0002	0.3
Hawksbill			
Greens[b]	1	0.0001	0.2

[a] Loggerheads have only been observed taken during El Niños. NMFS regulation can shut down the DGN fishery when takes are likely

[b] Only one green turtle has been observed taken, east of current closure. Greens are more often found in waters warmer than those of the US west coast, in waters of 18 degrees Celsius or above. The one take occurred just north of Pt Conception, at 34 31.7, it may not be accurate to assume that there is a difference in take rates north and south of Pt. Conception based on one take occurring so close to the oceanographic break in temperatures.

Table 4.14. Summary of the effects of the alternatives on protected species and seabirds.

	Increase likelihood of exceeding marine mammal PBR?	Increase likelihood of significantly affecting leatherbacks?	Increase likelihood of increased take of sea birds?
No Action	No	No	Yes
Alt 1 with a 300 set limit or turtle take cap of ≤3	No	No	No
Alt 1 with a ≥300 set limit or turtle take cap ≥4	Yes	Yes	No
Alt 2 with a 300 set limit or turtle take cap of ≤3	No	No	No
Alt 2 with a ≥300 set limit or turtle take cap ≥4	Yes	Yes	No
Alt 3 with a 300 set limit or turtle take cap of ≤3	No	No	No
Alt 3 with a ≥300 set limit or turtle take cap ≥4	Yes	Yes	No
Alt 4	Possibly	Possibly	Possibly
Alt 5	Possibly	Possibly	Possibly
Alt 6	Possibly	Probably	Possibly
Alt 7	Yes	Yes	Possibly

4.4 Seabirds

4.4.1 Evaluation Criteria

In evaluating the impacts of the alternatives on seabirds the following criterion is used:

- Would the alternative likely result in increased levels of take of seabirds?

4.4.2 Direct and Indirect Effects

Take of seabirds is extremely rare in the DGN fishery. Only northern fulmars and cassin's auklets have been identified on observed trips. Some of the smaller alcids that dive to depths where DGN may be set are quite small (7 to 9 inches) and therefore unlikely to be entangled in the 14 inch or greater mesh size of the DGN fishery. Northern fulmars have been encountered in this fishery, however very rarely.

In 7,208 observed sets in the DGN fishery, 31 northern fulmars have been observed taken, 20 south of Pt. Conception and 11 north of Pt. Conception. The take rate per unit effort is almost identical in these areas, with a combined CPUE of 0.0043 for northern fulmars (see Table 4.15). Most of the observed takes of northern fulmars occurred in October and November and generally close to shore (between 117° W degrees and 121° W longitude). Also, most of the takes occurred in the open area between Pt. Conception and Pt. Sur. Fishing under the No Action Alternative, with possible concentration in this open area may have more of an adverse affect on northern fulmars than the action alternatives, which may cause some effort to shift out of the currently opened area. Only one cassin's auklet was observed taken. It was taken by a DGN vessel fishing south of Pt. Conception.

Based uon the areas in which these birds were taken, outside the current time/area closure area, it is not likely that the increase in effort in the currently closed areas will have an effect of sea birds.

The target species of the DGN fishery are not prey species of cassin's auklets or northern fulmars.

4.4.4 Summary Evaluation

None of the alternatives is expected to result in an increase in take of cassins auklets or northern fulmars. If fishing effort declines in the current DGN open area, then impacts to northern fulmars may decline compared to No Action. No seabirds were observed taken in the area covered by the alternatives; therefore, no adverse effects are anticipated.

Table 4.15. Sea bird takes in status quo DGN fishery.

Sea Birds	Number Taken	Rate of Take	Anticipated Takes
Cassin's auklet	1	0.0002	0.3
Northern fulmar[a]	31	0.0043	6.3

[a] Multiple northern fulmars were observed taken on eight DGN hauls.

4.5 Drift Gillnet Fleet

4.5.1 Introduction

NEPA regulations define the human environment "to include the natural and physical environment and the relationship of people with that environment." (40 CFR 1508.14). In the case of the DGN fishery, the seasonal closure which went into effect in 2001 appears to have had a significant direct effect on the economic performance of the DGN fishery.

In examining the socioeconomic effects of DGN alternatives, benefits, costs and economic impacts are evaluated by comparing the estimated impact under each EFP alternative to the level under the baseline or no action alternative. Where sufficient economic data exist—primarily for the harvesting sectors of the DGN fishery—quantitative analysis of the socioeconomic impacts of EFP alternatives is provided. Otherwise—particularly with regard to indirect effects, and non-consumptive and non-use values associated with EFP alternatives—socioeconomic evaluations of management alternatives are primarily theory-informed, qualitative descriptions (Herrick, *et al.* 2003).

Benefit-cost analysis (the focus of Regulatory Impact Review) concerns the change in net benefits resulting from the various EFP alternatives that would be realized by society as a whole, known as welfare effects. Benefits are measured by willingness to pay and costs are opportunity costs or the value of the next best alternative. These are primarily quantified here through measures of economic producer surplus (anticipated economic benefits to society of increased effort under the EFP alternatives).

Net economic benefits primarily consist of economic producer surplus, which on an individual commercial fishing vessel basis is the difference between gross exvessel revenues and all fishing costs, including labor costs for captain and crew and a return to the vessel owner. The net economic benefit also includes consumer surplus, which is the net value of finfish products to the consumer. The net benefit to the consumer is the difference between what the consumer actually pays and what they are willing to pay, i.e., the value to the consumer over and above the actual purchase price (the total consumer willingness to pay less the amount actually paid). Producer surplus can increase through decreases in unit harvesting costs (improved economic efficiency), or an increase in exvessel prices received. Consumer surplus can increase through a decrease in prices paid, increases in the quantities consumed, or improvements in product quality. If the inputs used to harvest fish and the resulting landings are traded in competitive markets, then theoretically, consumer and producer surplus can be measured or approximated by market demand and supply curves.

Financial impacts (the subject of Regulatory Flexibility Analysis) relate to the potential consequences of the action alternatives on the financial well being of small entities. This concerns changes in profitability, i.e., changes in firms' cost and earnings. For small organizations (not-for-profit enterprises), concern is with the potential impact of the action alternatives on their economic viability. In the case of small government jurisdictions, the impacts deal with how the action alternatives would affect the income and expenditures of public authorities.

Given that the area affected by the proposed action has been closed to fishing during the period from August 15 through November 15 since the 2001–02 fishing season, there is no recent economic data from the affected area on which to base an economic analysis. However, a cost-and-earnings survey of the DGN fleet and subsequent analysis were conducted by NMFS in March 2003 to measure the producer surplus and private profits for West Coast HMS fishing fleets (Herrick, *et al.* 2003). An updated version of this analysis was used herein to estimate changes in economic producer surplus and private producer surplus under the various EFP alternatives. Where empirical data are lacking—most notably for the measurement of indirect impacts and nonmarket value—the impacts of the various EFP alternatives are described by appealing to economic theory.

4.5.1 Evaluation Criteria

The evaluation criteria employed to assess economic consequences of the action alternatives, including the proposed EFP and regulatory changes, to the human environment have both a quantitative component and some qualitative components. The former involves the use of an estimate of potential effort under each of the alternatives to produce a corresponding estimate of producer surplus, based on a similar approach to previous analysis of the 2003 West Coast DGN survey data (Herrick, *et al.* 2003; Squires, *et al.* 2003). The latter involves a number of considerations which are addressed below in this section.

The first qualitative component addresses the random nature of the constraint on the level of DGN fishing effort due to compliance requirements under the ESA, the MMPA, and other applicable Federal law, intended to protect rare and endangered species. Most of the alternatives include an explicit cap on leatherback turtle take. However, protected species take risk creates an implicit loss of long-term value to the fishery at higher levels of effort, which could result under less restrictive alternatives. Hence alternatives that superficially may appear to offer the prospect for higher economic gains due to less restriction on potential effort may inadvertently reduce the long-term value of fishing opportunities, if the resulting level of protected species take triggers a policy response similar to the turtle conservation closure.

A second qualitative concern regards the choice between a leatherback sea turtle mortality cap, a set limit, or a combination of the two, where the mortality cap and set limit are the same in all three suboptions under comparison. The principle of targeting[19] favors the use of mortality caps over the other two possible forms of suboption under a given set limit and turtle cap combination.

Although not included as part of this analysis, an objective optimality criterion could, in principle, be developed to rank EFP alternatives. The basic idea is that as constraints on effort are relaxed, there is a commensurate increase in short-term potential fishing opportunities, which are offset by increased protected species take risk. In principle, there is a management strategy that provides the maximum possible level of current effort while controlling the risk of an unacceptably high level of protected species take and subsequent large reduction in permissible future effort.

If the Council chooses a preferred alternative under which the EFP fishery is constrained by a leatherback mortality cap, then the number of suboptions under each of Alternatives 1 through 5 can be pared from nine down to three. Further, given that the remaining three are concurrently increasing in permissible DGN sets and leatherback take risk, the tradeoff under each alternative can be more narrowly focused on the question of choosing the highest take/mortality cap which satisfies the legal mandate of leatherback protection, because it is clear that potential economic opportunity increases with the level of the leatherback take/mortality cap.

4.5.2 Direct and Indirect Effects

Direct economic effects of changes in economic production are normally measured by the change in producer surplus, an economic concept intended to measure the net benefit of changes in production, which is calculated as the difference between the anticipated increase in revenues less the anticipated

[19] The principle of targeting is an idea in economics which states that market failures (such as an unacceptably high level of leatherback take) should be targeted as directly as possible.

increase in costs due to a change in the level of production effort. In the case of the DGN fishery, two measures of producer surplus were taken into consideration: economic producer surplus and financial producer surplus. Financial producer surplus is the estimated increase in producer revenues less the estimated increase in pecuniary costs under each alternative. Economic producer surplus adjusts the financial producer surplus downwards to reflect the opportunity cost of alternative potential sources of income. For instance, if a DGN fisherman expects to earn a net profit of $15,000 in DGN fishing but could earn $20,000 in alternative employment over the same period, his financial producer surplus would be $15,000 while his economic producer surplus would be -$5,000 (a $5,000 loss).

The 2003 survey results were used (Herrick, *et al.* 2003; Squires, *et al.* 2003) to estimate economic and financial producer surplus. These estimates were used to conduct hypothesis tests for whether either the economic or financial producer surplus was greater than zero based on the t-statistic. With a small sample size of 18 surveys, and the estimated mean and standard deviation for each of economic and financial producer surplus, the null hypothesis that the expected producer surplus differs by a significant amount from zero cannot be rejected at conventional statistical significance levels. The results of the hypothesis tests are summarized below:

	Economic PS	Financial PS
Mean	-5,730.34	13,842.59
Standard Deviation	18,371.77	19,540.08
Sample Size	18	18
t-statistic	0.3119	0.7084
Degrees of Freedom	17	17
P-value for two-tailed t-test	0.7589	0.4883

On the basis of the above hypothesis tests, we can conclude that the economic impact of an increase in DGN effort is likely to differ little from zero. However, in order to get some indication of the potential magnitude of financial impact under the various alternatives, the mean estimate of financial producer surplus was rescaled into an estimate of financial producer surplus per set. The producer surplus per set was then scaled by projected effort to obtain an indication of potential financial producer surplus under each alternative.[20]

The results of the analysis of direct effects of the various EFP alternatives on financial producer surplus are presented in Table 4.16. The producer surplus estimates scale with anticipated changes in EFP effort under each alternative. The magnitude of producer surplus measures across the sub-alternatives under each EFP alternative are generally increasing as the turtle take cap or effort limit increases. Alternatives that open larger areas to resumption of DGN fishing during the closed season are generally projected to result in larger magnitude changes in producer surplus.

Generally the options with combined take/mortality cap / set limits provide less expected financial producer surplus, because two constraints on effort are expected to be more restrictive than one. Expected effort for the take/mortality caps under consideration is expected to be slightly lower than that for the comparable effort limit, although the expectation may be slightly misleading, because in years when few or no leatherback takes occur, an effort limit could still constrain fishing while a take/mortality cap would not. Alternatives which include both EFP effort and a regulatory amendment to reopen a

[20] While not statistically distinguishable from zero, this exercise at least provides some means to compare plausible estimates of the financial profit which would result under the various DGN alternatives under consideration.

portion of the current time/area closure along the southern boundary generally are expected to generate higher financial producer surplus than comparable alternatives without a regulatory amendment.

There are a number of further considerations which should be taken into account when considering the likely economic impact of the EFP:

- The 2003 DGN survey was not narrowly targeted to EFP participants, and hence does not measure the extra value of access to larger swordfish for fishing North of Pt. Conception. Fishing conditions may also be individually better due to a small number of EFP participants than they were with relatively more effort before the current time/area closure policy went into effect. The survey is further representative of the state of the fishery when it was conducted (1999) rather than its present state. The estimated economic producer surplus is based on a small sample of fishermen, and is not statistically different from zero. Hence, while the estimated values for economic producer surplus suggest on the face that the EFP will result in a limited short-term loss of economic producer surplus, we cannot on statistical grounds reject the null hypothesis that the economic producer surplus of the change in effort under the EFP equals zero.

- Participation in the EFP is done on the basis of mutual agreement between the contractor and the fishermen who elect to participate. Standard results in economics suggest that an at-will contract between two consenting parties will generally only be entered if both anticipate an increase in personal well-being. This runs counter to the negative economic producer surplus measure, which indicates that after taking into consideration the opportunity cost of other potential uses of their time, the EFP participants will be made worse off. However, a number of potential offsetting factors are not reflected in the data or the quantitative analysis:

    1. The theory of comparative advantage suggests fishermen with specialized gear and skills cannot replace the value of lost opportunity in the optimum fishing environment with less suitable opportunities of equal value elsewhere. The indirect positive effects of the EFP on the value of specialized skills and gear are not quantified in the analysis, but tip the results in favor of a net gain in economic producer surplus.

    2. The positive indirect effect of revenues and local catch to downstream industries is not covered in the analysis, but is considered below in the discussion of affected fishing communities.

    3. Nonmarket value plays a hidden role in the participation decision, as part of the decision to undertake an occupational endeavor is based on a tradeoff between relative enjoyment of the work and pecuniary remuneration. As pointed out above, fishermen would not willingly enter the EFP if they had a more attractive work opportunity elsewhere, and this is not reflected in the attempt to measure the opportunity cost of alternative employment which results in negative estimated economic producer surplus.

    4. A loss of nonmarket existence value of protected species affected under the EFP alternatives would work against the economic gains under the EFP. However, this effect is ambiguous, due to the unknown and unmeasured indirect impact of changes in EFP effort on the global level of endangered species take. The problem is that when the protected species as well as the target species are migratory, a curtailment of fishing effort in the turtle closure area may lead to an export of consumption demand for the target species to other fisheries, which would otherwise be satisfied by U.S. production. If these other fisheries happen to be less regulated or for other reasons have higher CPUE for the protected species than in the DGN fishery, then it is possible for less effort in the DGN fishery to translate into a larger overall

number of protected species takes on a global level, and hence a loss of nonmarket existence value of protected species with less DGN effort.

5. Aside from the potential for overall leatherback take to increase with a more stringent limit on DGN effort, there is also a loss of nature's bounty to the U.S. economy when swordfish not harvested in U.S. EEZ are instead harvested outside of the U.S. EEZ by foreign fleets. Some of this foreign harvest will be imported into the U.S. to replace the drift gillnet-caught swordfish, but the value of the resource is lost to the U.S. economy. In short, the realized benefits of overly stringent limits on DGN effort, including the nonmarket benefit of leatherback protection and the market value of production, are likely to fall short of the expected benefits, and could even approach zero or negative, to the extent that effort is pushed into foreign waters where sea turtle CPUE is higher than that for the U.S. drift gillnet fleet.

6. Including observer costs of the EFP theoretically should be included as a reduction in economic producer surplus, at an approximate cost of $1,000 per trip. Their effect on economic producer surplus is unpredictable without advance knowledge of whether the 100 percent observer coverage under the EFP would be entirely covered through a transfer of observers who would otherwise cover effort outside the EFP, or by newly entering observers. In the former case, the reallocated observers would not need to be included since an additional decrease in economic producer surplus, while in the latter case they would. In either case, private producer surplus is unaffected, because observer costs would not be born by EFP participants.

The most important indirect effect of the EFP alternatives, which is not explicitly quantified above, is the indirect effect of species protection measures. This indirect effect is realized through the structuring of proposed constraints on effort under the various alternatives intended to satisfy compliance requirements under the ESA and the MMPA. Protected species take is a rare event whose future level is difficult to predict due to the random nature of protected species interactions and unpredictable fluctuations in environmental variables affecting the risk of protected species take. The alternatives generally would either explicitly or implicitly end the season prematurely if a small number of protected species takes occurred. Further, while alternatives which impose less constraint on potential effort seem appealing from a predictability standpoint, these also create the risk that effort would continue after an unacceptably high protected species take level had been exceeded.

4.5.3 Cumulative Effects

Cumulative effects consider events outside of the proposed action. When "external" effects combine with the direct and indirect effects of the action they have a net cumulative effect. Due to the small scale and short-term nature of the EFP, no cumulative effects are anticipated as a direct result of fishing effort under the EFP. Under most of the alternatives offered, the EFP would potentially restore a portion of historical fishing opportunity in a manner which tightly controls leatherback take risk through take/mortality caps. Under the remaining alternatives, any potential for an unacceptably high level of near-term protected species take would be mitigated by the short time horizon of the EFP and by the option to prematurely end it if warranted by protected species take experience. Because the target species are highly migratory and hence also targeted outside the area affected by the EFP, the impact on the price of target species is expected to be negligible. Because of the small scale of fishing activity relative to other industrial uses of the relevant production inputs (e.g., fuel) the price impact on inputs is also expected to be negligible.

However, there are other potential cumulative effects which should be taken into consideration when comparing alternatives. One potential cumulative effect is related to the risk of future lost fishing opportunity due to higher-than-anticipated protected species take experience. Preliminary statistical evidence suggests that the expected level of protected species scales with effort after taking randomness into account, and that there is a non-negligible risk the actual take experience in a particular year will exceed the expected level. Alternatives which appear to offer the most fishing opportunity through the least binding constraints on effort also run the highest risk of leading to a level of protected species take which triggers curtailment of future fishing opportunity comparable to the 2001 seasonal closure of the turtle conservation area.

A second potential cumulative effect could arise under alternatives involving either a regulatory amendment to change the southern boundary of the closed area, or to eliminate the closed area. Because of the quasi-permanent nature of these proposed changes, they pose a risk of cumulative impact which does not pertain to EFP effort, since the EFP would be a temporary measure. Since the observer coverage level for these boundary-change areas would only be 20 percent, observer records of turtle take experience would be less reliable than for the EFP-participant portion of any new effort.

In the most extreme case of Alternative 7, which proposes to reopen the turtle closure area without an EFP, effort could potentially revert to historic levels over time, as fishermen adjust their allocation of investment and effort to exploit a renewed opportunity. This perversely could reduce the long-term value of the fishery if a section 7 consultation or take reduction plan resulted from unacceptably high protected species take levels, leading to reinstitution of a time/area closure. Thus without significant new evidence establishing that the turtle take risk in the time/area closure has fallen significantly since the closure was instituted, a return to the previous management regime creates the risk of trading off a high short-term level of potential effort against the long-term risk of tighter limits on effort.

A third potential cumulative impact relates to the nature of the conclusions drawn from the outcome of the EFP. Since protected species take risk appears to scale with effort, and since the level of take over a given season is subject to random variation, caution must be exercised with respect to drawing inferences from the experience in an EFP with a very limited level of effort that remain valid for predicting protected species take experience at a much higher level of effort.

4.5.4 Summary Evaluation

The evaluation criteria discussed above in Section 4.5.2 may be summarized as:

- The short-term socioeconomic impact to the DGN fleet as imputed by measures of producer surplus.

- The long-term risk that increases in fishing effort in the current closed area would result in a regulatory response, due to protected species concerns, constraining fishery participation more than it is constrained by the current regulatory regime.

The estimated economic surplus under the action alternatives is not significantly different from zero, and would likely be positive if the nonmarket benefit to fishermen of increased fishing opportunity is taken into consideration. As discussed above, economic benefit is assumed to scale positively with the estimated increases in fishing effort that would result under the action alternatives. Therefore, the comparative impacts of the alternatives are similar to those discussed above for other environmental components, albeit beneficial in the case of socioeconomic impacts. For example, the largest estimated increase in financial producer surplus would be realized under Alternative 5.3 at $149,116 while the smallest estimated increase would occur under alternatives 1.7, 2.7, and 3.7.

These benefits range from a low of $24,894 (Alternatives 1.7, 2.7, and 3.7) to $137,664 (Alternative 3.3). Generally, across the various suboptions, Alternative 3 results in the largest estimated increase in financial producer surplus of these three alternatives, because no geographic constraint (Area Restriction Option) is imposed on the EFP fishery.

Under Alternatives 4 and 5 both an EFP fishery component and a regulatory change to the boundary of the closed area, affecting all fishery participants, would be implemented. Out of the overall increase in fishing effort (which varies according to constraints placed on the DGN fishery) an estimated 92 additional sets would occur in the non-EFP fishery due to the boundary change. Thus some benefits would accrue to participants in the non-EFP fishery segment. On a per-vessel basis these benefits could be more modest, if the effort estimated increase is distributed across a greater number of fishery participants in comparison to participants in the EFP.

Alternatives 6 and 7 do not involve an EFP; only regulatory changes to the closed area would occur. The short-term impacts are relatively modest under Alternative 6, which would open the area south of Pt. Arena to the whole DGN fleet. The $29,624 estimated increase in producer surplus is commensurate with the estimated increases seen under the most heavily constrained EFP suboptions (i.e., Alternatives 1.7, 2.7, and 3.7). Alternative 7 would eliminate the closed area and shows a comparatively large estimated increase in financial producer surplus, within the range of possible increases estimates for Alternatives 4 and 5.

These short-term beneficial impacts need to be considered against a long-term risk that impacts to protected species will result in constraints on the fishery similar to or more drastic than current conditions. This risk is much greater under alternatives that propose immediate regulatory changes to the configuration of the closed area. First, as noted above, changing the closed area boundary could stimulate an overall increase in fishery participation. It should be noted that a large proportion of current DGN permits are latent, or unfished. The prospect of access to more fishing area for all fishery participants (permit holders) could result in the use of these latent permits. Also, if the change in the boundary of the fishing area (or its elimination) stimulated increased participation, it is reasonable to assume that a greater proportion of the effort would be deployed in the area that is currently closed, since access is what would motivate participation. A second factor increasing the risk of a regulatory response results from the partial observer coverage in the non-EFP component of the fishery. This results in the greater uncertainty about the actual impact to protected species. On a practical level it means that an observed take must be extrapolated to an estimate of DGN fishery-wide takes. In the face of this uncertainty managers are more likely to respond, for example by reinitiating section 7 consultations, based on observed takes.

Table 4.15. Estimate of the change in producer surplus under the action alternatives.

	Sets Change	Producer Surplus Change
Alternative/Suboption		
Alternative 1		
1.1	300	74,682
1.2	436	108,538
1.3	486	120,985
1.4	137	34,105
1.5	392	97,585
1.6	461	114,762
1.7	100	24,894
1.8	289	71,944
1.9	378	94,100
Alternative 2		
2.1	246	61,239
2.2	346	86,134
2.3	396	98,581
2.4	137	34,105
2.5	302	75,180
2.6	371	92,357
2.7	100	24,894
2.8	241	59,995
2.9	288	71,695
Alternative 3		
3.1	300	74,682
3.2	500	124,471
3.3	553	137,664
3.4	137	34,105
3.5	412	102,564
3.6	528	131,441
3.7	100	24,894
3.8	289	71,944
3.9	384	95,593
Alternative 4		
4.1	382	95,095
4.2	482	119,990
4.3	532	132,437
4.4	229	57,007
4.5	438	109,036
4.6	507	126,213
4.7	192	47,797
4.8	377	93,851
4.9	424	105,551
Alternative 5		
5.1	392	97,585
5.2	549	136,669
5.3	599	149,116

5.4	229	57,007
5.5	504	125,466
5.6	574	142,892
5.7	192	47,797
5.8	381	94,847
5.90	476	118,496
Alternative 6	119	29,624
Alternative 7	506	125,964

4.6 Fishing Communities Involved in the Drift Gillnet Fishery (Including Buyers/Processors)

Socioeconomic impacts of EFP alternatives on affected communities would be realized by: (1) the commercial fishing sector (harvesters, processors and consumers); (2) the recreational fishing sector (charter/party boat operators, charter/party boat patrons and private boat anglers); (3) the non-consumptive use (e.g. recreational divers); (4) non-use sectors (protectionists and preservationists); and, (5) DGN fishing communities.

Economic impacts to fishing communities involved in the DGN Fishery relate to income and employment effects of alternative management actions. Economic impact analyses provide measures of the changes in economic activity by locale, which are not the same as changes in net national benefits. Regional economic models can be used to estimate economic impacts by evaluating the extent to which growth or decline in fishing affects production, trade, and employment throughout the regional economy, as fishers make purchases and as the fish are processed, distributed, and marketed. Revenues from these expenditures filter through local, state, and regional economies. Economic multipliers can be used to calculate change in income and employment resulting from a change in the level or the success of fishing. Details on fisheries contributions to the economic well-being of coastal communities is provided in the Council's draft "Community Descriptions" document. The most important locales for HMS fishing activity, in the context of potential economic impacts associated with the proposed actions are discussed in Chapter 2, Description of the Fisheries, Section 2.4.3, Community Profiles ion the Community Descriptions document.

The proposed impacts on consumers, although grounded in economic theory, are more conjectural and difficult to affirm in the absence of empirical information. The magnitude and direction of changes in consumer surplus will depend more on observable factors, including: (1) changes in quantities of EFP catch available to consumers, recreational fishers, and other users and non-users; (2) to what extent efficiency gains or losses by commercial harvesters are passed on to consumers; (3) how much product quality is affected by management regulations; and (4) whether the final markets for HMS products are foreign or domestic. Given that the species targeted under the EFP are highly migratory and that the level of EFP fishing effort would be a small share of overall effort on the world market, the effect of changes in local effort under the EFP on world supply and consumer prices is likely to be small. The main effect may be more qualitative than quantitative in nature, through increased supply of locally-caught fresh swordfish to restaurants supplied by the DGN catch.

4.6.1 Evaluation Criteria

The evaluation criteria are primarily qualitative in nature, and concern the question of whether any reasonably foreseeable adverse impact would result to any affected communities if the EFP were adopted. The primary communities of concern in this regard are the non-use sectors (protectionists and preservationists) and the recreational fishing and non-consumptive users, because the commercial fishing sector (harvesters, processors and consumers) and the DGN fishing communities are expected to enjoy net benefits with a partial restoration of historic fishing opportunity.

4.6.2 Direct and Indirect Effects

Due to the limited number of permits to be granted under the EFP, the action is anticipated to have a limited effect on the affected fishing communities, outside of the direct impact of restoring opportunity to the EFP participants to resume historic fishing grounds, and increased supply of locally caught fresh swordfish and thresher shark catch to area buyers and processors.

Most thresher shark and swordfish landings in California provide a source of fresh catch to the domestic seafood restaurant businesses. A resumption of fishing activity under the EFP is expected to have a small-scale direct effect on the supply of fresh fish to area processors and restaurants. Because the onshore area in close proximity to the turtle conservation area is a popular tourist destination and seafood consumption is an important component of the tourist experience the supply of fresh fish would support this sector.

Because the target species are highly migratory, they can be caught elsewhere and supplied on the world market. Thus the impact on local availability of these species for consumption purposes is primarily limited to the availability of fresh local supply rather than availability in general, and the impact on the world market price is expected to be negligible.

Some degree of local economic stimulus would result from an increase in DGN effort, not only through the direct effect on the incomes of EFP fishermen, but also through the economic stimulus on downstream processors and consumers of local fresh catch. This stimulus would extend beyond those directly involved in the industry through the multiplier effect; that is, some proportion of each dollar earned by those directly involved in the industry would be spent in other sectors of the local economy.

Protectionists and preservationists are concerned with minimizing environmental impacts, particularly with respect to jeopardizing the continued existence of protected species such as the leatherback turtle and the short-finned pilot whale.

4.6.3 Cumulative Effects

Due to the short-term nature and small scale of the EFP, cumulative effects on affected communities are anticipated to be negligible. The only exception to this would be alternatives which involve a regulatory amendment to change the southern boundary of the closed area. The observer coverage would only be 20 percent, increasing the risk that protectionists and preservationists would object due to possible unobserved increase in protected species take. The permanent nature of the change under a regulatory amendment would constitute a cumulative effect of whatever impacts resulted due to the boundary change effect on DGN effort.

4.6.4 Summary Evaluation

The primary affected communities of concern are the members of the DGN fishing community and members of the non-use sector (protectionists and preservationists). The DGN fishing community members are protected by the at-will nature of EFP fishing opportunity, and the non-use sector members are protected by 100 percent observer coverage and effort limits designed to tightly control the risk of exceeding PBR. The nature of impacts under the action alternatives will be similar to those summarized for the DGN fleet, because socioeconomic benefits to DGN fishermen result in indirect benefits of similar magnitude to fishing communities.

5.0 CONSISTENCY WITH MSA NATIONAL STANDARDS

An FMP or plan amendment and any pursuant regulations must be consistent with ten national standards contained in the MSA (§301). These are:

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

6.0 CROSS-CUTTING MANDATES

6.1 Other Federal Laws

6.1.1 Coastal Zone Management Act

Section 307(c)(1) of the Coastal Zone Management Act (CZMA) of 1972 requires all Federal activities that directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. The Council-preferred Alternative would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California. This determination has been submitted to the responsible state agencies for review under Section 307(c)(1) of the CZMA. The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the Groundfish FMP. The CPS FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs. The recommended action is consistent and within the scope of the actions contemplated under the framework FMP.

Under the CZMA, each state develops its own coastal zone management program which is then submitted for Federal approval. This has resulted in programs which vary widely from one state to the next. The proposed action is not expected to affect any state's coastal management program.

6.1.2 Endangered Species Act

NMFS is required under section 7(a)(2) of the ESA to insure that any action it carries out is not likely to jeopardize the continued existence of any endangered or threatened marine species or adversely modify designated critical habitat. To fulfill this obligation, NMFS will conduct a section 7 consultation to determine if the DGN fishery will jeopardize the continued existence of endangered or threatened species. Because NMFS will implement the proposed action and must protect protected marine species, it functions as both the action agency and the consulting agency during the section 7 consultation. However, different divisions within the agency fulfill these roles. Additionally, USFWS is responsible for, and was consulted regarding, potential impacts to seabirds.

In 2000, NMFS conducted a section 7 consultation and wrote a biological opinion on the issuance of an MMPA 101(a)(5)(e) permit for the DGN fishery (without the current time and area closure). Based upon the best available information at that time and anticipated level of effort, it was NMFS' opinion that continued operation of the DGN fishery would jeopardize the continued existence and recovery of leatherback sea turtles, an endangered species. As part of the jeopardy opinion, NMFS provided a reasonable and prudent alternative (RPA) designed to minimize impacts on leatherbacks and avoid jeopardy. The RPA was implemented via a closure of the DGN fishery from August 15 to November 15 annually. The area of the closure was a diagonal line from Pt. Sur to a point due west of Pt. Conception, out to 129 degrees west longitude and north to 45 degrees north latitude.

In 2001 and again in 2004 (for the final rule implementing the HMS FMP), NMFS conducted a section 7 consultation on the DGN fishery. In both of those consultations, NMFS found that the take of three leatherbacks in the DGN fishery (of which two were expected to be mortalities) would not jeopardize the continued existence of leatherbacks. It is important to note that any finding based on this EA is not the same as a no jeopardy finding from a section 7 consultation. Therefore, the analyses and conclusions reached in this EA do not preclude the need for a formal section 7 consultation

6.1.3 Marine Mammal Protection Act

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under the MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals; while the USFWS Service is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Steller sea lion (*Eumetopias jubatus*) eastern stock, Guadalupe fur seal (*Arctocephalus townsendi*), and Southern sea otter (*Enhydra lutris*) California stock are listed as threatened under the ESA. The sperm whale (*Physeter macrocephalus*) Washington, Oregon, and California stock, humpback whale (*Megaptera novaeangliae*) Washington, Oregon, and California - Mexico Stock, blue whale (*Balaenoptera musculus*) eastern north Pacific stock, and Fin whale (*Balaenoptera physalus*) Washington, Oregon, and California stock are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

The DGN fishery is categorized as Category I under the MMPA, meaning frequent incidental mortality and serious injury of marine mammals occurs in this fishery.

6.1.4 Migratory Bird Treaty Act

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished the populations of many native bird species. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers) and is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. The MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur. NOAA General Council has made a determination that the MBTA is applicable in state waters but not Federal waters. Because the DGN fishery occurs in Federal waters it would not be subject to the MBTA. Section 4.4 of this EA evaluates the effect of the alternatives on sea birds.

6.1.5 Paperwork Reduction Act

The proposed action does not require collection-of-information subject to the Paperwork Reduction Act.

6.1.6 Regulatory Flexibility Act

The purpose of the Regulatory Flexibility Act (RFA) is to relieve small businesses, small organizations, and small governmental entities of burdensome regulations and record-keeping requirements. Major goals of the RFA are; (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group distinct from other entities and the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. An initial regulatory flexibility analysis (IRFA) is conducted unless it is determined that an action will not have a "significant economic impact on a substantial number of small entities." The RFA requires that an IRFA include elements that are similar to those required by Executive Order (EO) 12866 and NEPA. Therefore, the IRFA has been combined with the RIR and NEPA analyses.
Section 6.3 (below) summarizes the analytical conclusions specific to the RFA and EO 12866.

6.2 Executive Orders

6.2.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.
The RIR and IRFA determinations are part of the combined summary analysis in Section 6.3 of this document.

6.2.2 EO 12898 (Environmental Justice)

EO 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance, NAO 216-6, at §7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation—especially by affected communities—during scoping, as part of a broader strategy to address environmental justice issues.

The environmental justice analysis must first identify minority and low-income groups that live in the project area and may be affected by the action. Typically, census data are used to document the occurrence and distribution of these groups. Agencies should be cognizant of distinct cultural, social, economic, or occupational factors that could amplify the adverse effects of the proposed action. (For example, if a particular kind of fish is an important dietary component, fishery management actions affecting the availability, or price of that fish, could have a disproportionate effect.) In the case of Indian tribes, pertinent treaty or other special rights should be considered. Once communities have been identified and characterized, and potential adverse impacts of the alternatives are identified, the analysis must determine whether these impacts are disproportionate. Because of the context in which environmental justice is developed, health effects are usually considered, and three factors may be used in an evaluation: whether the effects are deemed significant, as the term is employed by NEPA; whether the rate or risk of exposure to the effect appreciably exceeds the rate for the general population or some other comparison group; and whether the group in question may be affected by cumulative or multiple sources of exposure. If disproportionately high adverse effects are identified, mitigation measures should be proposed. Community input into appropriate mitigation is encouraged.

Section 3.6 describes the demographic characteristics of the communities affected by the proposed action. This information can be used, to identify potential "communities of concern" because their populations have a lower income or a higher proportion of minorities than comparable communities in their region.

It should be noted that fishery participants make up a small proportion of the total population in these communities, and their demographic characteristics may be different from the community as a whole. However, information specific to fishery participants is not available. Furthermore, different segments of the fishery-involved population may differ demographically. For example, workers in fish processing plants may be more often from a minority population while deckhands may be more frequently low income in comparison to vessel owners.

Participation in decisions about the proposed action by communities that could experience disproportionately high and adverse impacts is another important principle of the EO. The Council offers a range of opportunities for participation by those affected by its actions and disseminates information to affected communities about its proposals and their effects through several channels. In addition to Council membership, which includes representatives from the fishing industries affected by Council action, the HMSAS, a Council advisory body, draws membership from fishing communities affected by the proposed action. While no special provisions are made for membership to include representatives from low income and minority populations, concerns about disproportionate effects to minority and low income populations could be voiced through this body or to the Council directly. Although Council meetings are not held in isolated coastal communities for logistical reasons, they are held in different places up and down the West Coast to increase accessibility.

The Council disseminates information about issues and actions through several media. Although not specifically targeted at low income and minority populations, these materials are intended for consumption by affected populations. Materials include a newsletter, describing business conducted at Council meetings, notices for meetings of all Council bodies, and fact sheets intended for the general reader. The Council maintains a postal and electronic mailing list to disseminate this information. The Council also maintains a website (www.pcouncil.org) providing information about the Council, its meetings, and decisions taken. Most of the documents produced by the Council, including NEPA documents, can be downloaded from the website.

6.2.3 EO 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight fundamental federalism principles. The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such federalism implications is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a federalism summary impact statement.

The Council process offers many opportunities for states (through their agencies, Council appointees, consultations, and meetings) to participate in the formulation of management measures. This process encourages states to institute complementary measures to manage fisheries under their jurisdiction that may affect federally-managed stocks.

The proposed action does not have federalism implications subject to EO 13132.

6.2.4 EO 13175 (Consultation and Coordination With Indian Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. At Section 302(b)(5), the Magnuson-Stevens Act reserves a seat on the Council for a representative of an Indian tribe with federally-recognized fishing rights from California, Oregon, Washington, or Idaho.

The U.S. government formally recognizes the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) have treaty rights to marine fish. In general terms, the quantification of those rights is 50 percent of the harvestable surplus of groundfish available in the tribes' Usual and accustomed fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer their fisheries and to establish their own policies to achieve program objectives.

There is no tribal involvement in the DGN fishery.

6.2.5 EO 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds)

EO 13186 supplements the MBTA (above) by requiring Federal agencies to work with the USFWS to develop memoranda of agreement to conserve migratory birds. NMFS is in the process of implementing a memorandum of understanding. The protocols developed by this consultation will guide agency regulatory actions and policy decisions in order to address this conservation goal. The EO also directs agencies to evaluate the effects of their actions on migratory birds in environmental documents prepared pursuant to the NEPA.

Section 4.4 in this EA evaluates impacts to seabirds.

6.3 Regulatory Impact Review and Regulatory Flexibility Analysis

In order to comply with EO 12866 and the RFA, this document also serves as an RIR and an IRFA. A summary of these analyses is presented below.

6.3.1 EO 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, was signed on September 30, 1993, and established guidelines for promulgating new regulations and reviewing existing regulations. The EO covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. Section 1 of the EO deals with the regulatory philosophy and principles that are to guide agency development of regulations. It stresses that in deciding whether and how to regulate, agencies should assess all of the costs and benefits across all regulatory alternatives. Based on this analysis, NMFS should choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach.

The regulatory principles in EO 12866 emphasize careful identification of the problem to be addressed. The agency is to identify and assess alternatives to direct regulation, including economic incentives such as user fees or marketable permits, to encourage the desired behavior. Each agency is to assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after reasoned determination the benefits of the intended regulation justify the costs. In reaching its decision agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation.

NMFS requires the preparation of an RIR for all regulatory actions of public interest; implementation of rebuilding plans includes the publication of strategic rebuilding parameters in Federal regulations. The RIR provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems. The purpose of the analysis is to ensure the regulatory agency systematically and comprehensively considers all available alternatives, so the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of EO 12866.

The RIR analysis and an environmental analyses required by NEPA have many common elements and they have been combined in this document. The following table shows where the elements of an RIR, as required by EO 12866, are located.

Required RIR Elements	Corresponding Sections
Description of management objectives	Sections 1.2 & 1.3
Description of the fishery[a/]	Section 3.1
Statement of the problem	Section 1.3
Description of each alternative considered in the analysis	Chapter 2
An analysis of the expected economic effects of each alternative	Sections 4.5–4.6
a/ In addition to the information in this document, basic economic information is provided annually in the HMS Stock Assessment and Fishery Evaluation document.	

The RIR is designed to determine whether the proposed action could be considered a significant regulatory action according to EO 12866. The EO 12866 test requirements are used to assess whether or not an action would be a “significant regulatory action” and the expected outcomes of the proposed management alternative are discussed below. A regulatory program is “economically significant” if it is likely to result in the following effects:

1.a. Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or state, local, or tribal governments or communities.

No.

1.b. Present a risk to long-term productivity.

No.

2. Create a serious inconsistency or otherwise interfere with action taken or planned by another agency.

No.

3. Materially alter the budgetary impact of entitlement, grants, user fees, or loan programs or the rights and obligations of recipients thereof.

No.

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this EO.

No.

None of the proposed changes to the management measures for the DGN fishery would be a significant action according to Executive Order (E.O.) 12866. This action will not have a cumulative effect on the economy of $100 million or more, nor will it result in a major increase in costs to consumers, industries, governmental agencies, or geographical regions. No significant adverse impacts are anticipated on competition, employment, investments, productivity, innovation, or competitiveness of U.S.-based enterprises.

The key elements of an RIR have been thoroughly addressed in the EA above. It appears the proposed action would not have any significant adverse economic effects on consumers and producers of HMS finfish.

6.3.2 Impacts on Small Entities (Regulatory Flexibility Act, RFA)

The RFA requires government agencies to assess the effects that various regulatory alternatives would have on small entities, including small businesses, and to determine ways to minimize those effects. A fish-harvesting business is considered a "small" business by the Small Business Administration (SBA) if it has annual receipts not in excess of $3.5 million. For related fish-processing businesses, a small business is one that employs 500 or fewer persons. For marinas and charter/party boats, a small business is one with annual receipts not in excess of $5.0 million. DGN vessels are expected to be the only types of small entities directly impacted by the proposed action.

The small entities that would be affected by the proposed action are the vessels that compose the West Coast DGN fleet. The financial impacts analysis focuses on the exvessel revenue effects of each alternative on DGN vessels. Because cost data are lacking for the harvesting operations of DGN vessels, it was not possible to evaluate the financial impacts from estimated changes in sardine landings, under each allocation alternative, in terms of vessel profitability. Instead, financial impacts were evaluated based only on changes in exvessel revenues relative to the No Action.

Summary of the Economic Effects of the Alternatives on the DGN Fleet

The estimates of direct economic effects of the alternatives on the DGN fleet are quantified in the table of estimated changes in producer surplus presented in section 4.5.2. The relevant measure of direct economic effects on the DGN fleet for RFA reporting purposes is provided by the values given in the right column, entitled financial producer surplus, which is an estimate of the potential increase in private profits aggregated across DGN fishermen who contribute to the increase in fishing effort under the proposed alternatives.

The estimated increase in private DGN fishermen profits ranges from a minimum value of $24,894 for Alternatives 1.7, 2.7, and 3.7, which cap turtle take at one with no boundary change to the southern boundary, to a maximum of $149,116 for Alternative 5.3, which has only a set limit of 600 sets on EFP effort, and a Regulatory Amendment to change the southern boundary to allow a larger open area. The producer surplus estimates scale with anticipated changes in EFP effort under each alternative. The magnitude of producer surplus measures across the sub-alternatives under each EFP alternative are generally increasing as the turtle take cap or effort limit increases. Alternatives which open larger areas to resumption of DGN fishing during the closed season are generally projected to result in larger magnitude changes in producer surplus.

Location of IRFA Elements in this EA

Section 603 (b) of the RFA identifies the elements that should be included in the IRFA. These are bulleted below, followed by information that addresses each element.

- A description of the reasons why action by the agency is being considered.

The purpose and need for the proposed action are discussed in Sections 1.2 and 1.3.

- A succinct statement of the objectives of, and legal basis for, the proposed rule.

The description of need in Section 1.3 also outlines the objectives of the proposed action the legal basis for the proposed action. Alternatives 4–7 would require Federal rulemaking and therefore the publication of a proposed rule.

- A description and, where feasible, an estimate of the number of small entities to which the proposed rule will apply.

Section 3.5 and Section 3.6 describe the fishing sectors, processors, and communities.

- A description of the projected reporting, record-keeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirements of the report or record.

There are no new reporting or record-keeping requirements that are proposed as part of this action.

- An identification, to the extent practicable, of all relevant Federal rules, which may duplicate, overlap, or conflict with the proposed rule.

No Federal rules have been identified that duplicate, overlap, or conflict with the alternatives. Public comment is hereby solicited, identifying such rules.

- A description of any significant alternatives to the proposed rule that accomplish the stated objectives that would minimize any significant economic impact of the proposed rule on small entities.

This EA includes a range of alternatives and their socioeconomic impacts, which were considered by the Council.

7.0 LIST OF PREPARERS

Name and Affiliation	Responsibility
Ms. Michele Culver, Policy Coordinator, Washington Department of Fish and Wildlife	Contributing author, Chapters 1 and 2
Dr. Kit Dahl, Staff Officer – Highly Migratory Species, Pacific Fishery Management Council	Project management, principal author Chapters 1 and 2
Ms. Monica DeAngelis, NMFS SWR, Protected Resources Division	Contributing author, protected species affected environment, Sections 3.3–3.4
Ms. Christina Fahy, NMFS SWR, Protected Resources Division	Principal author, protected species affected environment, Sections 3.3–3.4
Mr. Craig Heberer, , Fishery Biologist, NMFS SWR	Finfish species impacts, principal author, Sections 3.1–3.2 and 4.1–4.2
Ms. Elizabeth Petras, Liaison Officer, NMFS SWR Office of Protected Resources	Protected species impact analysis, Sections 4.3–4.4
Dr. Stephen Stohs, NMFS Southwest Fisheries Science Center	Socioeconomic environment and impacts, principal author, Sections 3.5–3.6 and 4.5–4.6
Mr. Stephen Wertz, Associate Marine Biologist, California Department of Fish and Game	Analysis of historical fishing effort, effort projection modeling, California regulatory issues

8.0 LITERATURE CITED

Aguirre, A. A., T. R. Spraker, A. Chaves, L. D. Toit, W. Eure, and G. H. Balazs. 1999. Pathology of fibropapillomatosis in olive ridley sea turtles, *Lepidochelys olivacea*, nesting in Costa Rica. Journal of Aquatic Animal Health 11:283-289.

Alvarado-Diaz, J. and C. D. Trejo. 2003. Reproductive biology and current status of the black turtle in Michoacan, Mexico. Pages 69 *in* Proceedings of the 22nd Annual Symposium on Sea Turtle Biology and Conservation, Miami, April 4-7, 2002.

Angliss, R. P. and R. Outlaw. 2005. Draft Alaska marine mammal stock assessments, 2005. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-144.

Arauz, R. 2002. Sea turtle nesting activity and conservation of leatherback sea turtles in Playa El Mogote, Río Escalante Chacocente Wildlife Refuge, Nicaragua, September 2002.

Arenas, P., L. Sarti, and P. Ulloa. 2000. Conservation and management of sea turtles in Mexico. Pages 6-7 *in* Proceedings of the 18th International Sea Turtle Symposium, Mazatlán, Sinaloa, Mexico, March 3-7, 1998.

Aureggi, M., G. Gerosa, and S. Chantrapornsyl. 1999. Marine turtle survey at Phra Thong Island. South Thailand Marine Turtle Newsletter 85:4-5.

Balazs, G. 2002. Conservation and research of sea turtles in the Hawaiian Islands: An overview. Pages 27-29 *in* I. Kinan, editor. Proceedings of the Western Pacific Sea Turtle Cooperative Research and Management Workshop, Honolulu, Hawaii.

Balazs, G. and M. Chaloupka. 2003. Thirty year recovery trend in the once depleted Hawaiian green turtle stock. Submitted to Biological Conservation.

Balazs, G. H. 1982. Status of sea turtles in the central Pacific Ocean. Pages 243-252 *in* K. A. Bjorndal, editor. Biology and Conservation of Sea Turtles. Smithsonian Institute Press, Washington, D.C.

Balazs, G. H. 1995. Status of sea turtles in the central Pacific Ocean In Biology and conservation of sea turtles (revised edition). Smithsonian Institution Press, Washington, D.C. and London.

Balazs, G. H. 1996. Behavioral changes within the recovering Hawaiian green turtle population. Pages 16 *in* 15th Annual Symposium, Sea Turtle Biology. and Conservation, Hilton Head, South Carolina, Feb. 20-25, 1995.

Balazs, G. H., R. Forsyth, and A.Kam. 1987. Preliminary assessment of habitat utilization by Hawaii green turtles in their resident foraging pastures, NOAA Technical memorandum NOAA-TM-NMFS, SWFC-71.

Ballestero, J., R. M. Arauz, and R. Rojas. 2000. Management, conservation, and sustained use of olive ridley sea turtle eggs (*Lepidochelys olivacea*) in the Ostional Wildlife Refuge, Costa Rica: An 11 year review. Pages 4-5 *in* Proceedings of the 18th International Sea Turtle Symposium, Mazatlán, Sinaloa, Mexico.

Barlow, J. and G. A. Cameron. 2003. Field experiments show that acoustic pingers reduce marine mammal bycatch in the California drift gillnet fishery. Mar. Mammal Sc. 19(2):265-28.

Benson, S. R. 2005. Preliminary report on aerial surveys of leatherback turtle nesting beaches in Papua New Guinea during January, 2005.

Benson, S. R., K. A. Forney, P. H. Dutton, and S. A. Eckert. 2003. Occurrence of leatherback sea turtles off the coast of Central California. *in* Proceedings of the twenty-second annual symposium on sea turtle biology and conservation, Miami, Florida.

Black, N. A., A. Schulman-Janiger, R.L. Ternullo, and M. Guerrero-Ruiz. 1997. Killer whales of California and western Mexico: a catalog of photo-identified individuals. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-247.

Bowen, B. W., F. A. Abreu-Grobois, G. H. Balazs, N. Kamezaki, C. J. Limpus, and R. J. Ferl. 1995. Trans-Pacific migration of the loggerhead turtle (*Caretta caretta*) demonstrated with mitochondrial DNA markers. Proc. Natl. Acad. Sci. 92:3731-3734.

Briggs, K. T., D. G. Ainley, L. B. Spear, P. B. Adams, and S. E. Smith. 1988. Distribution and diet of Cassin auklet and common murre in relation to central California upwellings. Pages 982-990 *in* Proceedings of the International Ornithological Congress, volume 19.

Brown, C. H. and W. M. Brown. 1982. Status of sea turtles in the Southeastern Pacific: Emphasis on Peru, pp. Pages 235-240 *in* K. A. Bjorndal, editor. Biology and Conservation of Sea Turtles (First edition). Smithsonian Institution Press, Washington, D.C.

Cailliet, G. M. and D. W. Bedford. 1983. The biology of three pelagic sharks from California waters, and their emerging fisheries: a review. CalCOFI Rep. 24:57-69.

Calambokidis, J., T. Chandler, L. Schlender, G. H. Steiger, and A. Douglas. 2003. Research on humpback and blue whales off California, Oregon and Washington in 2002. National marine Fisheries Service, La Jolla, CA, Final Contract Report to Southwest Fisheries Science Center.

California Interagency Wildlife Task Group. 2006. California Wildlife Habitat Relationships System [WWW]. California Department of Fish and Game. Accessed: 01/26/2006 at < http://www.dfg.ca.gov/whdab/html/b244.html>.

Carretta, J. V. and K. A. Forney. 2004. Preliminary estimates of harbor porpoise abundance in California from 1999 and 2002 aerial surveys, SWFSC Administrative Report LJ-04-01.

Carretta, J. V., K. A. Forney, and J. L. Laake. 1998. The abundance of southern California coastal bottlenose dolphins estimated from tandem aerial surveys. Marine Mammal Science 14:655-675.

Carretta, J. V., K. A. Forney, M. M. Muto, J. Barlow, J. Baker, B. Hanson, and coauthors. 2005a. U.S. Pacific Marine Mammal Stock Assessments: 2004. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-375.

Carretta, J. V., K. A. Forney, M. M. Muto, J. Barlow, J. Baker, B. Hanson, and coauthors. 2006. Draft U.S. Pacific Marine Mammal Stock Assessments: 2005. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-375.

Carretta, J. V., T. Price, D. Petersen, and R. Read. 2005b. Estimtaes of marine mammal, sea turtle, and Seabird mortality in the California drift gillnet fishery for swordfish and thresher shark, 1996-2002. Marine Fisheries Review 66(2):21-30.

Cartamil, D. and H. O. Lowe. 2004. Diel movement patterns of ocean sunfish, Mola mola, off southern California. Mar. Ecol. Prog. Ser 266:245-253.

Chaloupka, M. Y. 1997. Age, growth, and population dynamics. *in* P. L. Lutz and J. A. Musick, editors. The Biology of Sea Turtles. CRC Press, Boca Raton, Florida.

Chan, E. H. and H. C. Liew. 1996. Decline of the leatherback population in Terengganu, Malaysia, 1956-1995. Chelonian Conservation and Biology 2(2):196-203.

Chelton, D. B. and R. E. Davis. 1982. Monthly mean sea-level variability along the west coast of North America. J. Phys. Oceanogr. 12:757-784.

Chivers, S. J., A. E. Dizon, P. J. Gearin, and K. M. Robertson. 2002. Small-scale population structure of eastern North Pacific harbour porpoises, (*Phocoena phocoena*), indicated by molecular genetic analyses. Journal of Cetacean Research and Management 4(2):111-122.

Dalebout, M. L., J. G. Mead, C. S. Baker, A. N. Baker, and A. L. v. Helden. 2002. A new species of beaked whale *Mesoplodon perrini* Sp. N. (*Cetacea Ziphiidae*) discovered through phylogenetic analyses of mitochondrial DNA sequences. Marine Mammal Science 18(3):577-608.

Delgado, C. and J. Alvarado. 1999. Recovery of the black sea turtle (*Chelonia agassizi*) of Michoacan, Mexico, Final report 1998-1999, submitted to U.S. Fish and Wildlife Service.

Dobbs, K. 2002. Marine turtle conservation in the Great Barrier Reef, World Heritage Area, Queensland, Australia. Pages 79-83 *in* I. Kinan, editor. Proceedings of the Western Pacific Sea Turtle Cooperative Research and Management Workshop, Honolulu, Hawaii, February 5-8, 2002.

Dodd, C. K., Jr. 1988. Synopsis of the biological data on the loggerhead sea turtle *Caretta caretta* (Linnaeus 1758). U.S. Fish and Wildlife Service Biological Report 88(14).

Dutton, P. 2003. Molecular ecology of *Chelonia mydas* in the eastern Pacific Ocean. Proceedings of the 22nd Annual Symposium on Sea Turtle Biology and Conservation, Miami, Florida, April 4-7, 2002.

Dutton, P. H., B. W. Bowen, D. W. Owens, A. Barragan, and S. K. Davis. 1999. Global phylogeography of the leatherback turtle (*Dermochelys coriacea*). Journal of Zoology, London 248:397-409.

Dutton, P. H. and S. A. Eckert. 2005. Tracking leatherback turtles from Pacific forage grounds in Monterey Bay, California. Proceedings of the 21st Annual Symposium on Sea Turtle Conservation and Biology.

Dutton, P. H., C. Hitipeuw, M. Zein, G. Petro, J. Pita, V. Rei, and coauthors. In review. Status and genetic structure of nesting stocks of leatherback turtles (*Dermochelys coriacea*) in the western Pacific. Submitted to Chelonian Conservation and Biology in 2005.

Eckert, K. L. 1993. The biology and population status of marine turtles in the North Pacific Ocean. NMFS, NOAA, Honolulu, HI, Final Report to SWFSC.

Eckert, S. A. 1997. Distant fisheries implicated in the loss of the world's largest leatherback nesting population. Marine Turtle Newsletter 78:2-7.

Eckert, S. A. 1998. Perspectives on the use of satellite telemetry and other electronic technologies for the study of marine turtles, with reference to the first year long tracking of leatherback sea turtles. Pages 44 *in* Proceedings of the Seventeenth Annual Sea Turtle Symposium, 4-8 March 1997.

Eckert, S. A. 1999. Habitats and migratory pathways of the Pacific leatherback sea turtle, Hubbs Sea World Research Institute Technical Report 99-290.

Eschmeyer, W. N., E. S. Hrerald, and H. Hamman. 1983. A field guide to Pacific coast fishes of North America. Houghton Miffin Company, Boston.

Florida Museum of Natural History. 2006. Megamouth Shark [WWW]. Accessed: 02/8/2006 at <http://www.flmnh.ufl.edu/fish/Gallery/descript/Megamouth/Megamouth.htm>.

Fraser-Bruner, A. 1951. The ocean sunfishes (Family Molidae). Bull Brit Mus Nat Hist. 1:89–121.

Fritts, T., M. Stinson, and R. Marquez. 1982. Status of sea turtle nesting in southern Baja California, Mexico. Bull. South. Calif. Acad. Sci 81:51-60.

García, D. and L. Sarti. 2000. Reproductive cycles of leatherback turtles. Pages 163 *in* Proceedings of the Eighteenth International Sea Turtle Symposium, Mazatlán, Sinaloa Mexico, 3-7 March, 1998.

Hanan, D. A., D. B. Holts, and J. Atilio L. Coan. 1993. The California drift gill net fishery for sharks and swordfish, 1981-82 through 1990-91. Calif. Dept. Fish Game, Fish Bull. 175:95 pp.

Harrison, P. 1987. A Field Guide to Seabirds of the World. The Stephen Greene Press, Lexington, MA.

Hatase, H., M. Kinoshita, T. Bando, N. Kamezaki, K. Sato, Y. Matsuzawa, and coauthors. 2002. Population structure of loggerhead turtles, *Caretta caretta*, nesting in Japan: Bottlenecks on the Pacific population. Marine Biology 141:299-305.

Herrick, S. F., Jr., R. Rasmussen, D. Dealy, and D. Squires. 2003. An analysis of producer surplus for the Pacific Coast HMS fishing fleets. NMFS SWFSC, La Jolla, NMFS, SWFSC Admin Rep. LJ-03-07.

Heyning, J. E. and W. F. Perrin. 1994. Evidence for two species of common dolphins (Genus Delphinus) from the eastern North Pacific. Contr. Nat. Hist. Mus. L.A. County (442).

Hickey, B. M. 1988. Coastal oceanography of western North America from the tip of Baja California to Vancouver Island. Pages 345-393 *in* A. R. Robinson and K. H. Brink, editors. The Sea, volume 11. John Wiley & Sons, Inc.

Hinton, M. G. 2003. Status of swordfish stocks in the eastern Pacific Ocean estimated using data from Japanese tuna longline fisheries. Mar. Freshwat. Res 54(4):393-399.

Hinton, M. G., W. H. Bayliff, and J. Suter. 2004. Assessment of swordfish in the eastern Pacific ocean, 5th Meeting of the Scientific Working Group, La Jolla, CA, May 11-13, IATTC SAR-5-05-SWO.

Hitipeuw, C. 2003. Leatherback conservation program, Papua, Indonesia, Technical progress report to National Marine Fisheries Service.

Hitipeuw, C. and J. Maturbongs. 2002. Marine Turtle Conservation Program: Jamursba-Medi Nesting Beach, North Coast of the Bird's Head Peninsula, Papua.

HMSMT (Highly Migratory Species Management Team). 2005. Status of the U.S. West Coast Fisheries for Highly Migratory Species through 2004. Pacific Fishery Management Council, Portland, OR, October 2005.
Hodge, R. and B. L. Wing. 2000. Occurrence of marine turtles in Alaska Waters: 1960-1998. Herpetological Review 31:148-151.
Holts, D. and O. Sosa-Nishizaki. 1998. Swordfish, *Xiphias gladius*, fisheries of the eastern North Pacific Ocean, NOAA Tech. Rep. NMFS 142.
ISC (International Scientific Committee for Tuna and Tunal-like Species in the North Pacific Ocean). 2004a. Report of the 3rd ISC Pacific bluefin tuna working group, ISC/04/Plenary/6.
ISC (International Scientific Committee for Tuna and Tunal-like Species in the North Pacific Ocean). 2004b. Report of the swordfish working group, ISC/04/Plenary/7.
Kalb, H. J., J. A. Kureen, P. A. Mayor, J. Peskin, and R. L. Phyliky. 1996. Conservation concerns for the Nancite Olive Ridleys. Pages 141 *in* 15th Annual Symposium Sea Turtle Biology and Conservation, Hilton Head, South Carolina, Feb. 20-25, 1995.
Kamezaki, N., Y. Matsuzawa, O. Abe, H. Asakawa, T. Fujii, K. Goto, and coauthors. 2003. Loggerhead turtles nesting in Japan. *in* A. B. Bolten and B. E. Witherington, editors. Loggerhead Sea Turtles. Smithsonian Institution.
Karpov, K. A. and D. Albin. 1995. The marine recreational fishery of Northern and Central California. California Department of Fish and Game Fish Bulletin 176.
Kleiber, P., Y. Takeuchi, and H. Nakano. 2001. Calculation of plausible maximum sustainable yield (MSY) for blue shark (*Prionace glauca*) in the north Pacific, SWFSC Admin. Rep. H-01-02 and Dept. of Commerce 2001.
Klimley, A. P. 1994. The predatory behavior of the white shark. American Scientist 52:122-133.
Kohler, N. E., J. G. Casey, and P. A. Turner. 1996. Length-length and length-weight relationships for 13 shark species from the western North Atlantic, NOAA Tech. Memo. NMFS-NE-110.
Leatherwood, S., R. R. Reeves, and L. Foster (illustrator). 1983. The Sierra Club Handbook of Whales and Dolphins. Sierra Club Books, San Francisco, CA.
Lee, D. S. 1986. Seasonal, thermal, and zonal distribution of the ocean sunfish, Mola mola, off the North Carolina coast. Brimleyana 12:75–83.
Limpus, C. J. and D. J. Limpus. 2003. Loggerhead Turtles in the Equatorial Pacific and Southern Pacific Ocean: A Species in Decline. *in* A. B. Bolten and B. E. Witherington, editors. Loggerhead Sea Turtles. Smithsonian Institution.
Limpus, C. J. and D. Reimer. 1994. The loggerhead turtle, *Caretta caretta*, in Queensland: a population in decline. Pages 39-59 *in* R. James, editor. Proceedings of the Australian Marine Turtle Conservation Workshop. Australian Nature Conservation Agency, Australia, Sea World Nara Resort, Gold Coast, November 14-17, 1990.
López, E. and R. Arauz. 2003. Nesting records of East Pacific green turtles (*Chelonia mydas agassizii*) in south Pacific Costa Rica, including notes on incidental capture by shrimping and longline activities. Pages 84-85 *in* Proceedings of the 22nd Annual Symposium on Sea Turtle Biology and Conservation, Miami, Florida, April 4-7, 2002.
Lutcavage, M. E. and P. L. Lutz. 1997. Diving physiology. *in* P. L. Lutz and J. A. Musick, editors. The biology of sea turtles. CRC Press, Boca Raton, Florida. .
Márquez, M. R., C. S. Peñaflores, A. O. Villanueva, and a. J. F. Diaz. 1995. A model for diagnosis of populations of olive ridleys and green turtles of west Pacific tropical coasts. *in* K. A. Bjorndal, editor. Biology and Conservation of Sea Turtles (revised edition).
Maunder, M. N. and S. J. Harley. 2004. Status of skipjack tuna in the eastern Pacific ocean in 2003 and outlook for 2004, La Jolla, CA, May 11-13, IATTC-SAR-5-05 SKJ.
McDonald, D., P. Dutton, D. Mayer, and K. Merkel. 1994. Review of the green turtles of South San Diego Bay in relation to the operations of the SDG&E South Bay Power Plant. Prepared for San Diego Gas & Electric Co., C941210311, San Diego, CA, Doc 94-045-01.

Melin, S. R. and R. L. DeLong. 1999. Observations of a Guadalupe Fur Seal (*Arctocephalus townsendi*) female and pup at San Miguel Island, California. Marine Mammal Science 15:885-888.

Millán, R. M. 2000. The ridley sea turtle populations in Mexico. Pages 19 *in* Proceedings of the Eighteenth International Sea Turtle Symposium, Mazatlán, Sinaloa Mexico, 3-7 March, 1998.

MMS (Minerals Management Service). 1992. Outer continental shelf natural gas and oil resource management; Comprehensive program, 1991-1997; Final environmental impact statement. U.S. Department of the Interior, April 1992.

Morreale, S., E. Standora, F. Paladino, and J. Spotila. 1994. Leatherback migrations along deepwater bathymetric contours. Pages 109 *in* 13th Ann. Symp. Sea Turtle Biol. and Conserv, Jekyll Island, Georgia, Feb. 23-27, 1993.

Muccio, C. 1998. National sea turtle conservation report for Guatemala, August, 1998.

National Weather Service Climate Prediction Center. 2006. NOAA Says La Niña Here as Predicted [WWW]. Accessed: 2/10/06 at < www.cpc.ncep.noaa.gov>.

Nevins, H. and J. Harvey. 2003. Mortality of Northern Fulmar (*Fulmarus glacialis*) in Monterey Bay during winter 2003 [WWW]. Accessed: 01/26/2006 at <http://www.coasst.org/display/MortalityofNorthernFulmars.pdf>.

Nichols, W. J. 2002. Biology and conservation of sea turtles in Baja California, Mexico. Doctoral dissertation. University of Arizona, Arizona.

Nichols, W. J., A. Resendiz, and C. Mayoral-Russeau. 2000. Biology and conservation of loggerhead turtles (*Caretta caretta*) in Baja California, Mexico. Pages 169-171 *in* Proceedings of the 19th Annual Symposium on Sea Turtle Conservation and Biology, South Padre Island, Texas, March 2-6, 1999.

NMFS (National Marine Fisheries Service). 1997. Pacific Offshore Cetacean Take Reduction Plan.

NMFS (National Marine Fisheries Service). 2004a. Biological opinion on the Adoption of (1) proposed Highely Migratory Species fishery Managemetn plan; (2) continued operation of Highly Migratory Species fishery vessels under permits pursuant to the High Seas Fishing Compliance Act; and (3) Endangered Species Act regulation on the prohibition of shallow longline sets east of the 150 degree West longitude. National Marine Fisheries Service Southwest Region, Sustainable Fisheries Division and Protected Resources Division, Long Beach, February 4, 2004.

NMFS (National Marine Fisheries Service). 2004b. Evaulating bycatch: a national approach to standardized bycatch monitoring programs, NOAA Tech. Memo. NMFS-F/SPO-66.

NMFS (National Marine Fisheries Service). 2005. Proposed conservation plan for southern resident killer whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998a. Recovery Plan for U.S. Pacific Populations of the Green Turtle. Prepared by the Pacific Sea Turtle Recovery Team.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998b. Recovery Plan for U.S. Pacific Populations of the Leatherback Turtle. Prepared by the Pacific Sea Turtle Recovery Team.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998c. Recovery Plan for U.S. Pacific Populations of the Loggerhead Turtle. Prepared by the Pacific Sea Turtle Recovery Team.

NMFS and USFWS (National Marine Fisheries Service and U.S. Fish and Wildlife Service). 1998d. Recovery Plan for U.S. Pacific Populations of the Olive Ridley Turtle. Prepared by the Pacific Sea Turtle Recovery Team.

Pacific Marine Environmental Labratory. 2006. What is an El Nino? [WWW]. NOAA / PMEL / TAO. Accessed: 2/2/06 at <www.pmel.noaa.gov/tao/elnino/el-nino-story.html>.

Pandav, B. and B. C. Choudhury. 1999. An update on the mortality of olive ridley sea turtles in Orissa, India. Marine Turtle Newsletter 83:10-12.

Pandav, B. and C. S. Kar. 2000. Reproductive span of olive ridley turtles at Gahirmatha rookery, Orissa, India. Marine Turtle Newsletter 87:8-9.

Parker, D. M., W. Cooke, and G. H. Balazs. 2000. Dietary components of pelagic loggerhead turtles in the North Pacific Ocean. Proceedings of the 20th Annual Symposium on Sea Turtle Biology and Conservation, Orlando, Florida, February 28-March 4, 2000.

Peterson, R. T. 1990. A Field Guide to Western Birds. Houghton Mifflin Company, Boston, MA.

Petro, G., F. Hickey, and K. MacKay. 2004. Leatherback turtles in Vanuatu. Paper presented at the Western Pacific Cooperative and Management Workshop on Leatherback Turtles, Honolulu, HI, 19-21 May, 2004.

PFMC (Pacific Fishery Management Council). 2003. Fishery Management Plan and Environmental Impact Statement for U.S. West Coast Fisheries for Highly Migratory Species. Pacific Fishery Management Council, Portland, OR, August, 2003.

Philip, M. 2002. Marine turtle conservation in Papua New Guinea. *in* I. Kinan, editor. Proceedings of the Western Pacific Sea Turtle Cooperative Research and Management Workshop, Honolulu, Hawaii, USA.

Phillips, R. A., M. K. Petersen, K. Lilliendahl, J. Solmundsson, K. C. Hamer, C. J. Camphuysen, and coauthors. 1999. Diet of the northern fulmar *Fulmarus glacialis*: reliance on commercial fisheries? Marine Biology 135:159-170.

Pitman, K. L. 1990. Pelagic distribution and biology of sea turtles in the eastern tropical Pacific. Pages 143-148 *in* E. H. Richardson, J. A. Richardson, and M. Donnell, editors. Proc. Tenth Annual Workshop on Sea Turtles Biology and Conservation, volume NMFS-SEC-278. U.S. Dep. Commerce, NOAA Technical Memo.

Plotkin, P. and J. Bernardo. 2003. Investigations into the basis of the reproductive behavioral polymorphism in *Lepidochelys olivacea*. Pages 29 *in* Proceedings of the Twenty-Second Annual Symposium on Sea Turtle Biology and Conservation, Miami, Florida.

Plotkin, P. T., R. A. Bales, and D. C. Owens. 1993. Migratory and reproductive behavior of *Lepidochelys olivacea* in the eastern Pacific Ocean. B. A. Schroeder and B. E. Witherington, editors. Proc. of the Thirteenth Annual Symp. on Sea Turtle Biology and Conservation, volume NOAA Tech. Mem. NMFS-SEFSC-31. NOAA, Natl. Mar. Fish. Serv., Southeast Fish. Sci. Cent.

Polovina, J. J., G. H. Balazs, E. A. Howell, D. M. Parker, M. P. Seki, and P. H. Dutton. 2004. Forage and migration habitat of loggerhead (*Caretta caretta*) and olive ridley (*Lepidochelys olivacea*) sea turtles in the central North Pacific Ocean. Fisheries Oceanography 13(1):36-51.

Pritchard, P. C. H. 1982. Nesting of the leatherback turtle (*Dermochelys coriacea*) in Pacific Mexico, with a new estimate of the world population status. Copeia 1982:741-747.

Putrawidjaja, M. 2000. Marine turtles in Irian Jaya, Indonesia. Marine Turtle Newsletter 90:8-10.

Ramohia, P. C., J. Pita, and N. daWheya. 2001. Leatherback turtle tagging and nest monitoring survey, Sasakolo nesting beach, Isabel Province. Report to South Pacific Regional Environmental Programme, Apia, Samoa, March, 2001.

Reeves, R. R., B. S. Stewart, P. J. Clapham, J. A. Powell, and P. Folkens (illustrator). 2002. National Audubon Society Guide to Marine Mammals of the World. Alfred A. Knopf, New York, NY.

Reeves, R. R., B. S. Stewart, S. Leatherwood, and P. Folkens (illustrator). 1992. The Sierra Club Handbook of Seals and Sirenians. Sierra Club Books, San Francisco, CA.

Rei, V., R. Galama, R. Sine, and I. Liviko. 2004. Leatherback turtle survey of Kamiali Wildlife Management Area, Papua New Guinea, 2002.

Rosel, P. E., A. E. Dizon, and J. E. Heyning. 1994. Population genetic analysis of two forms of the common dolphin (genus Delphinus) utilizing mitochondrial DNA control region sequences. Marine Biology 119:159-167.

Ruiz, G. A. 1994. Sea turtle nesting population at Playa la Flor, Nicaragua: An Olive Ridley "Arribada" Beach. Pages 129-130 *in* 14th Annual Symposium, Sea Turtle Biology and Conservation, Hilton Head, South Carolina, March 1-5, 1994.

Salazar, C. P., J. F. Prez, E. A. Padilla, and R. Marquez-Millan. 1998. Nesting of olive ridley sea turtle Lepidochelys olivacea during twenty four years at La Escobilla Beach, Oaxaca, Mexico. Proc.

18th International Symposium on Biology and Conservation of Sea Turtles, Mazatlan, Mexico, March 1998.

Sarti, L. 2002. Current population status of *Dermochelys coriacea* in the Mexican Pacific Coast. Presented at the Western Pacific Sea Turtle Cooperative Research & Management Workshop, Honolulu, Hawaii, February 5-8, 2002.

Sarti, L. M., S. A. Eckert, N. T. Garcia, and A. R. Barragan. 1996. Decline of the world's largest nesting assemblage of leatherback turtles. Marine Turtle Newsletter (74).

Seattle Audubon Society. 2006. Bird Web, the Birds of Washington State [WWW]. Accessed: 01/26/2006 at <http://www.birdweb.org/birdweb/bird_details.aspx?id=228.>.

Seminoff, J. A. 2002. Global status of the green turtle (*Chelonia mydas*): a summary of the 2001 stock assessment for the IUCN Red List Programme. Presented at the Western Pacific Sea Turtle Cooperative Research & Management Workshop, Honolulu, Hawaii, February 5-8, 2002.

Shanker, K. B. P. and B. C. Choudhury. 2003. An assessment of the olive ridley turtle (*Lepidochelys olivacea*) nesting population in Orissa, India. Biological Conservation 115:149-160.

Silva-Batiz, F. A., E. Godinez-Dominguez, and J. A. Trejo-Robles. 1996. Status of the olive ridley nesting population in Playon de Mismaloya, Mexico: 13 years of data. Pages 302 *in* 15th Annual Symposium, Sea Turtle Biology and Conservation, Hilton Head, South Carolina, Feb. 20-25, 1995.

Silvani, L., M. Gazo, and A. Aguilar. 1999. Spanish driftnet fishing and incidental catches in the western Mediterranean. Biological Conservation 90:79-85.

Sims, D. W. and E. J. Southall. 2002. Occurrence of ocean sunfish, Mola mola near fronts in the western English Channel. J. Mar. Biol. Ass. U.K. 82:927-928.

Southwood, A. L., R. D. Andrews, M. E. Lutcavage, F. V. Paladino, N. H. West, R. H. George, and coauthors. 1999. Heart rates and diving behavior of leatherback sea turtles in the eastern Pacific Ocean. The Journal of Experimental Biology 202:1115-1125.

Sowls, A. L., A. R. DeGange, J. W. Nelson, and G. S. Lester. 1980. Catalog of California seabird colonies. Coastal Ecosystems Project, Office of Biological Services. Fish and Wildlife Service, U.S. Department of the Interior, Washington, D.C.

Spotila, J. R., A. E. Dunham, A. J. Leslie, A. C. Steyermark, P. T. Plotkin, and F. V. Paladino. 1996. Worldwide population decline of *Dermochelys coriacea*: Are leatherback turtles going extinct? Chelonian Cons. and Biol. 2(2):209-222.

Spotila, J. R., R. D. Reina, A. C. Steyermark, P. T. Plotkin, and F. V. Paladino. 2000. Pacific leatherback turtles face extinction. Nature 45.

Squires, D., S. F. Herrick, Jr., D. Dealy, C. Janisse, and D. Colpo. 2003. Cost-and-earnings survey of the California-Oregon drift gillnet fleet, 1998-1999. NMFS SWFSC, La Jolla, NMFS, SWFSC, Admin Rep. LJ-03-02.

Starbird, C. H. and M. M. Suarez. 1994. Leatherback sea turtle nesting on the north Vogelkop coast of Irian Jaya and the discovery of a leatherback sea turtle fishery on Kei Kecil Island. Pages 143 *in* 14th Ann. Symp. Sea Turtle Biol. and Conserv., Hilton Head, South Carolina, Mar. 1-5, 1994.

Stocker, M., editor. 2005. Report of the nineteenth north Pacific albacore workshop. Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C., Canada.

Suárez, A., P. H. Dutton, and J. Bakarbessy. 2000. Leatherback (*Dermochelys coriacea*) nesting on the north Vogelkop coast of Irian Jaya, Indonesia. Proceedings of the 19th Annual Sea Turtle Symposium.

Sydeman, W. J., M. M. Hester, J. A. Thayer, F. Gress, P. Martin, and J. Buffa. 2001. Climate change, reproductive performance and diet composition of marine birds in the southern California Current system, 1969-1997. Progress in Oceanography 49(309-329).

Taylor, V. B. and D. W. Bedford. 2001. California's Living Marine Resources: A Status Report. California Department of Fish and Game: Resources Agency.

Tillman, M. 2000. Internal memorandum, dated July 18, 2000, from M. Tillman (NMFS- Southwest Fisheries Science Center) to R. McInnis (NMFS - Southwest regional office)

Triangle Island Seabird Research and Monitoring Program. 2006. Research and Monitoring [WWW]. Accessed: 01/26/2006 at <http://www.sfu.ca/biology/wildberg/bertram/triangle/caau.htm>.

U.S. Geoglocial Survey. 2006. Northern fulmar *Fulmarus glacialis* Accessed: 01/26/2006 at <http://www.mbr-pwrc.usgs.gov/Infocenter/i0860id.html>.

USGS. 2006. Cassin's auklet *Ptychoramphus aleuticus* [WWW]. Accessed: 01/26/2006 at <http://www.mbr-pwrc.usgs.gov/Infocenter/i0160id.html>.

von Mutius, A. and E. P. v. d. Bergue. 2002. Hatching success of olive ridley sea turtles in La Flor, Nicaragua. Pages 291 *in* Proceedings of the Twentieth Annual Symposium on Sea Turtle Biology and Conservation, Orlando, Florida, February 29-March 4, 2000.

Washington Department of Fish and Wildlife. 2006. Species of Concern [WWW]. Accessed: 01/26/2006 at <http://wdfw.wa.gov/wlm/diversty/soc/concern.htm>.

Wetherall, J. A., G. H. Balazs, R. A. Tokunaga, and M. Y. Y. Yong. 1993. Bycatch of marine turtles in North Pacific high-seas driftnet fisheries and impacts on the stocks. Pages 519-538 *in* J. Ito and et al., editors. INPFC Symposium on biology, distribution, and stock assessment of species caught in the high seas driftnet fisheries in the North Pacific Ocean, volume Bulletin 53(III). Inter. North Pacific Fish. Comm., Vancouver, Canada.

Zárate, P. 2005. Anidación de la tortuga verde, *Chelonia mydas*, en playas de Galápagos durante la temporada 2004-2005, Segundo informe de avance.

Zug, G. R., G. H. Balazs, J. A. Wetherall, D. M. Parker, and S. K. K. Murakawa. 2002. Age and growth of Hawaiian green turtles (*Chelonia mydas*): an analysis based on skeletrochronology. Fish. Bulletin 100:117-127.

Zug, G. R. and J. F. Parham. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea*: a skeletochronological analysis. Chelonian Conservation and Biology 2(2):244-249.

APPENDIX B
DESCRIPTION OF MANAGEMENT MEASURES CURRENTLY APPLICABLE TO THE DRIFT GILLNET FISHERY

Excerpt from the HMS FMP Section 8.5.1, Drift Gillnet Fishery Management Measures (August 2003)

Background

The drift gillnet fishery for swordfish and shark (14" minimum mesh size) is managed under numerous complex and detailed federal and state regulations to protect the populations fished as well as the protected species incidentally taken. These regulations are described in *APPENDIXES B AND C*, the latter being the California code for fishing swordfish and shark with minimum stretched mesh of 14 inches required. Briefly, the regulations (for ≥14" stretched mesh only) drift gillnets are as follows:

<u>Federal Regulations</u>

Take Reduction Team (POCTRT) measures to protect marine mammals:

- Acoustic deterrent devices (pingers) are required on drift gillnets to deter entanglement of marine mammals.
- All drift gillnets must be fished at minimum depth below the surface of 6 fm (10.9 m).
- Skipper workshops may be required.
- Vessels must provide accommodations for observers when assigned.

Federal Turtle Conservation Closed Areas:

- Drift gillnet fishing may not be conducted:.
    - In the portion of the EEZ bounded by the coordinates 36° 18.5' N latitude (Pt. Sur), to 34°27' N latitude, 123° 35' W longitude (off CA); then to 129° W longitude; then north to 45° N latitude (off OR); then east to the point where 45° N latitude meets land (OR), through year 2003 from August 15 to November 15 (see map, *CHAPTER 9 FIGURE 9-1*);
    - In the portion of the EEZ south of Pt. 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, as announced by NMFS[21].

<u>State Restrictions (applicable to vessels operating from the state's ports)</u>

Participation restrictions:

- The California and Oregon limited entry programs for the swordfish/shark drift gillnet fisheries.

Gear restrictions (California):

[21] As of June 2003, a rule to modify the El Niño closure is being finalized. It proposes instead to prohibit fishing during the months of June, July, and August, which NMFS has concluded offers more protection for loggerheads while having less impact on the fishery than a closure in January and August. [The final rule was published December 16, 2003, at 68 FR 69967, changing 50 CFR § 223.206(d).]

- The maximum cumulative length of a shark or swordfish gill net(s) on the net reel of a vessel, on the dock of the vessel, and/or in the water at any time shall not exceed 6,000 ft in float line length, except that up to 250 fm of spare net (in separate panels not to exceed 100 fm) may be on board the vessel stowed in lockers, wells, or other storage.

- The use of quick disconnect devices to attach net panels is prohibited.

- 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.

- Mainland area restrictions/closures:

- Drift gillnets cannot be used:

  - In the EEZ off California from February 1 to April 30.

  - In the portion of the EEZ off California within 75 nm of the coastline from May 1 to August 14.

  - In the portion of the EEZ off California within 25 nm of the coastline from Dec. 15 through Jan. 31.

  - In the portion of the EEZ bounded by a direct line connecting Dana Point; Church Rock on Catalina Island; and Pt. La Jolla, San Diego County; and the inner boundary of the EEZ from August 15 through September 30 each year.

  - In the portion of the EEZ within 12 nm from the nearest point on the mainland shore north to the Oregon border from a line extending due west from Pt. Arguello.

  - East of a line running from Pt. Reyes to Noonday Rock to the westernmost point of southeast Farallon Island to Pillar Pt..

  - In the portion of the EEZ within 75 nm of the Oregon shoreline from May 1 through August 14, and within 1000 fm the remainder of the year.

  - Off Washington (Washington does not authorize this HMS gear).

Channel Islands (California) closures:

- Drift gillnets cannot be used:

  - In the portion of the EEZ within six nm westerly, northerly, and easterly of the shoreline of San Miguel Island between a line extending six nm west magnetically from Pt. Bennett and a line extending six nm east magnetically from Cardwell Point. and within six nm westerly, northerly, and easterly of the shoreline of Santa Rosa Island between a line extending six nm west magnetically from Sandy Point and a line extending six nm east magnetically from Skunk Point, from May 1 through July 31 each year.

- In the portion of the EEZ within 10 nm westerly, southerly, and easterly of the shoreline of San Miguel Island between a line extending 10 nm west magnetically from Pt. Bennett and a line extending 10 nm east magnetically from Cardwell Point and within 10 nm westerly, southerly, and easterly of the shoreline of Santa Rosa Island between a line extending 10 nm west magnetically from Sandy Point and a line extending 10 nm east magnetically from Skunk Point from May 1 through July 31 each year.

- In the portion of the EEZ within a radius of 10 nm of the west end of San Nicolas Island from May 1 through July 31 each year.

- In the portion of the EEZ within six of the coastline on the northerly and easterly side of San Clemente Island, lying between a line extending six nm west magnetically from the extreme northerly end of San Clemente Island to a line extending six nm east magnetically from Pyramid Head from August 15 through September 30 each year.

The federal Turtle Conservation Closed Areas are based on recommendation from the Pacific Offshore Cetacean Take Reduction Team (POCTRT or TRT), which was modified by NMFS after considering fishery observer data and recent satellite telemetry tracking data obtained from two leatherback sea turtles that were tagged in Monterey Bay in September 2000; and on existing state restrictions that regulate drift gillnet gear and regulate drift gillnet use in certain times or places. In an effort to minimize the economic impact of the time and area closures, the above “modified” TRT recommendation was developed to provide access to the productive fishing grounds north of Pt. Conception, which is consistent with the intent of the TRT proposal, while still providing at least an equal, if not greater, level of protection for leatherback and loggerhead sea turtles. In addition, the modified TRT recommendation does not include the lowering of the net to at least 60 ft as recommended by the TRT because observer data (1990-2000) do not suggest that the lengthening of extenders to 60 ft would result in a definite decrease in leatherback interactions. The original *trigger* language identified by the TRT to extend the area closure in a southerly direction to Pt. Conception if a leatherback was observed was also removed because NMFS did not consider this extra precaution to be necessary based on the distribution of the turtles. Although the TRT recommended 36°15' N latitude as the southern boundary of the closed area, Pt. Sur was set as the southern boundary because it is a more recognizable landmark and only 3 mi north of 36° 15' N latitude. The diagonal line from Pt. Sur to 34° 27' N latitude, 123° 35' W longitude was developed by plotting the satellite tracking data of two leatherback turtles, keeping the southernmost turtle trajectory north of the diagonal line. The reason for this precaution is to protect a potential migratory corridor of leatherbacks departing Monterey Bay for western Pacific nesting beaches. NMFS hopes to learn more about this migratory corridor through additional satellite tag attachments on turtles leaving Monterey Bay, in order to minimize the impact of commercial fisheries on leatherbacks.

The FMP endorses or adopts in the FMP all federal conservation and management measures in place under the MMPA and ESA; adopts all state regulations for swordfish/shark drift gillnet fishing under Magnuson-Stevens authority except limited entry programs (which will remain under states’ authority); modifies an OR closure inside 1000 fm (or way point equivalent) to be in effect year round; closes EEZ waters off WA to all drift gillnet fishers; and continues the current turtle protection closure north of Pt. Sur, CA to 45° N latitude (August 15 to November 15), and south of Pt. Conception to 120° W longitude during a forecasted or occurring El Niño event (August and January). **Note:** NMFS had issued a proposed and interim final rule to implement this January and August 15-31 El Niño closure stemming from the October 2000 Biological Opinion, but a modified rule is now being finalized, which would change the closure months to June, July and August. NMFS has concluded that this modified closure offers more protection for loggerheads during El Niño periods, while having less impact on the fishery than the former closure in January and August. An analysis for this alternate closure will be included in the final rule. This final rule will likely be published by the time NMFS issues the proposed regulations to implement this FMP and therefore the FMP regulations should reflect this modified closure. It would prohibit fishing with drift gillnets in the CA/OR thresher shark/swordfish drift gillnet fishery in U.S. waters off southern California east of 120° W longitude, for the months of June, July, and August, when El Niño conditions are forecasted or present off southern California. Rationale: Existing federal and state regulations, including current states' drift gillnet time-area closures and gear restrictions (except for an Oregon spring-summer closure) were deemed appropriate for adopting intact. However, the Council concluded it was premature to federalize the states' limited entry programs, with its increase in federal costs and administrative burdens. Closures off Washington and Oregon are intended to protect the common thresher shark, sea turtles and marine mammals.

This alternative modifies the current state regulations to prohibit, year round, drift gillnet fishing for swordfish and sharks in EEZ waters off OR east of a line approximating the 1000 fm curve (deleting the May-August prohibition within 75 nm) and prohibits HMS DGN fishing in all EEZ waters off WA. The state of Washington currently does not allow the use of drift gillnet gear and Oregon does not allow drift gillnets to target thresher shark, although DGN vessels have fished off both states and landed their catch in California.

Federal Regulations for the Drift Gillnet Fishery (October 2005)

TITLE 50--WILDLIFE AND FISHERIES
DEPARTMENT OF COMMERCE
PART 660 FISHERIES OFF WEST COAST STATES AND IN THE WESTERN PACIFIC
Subpart K Highly Migratory Fisheries

Sec. 660.711 General catch restrictions.

….

(b) Incidental landings. HMS caught by gear not authorized by this subpart may be landed in incidental amounts as follows:

(1) Drift gillnet vessels with stretched mesh less than 14 inches may land up to 10 HMS per trip, except that no swordfish may be landed.

….

Sec. 660.713 Drift gillnet fishery.

(a) Take Reduction Plan gear restrictions. Gear restrictions resulting from the Pacific Offshore Cetacean Take Reduction Plan established under the authority of the Marine Mammal Protection Act of 1972 can be found at 50 CFR 229.31.

(b) Other gear restrictions. (1) The maximum length of a drift gillnet on board a vessel shall not exceed 6,000 ft (1828 m).

(2) Up to 1,500 ft (457 m) of drift gillnet in separate panels of 600 ft (182.88 m) may be on board the vessel in a storage area. (c) Protected Resource Area closures. (1) Pacific leatherback conservation area. No person may fish with, set, or haul back drift gillnet gear in U.S. waters of the Pacific Ocean from August 15 through November 15 in the area bounded by straight lines connecting the following coordinates in the order listed:

(i) Pt. Sur at 36[deg]18.5[min] N. lat., to

(ii) 34[deg]27[min] N. lat. 123[deg]35[min] W. long., to

(iii) 34[deg]27[min] N. lat. 129[deg] W. long., to

(iv) 45[deg] N. lat. 129[deg] W. long., thence to

(v) the point where 45[deg] N. lat. intersects the Oregon coast.

(2) Pacific loggerhead conservation area. No person may fish with, set, or haul back drift gillnet gear in U.S. waters of the Pacific Ocean east of the 120[deg] W. meridian from June 1 through August 31 during a forecasted, or occurring, El Nino event off the coast of southern California.

(i) The Assistant Administrator will publish a notification in the Federal Register that an El Nino event is occurring off, or is forecast for off, the coast of southern California and the requirement for time area closures in the Pacific loggerhead conservation zone. The notification will also be announced in summary form by other methods as the Assistant Administrator determines necessary and appropriate to provide notice to the California/Oregon drift gillnet fishery.

(ii) The Assistant Administrator will rely on information developed by NOAA offices that monitor El Nino events, such as NOAA's Coast Watch program, and developed by the State of California, to determine if such a notice should be published. The requirement for the area closures from January 1 through January 31 and from August 15 through August 31 will remain effective until the Assistant Administrator issues a notice that the El Nino event is no longer occurring.

(d) Mainland area closures. The following areas off the Pacific coast are closed to driftnet gear:

(1) Within the U.S. EEZ from the United States-Mexico International Boundary to the California-Oregon border from February 1 through April 30.

(2) In the portion of the U.S. EEZ within 75 nautical miles from the mainland shore from the United States-Mexico International Boundary to the California-Oregon border from May 1 through August 14.

(3) In the portion of the U.S. EEZ within 25 nautical miles of the coastline from December 15 through January 31 of the following year from the United States-Mexico International Boundary to the California-Oregon border.[[Page 806]]

(4) In the portion of the U.S. EEZ from August 15 through September 30 within the area bounded by line extending from Dana Point to Church Rock on Santa Catalina Island, to Point La Jolla, CA.

(5) In the portion of the U.S. EEZ within 12 nautical miles from the mainland shore north of a line extending west of Point Arguello, CA, to the California-Oregon border.

(6) In the portion of the U.S. EEZ within the area bounded by a line from the lighthouse at Point Reyes to Noonday Rock, to Southeast Farallon Island to Pillar Point, CA.

(7) In the portion of the U.S. EEZ off the Oregon coast east of a line approximating 1000 fathoms as defined by the following coordinates:

42[deg]00[min]00[sec] N. lat. 125[deg]10[min]30[sec] W. long.
42[deg]25[min]39[sec] N. lat. 124[deg]59[min]09[sec] W. long.
42[deg]30[min]42[sec] N. lat. 125[deg]00[min]46[sec] W. long.
42[deg]30[min]23[sec] N. lat. 125[deg]04[min]14[sec] W. long.
43[deg]02[min]56[sec] N. lat. 125[deg]06[min]57[sec] W. long.
43[deg]01[min]29[sec] N. lat. 125[deg]10[min]55[sec] W. long.
43[deg]50[min]11[sec] N. lat. 125[deg]19[min]14[sec] W. long.
44[deg]03[min]23[sec] N. lat. 125[deg]12[min]22[sec] W. long.
45[deg]00[min]06[sec] N. lat. 125[deg]16[min]42[sec] W. long.
45[deg]25[min]27[sec] N. lat. 125[deg]16[min]29[sec] W. long.
45[deg]45[min]37[sec] N. lat. 125[deg]15[min]19[sec] W. long.
46[deg]04[min]45[sec] N. lat. 125[deg]24[min]41[sec] W. long.
46[deg]16[min]00[sec] N. lat. 125[deg]20[min]32[sec] W. long.

(8) In the portion of the U.S. EEZ north of 46[deg]16[min] N. latitude (Washington coast).

(e) Channel Islands area closures. The following areas off the Channel Islands are closed to driftnet gear:

(1) San Miguel Island closures. (i) Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nautical miles west of Point Bennett, CA, and a line extending 6 nautical miles east of Cardwell Point, CA.

(ii) Within the portion of the U.S. EEZ south of San Miguel Island between a line extending 10 nautical miles west of Point Bennett, CA, and a line extending 10 nautical miles east of Cardwell Point, CA.

(2) Santa Rosa Island closure. Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nautical miles west from Sandy Point, CA, and a line extending 6 nautical miles east of Skunk Point, CA, from May 1 through July 31.

(3) San Nicolas Island closure. In the portion of the U.S. EEZ within a radius of 10 nautical miles of 33[deg]16[min]41[sec] N. lat., 119[deg]34[min]39[sec] W. long. (west end) from May 1 through July 31.

(4) San Clemente Island closure. In the portion of the U.S. EEZ within 6 nautical miles of the coastline on the easterly side of San Clemente Island within a line extending 6 nautical miles west from 33[deg]02[min]16[sec] N. lat., 118[deg]35[min]27[sec] W. long. and a line extending 6 nautical miles east from the light at Pyramid Head, CA.

Estimating Effort and Leatherback Take Experience for the DGN Fishery EFP

February 28, 2006

Stephen M. Stohs, Ph.D.
Fisheries Resources Division
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla CA 92037-1508

1. Introduction

The proposed EFP for the California Drift Gillnet (DGN) Fishery considers a range of alternatives which would generally permit an increase in DGN fishing effort in the leatherback conservation area north of Point Conception which is currently closed to fishing between August 15 and November 15. Many of the alternatives under consideration involve a constraint on effort in the form of a leatherback take cap[1]. Because leatherback take is inherently random, a probability model is used here in an attempt to quantify the likely range of possible outcomes for fishing effort and leatherback takes under the various alternatives. The following section summarizes the approach to estimating DGN effort. Subsequent sections provide the details of probability calculations used for estimating effort and leatherback take experience under different alternatives.

2. Summary of Effort Estimates

Our analysis was based on estimates of the change in effort which would occur under each of the proposed alternatives. The various EFP alternatives all include a set limit, a leatherback cap, or both as measures to mitigate leatherback take risk. Each EFP alternative includes geographic restrictions on fishing. The alternatives also include cases which restrict the EFP area or change the boundary of the currently closed area (through a regulatory amendment). The approach to estimating effort under the various alternative combinations of constraints is described below.

For all alternatives under consideration, we estimated that effort South of Pt. Conception would not be affected by implementation of any of the EFP alternatives. This approach was based on three reasons: (1) The approach is conservative, in the sense that the direction of the effect of any change in effort South of Pt. Conception under EFP alternatives is likely to be negative, due to a transfer of effort into the leatherback conservation area; (2) Larger-sized boats are normally used for fishing North of Pt. Sur than for fishing to the South, resulting in a degree of independence between effort levels North and South of Pt. Conception; (3) We have no way to

[1] A leatherback take cap is the maximum allowable number of observed leatherback turtle takes before EFP fishing effort is halted for the season.

reliably predict any shift in effort which would take place to the South of Pt. Conception in response to the various EFP alternatives.

For EFP alternatives, we assumed that fishing effort would continue until the first of a set limit or a leatherback cap was reached. For sub-alternatives with only set limits, the set limit was directly used as the estimated effort. Effort subject to a leatherback cap was estimated using a probability model which delivers an estimate of the expected number of sets which could be fished until a specified number of leatherback takes occurred. Based on a conservative 70% mortality rate assumption, we translated leatherback mortality caps of 1, 2, and 3 into corresponding take caps of 1, 3 and 4. We then calculated the expected effort up to the point the take cap (1, 3, or 4 leatherbacks) would be reached in order to compute the corresponding leatherback cap constraint on effort. Effort levels under alternatives with both leatherback caps and set limits were estimated as the expected fishing effort until the first of the leatherback cap or the set limit is reached.

For alternatives with area restrictions on EFP effort or boundary changes in the current leatherback conservation area, we used historic logbook effort to scale the anticipated effort under the various alternatives. We first used an analysis of logbook effort to determine the historic proportion of all DGN effort, from 1991-2000, which occurred in the leatherback conservation area and the historic proportion of fishing effort in each of the more restrictive areas under consideration. We estimated potential new effort under Alternative 7 based on an assumption that effort in the leatherback conservation area would revert from the baseline level[2] in proportion to its historic share of total logbook effort. The calculation used was *(Alternative 7 Effort) = (Baseline Effort) X [p / (1-p)]*, where p = 25.7% was the historic proportion of logbook effort in the leatherback conservation area. Effort under Alternative 6 was estimated by scaling down the Alternative 7 effort estimate by the ratio of historic effort in the Boundary Change Option 2 area to the amount of historic effort in the entire leatherback conservation area. It should be noted that historic effort in this area is based upon the entire area north of Pt Conception being open and utilized by the DGN fishery. It is not known how re-opening only a fraction of the currently closed area may affect effort and whether the historic proportions appropriately reflect future effort in this area. For EFP alternatives which included a boundary change (Alternatives 4 and 5), the estimated effect of Boundary Change Option 1 was added to the estimated EFP effort subject to leatherback caps or set limits.

Area restriction effects for EFP alternatives with area restrictions were estimated in a similar fashion to the effects of Boundary Changes 1 and 2, taking into consideration historic effort within the applicable restricted area as a share of historic effort in the entire leatherback conservation area. The area restrictions were assumed to have no effect under EFP alternatives where the area restriction estimate of effort exceeded the expected effort subject to the leatherback cap / set limit constraints; in cases where estimated effort subject to the area restriction was lower than estimated effort subject to only a leatherback cap / set limit combination, EFP effort was estimated at the average of area restriction constrained effort and leatherback cap / set limit constrained effort.

[2]The baseline level was estimated using average effort measured from historical observer records. A detailed discussion of the baseline level calculation is provided in the Environmental Assessment.

Other defensible approaches are possible to estimate effort when all three types of constraint apply; for instance, we could either apply the estimated effort change subject to the area restriction as an additional binding limit on estimated effort for EFP alternatives with area restrictions, or chose to ignore the area restriction effect on EFP effort. While using the averaging approach is *ad hoc*, due to the unknown effect on effort of combining area restrictions with set limits and leatherback caps, it is at least consistent in direction with the known qualitative effects of area restrictions on the level of effort, thereby facilitating comparison of alternatives where the area restriction is the only difference between them (i.e., Alternatives 1 – 3, and Alternatives 4 – 5).

Given the inherent uncertainty in regulating a fishery contingent on variation in a small number of leatherback takes, the estimates under the various alternatives are not intended to provide a precise forecast of what effort will actually occur, but rather a reasonable estimate of potential effort which orders the estimates to agree with the theoretical effects of the various constraints under each alternative, and which reflects historical information about the distribution of DGN effort. The approach taken is deliberately conservative, reflecting a lack of prior knowledge about how the combined impact of overlapping constraints will affect EFP effort. Several other known factors which might further reduce effort are not taken into consideration, including permit limits on the number of potential EFP participants, limits in the number of available observers to satisfy the 100% observer coverage requirement, and potential transfer of effort from the currently open area into either the EFP or into the part of the area open to all fishing under alternatives with boundary changes.

3. Probability Model for Estimating Effort and Leatherback Take Experience

The inherent randomness and unpredictability of leatherback take experience requires the use of a probability model to describe the random variation for proposed alternatives which depend upon leatherback take. The probability model used to estimate fishing effort and leatherback takes under the various proposed alternatives is based on three simplifying assumptions:

1) DGN fishing effort will continue until the point when a policy constraint requires fishing to stop.

2) Leatherback takes follow a binomial distribution with a fixed rate parameter, where the number of Bernoulli trials is equal to the number of sets fished, and the binomial take rate parameter is estimated by the historical take rate.

3) Since the number of sets fished is generally large and the take rate is small, the Poisson approximation to the binomial distribution will provide a sufficiently accurate probability calculation for the number of takes.

Under the above assumptions, the probability model for leatherback take may be described with an equation which describes the take distribution conditional on number of sets fished. Let n represent the number of sets fished and y the number of leatherback takes in a given season. Using the Poisson approximation to the binomial distribution, the probability distribution for the number of takes is given by

$$f(y \mid n) = e^{-n\theta} \frac{n\theta^{y}}{y!},$$

where θ is the take rate parameter. The probability model for the number of takes assumes that conditional on the level of effort, n, the realized number of leatherback takes is analogous to the number of heads in a series of n coin tosses, with independent probability θ of heads (analogous to a leatherback take) on each coin toss (analogous to a DGN set).

4. Does the Poisson Model Agree With Historical Data?

Use of a Poisson probability model is a standard approach for describing random count data. However, whether using a Poisson model with constant CPUE parameter is adequate for modeling leatherback take experience in the DGN fishery is an empirical question, which can be addressed using a Chi square goodness of fit test. This was done for the case at hand using annual data on the number of takes and sets for the seasons from 1990-2005. These data and the result of the Chi square test are displayed in the table shown below:

		Takes		
Year	Sets	Observed (o)	Expected (e)	$(o-e)^2/e$
1990	94	1	0.6842	0.1457
1991	210	1	1.5286	0.1828
1992	431	4	3.1373	0.2373
1993	446	2	3.2464	0.4786
1994	265	1	1.9289	0.4474
1995	282	5	2.0527	4.2318
1996	237	2	1.7251	0.0438
1997	292	4	2.1255	1.6532
1998	235	0	1.7106	1.7106
1999	153	1	1.1137	0.0116
2000	141	0	1.0263	1.0263
2001	35	0	0.2548	0.2548
2002	46	0	0.3348	0.3348
2003	13	0	0.0946	0.0946
2004	5	0	0.0364	0.0364
Total	2885	21	21	10.8897

The calculations shown above and through the remainder of this paper use an estimated leatherback CPUE parameter of $\theta = 21 / 2885 \approx 7.279$ leatherback takes per 1000 sets of DGN effort[3], based on 21 observed takes out of 2885 observed sets in the DGN fishery from 1990 through 2005. The table breaks out the number of historically observed sets and leatherback takes which occurred in the area North of Pt. Conception by year from 1990 through 1994. The expected number of takes in each is computed as the number of sets fished in that year multiplied by the CPUE.

The rightmost column computes a statistical measure of the difference between observed and expected numbers of takes in each year, under the null hypothesis that the Poisson model with fixed CPUE parameter $\theta = 21/2885$ is the underlying data generating process, computed as the squared difference between the observed and expected numbers of takes for that year divided by expected takes[4]. The rightmost column sums to a value known as Pearson's chi square statistic, which provides a measure of statistical agreement between the historically observed numbers of takes in each year and the expected number of takes under the null hypothesis; small values of this statistic are consistent with a close fit of the model to the data, while large values are indicative of disagreement. Under the null hypothesis, this statistic has an approximate Chi square distribution with 15 – 2 = 13 degrees of freedom[5]. The p-value for a one tailed Chi square test using the computed test statistic is 0.62, which indicates the historical data are consistent with the null hypothesis under conventional significance levels. On the basis of this result, the hypothesis that the data generating process is a Poisson distribution with fixed CPUE parameter $\theta = 21/2885$ is accepted and used to compute probability estimates for future DGN effort and take experience for alternatives which are impacted by leatherback caps, with individual sets each facing an independent probability of $\theta = 21/2885$ that a leatherback take will occur.

5. Estimating Effort under Proposed Alternatives with Leatherback Take Caps

The probability framework described above may be used to describe a related probability model for estimating the level of effort under alternatives which are subject to leatherback take caps. The applicable model is the *negative binomial distribution*, which describes the number of sets which could be fished up until the point when a leatherback take cap prohibits further fishing effort. Let c denote the leatherback take cap. Assuming an independent probability of θ for a take on each set, and that effort will continue until a leatherback cap is reached, the negative binomial probability that n sets are fished by the time c leatherback takes have occurred is given by

$$h(n \mid c) = \binom{n-1}{c-1} \theta^{c} (1-\theta)^{n-c},$$

reflecting the occurrence of $c-1$ leatherback takes over the first $n-1$ DGN sets, followed by a final take on the n^{th} set.

[3] The CPUE estimate here differs slightly from the estimate of 0.0077 used in the context of the discussion of protected species take experience in the EA, as the latter is based on bootstrap simulation, while the CPUE used in this report is the ratio of observed leatherback takes to observed DGN sets. The discrepancy does not have a material effect on results.
[4] Small values of $(o-e)^2/e$ reflect close agreement between the observed and expected numbers of takes.
[5] As discussed in Lindgren, the degrees of freedom are k – 1 – r, where k is the number of cells in the table and r is the number of estimated parameters (r = 1 in this case).

For alternatives with only a leatherback take cap, effort was estimated as the expected number of sets, assuming effort would continue until the limit is reached, and the probability distribution of effort is given by the above formula. For alternatives with both set limits and leatherback take caps, effort was estimated as the expected number of sets over the probability of effort with upper truncation at the set limit, resulting in lower estimated effort than for the corresponding case with no set limit. The resulting EFP effort estimates are displayed in the following table.

Expected Limit on the Number of EFP Sets					
	Leatherback Take Cap				
Set Limit	1	2	3	4	None
300	100	160	197	220	300
500	125	221	289	337	500
600	131	240	323	384	600
No set limit	137	275	412	550	NA

For example, with a set limit of 300 and a leatherback take cap of three, the expected limit on the allowable number of EFP sets is 197. Raising the leatherback take cap to four increases the expected limit on EFP sets to 220. Without a leatherback take cap, the allowable number of EFP sets is given by the set limit of 300.

6. Estimating Leatherback Take Experience under Proposed Alternatives

In this section, we use the probability framework described above to develop estimates of leatherback take experience under the DGN alternatives. The basic strategy is to use the probability distribution for the number of leatherback takes conditional on effort to estimate the probability that no more than three leatherback takes will occur under each EFP alternative[6].

For alternatives involving a leatherback take cap as well as a set limit, we assume that the leatherback take cap imposes a binding constraint on the number of leatherback takes. Under the assumptions that observer coverage measures the number of leatherback takes without error, and that effort will cease once a take cap is reached, the probability of no more than three leatherback takes equals 100%.

Under alternatives where only a set limit applies, we assume that fishing continues up until the set limit is reached[7]. The Poisson distribution of the number of takes conditional on effort may be used in these cases to estimate the probability that three or fewer leatherback takes will occur, assuming effort continues until either the applicable leatherback cap or the set limit is reached. The results of these calculations are shown in the table below.

---

[6] Using an assumed mortality rate of 70%, three leatherback takes correspond to an expected mortality of 2.1 (70% X 3). Since we have no methodology in place for considering the take experience without set limits or take caps, we did not analyze take experience under regulatory amendments to change the Southern Boundary of the closed area.

[7] The assumption that effort will continue up until a set limit is reached is deliberately conservative as a precautionary measure to limit the number of leatherback takes. Fishing effort depends on a number of unforeseeable factors, and it is entirely possible that effort would cease before a set limit was reached.

Probability of 3 or Fewer EFP Leatherback Takes					
	Leatherback Take Cap				
Set Limit	1	2	3	4	None
300	100%	100%	100%	89%	82%
500	100%	100%	100%	73%	51%
600	100%	100%	100%	66%	37%
No set limit	100%	100%	100%	0%	NA

Consider, for example, a set limit of 300. When the leatherback take cap is three, the probability is 100% that three or fewer leatherback takes will occur due to EFP fishing effort with 100% observer coverage. With a leatherback take cap of four, the probability of three or fewer leatherback takes falls to 89%; conversely, there is an 11% chance that more than three leatherbacks will be taken.

The result of these calculations indicates that a set cap alone is not sufficient to guarantee that fewer than three leatherback takes will occur. Even at the lowest set limit under consideration of 300, there is an 18% chance that more than three leatherback takes would occur.

7. Illustrative Example

An example is presented here to illustrate the relevance of the above results to choosing an EFP alternative. For purposes of discussion, suppose that fishing industry representatives are interested in maximizing the expected policy limit on effort (whether due to a leatherback take cap or a set limit), and species protection concerns dictate that the chance of exceeding three leatherback takes be reduced to an acceptable level. The probability table presented in section 6 shows that, assuming no observer error, a leatherback take cap of 3 or fewer achieves the species protection objective with 100% probability, while a higher take cap than three results in a significant probability that more than three leatherback takes would occur; for instance, even with a low set cap of 300, there is an 11% (= 100% - 89%) probability that the cap will be reached with a leatherback take cap of four, and an 18% probability that four or more leatherback takes will occur without any leatherback take cap.

Under the alternatives which guarantee that three or fewer leatherback takes will occur, the most advantageous alternative for fishing opportunity is the case with a leatherback take cap of three and no set limit, which results in an expected allowance of 412 sets of fishing under the assumption that effort continues up until the point when the third leatherback take occurred[8]. By contrast, with a set limit of 600 and a leatherback take cap of three, the expected effort allowance would drop to 323 sets, reflecting that effort would be limited to 600 sets regardless of whether the leatherback take limit had been reached.

[8] This assumption that effort continues until the third leatherback take occurs is used to calculate the expected limit on effort, and should not be misconstrued to imply that three leatherback takes would occur with certainty under this alternative.

8. Summary

The dependence of effort and leatherback take experience on a small number of random events requires the use of a probability model to adequately describe the range of potential variation in experience under the various proposed EFP alternatives. The discussion here provides a description of how this was done for purposes of analyzing the potential random variation in effort and leatherback take experience which could occur if an EFP were adopted.

The probability estimates of effort and leatherback takes are based on simplifying assumptions which may not perfectly describe the actual operation of the DGN fishery. The assumption that fishing effort will continue up until a policy constraint (leatherback cap or set limit) is reached is conservative in the sense that a number of other factors may ultimately limit effort, including logistical constraints on effort such as the limited three month length of the fishing season, and the potential for 100% observer coverage requirements to constrain effort. Further, the level of effort is a choice variable for fishermen, and it is possible that economic conditions will result in fishermen choosing a lower level of effort than what is permitted. Since we have no way to predict the effect of these other factors which may limit effort, we have adopted a conservative approach which reflects precaution with respect to predicting the level of leatherback bycatch and mortality.

No attempt was made to produce probability estimates of leatherback take for an increase in non-EFP effort due to a regulatory amendment which changes the Southern Boundary of the existing closure, as we have no methodology in place for reliably predicting the take experience given the many uncertainties which could impact future take experience under these alternatives. However, the HMS Team is concerned that unregulated effort due to a change in the Southern Boundary could result in an unacceptably high level of leatherback take, with no constraint on effort under this contingency.

The use of a Poisson model to describe probabilities which affect experience under the various EFP alternatives represents an attempt to improve on the questionable assumption that potential experience can be deterministically predicted based on historical experience. The simplicity of this Poisson modeling framework makes the analysis highly tractable and hopefully transparent, but it is worth considering what elements are left out of the model, and how these could potentially affect the analysis. One simplifying assumption is that the estimated take rate and mortality rate parameters are sufficiently accurate to safely ignore sampling variability[9]. A second simplifying assumption is that the variables[10] which govern the future variation in leatherback take and mortality are sufficiently stationary so that past experience offers a useful foundation from which to estimate future experience. Departure from these assumptions would likely result in a greater variance in the distributions of leatherback take and effort subject to a leatherback take cap.

[9] The Chi square test results show this assumption is consistent with historical data.
[10] Among other factors, these would include environmental conditions, climatic variation, and changes in leatherback population size and migration behavior.

References

Cameron, A. Colin and Pravin K. Trivedi, 1998. *Regression analysis of count data*. Cambridge University Press.

Carretta, Jim (2005) "Background information on leatherback turtle (Dermochelys coriacea) takes in the large-mesh drift gillnet fishery off California, with comments on the calculation of leatherback turtle catch per unit effort (CPUE)," *Southwest Fisheries Science Center, La Jolla Laboratory, National Marine Fisheries Service*.

Gelman, Andrew, John B. Carlin, Hal S. Stern and Donald B. Rubin, 2004. *Bayesian Data Analysis*. 3rd Edition, Chapman & Hall.

Lindgren, Bernard, 1976. *Statistical Theory*. Macmillan Publishing Co., Inc.

F:\!PFMC\MEETING\2006\March\HMS\Ex_J3 Supp Att 3 Estimating Effort EFP-1.doc

Revised 5 August 2005 (correction of Figure 4.)

Background information on leatherback turtle (Dermochelys coriacea) takes in the large-mesh drift gillnet fishery off California, with comments on the calculation of leatherback turtle catch per unit effort (CPUE).

Jim Carretta
Protected Resources Division
Southwest Fisheries Science Center
National Marine Fisheries Service
8604 La Jolla Shores Drive
La Jolla, CA 92037

One of the Highly Migratory Species Management Team (HMSMT) agenda items for 2005 is to examine the potential impact of re-opening portions of the large-mesh swordfish and thresher shark drift gillnet fishery that have been under area closures since 2001 to protect leatherback sea turtles. In their May 2005 meeting in La Jolla, the HMSMT requested that the Protected Resources Division calculate leatherback CPUE for different regions within this fishery; specifically the area south of Point Sur, California (latitude 36 degrees), and another region north of 40 degrees latitude. Jim Carretta cautioned that relatively low take rates of leatherbacks could be found on small geographic scales purely by chance (through geographic overstratification) because leatherback takes are rare events in this fishery (23 observed in approximately 7,000 sets through early 2004)[1]. It is inadvisable to calculate CPUE values for such small regions as a tool for projecting future takes. Leatherback turtles are, however, more common north of Point Conception, California (latitude 34.45 degrees), thus, separate CPUE calculations for areas north and south of Point Conception are more appropriate, as these two regions coincide with major differences in oceanographic water masses, currents, and fauna. As such, they better represent "ecological strata", rather than geographical strata.

---

[1] Peter Dutton of the Protected Resources Division's Sea Turtle Program noted at the May 2005 meeting that it was important to include biological information such as leatherback foraging habitat preferences and known migratory pathways in any decision-making regarding the relaxation of area closures or the determination of potential fishery takes. He further emphasized that foraging areas and migratory pathways may vary inter-annually, depending on prevailing oceanographic conditions.

Of the 23 observed leatherback takes, only 2 occurred south of Point Conception, CA (N 34° 27' latitude) from 4,090 observed sets (~0.5 takes/1000 sets). The two takes observed south of Point Conception were in December and January. In comparison, there were 21 observed takes from 2,871 observed sets north of Point Conception (~7 takes/1000 sets). Fourteen of the 21 observed takes occurred in October; the remaining takes were in September (4), November (2) and December (1). Of all 23 takes, thirteen turtles were retrieved dead, nine alive, and one was recorded as 'unknown'. The location of all 23 observed leatherback takes in this fishery are shown in Figure 1. The location of observed sets for the period 1990 – January 2004 are shown in Figure 2.

To examine leatherback CPUE in the drift gillnet fishery, a bootstrap analysis was performed on the actual set data to generate a distribution of "pseudo-CPUE values" for the regions south and north of Point Conception,. Simply, sets were randomly selected with replacement from the actual set data until the number of random sets was equal to the number of observed sets. This selection of random sets constituted "one bootstrap sample". A CPUE value was calculated from each bootstrap sample and this was repeated 1,000 times, resulting in a distribution of 1,000 "pseudo-CPUE values". Confidence intervals (CI) for this distribution were obtained by using the percentile method, where the lower 95% CI represents the 2.5th percentile of the bootstrap distribution and the upper 95% CI represents the 97.5th percentile. The actual set data and bootstrap CPUE values are included in the Excel file "LeatherbackCPUE.xls" (available upon request from Jim.Carretta@noaa.gov).

For the area south of Point Conception, the bootstrap mean CPUE is 0.5 leatherbacks per 1,000 sets, with a 95% CI of zero to 1.4 leatherbacks per 1,000 sets (Figure 3). North of Point Conception, the bootstrap mean CPUE is 7.7 leatherbacks per 1,000 sets, with a 95% CI of 4.5 to 10.8 leatherbacks per 1,000 sets (Figure 4). These CPUE values merely reflect the historical take rates in the fishery over large areas, and future CPUE of leatherbacks cannot be "predicted" based on these historical CPUE data. Much new information about the foraging areas and migratory pathways of leatherback turtles has been collected in this region since the area closure was implemented in 2001[2]. This biological information should be incorporated in determining which, if any, areas to re-open in this fishery, as historical CPUE values examined alone are not informative enough for good decision-making.

---

[2] Peter Dutton, Southwest Fisheries Science Center, Marine Turtle Program, 8604 La Jolla Shores Drive, La Jolla, CA 92037.

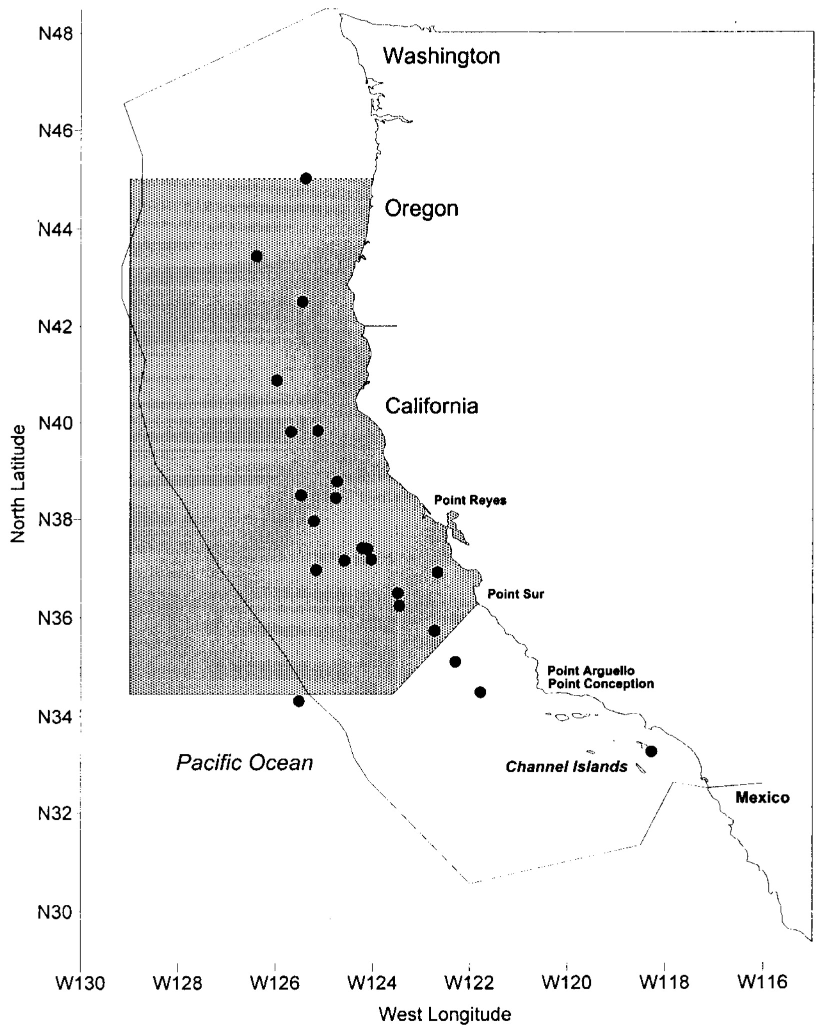


Figure 1. Location of observed leatherback sea turtle takes (n = 23) in the large-mesh drift gillnet fishery for swordfish and thresher shark, 1990 – 2004. The shaded region represents the area closure implemented in 2001 to protect leatherback sea turtles.

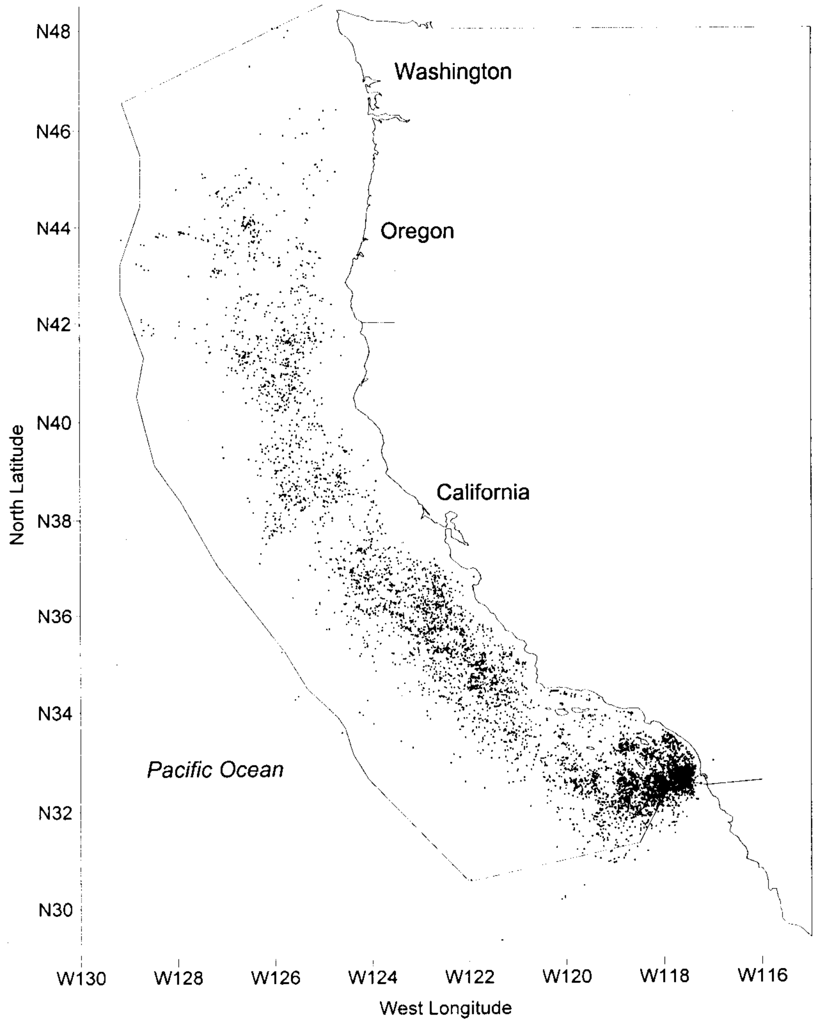


Figure 2. Locations of all observed sets (n = 6,961) in the large-mesh swordfish and thresher shark drift gillnet fishery, 1990 – January 2004.

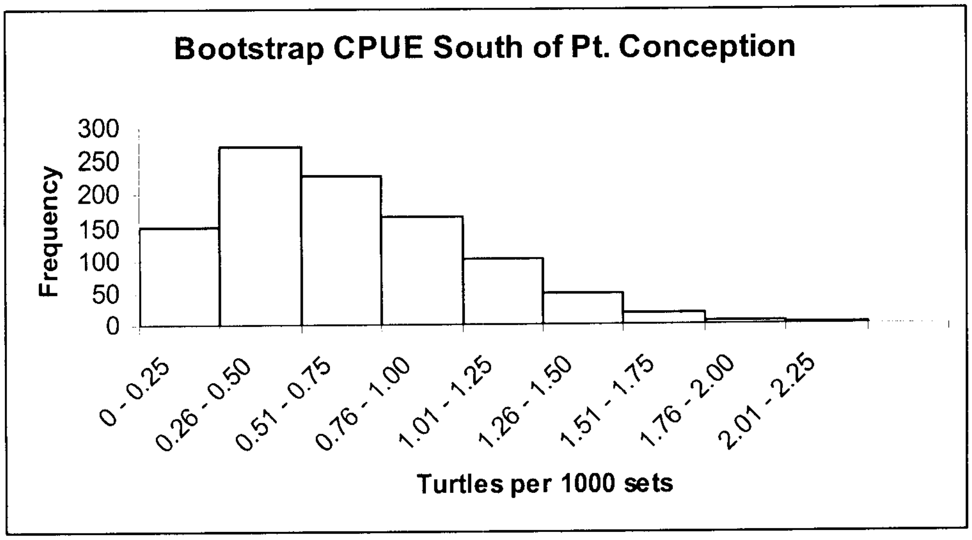


Figure 3. Distribution of bootstrap-derived leatherback CPUE values for the area south of Point Conception, California.

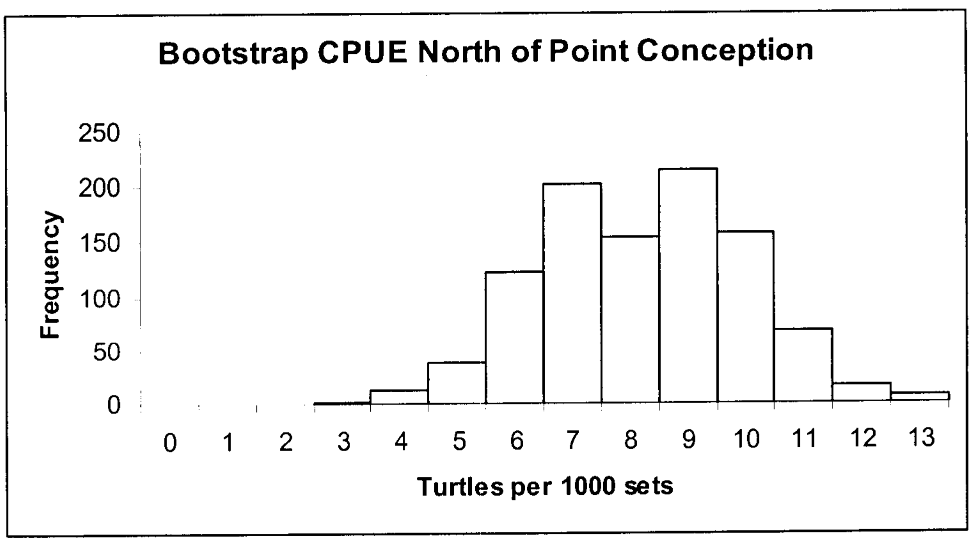


Figure 4. Distribution of bootstrap-derived leatherback CPUE values for the area north of Point Conception, California.

Projected takes of marine mammals (table 4.8.a)

	Short-finned pilot whales	Long-beaked common dolphins	Short-beaked common dolphins	Dall's porpoise	Northern Right whale dolphins	Pacific white-sided dolphins	Risso's dolphins	*Sperm whales*	*Fin whale*	Gray whale	*Humpback whale*	Minke whale	California sea lion	Northern elephant seal
				Odontocetes							**Mysticetes**		**Pinnipeds**	
PBR	1.2	242	3653	729	164	382	115	*1.80*	*15*	442	*2.3*	5.8	8333.00	2513.00
ZMRG	0.12	24.2	365.3	72.9	16.4	38.2	11.5	*0.18*	*1.5*	44.2	*0.23*	0.58	833.30	251.30
CPUE N. Pt Conc	0.0003	0.0018	0.033	0.0015	0.034	0.0021	0.0027	*0.0031*	*0.0003*	0.0009	*0.0006*	0.0003	0.0248	0.0050
CPUE S. Pt Conc	0.0003	0.0018	0.033	0.000	0.0018	0.0021	0.0027	*0.0000*	*0.0003*	0.0009	*0.0006*	0.0003	0.0248	0.0050
Baseline (No Action)														
N. Pt Conc	0.03	0.18	3.37	0.15	3.47	0.21	0.28	*0.32*	*0.03*	0.09	*0.06*	0.03	2.53	0.51
S. Pt Conc	0.41	2.45	44.91	0	2.45	2.86	3.67	*0.00*	*0.41*	1.22	*0.82*	0.41	33.75	6.81
Total	0.44	2.63	48.28	0.15	5.92	3.07	3.95	*0.32*	*0.44*	1.32	*0.88*	0.44	36.28	7.32
Additional sets alone (not added to baseline)														
100	0.03	0.18	3.30	0.15	3.40	0.21	0.27	*0.31*	*0.03*	0.09	*0.06*	0.03	2.48	0.50
200	0.06	0.36	6.60	0.30	6.80	0.42	0.54	*0.62*	*0.06*	0.18	*0.12*	0.06	4.96	1.00
300	0.09	0.54	9.90	0.45	10.20	0.63	0.81	*0.93*	*0.09*	0.27	*0.18*	0.09	7.44	1.50
400	0.12	0.72	13.20	0.60	13.60	0.84	1.08	*1.24*	*0.12*	0.36	*0.24*	0.12	9.92	2.00
500	0.15	0.90	16.50	0.75	17.00	1.05	1.35	*1.55*	*0.15*	0.45	*0.30*	0.15	12.40	2.50
600	0.18	1.08	19.80	0.90	20.40	1.26	1.62	*1.86*	*0.18*	0.54	*0.36*	0.18	14.88	3.00

Agenda Item J.3.b
Supplemental HMSMT Report
March 2006

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON DRIFT GILLNET MANAGEMENT

The Highly Migratory Species Management Team (HMSMT) developed and analyzed the range of alternatives for the drift gillnet fishery. The HMSMT notes that most of the alternatives would require approval of an exempted fishing permit (EFP) to allow access to all, or portions of, the currently closed area. Absent an EFP, regulatory action could be taken to allow access to the closed area, but participation could not be limited without an amendment to the fishery management plan.

Leatherback Turtle Conservation Measures

The HMSMT developed conservation measures designed to be implemented with the EFP to minimize impacts on endangered leatherback sea turtles. These are in the form of a turtle cap only, set limit only, or a combination of a turtle cap and set limits. The HMSMT notes that applying a turtle cap on mortalities would increase subjectivity on the part of observer, who would have to determine the condition of a turtle that was caught and released. Therefore, the HMSMT recommends that the turtle cap be implemented as a "take limit" whereby the EFP would be terminated once the number of encounters reached the cap. As there is a chance that some encountered turtles would survive, the "take limit" is slightly higher than the estimated number of mortalities (Table 1.). However, with a take limit of three, there would be less than 100% assurance that no more than two mortalities would occur.

Table 1. The HMSMT's estimates, based on the available data, of the turtle mortalities and takes that would occur at the corresponding set amounts, and the incidental take limits that would apply if a turtle cap is adopted as part of the EFP.

Set Limits	Mortality Estimates	Incidental Take Estimates	Take Limits
300	2	2.31	3
500	3	3.85	4
600	4	4.62	5

For example, some EFP alternatives constrain effort to 300 sets without a turtle cap; some impose a turtle cap of 1 without a set limit; and some include a set limit of 300 sets in combination with a turtle cap of 1. For an alternative with both a set limit and a turtle cap, the turtle cap could be reached prior to the set limit and, conversely, the total number of allowable sets could be made prior to reaching the turtle cap, resulting in foregone opportunity. The conservation community has expressed support for an alternative that would combine a set limit with a turtle cap as a precautionary measure. If the set limit is reached before the turtle cap, this reduces the expected impacts to other protected species (since, in this example, one leatherback take would shut down the EFP regardless of the amount of sets expended). However, if the EFP participants complete more sets before the turtle cap is reached, then there would be additional economic benefits to the fishery. In any case, as long as a turtle cap is selected, there would be a maximum limit on the number of turtle takes.

The turtle caps and corresponding set limits were developed during the fall of 2005 using the best available information at that time. Since then, additional analysis of the observer records has been conducted suggesting that the leatherback mortality rate in the observed historic DGN is approximately 70% (up from the original estimate of 61%). Utilizing this mortality rate, it is projected that 300 sets may result in two mortalities, not one as originally calculated. This does not invalidate the use of the set limits and turtle caps shown above, since either variable can constrain the fishery.

Incidental Marine Mammal Takes

First of all, the HMSMT would like to orient the Council to Agenda Item J.3.a, Supplemental Attachment 2), which is an errata sheet with corrected Tables 4.8.a. and 4.8.b (draft Environmental Assessment (EA), p. 135). These tables list the projected marine mammal mortalities in the drift gillnet fishery under the baseline plus specified set increments.

All marine mammals are protected under the Marine Mammal Protection Act (MMPA) and a number of marine mammal species have been observed taken in the historic drift gillnet fishery. Under the MMPA, each stock of marine mammals has a calculated potential biological removal (PBR) level, which is the estimated total anthropogenic impact (through mortalities or serious injuries) that a marine mammal stock can sustain. In the early to mid 1990's, high levels of bycatch were observed in the DGN fishery. To limit marine mammal incidental take, NMFS implemented the Pacific Cetacean Take Reduction Plan (TRP) in 1997 requiring that all drift gillnets to be set at least 36 feet from the surface of the water with a full complement of acoustic deterrents (pingers) and that drift gillnet skippers attend workshops on means to reduce impacts on protected species. Since implementation of the TRP, take rates of most marine mammals have declined substantially. Some of the species observed taken in the DGN since the TRP have very low PBRs; short-finned pilot whale PBR is 1.2, sperm whale PBR is 1.8, humpback whale PBR is 2.3. Takes of three Endangered Species Act (ESA) listed marine mammal species—sperm whales, humpback whales, and fin whales—have been observed in the drift gillnet fishery since implementation of the TRP. Fisheries are managed to ensure that levels of incidental take and mortalities do not exceed the stock's PBR (under MMPA) or result in jeopardy to the species (ESA). For some species, including short-finned pilot whales with a PBR of 1.2, environmental variables may significantly affect the probability of incidental takes.

If the EFP is approved, the HMSMT supports the use of a turtle cap only without a set limit as there would still be a maximum amount of turtles that could be taken under the EFP and the implementation of a set limit would be difficult to track (i.e., keeping a running tally of the number of sets that EFP participants make when multiple vessels fish at the same time). However, in the absence of a set limit, the HMSMT also recommends that the Council consider take limits for marine mammals to ensure that PBR is not exceeded.

Finfish Bycatch

The HMSMT reviewed the potential impacts of the alternatives on DGN target species (swordfish and common thresher shark), and non-target species (finfish, sharks, billfish, and prohibited species). The criterion used to evaluate the impact of the alternatives were whether they would result in overfishing, or an over-fished condition, for any management unit species in the highly migratory species (HMS) fishery management plan (FMP); whether the alternatives would be consistent with the management goals and objectives of the HMS FMP (e.g., stay within harvest guidelines); whether the alternatives would elevate, to an unacceptable level, conservation concerns for prohibited species; and whether the alternatives would provide sufficient monitoring resources to meet the HMS FMP management objectives. The draft EA relied upon available information from, among other sources, historic observer records and fishing logbooks. The impact analysis was constrained, however, by significant data gaps and lack of basic population dynamic information for many of the non-target species under consideration. These constraints confounded the ability to objectively evaluate the alternatives. Based upon the available information, none of the alternatives were considered to have substantial impacts on the target, non-target, and prohibited species under consideration.

EFP Proposal

As noted in November 2005, the HMSMT worked extensively with Chuck Janisse, the EFP applicant, to ensure the EFP application: 1) met the requirements of the draft proposed Interim Protocol for Consideration of EFPs for HMS Fisheries; 2) included adequate specificity for an analysis of the estimated impacts of the proposed action; and 3) addressed the issues of primary concern, such as the potential for interactions with protected species (in this case, leatherback sea turtles). The HMSMT reviewed the EFP application and believes that the provisions of the EFP, including 100% observer coverage, fishing under a maximum limit on turtle mortalities (and/or limits on the number of sets), and near real-time data reporting (via satellite phone) help ensure that turtle encounters will be accounted for and that limits or caps will not be exceeded.

The HMSMT would also like to point out that, with 20% coverage, the observer data are expanded by a magnitude of five; whereas, with 100% coverage, all encounters would be directly measured. The expansion of the observer data at 20% could result in overestimating the amount of turtle encounters in the fishery, or, given the rarity of the event, some encounters may be missed. Therefore, with 100% observer coverage, bycatch data will be collected that could better inform management of this fishery. As mentioned above, currently, this fishery is managed using assumed take and mortality rates for turtles and marine mammals, using data collected through an observer program with 20% coverage. By observing all trips within the closed area, data could be collected to determine whether the assumed rates are correct or need to be adjusted. On one hand, this could help determine whether the turtle conservation area needs to remain in effect; this could also potentially affect the drift gillnet fishery operating in the open area south of Pt. Sur, California, in a negative or positive manner, depending on the results.

Southern Boundary of Closed Area (Regulatory Amendment)

There is a substantial risk that additional leatherback and marine mammal mortalities will result from revising the southern boundary of the closed area (which is the northern boundary of the current open area) and the HMSMT would like to remind the Council that, while the EFP would have 100% observer coverage, the portion of the fleet fishing in the southern area would continue to have only 20% observer coverage. Not only would the risk of protected species bycatch increase, but future fishing opportunity would also face a risk of curtailment; for instance, a single leatherback take in an area reopened under a regulatory amendment may result in a level of take that would require re-initiation of a Section 7 consultation and potential emergency closure of the fishery an indefinite period of time. Because of this increased risk and the inability to adequately monitor turtle and other protected species encounters in this area, the HMSMT does not recommend changing the southern boundary.

Oregon Proposal

The HMSMT discussed a proposal from Oregon that would extend the turtle conservation closure north from 45°N. lat. to the Oregon/Washington border (46°16'N. lat.). The expansion of the turtle conservation area would apply from August 15-November 15 and would allow Oregon to manage the waters adjacent to the state in a consistent fashion. The HMSMT notes that this portion of the proposal would require Council action at a later date and a separate regulatory amendment.

HMSMT Preferred Alternative

The HMSMT supports Alternative 3.6, with the addition of marine mammal take limits (i.e., serious injury or mortality), such that, if any marine mammal PBR is reached, the EFP would cease for the year. This alternative includes approving the EFP, implementing a turtle take limit of 4 (which would correspond to an estimated mortality of 3), not including a set limit, not including an area restriction, and not including a change to the southern boundary of the closed area, and including marine mammal take limits of the PBR (rounded down to the nearest whole animal). As a fallback position (i.e., if NMFS determines that a turtle take limit of 4 is too high), the HMSMT would recommend Alternative 3.5, which is the same as 3.6, but with a reduced turtle limit of 3 (which would correspond to an estimated mortality of 2), again, with the addition of marine mammal take limits.

Decision-Making Tools

To assist the Council through its decision-making process, the HMSMT arranged the alternatives by degree of risk relative to turtle mortalities (Attachment 1) and developed a Decision Tree (Attachment 2), and recommends that the Council follow this step-wise list. This will help ensure that the Council's discussion remain focused on the trade-offs associated with the alternatives in each row. After completing the list of decision points, the HMSMT will then translate the actions into an overall selection of a preferred alternative.

HMSMT Recommendation:

1. Consider approving an alternative for the drift gillnet fishery; the HMSMT recommends Alternative 3.6, with marine mammal take limits set at PBR rounded down to the nearest whole animal.

2. Consider selecting a fallback alternative; the HMSMT recommends Alternative 3.5, with marine mammal take limits set at PBR rounded down to the nearest whole animal.

3. Provide guidance to the HMSMT on whether to proceed with a regulatory amendment to extend the turtle conservation area north to the Oregon/Washington border.

PFMC
03/09/06

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON DRIFT GILLNET MANAGEMENT

The Highly Migratory Species Advisory Subpanel (HMSAS) initially recommended that the Council adopt Alternative 5.5, which would open the diamond-shaped area south of Pt. Sur to all drift gillnet permit holders by regulatory amendment and would with authorize an exempted fishing permit fishery in the closed area with a cap of 2 leatherback takes. However, after further consultation with the Highly Migratory Species Management Team (HMSMT), the HMSAS decided to support the HMSMT's recommendation for the Council to adopt Alternative 3.6 as the preferred alternative. There was one vote to abstain.

PFMC
03/09/06

Agenda Item J.3.c
Supplemental SSC Report
March 2006

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON DRIFT GILLNET MANAGEMENT

Since 2001, the National Marine Fisheries Service, Southwest Region (SWR) has closed an area off the California/Oregon coast to drift gillnet (DGN) fishing during August 15-November 15. The purpose of this closure was to avoid jeopardy to leatherback turtles associated with entanglement and mortality in DGN operations. This closure (hereafter referred to in this statement as the leatherback closure) was based on a worst-case scenario, that is, the peak level of turtle takes reported in 1995 by the observer program.

The objective of the Draft Environmental Assessment (DEA) - "Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment", dated March 2006 - is "to restore fishing opportunity in the California DGN fishery without jeopardizing the continued existence of species listed under the ESA" (DEA, p. 2). The general approaches considered in the DEA for achieving this objective include: (1) an exempted fishing permit (EFP) issued to a subset of DGN vessels (with 100% observer coverage), and/or (2) a change to the boundaries of the existing leatherback closure that would apply to all DGN vessels (with 20% observer coverage).

Of the seven alternatives to the status quo considered in the DEA, alternatives 1-3 include varying provisions related to establishment of an EFP, alternatives 4-5 include both EFP provisions and a change to the boundaries of the leatherback closure, and alternatives 6-7 pertain to a boundary change without the EFP. The boundary changes considered in alternatives 5-6 would open part of the southern portion of the current leatherback closure, an area considered productive with regard to target species. Alternative 7 would eliminate the leatherback closure altogether.

The EFP alternatives included suboptions related to: (a) a leatherback mortality cap of 1, 2 or 3 turtles per year; (2) a cap on DGN effort of 300, 500 or 600 sets per year, and (3) three alternative geographic suboptions defining the portion of the current leatherback closure within which the EFP would be allowed to operate. The EFP would be subject to 100% observer coverage, with the option of renewal in future years.

The analysis of management alternatives provided in the DEA is based on a number of assumptions regarding leatherback contact and mortality rates and changes in the level/distribution of DGN fishing effort. For instance:

$ Mean turtle catch per unit of effort is assumed to be 7.7 leatherbacks per 1000 sets north of Point Conception and 0.5 leatherbacks per 1000 sets south of Point Conception (based on 1990-2004 observer data).

$ Leatherback mortality is assumed to be 70% (based on 1990-2004 observer data), with the associated inference that leatherback mortality caps of 1, 2 and 3 translate into take limits of 1, 3 and 4 respectively.

$ Effort projections for the EFP alternatives assume that fishing will not cease until the relevant set or take limit is reached.

$ The average annual baseline level of effort for the fishery under the boundary change alternatives is assumed to be 1,463 sets (based on 2001-2004 observer data).

$ DGN effort associated with each management alternative is estimated by scaling the anticipated level of effort under the alternative to the historical spatial distribution of DGN effort prior to the leatherback closure (derived from 1991-2000 logbook data).

The Scientific and Statistical Committee notes the following regarding the management alternatives:

$ There is a high degree of uncertainty in the effort projections contained in the DEA. For instance, effort projections for the EFP alternatives are treated differently from effort projections for the boundary expansion alternatives. This inconsistency is particularly apparent for alternatives 4-5 (which include both EFP and boundary expansion provisions) and alternative 7 (for which the projected number of sets reported in DEA Table 4.4 is curiously lower than the effort projections for some of the less restrictive alternatives). Also, the expectation of effort expansion under the various alternatives appears inconsistent with the negative economic producer surplus indicated in a 2003 economic survey of DGN vessels (DEA, p. 147).

$ The EFP alternatives include provisions (100% observer coverage, numeric caps on leatherback take) that strictly limit the effect of the fishery on leatherback turtles. Given these provisions, a cap on the number of sets would be superfluous with regard to leatherback protection. However, given the potential for contact between the DGN fishery and other sensitive species (e.g., sperm whales, shortfin pilot whales), a direct cap on take of these other species or a general cap on the number of sets may serve to limit these broader effects. Given the rare occurrence of leatherback interactions with the DGN fishery, an EFP without a set cap may lead to considerable expansion of effort in the fishery before the leatherback cap is reached.

$ In addition to providing DGN fishing opportunities, the DEA notes the potential use of the EFP "to gather additional information under more controlled conditions, in terms of the amount of fishing effort that would occur and the maximum impact to leatherback sea turtles" (DEA, p. 4). If this is the intent, a well-defined hypothesis, a sample stratification scheme and a power analysis should be specified. Given the low probability of leatherback interactions with the DGN fishery and the need to keep leatherback mortalities to a minimum, EFP data will likely need to be collected for many years in order to statistically detect spatial and temporal differences in leatherback contact rates.

PFMC
03/08/06

Agenda Item J.3.d
Public Comment
March 2006

*The following public comment is representative of **over 2,570** copies sent to the Council via mail, fax, and email:*

February 06, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Dr. McIsaac,

I oppose any expansion of the drift gillnet fishery off the California and Oregon coasts, either by regulation or under an experimental fishing permit. Five years ago this fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds.

The Pacific Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low. I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries.

Sincerely,

Sarah Schoenbach
9 Birch Street
Great Neck, NY 11023-2302
USA
sschoenbach@nrdc.org

*The following public comment is representative of **over 1,520** copies sent to the Council via mail, fax, and email:*

February 6, 2006

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

1-866-806-7204 (phone)
(503) 820-2299 (fax)

Dear Mr. McIsaac:

I am extremely concerned about two decisions the Pacific Fisheries Management Council will be making at its March 5-10, 2006 meeting. The Council will take a final vote on two applications for fishing permits that will undermine conservation measures protecting the critically endangered leatherback sea turtle as well as seabirds, marine mammals and sharks and other fish by allowing drift-gillnets and longlines to be used again in a critically important protected area along the California and Oregon coastline. I am writing to urge you to 1) continue the ban on longline fishing and to 2) maintain existing drift gillnet fishery time area closures along the West Coast. These two successful conservation measures protect endangered and threatened sea turtles, seabirds, sharks, marine mammals and fish.

These two effective conservation measures were originally put into place to protect the Pacific leatherback sea turtle. The leatherback sea turtle (Dermochelys coriacea) is at the top of the list of species being driven to the brink of extinction in the Pacific by the global expansion of industrial fishing. The Pacific leatherback turtle's nesting population has plummeted from 91,000 in 1980 to fewer than 5,000 in 2002. Leatherback sea turtle populations are in decline throughout their range. Leatherback sea turtles are listed as endangered under the U.S. Endangered Species Act and critically endangered by the World Conservation Union on the IUCN red list of threatened species. Leading scientists warn that unless immediate and significant steps are taken, the leatherback sea turtle, which has swum the oceans since the time of the dinosaurs 100 million years ago, will soon become extinct. Moreover, the plight of the leatherback sea turtle, the world's largest and most wide-ranging sea turtle, may foreshadow a host of extinction events that may significantly alter the oceans' ecosystem functions.

These drift-gillnet closures have provided a successful working balance between the interests of fishers and the urgent need to protect the critically endangered leatherback sea turtle which is on the threshold of extinction. During the past three years of these closures, this fishery, which targets swordfish, tuna and shark with drift-gillnet gear, had no recorded takes of critically endangered leatherback sea turtles. Such successful time/area closures, which eliminate the overlap of longline and drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction.

Allowing drift gillnets back into these areas will result in increasing injury and mortality to threatened and endangered wildlife as well as valuable recreational species. Since 2002, 64 dolphins, whales, seals and sea lions have been killed by the drift gillnet fishery. Additionally, seabirds including Northern fulmars and Cassin's auklet have been injured or killed. Injuries and killings of these species are in violation of numerous US laws including the Endangered Species Act, Marine Mammal Protection Act and the Migratory Bird Treaty Act.

One of the misconceptions perpetuated by permit applicant, the Vermont based Federation of Independent Seafood Harvesters, is that "the DGN fishery is now in serious decline because of that time/area closure." (Draft Exempted Fishing Permit Application, October 6, 2005, PFMC Briefing Book, Exhibit J.3, Attachment 2, November 2005) The facts do not support this accusation. Rather, the decline in both the number of vessels and the ex-vessel value of the catch actually began in 1994—long before the time and area closures were implemented. From 1994-2000, the number of vessels had already declined from 138 to 78 and the ex-vessel value of the catch also declined from $6.6 m to $4 m. (Status of the U.S. West Coast Fisheries for Highly Migratory Species Through 2004: Stock Assessment and Fishery Evaluation, PFMC, 2005 HMS SAFE, October 2005, p. 12) The proposed exemption would allow as many as two thirds of the remaining 36 vessels in the apparently unprofitable drift gillnet fishery into the closed areas.

Last year, 1,007 scientists from 97 countries and 281 non-governmental organizations from 62 countries delivered a letter to the United Nations urging it to implement a moratorium on harmful gillnet and longline fishing in the Pacific. The current restrictions on the longline and gillnet fisheries off California and Oregon are a model conservation measure in the spirit of this statement that should be emulated not abandoned.

The ban and time and area closures both demonstrate that the US is complying with not only the UN but also best scientific practices to protect our marine resources.

I urge you, as the Executive Director of the Pacific Fishery Management Council, to:

• Identify other measures such as capacity buy-outs that can help those who wish the leave the fishery do so without having to eliminate or weaken effective conservation measures.

• Maintain the current ban on all pelagic longline fishing within the West Coast U.S. EEZ and on shallow-set or swordfish longlining on the high seas beyond the U.S. EEZ.

• Maintain the current time/area closures that prohibit the deployment of drift-gillnet fishing gear in areas off the California and Oregon coasts when leatherback sea turtles likely to be inhabiting these waters.

Sincerely,

Dosia Paclawskyj 2826 N Calvert St #1 Baltimore, MD 21218
Paclawskyj@kennedykrieger.org

February 1, 2006

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac:

At its March 5-10, 2006 meeting, the Pacific Fisheries Management Council will take a final vote on proposals that, if implemented, will undermine conservation measures protecting the critically endangered leatherback sea turtle as well as seabirds, marine mammals and sharks and other fish by allowing drift-gillnets and pelagic longlines to be used in areas along the California and Oregon coastline in which these destructive gear types are currently prohibited.

Since 2001, areas north of Point Conception to an intersect with the Oregon coast and out beyond the Exclusive Economic Zone (EEZ) to 129° West longitude have been closed to drift-gillnet fishing from August 15th through November 15th in order to protect leatherback sea turtles which seasonally inhabit these waters. Similarly, pelagic longline fishing has been banned within 200 miles of the California coast for well over a decade, and in March 2004 this ban was extended to the entire West Coast EEZ for all pelagic longlining, and to the high seas beyond the EEZ for West Coast-based shallow-set pelagic longlining. The proposals under consideration by the PFMC would allow drift-gillnets back into the seasonally closed area when leatherbacks are present, as well as allow an „exempted‰ longline fishery in the EEZ off California.

The leatherback sea turtle (*Dermochelys coriacea*) is at the top of the list of species being driven to the brink of extinction in the Pacific by the global expansion of industrial fishing. The Pacific leatherback turtle‚s nesting population has plummeted from 91,000 in 1980 to fewer than 5,000 in 2002. Leatherback sea turtle populations are in decline throughout their range. Leatherback sea turtles are listed as endangered under the U.S. Endangered Species Act and critically endangered by the World Conservation Union on the IUCN red list of threatened species. Leading scientists warn that unless immediate and significant steps are taken, the leatherback sea turtle, which has swum the oceans since the time of the dinosaurs 100 million years ago, will soon become extinct. Moreover, the plight of the leatherback sea turtle, the world‚s largest and most wide-ranging sea turtle, may foreshadow a host of extinction events that may significantly alter the oceans, ecosystem functions.

The current drift-gillnet and longline closures have provided a successful working balance between the interests of fishers and the urgent need to protect the critically endangered leatherback sea turtle. During the past three years of the drift-gillnet closures, this fishery, which targets swordfish, tuna and sharks, had no recorded takes of leatherback sea turtles. Such successful time/area closures, which eliminate the overlap of longline and drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction.

Last year, 1,007 scientists from 97 countries and 281 non-governmental organizations from 62 countries delivered a letter to the United Nations urging it to implement a moratorium on harmful gillnet and longline fishing in the Pacific. The current restrictions on the longline and gillnet fisheries off California and Oregon are a model conservation measure in the spirit of this statement that should be emulated not abandoned.

The ban and time and area closures both demonstrate that the US is complying with not only the UN but also best scientific practices to protect our marine resources.

We, the undersigned, therefore urge the Pacific Fisheries Management Council to do the following:

* Maintain the current ban on all pelagic longline fishing within the West Coast U.S. EEZ and on shallow-set or swordfish longlining on the high seas beyond the U.S. EEZ.
* Maintain the current time/area closures that prohibit the deployment of drift-gillnet fishing gear in areas off the California and Oregon coasts when leatherback sea turtles likely to be inhabiting these waters.

Sincerely,

David Ehrenfeld
Professor of Biology
Dept. Ecology, Evolution, and Natural Resources
Cook College, Rutgers University
New Brunswick, NJ 08901-8551
USA
Founding Editor of *Conservation Biology*

As of February 10th, 122 scientists from 22 countries have signed this letter. Affiliation for identification purposes only. Listing of affiliation does not imply endorsement by that institution.

Donat Agosti
Research Associate
American Museum of Natural History and
Smithsonian Institution
Switzerland

Prof. Alex Aguilar
Professor of Animal Biology and Conservation
University of Barcelona
Spain

Homero Aridjis
President
Grupo de los Cien
Mexico

Susan Arter
Research Associate
San Diego Natural History Museum
California
United States of America

Peter J. Auster, Ph.D.
Assistant Professor
University of Connecticut
Connecticut
United States of America

Stefan Avramov
Biodiversity Coordinator
Bulgarian Biodiversity Foundation
Bulgaria

Barbara Bell, Ph.D.
University of the Sciences in Philadelphia
Pennsylvania
United States of America

Dr. Bregje Beyst, PhD
Marine Biologist
Flanders Marine Institute
Belgium

Ali Bloomfield
Research Officer
Marine Protected Areas
Australia

Christelle Bouchard
Post-Doctoral Research Associate
The Whitney Laboratory, University of Florida
Florida
United States of America

Richard Bradley
Associate Professor
Department of Evolution, Ecology and Organismal Biology
The Ohio State University, Marion
Ohio
United States of America

Dr. Clare Bradshaw
Research Fellow
Department of Systems Ecology, Stockholm University
Sweden

Dr. Daniel K. Brannan, Ph.D.
Professor of Biology
Abilene Christian University
Texas
United States of America

Tormod V. Burkey
Senior Scientist
DNV
Norway

John R. Cannon, Ph.D.
Conservation Biologist
University of Maryland
Maryland
United States of America

Heidi Perez Cao, MSc.

Zoomarine Curator
Oceanographic Park
Portugal

Dr. Andrew Chan
Department of Industrial and Manufacturing Systems Engineering
The University of Hong Kong
Hong Kong

Ngai-lai Cheng, Ph.D.
The University of Hong Kong
Hong Kong

Peter Chesson
Professor
Section of Evolution and Ecology
University of California, Davis
California
United States of America

Janeen Collings
Biodiversity Assets Ranger
Department of Conservation
New Zealand

Sarah Coote
Marine Biologist
University of Western Australia
Australia

Dr. Brian W Darvell
Reader in Dental Materials Science
The University of Hong Kong
Hong Kong

Thomas Davis
Wildlife Biologist
Garcia and Associates
California
United States of America

Dr. R. W. Day
Senior Lecturer in Zoology
The University of Melbourne
Australia

Prof. Bijan Dehgan
Professor
University of Florida
Florida
United States of America

Bill Dewey
Professor Emeritus
Dept. of Radiation Oncology, UCSF
California
United States of America

Dr. Mia W. Doron
Associate Professor of Pediatrics
University of North Carolina
North Carolina
United States of America

John Dziak
Graduate Student in Statistics
Penn State University
Pennsylvania
United States of America

E.A. Elsayed
Industrial and Systems Engineering
Rutgers, State University of New Jersey
New Jersey
United States of America

Ana C. Fonseca Escalante, M.Sc.
Professor
Ecología de Arrecifes Coralinos y (UCR)Geo-informática Marino Costera
Centro de Investigación en Ciencias del Mar y Limnología (CIMAR)
Universidad de Costa Rica
Costa Rica

Raimundo Espinoza, M.Sc.
Sustainable Development and Conservation Biology
University of Maryland
Maryland
United States of America

Julie Fekete
Ph.D. student
Drexel Univesity

Pennsylvania
USA

Stuart Field
Ph.D. candidate
University of Newcastle
Department of Biology
Australia

Myra Finkelstein
Postdoctoral Researcher
University of California, Santa Cruz
California
United States of America

Hugh Forehead
Ph.D. Student
CSIRO Marine Research
Australia

Dan Franklin
Postdoctoral Researcher
University of East Anglia School of Environmental Sciences
United Kingdom

Dr. Juan Pablo Gallo Reynoso
Investigador Titular
CIAD, Unidad Guaymas
Mexico

Barrie Gilbert
Emeritus Faculty
Dept. of Forest, Range and Wildlife Sciences
Utah State University
Utah
United States of America

Anthony J. Giordano, M.S.
Field Projects Director & Conservation Biology
LifeScape International
New York
United States of America

Carlos Ricardo Guzman Ricardo
Ecological Engineer
Universidad Popular Autónoma del Estado de Puebla

Mexico

Healy Hamilton, Ph.D.
Head, Center for Biodiversity Research and Information
California Academy of Sciences
California
United States of America

Gary Hannon, M.Sc. (Marine Zoology)
Fisheries Officer
Shannon Regional Fisheries Board
Limerick,
Ireland

Dr. Rebecca Harris
Program Coordinator
SEANET
Tufts University
Massachusetts
United States of America

Dr. Emma Harrison
Research Officer
St. Eustatius National Parks Foundation
St. Eustatius
Netherlands Antilles

Brian Hauk
Research Assistant
The Oceanic Institute
Hawaii
United States of America

Dr. Julie Hawkins
Research Associate
University of York
United Kingdom

Jane Higgins
Ph.D. Student
IASOS University of Tasmania
Australia

Ross Hill
Ph.D. Candidate

University of Technology, Sydney
Australia

Motonori Hoshi
Professor
Department of Biosciences & Informatics
Keio University
Japan

Malcolm Hunter
Libra Professor of Conservation Biology
University of Maine
Maine
United States of America

Maria Candela Iglesias
Ph.D. Student (Molecular Medicine Dept.)
Institut Pasteur
France

Maria Ikonomopoulou
Ph.D. Candidate
School of Biomedical Sciences
University of Queensland
Australia

Dr. David W. Inouye
Director
Graduate program in Sustainable
Development and Conservation Biology
University of Maryland
Maryland
United States of America

Aerin Jacob
Wildlife Biologist
University of British Columbia
Canada

John Keinath, Ph.D.
Adjunct Faculty
Columbia College of Missouri
Missouri
United States of America

Michelle Kinzel

Scientist, GIS Instructor
Coastal Ecosystems Research Foundation
California
United States of America

Arthur H. Kopelman
President
Coastal Research and Education Society of
Long Island
New York
United States of America

Dr. Frithjof C. Kuepper
Postdoctoral Research Associate
Department of Chemistry
University of California, Santa Barbara
California
United States of America

Juanita A. R. Ladyman, Ph.D.
Ecologist and Botanist/Managing Director
JnJ Associates LLC
Colorado
United States of America

Dr. Ivan Lawler
Lecturer
James Cook University
Australia

William Z. Lidicker, Jr.
Professor
Integrative Biology
University of California Berkeley
California
United States of America

Harvey B. Lillywhite
Professor of Zoology
University of Florida
Florida
United States of America

Anne Luehrmann
Biologist
IFM Geomar

Universitat Kiel
Germany

Shaheed Karl MacGregor
Veterinary Microbiologist
Zoological Society of London
United Kingdom

Nathan Mantua, Ph.D.
Research Scientist
University of Washington Climate Impacts Group
Washington
United States of America

Dr. Rene Marquez-M.
Vice president – Scientific Committee
Inter-american Sea Turtle Convention
Mexico

Dusty Marshall
Biological Research Tech
NOAA Fisheries, Marine Turtle Research Program
Hawaii
USA

Christina Mattis
Assistant Scientist
GlaxoSmithKline Pharmaceuticals
Pennsylvania
United States of America

Neil Mattocks
Senior Conservation Officer
Queensland Parks and Wildlife Service
Australia

Dr. Peter A. Meylan
Professor of Biology and Marine Science
Eckerd College
Florida
United States of America

Lance Morgan, Ph.D.
Chief Scientist
Marine Conservation Biology Institute
California

United States of America

Jon Nevill
Ph.D. Candidate
University of Tasmania
Australia

Wallace J. Nichols, Ph.D.
Director, Graduate Program in Marine Biology
Research Associate Professor in Center for Environmental Science
Department of Herpetology at California Academy of Sciences
California
United States of America

Thomas M. Niesen
Professor of Marine Biology
San Francisco State University
California
United States of America

Reed F. Noss, Ph.D.
Davis-Shine Professor of Conservation Biology
University of Central Florida
Florida
United States of America

Danielle O'Neil
Animal Care Supervisor
National Marine Life Center
Massachusetts
United States of America

Stefanie Ouellette
Project Manager
Nova Southeastern University Oceanographic Center
Florida
United States of America

Shyama Pagad
Invasive Species Specialist
IUCN SSC Invasive Species Specialist Group
University of Auckland
New Zealand

Frank V. Paladino, Ph.D.
Professor and Chair Department of Biology

Indiana - Purdue University
Indiana
United States of America

Karl Partridge, Ph.D.
Chairman, Sea Turtle Trust
59 Killyleagh St
Crossgar, Co Down
N. Ireland
United Kingdom

Andrew Peri, M.A.
Lecturer
Geography Department
San Francisco State University
California
United States of America

Jacqueline Pocklington
Ph.D. Candidate
The Museum of Victoria, Marine Invertebrate department*
Victoria
Australia

Whitney Pollard
Field Biologist
UCF Marine Turtle Research
Florida
United States of America

Thomas B. Prebble, M.D.
Marshfield Clinic
Wisconsin
United States of America

Mónica Revelles, Ph.D.
Department of Animal Biology
University of Barcelona
Spain

Elizabeth Rich, Ph.D.
Department of Bioscience and Biotechnology
Drexel University
Pennsylvania
United States of America

Sarah Richards
Marine Ecologist
National Marine Science Centre
Australia

Naomi A. Rose, Ph.D.
Marine Mammal Scientist
The Humane Society of the United States
Washington, D.C.
United States of America

Carl Safina, Ph.D
President
Blue Ocean Institute
New York
United States of America

Alaa Ed-Dine Shaker Saleh
Chemist
Atomic Energy Authority
Egypt

Sue Sargent
Coastal and Marine Coordinator
Burnett Mary Regional Goup for NRM Inc.
Australia

Dr. Raymond A. Saumure
Senior Conservation Biologist
Shark Reef at Mandalay Bay
Nevada
United States of America

C. Thomas Schaefer
Lecturer
University of Washington School of Oceanography
Washington
United States of America

Dr. Christiane Schelten
Programme Officer
Frankfurt Zoological Society
Tanzania

Beatrix G. Schramm
Conservation Biologist

Independent
United States of America

F. Richard Sheffield, Ph.D.
General Curator
Parque Zoologico de Leon
Mexico

David Sinn, Ph.D.
Research Fellow
University of Tasmania
Australia

Ronald M. Smith
Instructor
Mercer County Community College Department of Biology
New Jersey
United States of America

Gill Sorg, M.S., TSP
President
Mesilla Valley Audubon Society
New Mexico
United States of America

James R. Spotila
Professor of Environmental Science
Drexel University
Pennsylvania
United States of America

Ed Standora, Ph.D.
Biology Department
State University College
New York
United States of America

Nadia Halina Stegeman
DVM/MPH student
Tufts School of Veterinary Medicine
Massachusetts
United States of America

Todd Steiner
Director
Turtle Island Restoration Network

California
United States of America

Edna Stetzar
Biologist
Department of Natural Resources and Environmental Control
Division of Fish and Wildlife
Delaware
United States of America

Anthony Steyermark
Assistant Professor
University of St. Thomas
Minnesota
United States of America

Mei Sun, Ph.D.
Professor
Department of Zoology
The University of Hong Kong
China

Jack S. Suss
Ph.D. student
Department of Bioscience and Biotechnology
Drexel University
Pennsylvania
United States of America

Andrea Swensrud
Program Manager
Marine Science Institute
California
United States of America

Paul Switzer
Associate Professor of Biological Sciences
Eastern Illinois University
Illinois
United States of America

Simon Talbot
Boating, Diving & Field Officer
University of Tasmania &
Tasmanian Aquaculture and Fisheries Institute
Private Bag 5

Hobart TAS 7001
Australia

Dr. John Terborgh
James B. Duke Professor of Environmental Science
Co-Director of the Center for Tropical Conservation
Duke University
North Carolina
United States of America

Allen To Wai-Lun
Research Postgraduate
Department of Ecology & Biodiversity
The University of Hong Kong
Hong Kong

Elaina Todd
Marine Biologist
UnderWater World
Guam
United States of America

Dr. Marcus Trett
Scientific Director
Physalia Limited Consultant & Forensic Ecologists
United Kingdom

Sue Tuxbury
Restoration Ecologist
Save The Bay Narragansett Bay
Rhode Island
United States of America

Enriqueta Velarde
Centro de Ecología y Pesquerías
Universidad Veracruzana
Boca del Río, Veracruz
Mexico

Mário E. C. Vieira
Associate Professor
Oceanography Department
U.S. Naval Academy
Maryland
United States of America

Rachel Warren
Director
School of Environmental Sciences
University of East Anglia
United Kingdom

Simon C Wilson
Marine Environmental Consultant
Warwick University
United Kingdom

Dr. Nerida Wilson
Research Fellow
University of Adelaide
Australia

Eugenia Zandona
Ph.D. student
Department of Bioscience and Biotechnology
Drexel University
Pennsylvania
United States of America

John Zardus
Research Fellow at Kewalo Marine Lab
University of Hawaii
Hawaii
United States of America

The Council received four additional copies of the preceding letter signed by the following individuals. Listing of affiliation is for identification purposed only and does not imply endorsement by that institution.

Dr. Jeffery B. Graham
Marine Biologist and Physiologist
Scripps Institute of Oceanography
University of California San Diego
California
United States of America

Élio Vicente
Marine Biologist
Zoomarine, Director of Science and Education
Lisbon
Portugal

Regina Gandor-Edwards, M.D.
Associate Professor, Department of Pathology
University of California Davis
California
United States of America

Mr. Tomas Doherty-Bone, BSc
Student of Zoology/Leader of Belo-Community Herpetological Project, Cameroon
University of Aberdeen, School of Biological Sciences
Aberdeen
Scotland, United Kingdom

PFMC
2/16/2006

RECEIVED
DEC 29 2005
PFMC

Linn D. Barrett
4305 29th Street Road
Greeley, CO 80634

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place
Suite 200
Portland, OR 97220-1384

December 23, 2005

Re: Gillnet Exemptions

Dear Dr. McIsaac,

Since September the Pacific Fisheries Management Council has been considering a proposal to grant interim and permanent exemptions to time and area closures to gillnet fishers. Please do not grant these exemptions.

Gillnet fishing severely endangers the leatherback sea turtle. Estimated to be 100 million years old, scientists now warn that this species could become extinct in the Pacific in the next 5-30 years unless efforts are made to reduce the threat injury and death by longlines and gillnets. Moreover the number of female nesting Pacific leatherbacks has declined by 95% since 1984, and the US Pacific Coast is an important migratory route and foraging area for leatherback sea turtles.

There is no sense in taking a step backwards on gillnet and longline restriction. And taking a step backwards is exactly what the Pacific Fishery Management Council would do if it granted exemptions to gillnet fishers. I strenuously urge you to please reject the proposed exemption for gillnets from the time and area closures that protect sea turtles.

With utmost conviction and sincerity,

Linn D. Barrett

MR. DONALD McISAAC 2/7/06

EXECUTIVE DIRECTOR,

PACIFIC FISHERY MANAGEMENT COUNCIL

7700 NE AMBASSADOR PLACE, SUITE 200

PORTLAND, OR 97220-1384

RECEIVED

FEB 0 8 2006

PFMC

DEAR MR. McISAAC,

I'M WRITING TO ASK THAT SENSIBLE CONSERVATION MEASURES, WHICH HAVE BEEN ENACTED IN RECENT YEARS, BE KEPT IN PLACE. OF COURSE I AM REFERRING TO THE AUGUST 15th THROUGH NOVEMBER 15th CLOSURE TO DRIFT-GILLNET FISHING IN THE AREA FROM POINT CONCEPTION NORTH INTO OREGON AND OUT BEYOND THE EXCLUSIVE ECONOMIC ZONE OUT TO 129° WEST LONGITUDE. THIS SEASONAL CLOSURE IS NECESSARY BECAUSE CRITICALLY-ENDANGERED LEATHERBACK SEA TURTLES ARE IN THE AREA AT THAT TIME.

I HAVE READ THAT THERE ARE APPROXIMATELY ON 250 NESTING FEMALE LEATHERBACKS IN THE EAST PACIFIC (APPROXIMATELY 900 FEMALES TOTAL IN THIS REGION). THEREFORE, THIS SEASONAL BAN ON DRIFT-GILLNETS, ALONG WITH OTHER MEASURES, IS NECESSARY.

THE OTHER MEASURES WHICH NEED TO BE RENEWED ARE THE BANS ON PELAGIC LONGLINE FISHING (FOR THE ENTIRE E.E.Z. OUT TO A DISTANCE OF 200 MILES) AND ON WEST COAST-BASED SHALLOW-SET LONGLINING (OUT EVEN INTO THE HIGH SEAS, BEYOND THE 200 MILE-OFFSHORE BOUNDARY). THESE BANS ON LONGLINE PROTECT MANY COMPROMISED SPECIES, ALONG WITH THE TURTLES, OF COURSE.

RESPECTFULLY, STEPHEN AMY

730 S.W. 16th AVE. #206, PORTLAND, OR 97205

RECEIVED

FEB 13 2006

PFMC

February 6, 2006

John P. Alexander
1430 Christmas Lane
Atlanta, GA 30329

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac:

I am extremely concerned about two decisions the Pacific Fisheries Management Council will be making at its March 5-10, 2006 meeting. The Council will take a final vote on two applications for fishing permits that will undermine conservation measures protecting the critically endangered leatherback sea turtle by allowing drift-gillnets and longlines to be used again in an important protected area along the California and Oregon coastline.

I am writing to urge you to: 1) **continue the ban on longline fishing**; and to 2) **maintain existing drift gillnet fishery time area closures along the West Coast**. These two effective conservation measures were originally put into place to protect the critically endangered Pacific leatherback sea turtle which has seen its nesting population has plummeted from 91,000 in 1980 to fewer than 5,000 in 2002.

These drift-gillnet closures have provided a successful working balance between the interests of fishers and the urgent need to protect the leatherback sea turtle which is on the threshold of extinction. During the **past three years of these closures**, this fishery, which targets swordfish, tuna and shark with drift-gillnet gear, had **no recorded takes of critically endangered leatherback sea turtles**. Such successful time/area closures, which eliminate the overlap of longline and drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction.

I urge you, as the Executive Director of the Pacific Fishery Management Council, to:

• Maintain the current ban on all pelagic longline fishing within the West Coast U.S. EEZ and on shallow-set or swordfish longlining on the high seas beyond the U.S. EEZ.

• Maintain the current time/area closures that prohibit the deployment of drift-gillnet fishing gear in areas off the California and Oregon coasts when leatherback sea turtles likely to be inhabiting these waters.

Sincerely,

John P Alexander

John P. Alexander

722 Lesner Ave. 202
Norfolk, VA 23518

February 9, 2006

RECEIVED
FEB 13 2006
PFMC

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac:

The following comment is offered on the proposals that will be voted on at the March Council meeting to reopen a limited drift gillnet fishery and long-line fishery. The proposals would reopen these fisheries in an areas previously closed in order to protect leatherback sea turtles.

The marine ecosystem is a public resource and indeed has much intrinsic value of its own. Therefore the burden of proof that reopening these fisheries will not damage this resource lies with the fishing industry, and the Council should not reopen these fisheries unless that burden of proof is met. Also, given that the primary concern is the impact on an endangered species, the leatherback sea turtle, the standard of proof should be very high.

Factors to consider in meeting this burden of proof should include the level of observer coverage, a real-time observer reporting system, caps on bycatch, and enforcement of all applicable regulations. In my opinion, given the critical status of the leatherback sea turtle, the level of observer coverage should be 100% and a real-time system for reporting takes should be in place. Firm caps on takes for leatherback sea turtles in particular, and also other sea turtle and marine mammal species, should be established and the fishery closed if any of these caps are exceeded. Resources to provide a high level of enforcement should be a condition to reopening these fisheries.

Again, the burden of proof lies with the fishing industry. The marine ecosystem is a public resource and these fisheries should not be reopened unless the fishing industry can prove, to a very high standard, that the public interests will not be harmed.

Thank you for your consideration of these comments.

Respectfully,

Douglas Beckmann

RECEIVED

FEB 09 2006

PFMC

2950 Dean Parkway, #1001
Minneapolis
Minnesota 55416

February 6, 2006

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac:

I write to express my concerned about decisions the Pacific Fisheries Management Council will be making at its March 5-10, 2006 meeting. These concern two applications for fishing permits that will undermine conservation measures protecting the critically endangered leatherback sea turtle as well as other Pacific marine species. May I urge you to 1) continue the ban on longline fishing and to 2) maintain existing drift gillnet fishery time area closures along the West Coast. These two measures were originally put into place to protect the Pacific leatherback sea turtle. The leatherback sea turtle is being driven to the brink of extinction in the Pacific by the global expansion of industrial fishing.

No doubt you are aware of the toll being taken on other species, such as the albatross, by long line fishing in the Pacific. But the plight of the leatherback turtle is especially urgent. Its population can be properly described as having crashed in the last decade, and without immediate action a creature that has survived on earth longer than most may be gone forever.

Long line and drift gillnet methods of fishing are totally indiscriminate in their harvesting, and can do irreparable harm to the marine ecology. We may pay the price for these wasteful depredations for years to come, without some immediate measures to ameliorate their affects. Again, I would strongly urge you to continue the two measures that have afforded some measure of protection to threatened marine species.

Sincerely,

Peter Reed

Peter Reed

FAX

TO:	M.r D. McIsaac, Exec, Director P.F.M.	FROM:	Jennifer Kelly
FAX :	(503) 820-2299	FAX	(650) 321-1209
PHONE :		DATE:	02/11/06
RE.:	Turtle protection	PHONE	

Dear Mr. McIsaac,

As one who has followed with concern the tentative recovery of the turtle population off our west coast, I am writing to beg you to maintain the little existing protection we have afforded them. Please do not lift the ban on pelagic long line fishing, which is assisting not only turtles but many other marine species in their fight for survival. It is equally important to maintain the drift-gillnet fishing time closure during the period when the turtles are in the area to breed.

We as a species are incredibly destructive to all life on our precious planet and will undoubtedly pay the price for this sooner or later. Here is a simple opportunity to, perhaps, prevent the extinction of one of the most ancient species on earth, please see that we do so.

Sincerely,

J. P. Kelly

FAX

2139 W. Frances Rd.
Mt. Morris, MI 48458

To: Mr. Donald McIsaac
Fax number: 1503-820-2299

From: William McMullin
Fax number:
Business phone:
Home phone:

Date & Time: 2/7/2006 1:21:30 PM
Pages: 1
Re:

I urge the PFMC to continue the ban on longline fishing and to maintain existing drift-gillnet fishery time area closures along the West Coast.

This is a very important issue. I hope you will consider my comments. Thank you.

From: <rawmaterials@tds.net>
Date: Mon, 6 Feb 2006 16:28:47 +0000
To: <pfmc.comments@noaa.gov>

We urge you to not legislate fishing with gillnets of our California and Oregon coasts. We cannot even believe that this is under consideration... You are quite aware that this will further endanger our leather back turtles and will have long term negative affects on our eco system and our environments. It is time that you take responsibility and do not allow this legislation to pass.

Citizens' Sincere Concerns,

Nancy Kay Larson
Principle
Raw Materials
408 E. Wilson St.
Madison, WI 53703
rawmaterials@tds.net
608.268.0451

Subject: <no subject>
From: sanfordhigginbotham <bottega5@earthlink.net>
Date: Mon, 06 Feb 2006 09:03:06 -0800
To: <pfmc.comments@noaa.gov>

Donald McIsaac, Executive Director
Pacific Fishery Management Council

Subject: URGENT: Please stop all DRIFT GILLNETS operating in Leatherback Turtle waters

Hello Dr. McIsaac,

We must STOP any expansion of the drift gillnet fishery off the California/Oregon coasts.

This fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds.

The Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low.

I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries.

Thank you for the time here.

Best Regards,

sanford gregory higginbotham
designFIVEgroup
santa monica
kauai
bottega5@earthlink.net

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
Fax: 503-820-2299
Email: pfmc.comments@noaa.gov

Dear Dr. McIsaac,

I oppose any expansion of the drift gillnet fishery off the California and Oregon coasts, either by regulation or under an experimental fishing permit. Five years ago this fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds.

The Pacific Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low. I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries.

I worked as a professional Coast Guard licensed captain for 4 years at Island Packers, Ventura, California www.IslandPackers.com taking guests to the Channel Islands National Park 4-6 days per week. The whole business revolves around taking people out to enjoy nature, marine wildlife and our beautiful natural resources in the Channel Islands National Park and the Channel Islands Marine Sanctuary. I have personally seen a Common Dolphin killed by a gill net off the Ventura, California coast in gill net. The dolphin drowned 3 feet from the surface when it was held down by the gill net.

It was not a pretty sight with the dolphin decomposing. The highlight of the day for the guests is seeing Common Dolphins on 50% of the trips to the Channels Islands. So you can imagine the affect it had on them and their children to see a dead, decomposing Common Dolphin trapped in a gillnet. Gillnets should be illegal in any water due to the destruction they are doing, and especially in any waters of the United States.

We are the most powerful country in the world with some of the most innovative and productive minds. So why can't we outlaw gill nets to prevent destroying unwanted and discarded species like the leather back turtles and dolphins?

Sincerely,

Don Kreuter

NatureExhibit.com
65 Pine Avenue #541
Long Beach, CA 90802
562-491-1038
Don@NatureExhibit.com

Subject: Don't allow drift gillnets in our waters
From: Dianna Linden <diannalinden@earthlink.net>
Date: Mon, 6 Feb 2006 09:46:40 -0800
To: pfmc.comments@noaa.gov

Dear Dr. McIsaac,

I oppose any expansion of the drift gillnet fishery off the California and Oregon coasts, either by regulation or under an experimental fishing permit.

Five years ago this fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds. These nets harvest absolutely everything in their paths. It is a wasteful and unnecessarily destructive method of fishing. This is not proper stewardship of our ocean and marine life.

The Pacific Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low. I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries. Fishing by harvesting everything in your path, then throwing away so many living creatures is not the right way to make a living. That, sir, is just plain greed.

Your grandchildren and mine deserve to have an ocean that is still alive with diverse species. The gill nets are a serious threat to too many creatures, in particular the leatherbacks teetering on the brink of extinction.

Sincerely,
Dianna Linden

Dianna Linden
Sportsmassage therapist
diannalinden@earthlink.net
http://www.netvip.com/users/diannal/

"One of the penalties for refusing to participate in politics is that you end up being governed by your inferiors."
Plato

Part 1.2.1.1

Subject: endangered leatherback sea turtles
From: "Gijs Koudijs" <gj.koudijs@quicknet.nl>
Date: Tue, 7 Feb 2006 07:05:48 +0100
To: <pfmc.comments@noaa.gov>

Dear Donald McIsaac,

Leatherback sea turtles are the largest sea turtles in the world, weighing up to 1,500 pounds and living 30 years or longer. Named for the thick leathery hide that covers their bony shells, leatherbacks have swum the oceans since the time of the dinosaurs. But these ancient animals have been no match for the modern threats of fishing, hunting and habitat destruction.

In the Pacific Ocean, leatherback turtle populations have collapsed, with some estimates showing a 98 percent decline over the last 20 years. But despite the turtles' struggle to survive, the Pacific Fishery Management Council is considering a proposal to allow drift gillnets to be used again in waters that were previously closed to protect turtles. With leatherbacks in such dire straits, we cannot afford to risk more turtles being killed by these nets.

Please do not allow drift gillnets to further jeopardize the leatherback sea turtles' survival.

Sincerely,

Subject: gillnets and Leatherback turtles.
From: Mary Paine <mary@painepacific.com>
Date: Mon, 06 Feb 2006 17:42:45 -0800
To: <pfmc.comments@noaa.gov>

Please make every effort to protect the amazing leatherback turtles from further decline. Their nesting habitat should be protected and gillnetting should be restricted in their environment. I am especially concerned off the California and Oregon coast. Their history is long and we can take steps to help them survive. Thank you Mary Paine

Subject: Leatherback turtles
From: Nancy Zaman <nanzam3@yahoo.com>
Date: Mon, 6 Feb 2006 17:07:36 -0800 (PST)
To: pfmc.comments@noaa.gov

Dear Sir:

Gillnets are tools of corporate fishing fleets. They would gobble up all our God-given resources for spreadsheet spectacle. We humans live on a different time cycle than nature and we have to respect it in order that there is a future for our species. It is sinful not to protect what was given to us by God. We live in an Eden and we are expelling ourselves so that some coporate executive can join another country club.

Nancy Zaman
P.O. Box 2013
lake Isabella, Ca 93240

Subject: Leatherback Turtles
From: "Cheri Pillsbury" <cpillsbury@softcom.net>
Date: Tue, 7 Feb 2006 00:16:35 -0800
To: <pfmc.comments@noaa.gov>

Dear Mr. McIsaac,

Drift gill nets kill everything indiscriminately. They should not be allowed, let alone have their allowable area increased. Species such as the seriously threatened Leatherback Turtle need time to recover, and their long lived nature (until they meet a gill net) means they reproduce slowly.

For the sake of all air breathers, please do not allow these "dynamite fishing" tactics to prevail. The sea's resources are not endless. Please be a good steward.

Sincerely,

Cheri Pillsbury
2351 E. Anita St.
Stockton, CA

Subject: Protect LEATHERBACK Sea Turtles
From: "Jerry Fenning" <jfenning@verizon.net>
Date: Mon, 06 Feb 2006 19:32:40 -0800
To: <pfmc.comments@noaa.gov>

YOU MUST NOT AGAIN START USING THE LARGE DRIFT GILL NETS TO CATCH FISH IN THE OPEN OCEAN. THEY ENDANGER THE LEATHERBACK SEA TURTLES AND OTHER OCEAN LIVE.

YOU MUST NOT DO THIS!!!

Subject: Sea Turtles, Drift Nets
From: Ward Paine <ward@painepacific.com>
Date: Tue, 07 Feb 2006 17:45:22 -0800
To: <pfmc.comments@noaa.gov>

Do not allow large drift nets to be used again in the Pacific. The first effect will be to eliminate the Leatherback turtle population which is now in very bad shape.

How can you justify a return to this fishery when the problems that led to it prohibition have not bee solved?

Ward Paine

F. Ward Paine
290 Mapache Dr.
Portola Valley, CA 94028
650.851.8841

Subject: WHATS WRONG WITH YOUR THINKING ?
From: "Rob Valantine" <rob.valantine@verizon.net>
Date: Tue, 14 Feb 2006 08:07:54 -0800
To: <pfmc.comments@noaa.gov>

I CANT BELIEVE YOU ARE ACTUALLY CONSIDERING SUCH AN RIDICULOUS IDEA. I HAVE BOTH COMMERCIAL FISHED FOR MANY YEARS BUT HAVE ALSO CAPTAINED SPORTFISHING VESSELS FOR MANY YEARS AND HAVE WATCHED OUR OCEANS CHANGE CONSIDERABLY DUE TO OVERFISHING AND 90% CAN BE ATTRIBUTED TO THE USE OF IMPROPER METHODS OR LACK OF PROPER MANAGMENT. I ONCE HELD A NEARSHORE FISHERIES PERMIT AND HAD IT REVOKED ALONG WITH 1300 OTHER FISHERMAN DUE TO RIDICULOUS MANAGMENT POLICIES. THEY LET THE SAME 4 OR 5 HUNDRED NET AND TRAP FISHERMAN THAT PRODUCED THE HIGHEST YIELD FOR THE LONGEST PERIOD OF TIME CONTINUE TO RAPE THE OCEAN ALL IN THE NAME OF $$$$$$$$$.THESE ARE THE SAME PEOPLE WHO PUT OUR OCEANS IN THE SITUATION WE ARE IN TODAY WITH EMERGENCY CLOSURES AND LIMITS. CAN YOU NOT OPEN YOUR EYES AND REALIZE THAT YET ANOTHER FORM OF MASS DESTRUCTION I.E. NETS ,TRAPS ,LONGLINES,SEINERS, TRAWLERS WILL JUST PUT ANOTHER SPECIES OF FISH ON AN INDANGERED LIST ! HOW AND WHY YOU PEOPLE CAN EVEN CONSIDER SUCH A LAME IDEA IS AMAZING! YOUR EFFORTS SHOULD BE PUT TO BETTER USE SUCH AS HALTING THE MASS DESTRUCTION OF THE COMMERCIAL PURSIENER FLEET THAT IS WIPING OUT OUR OCEANS BIOMASS RIGHT IN FRONT OF YOUR VERY EYES !!!! THE AMMOUNT OF SQUID BEING DESTROYED IN LOCAL CALIFORNIA WATERS IS COMPLETELY UNACCECPTABLE. THEY HAVE CHANGED THE FEEDING AND SPAWNING PATTERNS OF MANY FISH AT OUR LOCAL ISLANDS ! NESTS ARE NOT EVEN GIVIN A CHANCE TO REPRODUCE BEFORE THEY ARE WRAPPED AND DESTROYED !!! THE SAME AFTERMATH WILL EVENTUALLY TAKE PLACE WITH LONGLINING. INCIDENTAL CATCHES OF SHARK AND IMMATURE MARLIN AND SWORDFISH ARE GUARANTEED ! YOU PEOPLE AMAZE ME AND THE PUBLIC ! WHY ARE YOU EVEN IN OFFICE ? WHAT ARE YOU THINKING !!!!!

Subject: Longline Fishery
From: DKadota@aol.com
Date: Tue, 14 Feb 2006 12:40:01 EST
To: pfmc.comments@noaa.gov

I am a fleet owner of three sportfishing vessels in San Diego, CA., and I am opposed to allowing any indiscriminate modes of fishing brought back into our waters. Over the years of banned gill nets and long lines in our local waters, we've found a vast improvement of the numbers of fish stock coming back. What appalls me the most, is a lack of knowing what trends have been set in conservation by way of the sportfishing fleet. The quality of fish is a huge issue today, and fish counts take a back seat to less fish, but "sashimi grade" fish.

After an angler catches what he can use, instead of what he is allowed, the remainder of the fish are released unharmed. This is not the case with gill nets, and long lines where all the fish are killed, left in terrible shape as far as fish quality goes. What a tragic waste of a tremendous asset.

Sincerely,
Dan Kadota

Subject: EXEMPTED FISHING PERMIT - CONCERNED COMMENT
From: "Charles G" <Agemoman@aol.com>
Date: Thu, 9 Feb 2006 19:26:51 -0500
To: <pfmc.comments@noaa.gov>

February 9, 2006

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
VIA EMAIL

To: Council Members, Pacific Fisheries Management Council
Subject: Longline Exempted Fishing Permit Request

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there is no rational reason to even consider expanding existing fisheries. Do not recommend issuance of the proposed EFP for longline gear.

Thank you for your consideration to this important matter.

Sincerely,

Charles L. Greenberg

Subject: just to let you know...
From: sneeuwpad@hotmail.com
Date: Thu, 09 Feb 2006 14:11:40 -0800
To: pfmc.comments@noaa.gov
CC: robert@seaturtles.org

Please take a little time to watch a female leatherback lay her eggs. It will only take you one night, and once you've seen this action take place, you will do everything in your power to protect this very special, beautiful ancient animal.

I have to warn you though, you will need to go out there as soon as possible, since money-minded people are killing and destructing life, nature and this planet in total right now, as we speak.

It seems they have forgotten that money cannot buy life, it cannot buy extincted animals and it cannot buy a new planet.

Please think twice, and then decide... (the only right thing)

Thank you for reading this. Mariska Schrever
someone who caresKarnemelksloot 118 Gouda, Zuid-Holland 2806 BJ sneeuwpad@hotmail.com

Subject: Leatherback sea turtle boundry
From: Morrobayds@aol.com
Date: Fri, 10 Feb 2006 10:23:53 EST
To: pfmc.comments@noaa.gov

Council Members
I'm IN FAVOR of moving the southern boundary of leatherback sea turtle closure.

The NMFS placed the southern boundary further south than was called for in the 2000 biological opinion. The reason was two electronically tagged turtles migrated through the area. Leatherback seaturtles rarely dive below 2 meters while migrating. Swordfish nets are now by law set at a minimum of 12 meters. This was done after an analysis by the Take Reduction Team showed that interactions rarely occur with the added depth. The Swordfish fleet has had zero interactions north of Pt. Conception since 1999.

Thankyou for your consideration
Diane Schoditsch
Morro Bay CA

Subject: Modifying the Sea turtle closure for Drift gillnets
From: Salmonfolk@aol.com
Date: Fri, 10 Feb 2006 10:20:09 EST
To: pfmc.comments@noaa.gov

I'm IN FAVOR of changing the southern boundary of the Leatherback sea turtle closure.
By moving the southern boundary the swordfish fleet will be able to access two canyons that are historically important to the fishery. The NMFS 2000 BiOp shows no additional impacts would be incurred by moving the boundary line.

Tom Roff
Morro Bay CA

Subject: continue ban of gillnets in turtle habitat
From: TScruggs <mscruggs@owl.csusm.edu>
Date: Fri, 10 Feb 2006 22:16:08 -0800
To: pfmc.comments@noaa.gov

Dear Dr. McIsaac,

I can't imagine why on earth why the Pacific Fishery Management Council would seriously consider allowing drift gillnets back into leatherback sea turtle territory. Please don't! And considering the considerable destruction that these gillnets cause, I hope they will soon be illegal.

Sincerely,

Tena Scruggs
PO Box 3131
Escondido CA 92033

The following public comment is representative of 3,397 emails, faxes, and letters received by the supplemental public comment deadline (including more than 2,750 received by the February 15th briefing book deadline).

Subject: Don't allow drift gillnets in endangered leatherback turtle waters
From: "Nancy Kramer"
Date: Wed, 15 Feb 2006 20:02:02 -0500
To: "pfmc.comments@noaa.gov"

February 15, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Dr. McIsaac,

I oppose any expansion of the drift gillnet fishery off the California and Oregon coasts, either by regulation or under an experimental fishing permit. Five years ago this fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds. The Pacific Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low. I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries.

Sincerely,

Nancy Kramer
125 Rivoli St
San Francisco, CA 94117-4340
USA
boldenkramer@yahoo.com

The following public comment is representative of 1,596 emails, faxes, and letters received by the supplemental public comment deadline (including more than 1,520 received by the March 15th briefing book deadline).

Subject: Keep the Current Restrictions on Drift-Gillnets and Longlines
From: lawyer112@aol.com
Date: Wed, 15 Feb 2006 18:53:21 -0800
To: pfmc.comments@noaa.gov
CC: robert@seaturtles.org

February 6, 2006

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

1-866-806-7204 (phone)
(503) 820-2299 (fax)

Dear Mr. McIsaac:

I am extremely concerned about two decisions the Pacific Fisheries Management Council will be making at its March 5-10, 2006 meeting. The Council will take a final vote on two applications for fishing permits that will undermine conservation measures protecting the critically endangered leatherback sea turtle as well as seabirds, marine mammals and sharks and other fish by allowing drift-gillnets and longlines to be used again in a critically important protected area along the California and Oregon coastline. I am writing to urge you to 1) continue the ban on longline fishing and to 2) maintain existing drift gillnet fishery time area closures along the West Coast. These two successful conservation measures protect endangered and threatened sea turtles, seabirds, sharks, marine mammals and fish.

These two effective conservation measures were originally put into place to protect the Pacific leatherback sea turtle. The leatherback sea turtle (Dermochelys coriacea) is at the top of the list of species being driven to the brink of extinction in the Pacific by the global expansion of industrial fishing. The Pacific leatherback turtle's nesting population has plummeted from 91,000 in 1980 to fewer than 5,000 in 2002. Leatherback sea turtle populations are in decline throughout their range. Leatherback sea turtles are listed as endangered under the U.S. Endangered Species Act and critically endangered by the World Conservation Union on the IUCN red list of threatened species. Leading scientists warn that unless immediate and significant steps are taken, the leatherback sea turtle, which has swum the oceans since the time of the dinosaurs 100 million years ago, will soon become extinct. Moreover, the plight of the leatherback sea turtle, the world’s largest and most wide-ranging sea turtle, may foreshadow a host of extinction events that may significantly alter the oceans’ ecosystem functions.

These drift-gillnet closures have provided a successful working balance between the interests of fishers and the urgent need to protect the critically endangered leatherback sea turtle which is on the threshold of extinction. During the past three years of these closures, this fishery, which targets swordfish, tuna and shark with drift-gillnet gear, had no recorded takes of critically endangered leatherback sea turtles. Such successful time/area closures, which eliminate the overlap of longline and drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction.

Allowing drift gillnets back into these areas will result in increasing injury and mortality to threatened and endangered wildlife as well as valuable recreational species. Since 2002, 64 dolphins, whales, seals and sea lions have been killed by the drift gillnet fishery. Additionally, seabirds including Northern fulmars and Cassin's auklet have been injured or killed. Injuries and killings of these species are in violation of numerous US laws including the Endangered Species Act, Marine Mammal Protection Act and the Migratory Bird Treaty Act.

One of the misconceptions perpetuated by permit applicant, the Vermont based Federation of Independent Seafood Harvesters, is that "the DGN fishery is now in serious decline because of that time/area closure." (Draft Exempted Fishing Permit Application, October 6, 2005, PFMC Briefing Book, Exhibit J.3, Attachment 2, November 2005) The facts do not support this accusation. Rather, the decline in both the number of vessels and the ex-vessel value of the catch actually began in 1994—long before the time and area closures were implemented. From 1994-2000, the number of vessels had already declined from 138 to 78 and the ex-vessel value of the catch also declined from $6.6 m to $4 m. (Status of the U.S. West Coast Fisheries for Highly Migratory Species Through 2004: Stock Assessment and Fishery Evaluation, PFMC, 2005 HMS SAFE, October 2005, p. 12) The proposed exemption would allow as many as two thirds of the remaining 36 vessels in the apparently unprofitable drift gillnet fishery into the closed areas.

Last year, 1,007 scientists from 97 countries and 281 non-governmental organizations from 62 countries delivered a letter to the United Nations urging it to implement a moratorium on harmful gillnet and longline fishing in the Pacific. The current restrictions on the longline and gillnet fisheries off California and Oregon are a model conservation measure in the spirit of this statement that should be emulated not abandoned.

The ban and time and area closures both demonstrate that the US is complying with not only the UN but also best scientific practices to protect our marine resources.

I urge you, as the Executive Director of the Pacific Fishery Management Council, to:

• Identify other measures such as capacity buy-outs that can help those who wish the leave the fishery do so without having to eliminate or weaken effective conservation measures.

• Maintain the current ban on all pelagic longline fishing within the West Coast U.S. EEZ and on shallow-set or swordfish longlining on the high seas beyond the U.S. EEZ.

• Maintain the current time/area closures that prohibit the deployment of drift-gillnet fishing gear in areas off the California and Oregon coasts when leatherback sea turtles likely to be inhabiting these waters.

Sincerely,

Phillip Angel Faria, Jr.
Home36 First Avenue Bay Shore, New York 11706 lawyer112@aol.com

Predicting Extinction: Fundamental Flaws In IUCN's Red List System, Exemplified By The Case Of Sea Turtles

by

N. Mrosovsky

Department of Zoology
University of Toronto
Toronto, Ontario,
Canada M5S 3G5

p. 24–34
re red listing of
leatherbacks
with compliments
N.M.

made for these doves and for the saltwater crocodile. These cases are raised here only to exemplify inconsistency. Maybe the IUCN system "can be applied consistently by different people" — one of the aims of IUCN (1994) — but it is clear that this is not in fact taking place. According to the criteria, the saltwater crocodile should probably have been placed in the highest category of threat (Critically Endangered) or, if not, at least in the second category (Endangered). Instead, it ended up as Least Concern.

Mediterranean green turtles and Pacific leatherbacks.

Further inconsistencies arise with respect to listing of widespread species. Green turtles were listed as Endangered in 1996, but those in the Mediterranean were designated Critically Endangered. Why was only this population given a different listing, with no indication that other populations, such as the large one nesting in Tortuguero, Costa Rica, had almost tripled in number since 1971 (Bjorndal et al, 1999; see also Solow et al 2002). A person looking at the Red List would be led to think that globally the green turtle was considered Endangered, with an especially dire situation in the Mediterranean. They would see no hint — no documentation was provided then — that the Endangered status for some other populations was, at the least, debatable. If the criteria were applied at the population level for green turtles — a reasonable approach with a widespread species — why was this done only for the Mediterranean population? Why give only the bad news?

Another example of the bad news overwhelming the good news for a widespread species occurs in the recent red listings of the leatherback turtle. This species has the widest distribution of any reptile, ranging from tropical beaches for nesting to cold waters far south and north for feeding. The leatherback was moved from Endangered to Critically Endangered in 2000, following increased concern about declines in the Pacific.

The documentation (IUCN 2000) supporting this listing states that analysis of two published estimates of the global population (Pritchard 1982; Spotila et al 1996) suggest a 70% decline in one generation. But this analysis was not actually produced! Presumably because the first estimate was 115,000 females and the second was 34,529, the 70% comes from the difference of 80,471, which is 70.0% of the earlier estimate. There are numerous potential problems about using this approach in this case.

A question that immediately arises is, were these two estimates sufficiently similar in coverage and methodology to be validly compared? Spotila et al's (1996) estimate "includes the same beaches" as Pritchard's (1982) estimate. However, Pritchard adds on 3,000 females to the world population to allow for dilute but widespread nesting in Melanesia. This area does not appear in Spotila et al's list. So it would appear that 3,000 should be taken from Pritchard's estimate to make the areas covered comparable to those in Spotila's estimate. But, on the other hand, something might be added to Pritchard's estimate (or taken from Spotila et al's) because Pritchard (1971, 1982) does not include Gandoca in Costa Rica, The Dominican Republic, or Puerto Rico, all of which are included in Spotila et al (1996).

There may be other cases in which areas surveyed were not comparable, but it is hard to go into this because not infrequently information comes from personal communications (Spotila et al 1996). IUCN now has a policy for red listing that anything cited that is not already in the public domain must be made available (S&PS 2001). This was introduced officially after the 2000 listing of the leatherback as Critically Endangered. For future listings or re-listings, one should expect ready availability of personal communications. That will still leave a nice question for IUCN to decide: what to require in terms of availability when the documentation supporting a listing refers to a publication in the public domain, such as Spotila et al (1996), if that publication itself makes considerable use of personal communications?

Probably a more complicated matter than sorting out whether exactly the same stretches of beach have been compared is arriving at estimates for particular years. Estimating changes in populations over time cannot be done on the basis of publication dates of estimates, certainly not if only 14 years apart. This appears to be another example of what is meant to be a standard system being applied in different ways. To assess if any of the decline thresholds for IUCN's criteria are met, one needs to have estimates for three generations ago and compare those to current estimates, or for when the listing was made. For this one needs some sort of table, with the numbers estimated for each beach, and the dates to which those estimates apply, not when they were published, and then extrapolations back to three generations ago and forward, if necessary, to the present (cf Seminoff 2002) — not a simple task as the years for which data are available often vary among beaches.

But the leatherback listing of 2000 does not even make an attempt to provide such information. Essentially, the case for being Critically Endangered rests on the citation of those two published estimates. This is minimal supporting documentation. And it is likely to result in erroneous impressions of the rate of changes in numbers. Although Pritchard's estimate was published in 1982, for parts of the world other than Mexico many of his estimates came from an earlier paper (Pritchard 1971). Taking 1982 as the date may give the impression that the changes in numbers have been more rapid than in fact was the case.

Another problem with a comparison between the 1982 and the 1996 global estimates is that what was known in 1996 may or may not reflect the situation in 2000, the year when the move to Critically Endangered was made. For example, Spotila et al (1996) give the numbers of females for Isla Culebra, part of Puerto Rico, as 12-27; they cite a 1990 annual report as the source of these figures. By the end of the 1990s, however, three to seven times as many leatherbacks were nesting in a year on Culebra, to be specific, 87 for 1999 (Soler 1999).

For Florida, Spotila et al (1996) cite a figure of 35 female nesters, based on a 1995 report. However, leatherback nesting has been going up in Florida in the 1990s (Weishampel et al 2003; Florida Marine Research Institute 2003; Anon 2003) and was almost certainly greater in 2000 than 1995.

Because the Culebra and Florida populations of leatherbacks are small, higher current figures make little difference to the overall estimates, but for other populations failure to use more current values makes more difference. Thus, in the case of Gabon, the 1996 paper (Spotila et al 1996) gives values of 1,276-2,553 females per year (to be consistent with their use of an average of five nests per female, they should have taken only the latter figure). These figures come from a 1988 publication by Fretey and Girardin. Since that time, more information has become available. In the 1999-2000 leatherback season, after extensive field work, 29,686 nests were estimated for Gabon (Billes et al 2000); assuming five nests per turtle, that gives 5,937 females. This makes the Gabon aggregation of leatherbacks arguably the largest for any single country in the world, though because of the variable coverage of beaches in Suriname and French Guiana, and movement of turtles between eroding and newly formed beaches in that region, perhaps there are even more leatherbacks in the Guianas. In 2001, at least 30,000 leatherback nests were estimated to have been laid in Suriname alone (Hilterman and Goverse 2002).

But whether Gabon or the Guianas host more leatherbacks, Gabon is undoubtedly a major breeding area for this species. Yet Gabon was scarcely mentioned in the documentation accompanying the IUCN (2000) listing; it is not even in the list of countries under Distribution. It appears that a preliminary report on the newer work in Gabon appeared in 2000 (Fretey and Billes 2000; see also Fretey 2001). Regardless of what was actually published at the time, those promoting the 2000 leatherback listing failed to consult adequately and obtain information from French biologists. Instead of using an up-to-date value approaching 6,000 females, they went back to the paper of Spotila et al (1996) which itself had used a value from a 1988 paper, a value less than half the number in the 1999-2000 season. At the least, an average of the two numbers should have been used.

These are a few examples of matters the 2000 documentation of the leatherback listing fails to cover. Whether a more thorough analysis would justify the Critically Endangered listing or not, according to IUCN criteria, is not speculated on here. It is up to the designated Red List Authorities to do the work and to come up with better supporting material — if the listing process is to be taken seriously as a scientific exercise.

Another point that should be considered, if this matter were revisited, is how much weight to put on the estimates in Pritchard (1982) for the West coast of Mexico. As he himself has said, "I probably chanced to hit an unusually good nesting year during my 1980 flight along the Mexican Pacific coast, the population estimates derived from which (Pritchard, 1982) have possibly been used as baseline data for subsequent estimates to a greater degree than the quality of the data would justify" (Pritchard 1996). A further irony is that Sarti et al (1996) say that Pritchard's (1982) population values for leatherbacks in Mexico "appear to be overestimates" when later, as an Assessor for the sea turtle Red List Authority, Sarti used Pritchard's paper in support of the Critically Endangered listing.

Among other problems in Pritchard's (1982) estimates are that the number of tracks was not tallied, and even if it had been possible to do this, there was no ground truthing for the flight. The estimate depended greatly on an extrapolation from a figure of 500 leatherbacks per night for a section of beach;

this ballpark figure of 500 was suggested by a biologist who had worked in that area. Building on this uncertain basis, Pritchard thought there might be 1,500 females per night in the combined states of Michoacan, Guerrero, and Oaxaca at the height of the season. Allowing for a 10-day internesting interval, that gives about 15,000 females over a 10-day period. This value was then doubled to reflect individual animals having shorter nesting seasons than for the population as a whole. It is surprising that this doubling — on paper — of the population estimate has not received more scrutiny and discussion. Another large uncertainty is the addition of 12,000 breeding females for East Pacific areas outside those in Mexico surveyed on the 1980 flight (i.e., including nesting on the Pacific coast of Costa Rica).

Pritchard's (1982) report of the high densities of nesting, and the extent of the beaches hosting nests along this coast, was an important contribution. Moreover, the estimates he gave were thoroughly and appropriately qualified with cautions. Unfortunately, these qualifications are often ignored or lost when these estimates are fed into the IUCN procedure, with their threshold values of 80%, 50%, and 20% declines over three generations for determining categories of threat. Is it really meaningful to put so much weight on the numerical values for estimated global declines when the data from which conclusions are drawn are so imprecise?

But the difficulty is not simply that there are problems with Pritchard's (1982) estimate — there are assumptions with most estimates. The difficulty is that the methods used by Pritchard (1982) and Spotila et al (1996) would seem to have differed, thereby weakening comparisons. The latter give values for the totals for the season which are based, at least in some cases, on surveys of nests over much of the season; for converting numbers of nests to numbers of females it is assumed that an individual lays five times in a nesting season. Pritchard's estimates (1971, 1982) are based on taking a figure for number of nests laid on a night during the "peak weeks" (Pritchard 1982) of the season or on "an average night" (Pritchard 1971), and multiplying by 20 to convert it to the number of female leatherbacks in the season. This conversion factor depends not only on an internesting interval of 10 days, for which there is plenty of evidence, but also on the assumption that individual turtles nest at these 10-day intervals for two months out of a total four-month nesting season, which is more problematical. So all that is needed in Pritchard's procedure is to multiply the number nests on a night by 20 (X 10 for different turtles over

Table 2. **Conversion factors for estimating the number of female leatherbacks nesting per season from the number of nests on a night at the peak of the season. Data for Suriname from Schulz (1975). Note: if turtles nest 7 or more times per season, conversion factors will be lower.**

Year	Total Nests Per Season	Total Nests in May (Peak)	Nests / Night in May	Females Per Season if Each 6 Nests	Conversion Factor
1964	95	35	1.1	15.8	14.0
1967	90	25	0.8	15.0	18.6
1968	200	85	2.7	33.3	12.2
1969	305	105	3.4	50.8	15.0
1970	255	90	2.9	42.5	14.6
1971	285	100	3.2	47.5	14.7
1972	380	125	4 .0	63.3	15.7
1973	900	320	10.3	150.0	14.5
1974	785	280	9.0	130.8	14.5
1975	1,625	625	20.2	270.8	13.4
					14.7 mean

the internesting interval and X 2 for the nesting season of the population being longer than that for an individual turtle).

This is certainly a quick method, quick and — debatable. It is not validated. A 20 conversion factor seems too high, on the basis of analysis of data from Suriname for the actual numbers of nests over almost full seasons of monitoring, as well as a breakdown into monthly totals (Table 2). From such data one can calculate the number per night at the height (peak month) of the season. Assuming that on average an individual nests 6 times per season, to be equivalent of Pritchard's (1971, 1982) nesting every 10 days for 2 months, one can derive the total numbers of individual females (nests/6). One can then calculate the conversion factor that would need to be applied to the number per night at the peak of the season to give the total number in the season. For the Surinam data covering 10 seasons, the values range from 12.2 to 18.6, with a mean of 15 (Table 2).

A conversion factor of 15 is smaller than the 20 used by Pritchard (1971, 1982). When applied to a number of 15,000 per night, Pritchard's (1982) starting point for Michoacan, Guerrero and Oaxaca, whether one uses a 15 or 20 conversion factor, makes a difference of 7,500 turtles per year. This difference is compounded to 18,750 to allow for an individual female nesting approximately only every 2.5 years on average.

Of course, application of a 15 conversion factor derived from Surinam data to a population on the west coast of Mexico may not be justified. These calculations are given only to show that it should be possible in principle to obtain some validation of conversion factors (see also Kerr et al 1999), and that what factors are used can make a major difference to the bottom line.

None of this denies that there are serious problems to be addressed. Loss of leatherbacks incidentally caught in fishing nets, or on long lines, is probably the greatest. Declines at known nesting areas in the Pacific should stimulate efforts to make sure the same does not occur elsewhere. Nevertheless, if the Red Lists are to be instructive, they should reflect the situation, as far as it is known, which for leatherbacks is that they are doing much better in the Atlantic than the Pacific. As well as there being major breeding aggregations in the Guianas and in Gabon, a number of smaller populations in the Atlantic currently appear to be increasing, namely those in Florida (Weishampel et al 2003; Florida Marine Research Institute 2003; Anon 2003), the US Virgin Islands (Boulon R, pers comm 24 Oct 2003), and some beaches in Puerto Rico (Soler 1999). One hears that there is a sizeable leatherback population in Trinidad, with >10,000 nests per year (e.g., Hilterman and Goverse 2003) but I have been unable to obtain confirmation from those working there.

The different situations for Atlantic and Pacific leatherbacks could have been recognized by listing the Pacific population as Critically Endangered, on the basis of the declines there, while leaving the species as a whole as Endangered, or in some lesser category of threat. A split listing of this kind would have been consistent with the way the Mediterranean green turtle was handled. It is not simply that citing differences between two population estimates derived by different methods, covering different areas, and based on data for years other than their publication dates is an inadequate and idiosyncratic procedure for documenting declines over three generations. The problem with the leatherback listing goes deeper. It stems from the fundamental flaw in the IUCN criteria method of making global listings for widespread species. Even if a 80% decline on a global basis for the leatherback were properly supported, the present red listing description — "facing an extremely high risk of extinction in the wild" — would be unconvincing. As Pritchard (1996) put it: "The term 'extinction' is a very absolute one. It should not used casually. The extirpation of leatherbacks throughout extensive parts of their global range does not constitute 'extinction.'"

Supremacy of the Criteria Over Common Sense

Contradictions in the hawksbill listing.

The hawksbill turtle is listed as Critically Endangered. This is the summary label put on this species for the public. Few will have time or interest to go into the fine print underlying this categorization. This fine print is not always simple. Consider some of the present (IUCN 2001a) criteria for Critically Endangered, those concerning decreases in numbers:

> An observed, estimated, inferred or suspected population size reduction of greater than or equal to 90% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
> (a) direct observation
> (b) an index of abundance appropriate to the taxon
> (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
> (d) actual or potential levels of exploitation
> (e) the effects of introduced taxa, hybridization, pathogens, pollutants or parasites.

However, where the reduction or its causes may not have ceased, or may not be understood etc., one then goes through the above again, but this time with an 80% cut-off. If one is still in doubt, there are 49 pages of recently available guidelines for using the categories and criteria (S&PS 2003).

Not surprisingly, most of the public will simply accept the Critically Endangered designation as meaning that the species is critically endangered. Few will ask about the criteria for being categorized in this way, fewer will struggle to unravel the meaning of the criteria, and virtually no one will check on the scientific support and documentation for the listing. If they do so for the hawksbill turtle, they will be surprised. The Marine Turtle Specialist Group (MTSG) is the Red List Authority for sea turtles. In the official position of the MTSG on the status of the hawksbill (Meylan and Donnelly 1999) one reads, "The species is not expected to become extinct in the foreseeable future." But at the time this listing was made in 1996, Critically Endangered was for species "facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A-E)" (IUCN 1994). How can a species be facing an extremely high risk of extinction in the immediate future when the official justification for this listing says it is not expected to become extinct in the foreseeable future?

These remarks about the foreseeable future should not just be disregarded as an unthoughtful statement by a harried volunteer team. The draft justification was sent out for review to various other members of the MTSG. Moreover, a number of people who work with hawksbills or know about them agree that it is not about to become extinct — in private at least, though most will not speak out. However, a few opinions on this matter have appeared in print. Pritchard (2000) says that "total extinction is not just around the corner for the hawksbill," though he considers that it does meet the IUCN criteria for Critically Endangered. Ross (2000) writes: "It is difficult to propose or imagine a scenario in which this species will disappear from the world in any current time frame. The species has undoubtedly declined, and probably requires our diligent conservation attention, but it is not going extinct."

What makes this still more important is that IUCN's Red List Standards and Petitions Subcommittee (S&PS 2001) have in effect endorsed the contradiction between the commonsense view and what the application of the criteria permit (allowing for inference, suspicion and the precautionary principle). After their deliberations on the appeals against the Critically Endangered listing, this committee ruled:

> Another basis of the petitions' challenge is the statement in the MTSG's justification that "the species is not expected to become extinct in the foreseeable future". The S&PS concludes that the petitioner's criticism on this point is not valid, because the listing is based on quantitative criteria rather than the qualitative beliefs of the RLA.

So there you have it: the criteria must reign supreme, however much they contradict common sense and the opinion of the turtle experts, the designated RLA. The importance of that little phrase "as defined by any of the following criteria (A-E)" (IUCN 1994) now becomes apparent. It does not matter that it is hard to perceive how the hawksbill is extremely likely to become extinct in the wild in the immediate future. What matters is what the criteria say. Why cannot IUCN consider the obvious alternative that criteria in this case fail to provide a reasonable guide to risk of extinction? (cf Pritchard 2000). Even the MTSG (1995) has noted that there is a risk that "marine turtles may be incorrectly assigned to status categories by IUCN, CITES and other treaties either because the criteria are inappropriate for marine turtles or because we have insufficient data for analysis."

That the criteria lead to contradictory conclusions is evident from other considerations. The hawksbill was listed as Critically Endangered in 1966 not only on the basis of past (Criterion A1) declines of 80% or more over three generations, but also on the basis of projected or suspected further (Criterion A2) declines of 80% over the next three generations. There is some uncertainty about the generation time for this species, with regional differences. Values of 35 and of 25 years have been mentioned (S&PS 2001). Taking the average of these, 30, and multiplying by 3 gives 90 years; let us say approximately 100 years in round figures. Whatever the exact figure, the 1996 hawksbill listing was appealed with respect to both past and projected declines. The Standards and Petitions Subcommittee (S&PS 2001) concluded that a future reduction in the next three generations "does not seem to be well justified." So that means — with the usual cautions about trying to predict anything about the future — that it may be reasonably expected that in 100 years there will at worst still be 20% of the number of hawksbills in existence today. That is not extinction. So how can this species be facing an extremely high risk of extinction in the wild in the immediate future?

What we have here is a clash between two criteria, the inferred past 80% decline (A1) and the poor evidence for a future 80% decline (A2). If the aim of the Red Lists is predicting the risk of extinction, it might be thought that expectations for the future would be weighted more heavily. But the rules say that if any one of the criteria A to E is met, the species goes into the relevant category of threat.

The appeals were made for the 1996 red listings. In 2001 IUCN revised the description of Critically Endangered and its criteria. Presumably, when this occurred, all listings made in 1996, on the basis of the older criteria (IUCN 1994), were reassessed and officially either confirmed or altered by RLAs, on the basis of the new criteria (IUCN 2001a). However, without pressing this point, even if one accepts the IUCN (2001a) revised description of Critically Endangered ("facing an extremely high risk of extinction in the wild"), it still appears inconsistent to say there is an extremely high risk of extinction in the wild while at the same time saying that there seems to be no good justification for expecting declines greater than 80% in the next century. Is IUCN, like a skilled politician, sending different messages to different constituencies? Probably it is just muddled or out of its depth and falling back on the bureaucratic comfort of following rules.

A vivid analogy to the rigid application of rules leading to silly conclusions has been made by the CSG, which considers the use of keys to identify the species of unknown specimens.

> If after following the key you conclude that you are holding a green tree frog, but the organism in hand is brown, warty, and has the definitive characteristics of a toad, it is obviously [*sic*] it is not the organism (category) reached via the key (criteria). This is important information and it happens commonly when developing keys. Either the key is wrong or it has ambiguities in it that need correcting. In any final analysis, you do need a description or illustration of the frog to make sure you reach the right answer, and to ensure the key is steadily improved. We found that thoughtless application of the IUCN criteria, without any consideration of whether the final "risk of extinction" is consistent with some narrative description, can lead to evaluations of extinction that are simply not justifiable. The real goal is to evaluate the risk of extinction, not just to apply the key wherever it may lead. (Messel 1998)

In the case of the hawksbill rulings, IUCN appears to have lost sight of the original question, whether the species is endangered with extinction. It has become fixated on its sublime, incontrovertible, all-encompassing criteria. The criteria dictate the brown toad is a green tree frog, that the hawksbill is Critically Endangered.

Qualitative and subjective aspects.

So surely there needs to be more room for qualitative assessments to participate in the process. Reasons for any such qualitative considerations can and should still be provided in the documentation. But some deviation should be allowed from what rigid adherence to the dictates of the criteria might entail, provided explanation and supporting evidence are given for such deviations. In effect, the IUCN system might be considered more as one of often helpful guidelines for determining categories of threat, and less one of rigid criteria for red listing.

It is not as if there are not already plenty of qualitative aspects in the red listing process. How to follow the IUCN (2001a) recommendation to be "precautionary but realistic" — almost a contradiction in terms — cannot be decided by entering numbers into a computer. Response to uncertainty involves qualitative judgments. How many gaps in the data constitute grounds for placement in the Data Deficient category? What allowance should be made for density-dependent factors? When a nesting beach becomes crowded, turtles sometimes destroy eggs laid by other individuals. There is a need for more research on this and other potential instances of density-dependent effects. Meanwhile, some qualitative decisions may have to be made. And for assessing whether long-lived, widely-distributed species have declined more than certain threshold amounts over three generations, decisions have to be made as to whether to project into the unknown past any present trends of those populations that are currently increasing. Retrospective projections of recently increasing trends will decrease estimates of numbers existing three generations ago and so make it harder to demonstrate declines from that time of 80%, 50% or 20% for the species as a whole. But retrospective projections only for populations that are currently declining biases these exercises toward demonstrating declines from past numbers, and seems to deny the possibility that some populations may be better off today than they were three generations ago. Qualitative decisions are needed to decide how to deal with such matters, and the available knowledge and factors relevant to such decisions may differ for different species. Application of rigid criteria may not be appropriate. It is worth recalling what IUCN (2001a) says about how the quantitative values for the various criteria were derived. They were "developed through wide consultation, and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists." Generally judged

Subject: Gill netting
From: "Kendall Linzee" <klinzee@hotmail.com>
Date: Thu, 16 Feb 2006 13:05:41 -0800
To: pfmc.comments@noaa.gov

DEAR MR, MC ISAAC,
I am not just a concerned environmentalist or member of the National Resources Defense Council that has a special interest for the survival of Sea turtles. I was a commercial Halibut and Black cod longline fisherman, for ten years, as well as Salmon Seining off Alaska. I have also fished off the coasts of WA. and OR. I have participated in other fisheries in these areas and other parts of the world. I have seen and know first hand of the state of these natural resources and I am personally schocked and deeply saddened that Gill Netting is still being used as a mode of harvest along with high volume Trawling. I hope you will find less destructive methods to suggest to those fisherman who do not see the sense in having more concern for the natural resources that provide them with a chance to survive. Thank You.
Best Regards,
Kendall Linzee

February 13, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RECEIVED
FEB 21 2006
PFMC

Dear Dr. McIsaac,

It has recently come to my attention the Pacific Fishery Management Council is deliberating on whether or not to allow the usage of drift gillnets in the Pacific. As a student of biodiversity at the University of California, Irvine, I would like to take the opportunity to give you the opinion of one person in the generation that will, tomorrow, be affected by the decisions made today.

These gillnets are known to be fatal to the leatherback sea turtles. The leatherbacks are not only an endangered species, but are also one of the few creatures that coexisted with dinosaurs. We as a society dedicate museums worth millions of dollars to recognize and admire the past. Archeologists spend hours upon hours uncovering new artifacts, slowly piecing together our history. It is foolish we are not doing everything in our power to protect these ancient creatures. Gillnets are also responsible for harming other marine life such as salmon, sharks, marine mammals, etc.

I understand, however, the benefits of using gillnets in the leatherback's protected waters. Of course, as executive director of the Pacific Fishery Management Council, your primary concern is the progress and success of the company. Certainly tapping into an area which has been protected for a while will bring in a larger catch leading to a greater profit. However, the real question is whether or not the benefits outweigh the costs. Though profit may rise for a few years, eventually over fishing will deplete your supply. To make things worse, along the way to depleting the once plentiful supply, an entire population of sea turtles who have inhabited the earth longer than any human will have been wiped away. There does not seem to be a fitting price for the extinction of a living artifact.

The extinction of one species also affects other species which depended on it for sustenance. Any animal which feeds on sea turtles will have to find another means of food. If this animal is unsuccessful, its population will drop. In turn, there will be an overpopulation of jellyfish, a common food of the leatherback.

I hope, Dr. McIsaac, as the executive director of the company who helped in establishing the Magnuson Fishery Conservation and Management Act of 1976, you can see all the negative outcomes which may come from exploiting the leatherback's land. If you do choose to use gillnets where there are leatherbacks, please, at least ensure the nets are equipped properly to allow the sea turtles to escape.

Sincerely,

Carlos Argueta
61222 Arroyo Dr.
Irvine, CA 92617

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RECEIVED
FEB 21 2006
PFMC

Dear Dr. McIsaac,

I am a Southern California resident and passionate ocean lover. I support marine life and am against the proposed reintroduction of fishing gillnets in the waters inhabited by leatherback turtles, especially off the California coast.

The leatherback turtle is a special and ancient species that we must do all in our power to protect. The leatherback is a remnant of the time of the dinosaurs and is the largest living sea turtle. It has evolved a body temperature mechanism that allows it to survive in oceans that are too cold for most other marine reptiles. A distinctive feature of the leatherback is its flexible and rubbery shell, not duplicated by any other kind of turtle. The leatherback is so unique among turtles in fact, biologist have classified it into a separate family, Dermochelys.

About twenty years ago, there were approximately 115,000 nesting females in the world. Since then, the decline in their population has been so great, only two percent of that population remains. This is due, in large part, to the commercial fishing industry.

While I understand that fishing gillnets are the most efficient and effective way of catching fish, they are notoriously indiscriminate and capture many non-target, in some cases endangered, marine species. I know that the economic profit of your industry would increase with their use, but this should not be at the cost of the lives of these irreplaceable turtles, which have taken millions of years to evolve. This is not a morally acceptable or even remotely reasonable exchange.

A few years ago, your industry discontinued use of drift gillnets in the areas of ocean where populations of leatherback turtles are known to live. This measure made a significant difference to help promote the health and continued existence of the species. However, a reintroduction of the drift gillnets along the California and Oregon coasts would surely have devastating effects on the already fragile population of these precious animals.

You would surely not want it on your conscience to be responsible for the endangerment and possible future extinction of one of the most amazing marine species living in the oceans today.

Sincerely,

Natasha Bhushan

Natasha Bhushan
Student of Biology at University of California, Irvine
157 Amherst Aisle
Irvine, CA 92612

RECEIVED
FEB 21 2006
PFMC

Donald McIsaac
Executive Director Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
Fax: 503-820-2299

Ms. Natascha Burgett
504 Arroyo Dr.
Irvine, CA 92617

Dear Executive Director,

On March 9th, the Pacific Fishery Management Council will decide whether or not to allow gill net fisheries to enter the waters of the endangered Leatherback Turtles. If this proposal passes it will be devastating both for these turtles and many other species of marine life.

Gill nets, or drift nets, are extremely good at catching marine life, however, the kind of marine life captured is often unwanted. This by-catch includes many marine mammals (such as dolphins, whales, and purposes), reptiles (such as sea turtles), sea birds, and unwanted fish species, including sharks. Each year these walls of death entangle 85,000 marine mammals and 750,000 sea birds in the northern Pacific ocean alone. These huge nets, which often span 8-12 meters deep and 32-40 km wide, trap nearly everything that happens to swim or drift by. However, we will never know exactly how much each net catches because 40-50% of each catch is lost while the net is being hauled in and some animals manage to escape, often with injuries that sentence them to death soon after.

Gill nets are simply inefficient. The wanted catch is accompanied by so much by-catch that it is not economical to fish using this technique. It is also extremely inhumane. Animals die slowly, often from drowning, or survive with debilitating injuries. Fisherman simply cannot haul the nets in quickly enough to save the unwanted animals from death or maiming. Furthermore, pieces or whole nets are often lost or abandoned at sea. These "Ghost Nets" continue to trap and kill indiscriminately until the dead weight finally sinks the net. These are cases of countless, meaningless deaths with no profit whatsoever.

Many species of marine life which become entangled in the drift nets are already endangered or threatened. Animals such as rare whales and sharks, sea turtles, and fish such as the sturgeon would have their survival threatened even further if the drift net fishery was approved. The Leatherback Turtle, an amazing creature which has survived the dinosaurs and is the largest, furthest swimming, and longest living of all sea turtles, would be devastated by the reintroduction of gill nets. Because of habitat loss, pollution, and hunting, these creatures are already extremely close to extinction. The gill net fishery, however, is their biggest threat yet. These turtles never leave the ocean, unless it is to lay eggs, and they migrate hundreds of miles each year. They would be extremely susceptible to drift netting. Leatherbacks Turtles are also slow growing and slow to reproduce, and therefore cannot recover quickly. Fewer and fewer have been coming ashore to breed each year and the additional threat of gill net fishing in their protected habitat would be their death-stroke.

Executive Director, I urge you strongly to prevent the extinction of the incredible Leatherback Turtles. Do not allow this proposal to pass. Drift netting is extremely wasteful and devastating to many species of marine life, some of which would not be able withstand this new threat. There are other, more sustainable, methods of fishing. Please consider these things when you make your decision on March 9th. Thank you.

Sincerely,

Natascha Burgett

543 E. Peltason Dr. 312A
Irvine, CA 92617

RECEIVED
FEB 21 2006
PFMC

February 11, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Executive Director Donald McIsaac,

I am a student at University of California, Irvine taking a Biodiversity and Conservation course. I am writing to you, because it is a required assignment to write to an official dealing with an issue that is related to our class, such as the reevaluation of time/area closure. After doing much research on this topic, I became perturbed by the potential drastic tolls on the waning leatherback sea turtle population if the time/area closure is altered.

Although the drift gillnet fishing industry is being affected by the time/area closure, the eradication of the leatherback sea turtle population will affect this industry more drastically. The leatherback sea turtles feed on jellyfishes, thus controlling the population. Without the turtles, there would be an overpopulation of jellyfishes. This mass of jellyfishes would overindulge on fish larvae, leading to the decrease of available commercially important fishes. This would hurt the fishing industry much more in the future.

It is vital to protect these critically endangered turtles from the prehistoric time. They are unique, because, similar to mammals, their system of blood supply allows their bodies to be warmer than water temperature, permitting them to dive deeper into the ocean. Moreover, the Pacific and Atlantic leatherback sea turtle populations are genetically different, though they originate from the same species. Thus, it is important to conserve the Pacific population's unique genes.

I request that the Pacific Fishing Management Council does not choose to alter the time/area closure. No leatherback sea turtles have been caught ever since the time/area closure has been established; it has proved to be successful. The turtles and the future of the fishing industry will thank your Council's decision. It will also be much appreciated if I were to hear from you. Thank you for your time.

Sincerely,

Arena Chang

RECEIVED
FEB 21 2006
PFMC

February 13, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Director McIsaac,

I am a current Undergraduate student at the University of California, Irvine. I do not represent the University, but am writing to you on behalf of myself and other young adults concerned with the preservation of biodiversity in our worlds' ecosystems and wildlife habitats. The upcoming Pacific Fishery Management Council (PFMC) meeting, set to begin this 5th of March, 2006, has on its agenda item J.C.e., the proposed council action to adopt a Final Preferred Alternative to Modify the Drift Gillnet Time/Area Closure. It is this topic, and forthcoming decision, that is the concern of this letter

I urge the council to make no effort to roll back the existing drift gillnet fishery time area closures along the West Coast which are widely considered to be successful conservation measures to protect threatened and endangered species.

These closures were put into effect five years ago due in a great deal to the effect that incidental catching of endangered leatherback turtles, and the detrimental effect this had on its populations Leatherback nesting populations declined from 91,000 in 1980 to fewer than 5,000 in 2002. Leatherback sea turtles are listed as endangered under the U.S. Endangered Species Act and critically endangered by the World Conservation Union on the IUCN red list of threatened species. Although the leatherback turtle have shown great vigor by its ability to swim the oceans for over 100 million years, our commercial fishing practices have managed to bring the species to the brink of extinction, reducing leatherback populations at an alarming rate over the past century, and a collapse of 98% of the population in just 20 years.

Although leatherback sea turtles are not actively targeted in US waters, drift gillnet fishery caused incidental catching of turtles. According to the United Nations Food and Agriculture Organization estimates, the annual bycatch in world fisheries totals 29 million metric tons. 27 metric tons, which is simply discarded for being considered of marginal value. Shrimp trawlers are among the worst offenders, it is said they often discard 10 pounds of bycatch for every pound of shrimp they catch.

Many fisheries contend that sea turtles very rarely get caught in their nets, and on the surface this may seem true. Yet according to Dr. J Frazier, in a report to the WTO, the reality is far from that. Dr Frazier states that in trawling trials off the coast of Malaysia, even with turtle evading devices (TED) installed in fishery gear, the figure of turtles caught per hour of trawling was estimated at 0.032258. That is a figure which seems low, but even if the figures were off by a factor of ten, and only 9 turtles were caught per ship per year, extrapolated over the thousands of fishery trawlers, the yearly count could reach many thousands, a figure that would surely bring the leatherback to extinction within our lifetime. Therefore, in addition to the TED devices that have been mandatory for US fisheries since 1990, Time/Area closure measures such as the one enacted in 2001 are a necessity to ensure the survival of the worlds sea life populations. Such successful time/area closures, which eliminate the overlap of drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction. They should not be reversed as is being proposed.

Although the leatherback sea turtle does not nest in the continental United States, it has been suggested that nearly half of the worlds population of females nest on the pacific coast of Mexico; if so our coastline provides essential foraging ground for the leatherback, without which survival would be all but impossible. Therefore it is squarely on the shoulders of American agencies such as yours to do their part to safeguard the future of the Leatherback and countless other species by continuing such measures as the current Time/Area closures.

I appreciate the opportunity to comment, thank you for your consideration.

Sincerely,

Beverly DeGuzman
10o7 West Peltason Dr. Apt. E
Irvine, CA 92617

RECEIVED
FEB 2 1 2006
PFMC

Audrey Do
4069 Mesa Road, Ste.203E
Irvine, Ca 92617
Doav@uci.edu
February 13, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
Fax: 503-820-2299
Email: pfmc.comments@noaa.gov

Dear Mr. McIsaac,

My name is Audrey Do, and I'm a student currently attending the University of California in Irvine. Being enrolled in a college-level course on Biodiversity and Conservation has opened my eyes to many issues going on in our environment. One issue I would like to address is the protection of leatherback sea turtles. These turtles have been enlisted under the Endangered Species Act but protection of these turtles has not yet been achieved. I was disappointed to learn that the Pacific Fishery Management Council was contemplating violating these turtle's living space by reintroducing drift gillnets in their habitat. These nets not only catch the swordfish it targets for, but also 30 other different species of marine mammals and seabirds.

These leatherback sea turtles are not just any ordinary sea turtle. They are known to be the largest sea turtle in the world and their existence can even be traced back to the time of dinosaurs! Unfortunately, their population has declined 98% in the last twenty years so we must help promote their survival and keep their history record alive.

From the perspective of the representatives of the drift gillnet fishery, the leatherback sea turtle habitat area that has been closed off should be reduced so they can improve their economic stature. Although these business men are concerned about their financial situation, the maintenance of these leatherback sea turtle species is priceless. We must not take any risks in guarding these leatherback sea turtles when there are only 2% of them left since their population 20 years ago. Any push on the limit of this secure area is detrimental to their survival, which would violate the law that calls for their protection under the Endangered Species Act.

As a Californian I hope to grow up and still be able to experience our natural pacific treasures. These sea turtles are just one of the many things that contribute to our natural world and add richness to our environment. Mr. McIsaac, I hope you will take this issue into careful consideration and protect the leatherback sea turtles by prohibiting any drift gillnets from violating their habitat.

Sincerely,

Audrey Do

Audrey Do

RECEIVED

FEB 2 1 2006

PFMC

2/12/06

Dear Dr. McIsaac,

My name is Sarah Fashbaugh, and I am enrolled in the Biodiversity and Conservation class at the University of California, Irvine. I have recently stumbled upon an issue concerning the leatherback turtles, and I am asking for your support.

There is an impending crisis involving the population of Californian and Oregonian leatherback turtles. These majestic creatures have been able to survive since the age of the dinosaurs, and they are remarkable creatures. Their uniqueness is obvious. They live up to thirty years, weigh up to 1,500 pounds, and have a shell that is unlike their relatives. In fact, they are so different that they have been placed in their own family called the Dermochelys. Unfortunately, over the last twenty years, there has been an estimated 98 percent decline in the leatherback turtle population. The United States Federal government has listed them as endangered both nationally and internationally. How did it get to this point? A while ago, many eggs were poached and consumed; however, that is not what plagues them today because their numbers are so minimal. Drift gillnet and longline fisheries clearly are the reason for the depletion of the Dermochelys. In 1987, a study demonstrated that approximately 640 turtles were caught by the offshore shrimp fleets every year. Some die from drowning whereas the others are injured on the decks of the fleets. In fact, all five different types of turtles in America have decreased. Numbers from around 90,000 fall to a measly 3,000. It is questionable whether or not future generation will ever see a wild turtle.

Sure, drift gillnets are an efficient and effective way to capture fish for the West Coast fishermen. They will, in many ways, help the economy: the price of fish will go down and fishermen will get more money are just two examples. There are even ways of fishing in the area which will not impact the leatherbacks as much. Turtle excluder devices make it possible to assist the numbers; however, they are not completely reliable. But, no creature is worth less than money.

This drastic decline occurred even with the barring of areas for the leatherback's safety. By allowing drift gillnets into the turtle's habitat, you are allowing a faster decline in the endangered species. Please do not let fishermen enter this area with such unsafe gear. Continue the current regulations and please do not open these areas for fishing. Leatherback turtles need protection. Please send a reply about your decision, and thank you for your time.

With sincerity and hope,

S. Fashbaugh

Sarah Fashbaugh
Student of the University of California, Irvine

61813 Arroyo Drive
Irvine, CA
92617

RECEIVED
FEB 21 2006
PFMC

February 13, 2006

Dr. Donald McIsaac
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Dr. Donald McIsaac,

My name is Hasan Khashwji and I am student at the University of California, Irvine and am currently taking a class on Biodiversity and Conservation. I have recently been researching on the Leatherback Sea Turtles of the Pacific Ocean and would like my letter to be considered as a comment for the Pacific Fishery Management Council hearing held on March 11th, 2006. As you are already aware, Pacific Fishery Management Council (PFMC) is interested in using drift gillnets once again in the areas that are designated for Leatherback Sea Turtles. This area is restricted from fishing with gillnets due to the declining population of the Leatherback Sea Turtles. These turtles weigh more than 1,500 pounds, live for more than 30 years, and have roamed the earth since the time of the dinosaurs. Furthermore, studies have shown that there has been more than a 98 percent decline over the last 20 years in Leatherback Sea Turtle's population. These turtles are one of the oldest living animals that we have and it is crucial that we protect their environment so that they can survive.

The Pacific Ocean already contains many species that are on the endangered list including the bottlenose dolphin, sea lions sea otters, seals, turtles, and whales. Furthermore, legalizing drift gillnets will kill thousands of innocent plants and animals that are of no interest to the fishermen. These gillnets go directly to the seafloor to grab their catch, but instead many by-catches which include these turtles, fishes, plant life, and sea birds are also killed. The use of gillnets in these protected Pacific Ocean waters should be considered because it will only create a longer Endangered Species List. In addition, a recovery program would be expensive and nearly impossible to maintain because of the extensive damages the area would incur. Instead of fishing on these protected waters with gillnets the PFMC should consider different areas or different mechanisms of fishing that will not jeopardize the thousands of innocent plants and animals caught in the nets.

Honorable Dr. McIsaac, it is necessary that we collect more data on the damages that will occur if this proposal is passed in order to understand the magnitude of the destruction that will incur if the drift gillnets are approved. Many species will be hurt and many will be damaged that we have no knowledge about. We should reconsider our options and necessities for using gillnets and understand that our future generations will be at loss if this natural habitat will be ruined. Please say no to the proposal for legalizing drift gillnets in the protected waters of the Leatherback Sea Turtles. If you would like any assistance on this issue, please consider me.

Sincerely,

Hasan Khashwji

525 E Peltason Dr.
Irvine, CA 92617
February 13, 2006

RECEIVED
FEB 21 2006
PFMC

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. Donald McIsaac:

Referring to the longline and driftnet fishery permits to fish in closed areas, I would like to comment on the proposed plan that will allow driftnet fishing to use protected areas in the West Coast.

The driftnet ships should not be allowed in the closed waters because endangered species thrive in the closed area along California and Oregon. If fishing occurs in closed areas that open again, the nets will kill numerous sea turtles, whales, dolphins, fish, birds and other non-food animals. The most endangered animal is the leatherback sea turtle in the protected area. Without leatherback sea turtles, the food web in the ocean will alter the marine environment. If we drive the sea turtles to extinction, some of the fish we love may not live long because of the disrupted marine food web. We cannot forget the beautiful sight of sea turtles coming towards the beaches to breed and nest along California and Oregon.

Driftnet and longline fishing should still be banned, so we can preserve marine life, especially the leatherback sea turtle, for future study of ocean animals. Without ocean life, we cannot study the importance of marine species and their role in the marine food web. By keeping the ban on driftnet and longline fishing, we can study leatherback sea turtles and other marine life in-depth through many years of research.

Although human demand for seafood, we should preserve the leatherback sea turtle to allow future generations to see them in the Pacific Ocean and along the Pacific beaches. Instead of allowing longline and driftnet fishing in preserved areas, we should allow ships to remain in open waters for commercial fishing. Because of the fishing industry, many marine animals became endangered, threatened or extinct. Once animals disappear, we can never see them again. To prevent the extinction of the leatherback sea turtles, we should leave their protected area in the Pacific alone. The population of the leatherback sea turtles declined due to commercial fishing over many years. If their native habitat is left intact, the leatherback sea turtles' population will grow in the next coming decades. The only outcome of opening the closed area along California and Oregon is the extinction of endangered species including the leatherback sea turtles and other marine plants and animals.

Please keep the ban on driftnets and longline fishing in the habitat of leatherback sea turtles and other marine life!

Thank you for your time. Please reply.

Respectfully,

Marvin Lee

Marvin Lee

Subject: drift gillnet fishery
From: "Trudi & Jeremiah O'Brien" <tjobrien@digitalputty.com>
Date: Tue, 21 Feb 2006 09:32:21 -0800
To: <pfmc.comments@noaa.gov>

Mr. Donald McIsaac and Council,
As a participant in the drift gillnet fishery I would like to ask that you adopt the plan to add an experimental area to determine the feasibility of a permanent area expansion. This fishery has worked very hard to limit by-catch and too generally become a clean and viable source of fresh seafood. The loss of most of our fleet has not affected the demand for Swordfish in the U.S. So imports have spiked from many countries that have little or no management or oversite practices. We have the most intensely managed fisheries in the world and can manage, without eliminating them, and leaving our food supply to countries that are undisiplined.

Sincerly,
Jeremiah OBrien
President, Morro Bay Commercial Fishermen's Organization

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RECEIVED
FEB 21 2006
PFMC

Dear Dr. McIsaac,

I am writing to let you know that I oppose any expansion of the drift gillnet fishery off the California and Oregon coasts, either by regulation or under an experimental fishing permit.

Five years ago this fishery was restricted because endangered leatherback sea turtles were being caught and killed in its gillnets. Today the fishery's gillnets still inadvertently catch more than 30 different species of marine life, including many marine mammals and seabirds.

The Pacific Fishery Management Council should not even consider reopening the area now closed to protect leatherback sea turtles while their populations remain perilously low.

I urge the council to maintain the current regulations to protect leatherback turtles and other marine life and to preserve the sustainability of our oceans and our fisheries.

Sincerely,

Terry L Pitt

Terry L. Pitt
5726 N.E. Detroit
Kansas City, Missouri 64119
t.pitt@sbcglobal.net

February 2, 2006
Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RECEIVED
FEB 2 1 2006
PFMC

Dear Mr. Donald McIsaac:

My name is Vincent Pham and I am currently attending the University of California Irvine. I am enrolled in a course on Biodiversity and Conservation, and would like to voice my concern over gillnet and longline fishing permit applications under consideration by the Pacific Fishery Management Council. I fear that the approval of these permits would harm the endangered leatherback sea turtles as well as other wildlife such as whales, dolphins, sea lions, and sea otters.

Currently, there are fewer than 5,000 leatherback sea turtles and its existence is already severely threatened. The continuing decline the leatherback turtle population has led to its placement on the endangered species list and is susceptible to extinction without action. The current gillnet closures have proved that fishers do not need gillnets and longlines to capture shark, swordfish, and tuna. The interests of fishers have been fulfilled without undermining conservation measures and zero take on leatherback sea turtles in the past three years have been recorded due to these measures. The approval of the fishing permits would allow fishing companies to use longlines and gillnets in these protected areas which would produce by-catch that would hurt marine species and endanger the ecosystem. In 2005, over 1000 scientists from 97 countries and 281 non-governmental organizations from 62 countries delivered a letter to the United Nations urging the implementation of a moratorium on harmful gillnet and longline fishing in the Pacific.

Mr. Donald McIsaac, Executive Director of the Pacific Fishery Management Council, I urge you to please continue the ban on longline fishing and to maintain existing gillnet fishery time area closures on the West Coast.

Sincerely,
Vincent Pham

Samantha So
543 E. Peltason Drive #208
Irvine, CA 92617
(949) 705 – 9020

RECEIVED
FEB 2 1 2006
PFMC

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Executive Director Donald McIsaac,

My name is Samantha So and I am a freshman at the University of California, Irvine. The current issue of drift gillnet fishing off the coast of several beaches in California has raised my awareness for the Leatherback sea turtles. In my Biodiversity and Conservation course, we learned about over-fishing and the threat of net fishing to other animal life. This letter concerns the existence of one of the oldest animals still living on earth, the Leatherback sea turtle.

Due to drift gillnet fishing and poaching of eggs, the Leatherback sea turtle declined in population by 98% over the past 20 years. These creatures have inhabited the ocean since the time of the dinosaurs yet humans have managed to wipe their numbers down to 2,300 females in a microscopic fraction of that time. They have been migrating to the coast of California for millions of years, contributing to the ecosystem of the west coast by feeding on the jellyfish and laying eggs. These animals have the right to keep its way of life without being caught in nets that aren't meant for them.

Drift gillnet fishing not only kills turtles, they kill other marine life and birds just for human consumption. There is an abundance of food sources in other industries that doesn't kill other life around it. There is no need for the opening of areas that are critical for Leatherback sea turtles just for the fishing of one or two different kinds of fish. Over-fishing is already a problem with the marine industry, let's not add more problems. Every single Leatherback sea turtle is important for the population of these species. Even the proposed alternatives aren't good enough for the conservation of this animal because it is still killing one or two for the sake of the fishing industry.

I vote against the admittance of drift gillnet fishing in the closed areas reserved for the Leatherback sea turtles. It won't contribute to the livelihood of these animals and only encourages a money driven society. Save the Leatherback sea turtle. It is the least we can do for them after we humans have abused it in every way possible.

Sincerely,

Samantha So

Samantha So

2/13/2006

RECEIVED
FEB 2 1 2006
PFMC

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac,

I am Brittany Torbert, a student from the University of California in Irvine, studying Biodiversity and Conservation. I am extremely concerned over the well-being of the endangered leatherback sea turtle which is going to be directly effect by the decisions made during March 5-10 this year by you and the rest of the Pacific Fishery Management Council. Your decisions determining the use of drift-gillnets and longlines on the coasts of California and Oregon will intensely threaten the leatherback species. I strongly urge you to vote to maintain the bans of longline fishing and drift-gillnet restrictions which are currently protecting the species from extinction.

The leatherback sea turtle is at the top of the list of animals in the Pacific being wiped out by industrial fishing. This turtle has plummeted from 91,00 to 5,000 nesting populations in the last twenty years. It is predicted that they will soon become extinct, even though they have been around since the dinosaurs, if drastic measure aren't taken. And, believe it or not, this can also radically effect the ocean's ecosystem. During the years that the net closures were in effects, were the only years that sea-turtle by-product was not reported. Violations of many U.S. laws are being made by using these nets and longlines. They are not only killing the leatherbacks which are on the Endangered Species List enforced by the ESA, but they are also effecting the mortality of many other endangered species and thus violating the Marine Mammal Protection Act and the Migratory Bird Treaty Act.

The Draft Exempted Fishing Permit Application which places time and area closures on these fishing procedures are claimed by some to have been declining the fishing industry but, facts show otherwise. The regulations in California and Oregon should not be abandoned. They should be emulated elsewhere to protect the leatherback sea turtles from being caught in longlines and drift-gillnets. Over 1000 people from around the world urged the UN to implement a halt on these fishing devices. It is important that you identify other measures such as capacity buy-outs that can help those that wish to leave the fishing industry, do so without having to weaken or eliminate effective conservation measures. And lastly, please work to maintain the time/area closures and restrictions that already exist. The leatherback sea turtles need our help! Thank you.

Sincerely,
Brittany Torbert

Brittany Torbert
88647809

RECEIVED
FEB 2 1 2006
PFMC

Background Information on Leatherback Sea Turtles

Five species of sea turtle spend a large amount of their live in U.S. waters. These species include loggerhead, leatherback, green, hawksbill, and Kemp's ridley turtles. They are all threatened and listed under the Endangered Species Act. The main reason they are threatened is there mortality in the shrimp fishery industry. They are being killed incidentally in various commercial fisheries. An estimated 55,000 sea turtles drown in American shrimp nets each year.

There are new improvements to these nets however, called TED, turtle excluder devices. These allow turtles to escape the trawl net. But, not all shrimp fishers are using these. The TED is a box cage with a trap door. They seem to reduce the incidental turtle kill by shrimp trawls by almost 100%. The improvement is great, but a real achievement can only be made if we globalize these methods. Killing sea turtles in this way kills them more than any other human activity combined.

For a long time, the U.S. restricted imports of shrimp caught not using Ted's. They did this with a justification under the law that allows restrictions in order to protect human, animal, and plant life. There was then a dispute in 1998 with Thailand, Malaysia, Pakistan and India. This was brought to the WTO and the restrictions were appealed due to laws that prohibit the restrictions of product bases on how they were produced.

Some accomplishing signs of the species are nests found in the Gulf of Mexico. The Gulf of Mexico shrimp fishery wastes many species of marine life every year. Only 20% of what is caught is actually shrimp and a good amount of that are sea turtles, most of which are endangered leatherback sea turtles. All of this extra marine life is called by-product and essentially discarded. By-catch reduction devices can reduce this waste by 50% and are now required in the Gulf of Mexico Fishery and should be required for all others. Increases in other kinds of fishing off South America is causing deaths to hundreds and hundreds of leatherback turtles. "The Inter-American Convention for the Protection and Conservation of Sea Turtles addresses all major threats to sea turtle survival, including accidental and intentional capture, exploitation and habitat destruction. It has been ratified by seven nations, and will go into effect when a total of eight have signed on."

The leatherback sea turtle is at the top of the list of animals in the Pacific being wiped out by industrial fishing. This turtle has plummeted from 91,00 to 5,000 nesting populations in the last twenty years. It is predicted that they will soon become extinct, even though they have been around since the dinosaurs, if drastic measure aren't taken. And, believe it or not, this can also radically effect the ocean's ecosystem. During the years that the net closures were in effects, were the only years that sea-turtle by-product was not reported. Violations of many U.S. laws are being made by using these nets and longlines. They are not only killing the leatherbacks which are on the Endangered Species List enforced by the ESA, but they are also effecting the mortality of many other endangered species and thus violating the Marine Mammal Protection Act and the Migratory Bird Treaty Act.

RECEIVED
FEB 21 2006
PFMC

February 12, 2006

Donald McIsaac, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

Dear Mr. McIsaac,

My name is Jimmy Zhao and I am currently an undergraduate student at University of California, Irvine. I am currently taking a University-level course on Biodiversity and Conservation and this letter is in regards to the continuation of the current restrictions on longlines and gillnets. Reversing your decision on banning the usage of longlines and gillnets can have a devastating effect on the California coastal ecology and I strongly urge you to consider the facts carefully before you make your decision.

Due to the rapid growth of the human race, more food needs to be produced in order to sustain such a huge and growing population. Granted that longline fishing and gillnets have been a great advancement for the fishing industry and that more food is generated that way, there needs to be better and more efficient ways than the crude and wasteful manners in which commercial fisheries conduct their business. Even though longlines and gillnets seem effective due to their large coverage, these large nets actually unintentionally encapsulate many unsuspecting marine animals that are not meant to be fished. Furthermore, many of these animals being captured by gillnets and longlines are endangered and under protection. Thus, many of these helpless creatures with already dwindling numbers are wasted and eradicated because they were at the wrong place at the wrong time. The species that I am most concerned with is the pacific leatherback sea turtle (Dermochelys coriacea), which is an endangered species with a currently stable population in the United States. In the past years, there were almost no reports of pacific leatherback sea turtles being inadvertently captured and part of reason for the turtle population stability is due to the current restrictions placed on longlines and gillnets. However, nullifying these bans and restrictions, the possibility of a population regression for leatherback sea turtles is very likely. During an age where technological advances never cease to astound us, we are constantly developing new and better technology to improve our lives. Instead of relying on archaic equipment like gillnets and longlines, the fishing industry should focus on developing new tools that can efficiently catch the fish they need. Until such technology is developed, we have to protect the diversity of our oceans in order to ensure that there will be enough fish left in the future, not only for us to eat, but also for us to appreciate.

Upon researching this topic, I had the opportunity to see a video of how these gillnets operate and I was shocked to see so many dead sea animals being dumped out from the large fishing ship. As the fishing ship swept by with its enormous gillnet, it left a trail of unwanted fish carcasses. This completely changed my impression of commercial fishing; if you agree to reverse the restrictions on longline and gillnet usage, then the image of commercial fishing will be further tarnished.

Sincerely,

Jimmy Zhao
Student
University of California, Irvine

553 E. PELTASON DR. #106
IRVINE, CA 92617

Subject: [Fwd: Drift Gillnet Exemptions]
From: "Mike Burner" <Mike.Burner@noaa.gov>
Date: Mon, 27 Feb 2006 08:32:31 -0800
To: Kit Dahl <Kit.Dahl@noaa.gov>

-------- Original Message --------
Subject: Drift Gillnet Exemptions
Date: Fri, 24 Feb 2006 12:32:19 -0500
From: Davis, Chris <Chris.Davis@compuware.com>
To: 'Mike.Burner@noaa.gov' <Mike.Burner@noaa.gov>

Mike -

When considering the drift gillnet exemption permits at the March meeting, please vote to disallow them. I think the time has come to banish these non-selective fishing techniques. You are much closer to the science behind this proposal, so I won't try to speculate on the data, but these techniques have been deemed ineffective and destructive.

Thanks for your consideration.

Chris Davis
20526 11th Dr SE
Bothell, WA 98012
425.488.5432

--
Mike Burner
Staff Officer
Pacific Fishery Management Council
Phone: (503) 820-2280
Toll Free: (866) 806-7204
Fax: (503) 820-2299

31

Heal the Bay.
3220 Nebraska Avenue
Santa Monica CA 90404
ph 310 453 0395
fax 310 453 7927
info@healthebay.org
www.healthebay.org

February 27, 2006

Mr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
Via FAX: (503) 820-2299

RECEIVED
FEB 27 2006
PFMC

Re: Oppose modification of the drift gillnet time/area closure requirements

Dear Mr. McIsaac:

Heal the Bay is a nonprofit environmental organization with over 10,000 members dedicated to making Santa Monica Bay and Southern California coastal waters safe and healthy for people and marine life. Heal the Bay has been actively involved in fisheries-related issues in the Santa Monica Bay and southern California. We are deeply concerned about the proposed modification to the drift gillnet time/area closure that will be addressed at the upcoming Pacific Fisheries Management Council ("Council") meeting. Specifically, we are very concerned that if the council reopens the protected waters off the coast of California and Oregon to drift gillnetting and longlining, the existing conservation measures that protect the critically endangered leatherback sea turtle will be undermined,[1] as well as those protecting other ecologically and intrinsically important species including seabirds, marine mammals, sharks, and non-target fish.

Instead, we urge you to protect the marine life in these waters from the risk of further damage caused by these destructive fishing practices through the following actions:

1. Retain the current time/area closures that prohibit the use of drift-gillnet fishing gear in areas off the California and Oregon coasts when leatherback sea turtles are likely to inhabit these waters;
2. Maintain the existing ban on all pelagic longline fishing within the United States pacific Exclusive Economic Zone and on shallow-set or swordfish longlining on the high seas beyond the United States waters; and
3. Identify other measures such as buy back programs to provide economic returns to individuals who wish the leave the fishery without removing or weakening effective conservation measures.

The existing conservation measures in these waters originally were implemented to protect the leatherback sea turtle, a critically endangered species.[2] The existing drift-gillnet and longline closures have successfully provided a working balance between fishing interests and the critical need to protect leatherback sea turtles. Indeed, there has been no recorded take of leatherbacks since the time/area closures were implemented. Thus, this management measure effectively eliminates the impact of destructive fishing

[1] IUCN, Red List of Endangered Species, 2004
[2] 50 CFR § 223 and §224

practices in areas where leatherback sea turtles are found, and should serve as a model to be replicated elsewhere.

Unfortunately, even with these protections, leatherback sea turtle populations are still in decline globally as they face significant threats from commercial fishing and other stressors. Worldwide, 50,000 leatherbacks were taken incidentally in the year 2000. The global population of nesting females has dropped 95% over the last 20 years.[3] A similar declining trend is evident in the pacific where the population of nesting leatherbacks plummeted from 91,000 in 1980 to fewer than 5,000 in 2002. Leading scientists warn that without immediate and considerable steps to protect leatherback sea turtles, these animals will soon become extinct.[4]

Yet, the Council's current proposal would ignore this evidence and reauthorize drift gillnet fishing, one of the most destructive fishing methods. This flies in the face of recent regulations and policies which focus on protecting fisheries and threatened and endangered species. The United States Commission on Ocean Policy and Pew Oceans Commission, as well as the California Ocean Protection Act, call for marine resource management that employs an ecosystem approach and is guided by precaution and sound science.[5] Through reopening gillnet and longline fishing in previously protected areas, the Council will defy these goals and thwart conservation efforts that groups such as Heal the Bay have worked so hard to employ. We strongly urge you to maintain the ban on longline fishing and retain existing drift gillnet fishery time/area closures along the West Coast.

We appreciate the opportunity to offer these comments and thank you for your careful consideration of our concerns. Please feel free to contact us if you have any questions at 310.453.0395.

Sincerely,

Sarah Abramson, MESM
Staff Scientist

Heather Hoecherl, Esq.
Director of Science and Policy

---

[3] Lewison, R.L., Freeman, S.A. and Crowder, L.B. (2004) Quantifying the effects of fisheries on threatened species through impact of pelagic longlines on loggerhead and leatherback sea turtles. *Ecol Lett*, v.7:221-231.

[4] Spotila (2000) Pacific leatherback turtles face extinction, *Nature* vol.405:529-530

[5] USCOP (2004) An Ocean Blueprint for the 21st Century; POC (2003) America's Living Oceans: Charting a Course for Sea Change; California Ocean Protection Act of 2004, Pub. Resources Code, §35505(c)

831 Dayton St
Edmonds, WA 98020
February 24, 2006

RECEIVED
FEB 27 2006
PFMC

Pacific Fishery Mgt. Council
770 One Ambassador Pl., Suite 200
Portland, OR. 97220

Dear Sirs and Madames,

I would like to express my opposition to the proposed commercial drift net fishery for the gill net fisherman!

We all know that these nets have high levels of by catch of protected species.

Why do you want to kill more?

You/we know that commercial fishermen will not stop until the last fish is caught.

I have heard them say this on their radios.

Please stop this nonsence

Save some fish for my grandchildren.

Sincerely
Bob Clos

Subject: Proposed Exempted Fishing Permit
From: "art baker" <a.baker@southwestoffset.com>
Date: Tue, 28 Feb 2006 13:41:47 -0800
To: <pfmc.comments@noaa.gov>

Dear Council:

I am adamantly opposed to any gill-net type fishing. This entire proposal reeks of the same type of scandalous nonsense we have seen in the media lately (e.g. Jack Abramoff & friends). One has to ask what would motivate the council to even consider allowing gill nets in our water. Obviously it took some lobbying to get this proposal this far.

The Pacific Fishery Management Council should do what their namesake implies—manage our fisheries. How can a gill net be considered a viable management tool? These nets wipe out entire swaths of all sea life. How can this be considered management? It's ludicrous!

Please, do the right thing—shut down these gill nets before they further endanger our already fragile fishery.

Sincerely,

Art Baker

32

CENTER FOR BIOLOGICAL DIVERSITY

CALIFORNIA AND PACIFIC OFFICE

protecting endangered species and wild places through science, education, policy, and environmental law

Via Electronic Mail

February 28, 2006

Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
E-mail: Donald.McIsaac@noaa.gov

Mr. Donald K. Hansen
Chair, Pacific Fishery Management Council
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220
E-mail: pfmc.comments@noaa.gov

Dr. William Hogarth
Assistant Administrator for Fisheries
National Oceanographic and Atmospheric Administration
1315 East-West Highway
Silver Springs, MD 20910
E-mail: bill.hogarth@noaa.gov

RE: Agenda Items J-3 and J-4: Drift Gillnet Management; Exempted Fishing Permits

Dear Mr. McIsaac, Mr. Hansen, Dr. Hogarth, and members of the Council:

The Center for Biological Diversity submits the following comments regarding Agenda Items J-3 and J-4 of the March 2006 meeting of the Pacific Fishery Management Council ("PFMC" or "Council") concerning Drift Gillnet Management and Exempted Fishing Permits for the Drift Gillnet Fishery and a new Longline Fishery. Pursuant to PFMC policy as articulated on its website, we request that this letter be distributed to the Council at or before the onset of the March meeting.

Tucson • Phoenix • Silver City • Joshua Tree • San Diego • San Francisco

Brendan Cummings
Marine Biodiversity Program Director
PO Box 549 • Joshua Tree, CA • 92252
T: (760) 366-2232 x. 304 • F: (760) 366-2669 •bcummings@biologicaldiversity.org

In previous letters to the Council, dated September 13, 2005 and November 25, 2005, we explained how we believed the Council's proposed actions related to Drift Gillnet Management and Exempted Fishing Permits ("EFPs") for the Drift Gillnet Fishery and a new Longline Fishery violated numerous procedural and substantive provisions of federal law. Unfortunately it seems the Council is moving forward on these ill-conceived proposals. We believe that doing so will result not just in harm to critically imperiled species such as the leatherback sea turtle, but also will inevitably result in litigation and the potential closure of the entire Drift Gillnet Fishery. We therefore request that the Council recommend denial of both the Drift Gillnet and Longline EFPs and that NMFS deny both permits. We further believe that the only lawful course for the Council and NMFS to follow is to either select the No Action Alternative in the Draft Environmental Assessment ("EA") for Drift Gillnet Management or to forgo action until the completion of a full environmental impact statement ("EIS") that analyzes a full range of alternatives, including alternatives, such as the complete closure of the Drift Gillnet fishery, which may be necessary to come into compliance with existing law.

As an initial matter, putting aside for a moment the substance of the proposed Drift Gillnet and Longline EFPs, we believe that consideration of any such EFP application is premature, as the proposed adoption of either without the benefit of an EIS would violate the National Environmental Policy Act ("NEPA") (42 U.S.C. § 4321 *et seq.*). For the Longline EFP, it appears no NEPA document whatsoever has been prepared; for the Drift Gillnet EFP, only an EA has been prepared when it is clear that an EIS is required.

As you should be aware, the Draft EA itself explicitly or implicitly acknowledges that several of the Council on Environmental Quality ("CEQ") "significance" factors triggering the need to prepare an EIS are met by the proposed Drift Gillnet EFP and related management measures. See 40 C.F.R. § 1508. CEQ factors triggered by the proposed action, include but are not limited to, whether the action involves "[u]nique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands [and] ecologically critical areas," Id. at § 1508.27(b)(3) (leatherback foraging areas); "[t]he degree to which the effects on the quality of the human environment are likely to be highly controversial," Id. at § 1508.27(b)(4) (EA at 6: "The proposed action is likely to be controversial"); "[t]he degree to which the action may establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration," Id. at § 1508.27(b)(6) (the stated purpose of the EFP is to expand the fishery); "the degree to which the action is related to other actions with . . . cumulatively significant impacts," Id. at § 1508.27(b)(7) (the related Longline EFP as well as all other impacts on the leatherback throughout its range); the "degree to which the action may adversely affect an endangered or threatened species," Id. at § 1508.27(b)(8) (previously found to jeopardize the leatherback); and whether "the action threatens a violation of Federal . . . law or requirements imposed for the protection of the environment." Id. at § 1508.27(b)(10) (violates ESA, MMPA and MBTA). In sum, reliance on an EA for the proposed action is completely at odds with the letter and spirit of NEPA. Rather than cast aside compliance with NEPA in its rush to accommodate the gillnet industry in time for the 2006 fishing season, if the Council and NMFS wish to consider modifications to existing gillnet management they must do so only in a careful manner after preparation of a full EIS.

We believe that the adoption by the Council of any of the proposed alternatives that allow drift gillnet fishing in currently closed areas, and any NMFS approval and implementation of any such decision, highly unlawful in violation of the procedural and substantive mandates of not just NEPA, but also the Magnuson-Stevens Fishery Conservation and Management Act ("MSA") (16 U.S.C. § 1801 *et seq*.), the Endangered Species Act ("ESA")(16 U.S.C. § 1531 *et seq*.), the Marine Mammal Protection Act ("MMPA")(16 U.S.C. § 1361 *et seq*.), and the Migratory Bird Treaty Act ("MBTA")(16 U.S.C. § 706 *et seq*.).

As the Council and NMFS are, or should be aware, the California/Oregon Drift-Gillnet Fishery is currently operating in violation of the ESA, MMPA and MBTA. Any decisions by the Council and/or NMFS that result in the expansion of this fishery into currently closed areas will be met by litigation seeking not just to prevent the expansion of the fishery, but likely also the complete closure of the fishery until and unless it can be operated in a manner consistent with applicable law.

The California/Oregon Drift Gillnet Fishery entangles and kills ESA-listed marine mammals and sea turtles. It must therefore be operated in a manner consistent with the procedural and substantive mandates of the ESA, or not at all. This fishery is currently operating without any take authorization for ESA-listed marine mammals. Take can be authorized via a biological opinion issued pursuant to the ESA only if such take is also authorized pursuant to Section 101 of the MMPA. On October 30, 2000, NMFS issued a three-year take authorization pursuant to Section 101(a)(5)(E) of the MMPA, 16 U.S.C. § 1371(a)(5)(E), to the Drift Gillnet Fishery allowing the take of ESA listed marine mammals, specifically sperm, fin, and humpback whales and the eastern stock of Steller sea lion. 65 Fed. Reg. 64670. While we believe this permit was improperly issued in the first instance, regardless of the infirmities of this permit, it is now expired and no take of any ESA-listed marine mammal is authorized for the Drift Gillnet Fishery, or for that matter any fishery under the HMS FMP. Unfortunately, the Drift Gillnet Fishery continues to entangle ESA-listed marine mammals. For example, observer data from the 2004-2005 fishing season shows the entanglement of a humpback whale. This take was not authorized under the ESA or the MMPA and therefore occurred in violation of Section 9 of the ESA. Take of listed sperm whales, fin whales, and Steller sea lions has also been observed in the fishery. Continued operation of the Drift Gillnet Fishery, and certainly any expansion of the fishery into currently closed areas, violates the provisions of the ESA prohibiting such take. Until and unless the fishery as a whole (including any proposed exempted fishing) receives a lawful Section 101 authorization pursuant to the MMPA, we believe that the fishery must be suspended.

Any proposal to allow the Drift-Gillnet Fishery into areas occupied by the critically endangered leatherback sea turtle would violate Sections 7 and 9 of the ESA. In the original Drift Gillnet biological opinion, NMFS had the following to say about <u>any</u> further mortality to the leatherback:

> Therefore, <u>any</u> additional impacts to the western Pacific leatherback stocks are likely to maintain or exacerbate the decline in these populations. This would further hinder population persistence or attempts at recovery as long as mortalities

> exceed any possible population growth, which appears to be the current case, appreciably reducing the likelihood that western Pacific leatherback populations will persist. Additional reductions in the likelihood of persistence of western Pacific leatherback stocks are likely to affect the overall persistence of the entire Pacific Ocean leatherback population by reducing genetic diversity and viability, representation of critical life stages, total population abundance, and metapopulation resilience as small sub-populations are extirpated. <u>These effects would be expected to appreciably reduce the likelihood of both the survival and recovery of the Pacific Ocean population of the leatherback sea turtle</u>.

Biological Opinion at 94. (Emphasis added). NMFS then concluded that the estimated annual mortality of leatherbacks from the Drift Gillnet Fishery would likely jeopardize the species. NMFS therefore proposed as a Reasonable and Prudent Alternative ("RPA") a seasonal closure to the Drift Gillnet Fishery in the waters off the Central and Northern California and Southern Oregon Coasts. NMFS adopted a variant of this RPA via an ESA rulemaking and instituted the current closure. 66 Fed. Reg. 44549. The closure was then reaffirmed by NMFS when it adopted the HMS FMP under its authorities under the MSA. 69 Fed. Reg. 18444; 50 C.F.R. § 660.713.[1] Since the October 2000 biological opinion for the Drift Gillnet Fishery, the status of the leatherback in the Pacific has further declined. We believe, as NMFS stated in 2000, that authorization of <u>any</u> leatherback take in the Pacific would violate the requirement to avoid jeopardy to the species.

Fortunately, the seasonal closure to the Drift Gillnet Fishery for the protection of the leatherback sea turtles appears to be effective. The past three years of observer data show no bycatch of leatherback sea turtles.[2] It would be criminal for the Council and NMFS to undue this apparently successful management measure and allow drift-gillnet vessels to set their nets in areas where they are likely to entangle and kill this critically endangered species.

The continued authorization of the Drift Gillnet Fishery under the FMP (and under any proposed exempted fishing permit) also violates the unambiguous command of the MMPA that all fisheries "shall reduce incidental mortality and serious injury of marine mammals to insignificant levels approaching a zero mortality and serious injury rate" by April 30, 2001. 16 U.S.C. § 1387(b)(1). NMFS has defined ZMRG by regulation as ten percent of Potential Biological Removal ("PBR"). The fishery's take of marine mammal species remains above this threshold. For example, in the most recent Draft Pacific Stock Assessment Reports (dated May 2005) the fishery was estimated to kill 23 northern right whale dolphins each year, in excess of a ZMRG level of 16. Similarly, take of the short-finned pilot whale is not just above ZMRG, but almost at PBR. Take of sperm, humpback and fin whales also remains well above 10% of PBR, thereby exceeding the definition of ZMRG. Because April 30, 2001 has come and gone without

[1] Similar closures were required south of Pt. Conception in El Nino years to avoid loggerhead sea turtles. NMFS has yet to actually invoke these closures even when other branches of the agency have declared the existence of El Nino conditions.
[2] We hope this does not simply reflect the unfortunate fact that there so few leatherback sea turtles left in the Pacific.

the Drift Gillnet Fishery reaching ZMRG, the continued authorization, or any expansion, of this fishery violates the MMPA.[3]

As mentioned above, we believe that the Drift-Gillnet Fishery as currently authorized is violating the MBTA. Obviously, any exempted fishing permit allowing an expansion of the fishery would likewise violate the MBTA. Section 2 of the MBTA provides that "it shall be unlawful at any time, by any means or in any manner," to, among many other prohibited actions, "pursue, hunt, take, capture, [or] kill" any migratory bird included in the terms of the treaties. 16 U.S.C. § 703 (emphasis added). The term "take" is defined as to "pursue, hunt, shoot, wound, kill, trap, capture, or collect." 50 C.F.R. § 10.12 (1997). The primary species taken by the Drift Gillnet Fishery, the northern fulmar, is included in the list of migratory birds protected by the MBTA. See 50 C.F.R. § 10.13 (list of protected migratory birds). Other MBTA protected species such as the Cassin's auklet are also taken by the fishery. The MBTA imposes strict liability for killing migratory birds, without regard to whether the harm was intended. Its scope extends to harm occurring "by any means or in any manner," and is not limited to, for example, poaching. See e.g., U.S. v. Moon Lake Electric Association, 45 F. Supp. 2d 1070 (1999) and cases cited therein. Indeed, the federal government itself has successfully prosecuted under the MBTA's criminal provisions those who have unintentionally killed migratory birds. E.g., U.S. v. Corbin Farm Service, 444 F. Supp. 510, 532-534 (E. D. Cal.), affirmed, 578 F.2d 259 (9th Cir. 1978); U.S. v. FMC Corp., 572 F.2d 902 (2nd Cir. 1978). The MBTA applies to federal agencies such as NMFS as well as private persons. See Humane Society v. Glickman, No. 98-1510, 1999 U.S. Dist. LEXIS 19759 (D.D.C. July 6, 1999)), affirmed, Humane Society v. Glickman, 217 F.3d 882, 885 (D.C. Cir. 2000)("There is no exemption in § 703 for farmers, or golf course superintendents, or ornithologists, or airport officials, or state officers, or federal agencies."). Following Glickman, FWS issued Director's Order No. 131, confirming that it is FWS's position that the MBTA applies equally to federal and non-federal entities, and that "take of migratory birds by Federal agencies is prohibited unless authorized pursuant to regulations promulgated under the MBTA." MBTA Section 3 authorizes the Secretary of the Interior to "determine when, to what extent, if at all, and by what means, it is compatible with the terms of the conventions to allow hunting, take, capture, [or] killing . . . of any such bird." 16 U.S.C. § 704. FWS may issue a permit allowing the take of migratory birds if consistent with the treaties, statute and FWS regulations. The Council and NMFS however have not obtained, much less applied for such a permit authorizing any take by the Drift Gillnet Fishery (or any other fishery under the HMS FMP).

NMFS and the Council cannot dispute that the Drift Gillnet Fishery kills birds protected under the MBTA. We believe that until such take is permitted, NMFS cannot lawfully allow any fishing that is likely to result in death of such species. In its response to comments on the FMP, NMFS claimed that the MBTA does not apply beyond the 3 nautical mile territorial sea and therefore it need not comply. The Draft EA reiterates this position. This is simply wrong. As NMFS is or should be aware, in 2001 an Interior Solicitor's Opinion concluded that the MBTA

[3] Because levels of marine mammal take violate the MMPA, the fishery cannot be considered "otherwise lawful" as required to receive incidental take authorization under the ESA.

does in fact apply in the U.S. EEZ. NMFS's conclusions to the contrary will not survive legal scrutiny.

As the above makes clear, we believe that the current Drift Gillnet Fishery is operating in violation of the ESA, MMPA and MBTA. If the Council and NMFS wish to reopen the regulatory process for the Drift Gillnet Fishery in an attempt to allow fishing in areas in which it is currently prohibited, we believe that the likely result will be something quite different- a court ruling suspending the entire Drift Gillnet Fishery until the fishery complies with all applicable laws.

In sum, we believe that the path the Council has embarked upon is improper and unlawful, and if pursued will only result in litigation and likely further limitations on the current Drift Gillnet Fishery. We believe that the Council should reject the proposed EFPs submitted by the gillnet and longline industries.

Thank you for the opportunity to comment.

Sincerely,
/s/
Brendan Cummings
Marine Biodiversity Program Director
Center for Biological Diversity

Sea Turtle Restoration Project Larry M. Brown, Brown & Associates, Inc.

February 28, 2006

Dr. William Hogarth, Director
NOAA Fisheries Service
1315 East West Highway, SSMC3
Silver Spring, MD 20910

fax: (301) 713-2384

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

fax: (503) 820-2299
pfmc.comments@noaa.gov

RE: Drift Gillnet Management and EFP Application for Pelagic Longlines

Dear Mr. Hogarth and Mr. Hansen:

We write in opposition to two proposals before the Pacific Fishery Management Council to expand the drift-gillnet fishery into a currently protected area and to establish a pelagic longline fishery through a proposed Exempted Fishing Permit (EFP). There is not sufficient justification to increase and expand the drift-gillnet fishery or to develop and expand a pelagic longline fishery. Moreover, the threats and risks to endangered species and to the California Current Large Marine Ecosystem are too great to proceed further with these proposals.

If approved by the Council, the proposals to modify the drift-gillnet time/area closure and to allow pelagic longline gear through an EFP will undermine successful conservation measures protecting the critically endangered leatherback sea turtle as well as billfish, seabirds, marine mammals, sharks and other fish,

Since 2001, areas north of Point Conception to an intersect with the Oregon coast and out beyond the Exclusive Economic Zone (EEZ) to 129° West longitude have been closed to drift-gillnet fishing from August 15th through November 15th in order to protect leatherback sea turtles which seasonally inhabit these waters. Similarly, pelagic longline fishing has been banned within 200 miles of the California coast for well over a decade, and in March 2004 this ban was extended to the entire West Coast EEZ for all pelagic longlining, and to the high seas for West Coast-based shallow-set pelagic longlining. The proposals under consideration by the PFMC would allow drift-gillnets back into the seasonally closed area when leatherbacks are present, as well as allow an "exempted" pelagic longline fishery in the EEZ off California.

Pacific leatherback turtle populations remain extremely low and these proposals that would increase the threats and risk of killing these protected species are unwise and fraught with peril. In addition to concerns regarding the killing of endangered leatherback sea turtles, we are greatly concerned by the impacts drift-gillnets will have on other marine life in the California Current. In the past three years, the drift gillnet fishery has also taken seabirds, elephant seals, California sea lions, dolphins, and humpback, grey, and pilot whales despite gear measures to reduce these interactions. Further, increased effort and expansion of this fishery into the time/area closure will place additional pressure on fish species that: do not have harvest caps, such as striped marlin; are not actively managed by the Council, such as bullet mackerel; or have populations that are currently the subject of scientific concern, such as albacore tuna.

Information provided in the draft exempted fishing permit and alternatives to modify the drift-gillnet closure do not allay our concerns. The drift-gillnet EFP for swordfish states that “bycatch” species will be released alive when possible, but historically the drift-gillnet swordfish fishery has retained a long list of “marketable” species, including bullet mackerel, Pacific mackerel and skipjack tuna. It proposes allowing as much as 2/3 of the active fleet to participate, relying solely on turtle takes to close the experiment. The purpose of the current closed area is to avoid taking and killing of endangered leatherback sea turtles but the measures under consideration risk increased interaction with them.

The current drift-gillnet time/area closures allow the fishery to continue while urgently protecting the critically endangered leatherback sea turtle. During the past three years of the drift-gillnet closures, this fishery, which targets swordfish and thresher shark, had no recorded takes of leatherback sea turtles. This successful time/area closures, which has eliminated the overlap of longline and drift-gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model to be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction. It would be irresponsible to proceed with either drift-gillnet or longline fishing in the current protected areas, at any level, including under an EFP, not predicated on a comprehensive assessment of sea turtle populations and fishery interactions and without full consideration of the impacts on other endangered species, impacts to fish and the ecosystem.

We appreciate that turtle conservation issues are international in scope, and we encourage the Council to coordinate with the Western Pacific Fishery Management Council and international bodies to improve turtle protections across the Pacific. We would like to work with NOAA Fisheries and the Council in finding comprehensive solutions to overcome the serious and impending threats to sea turtles in both U.S. and international waters. Until such time and given our concerns, we cannot support expansion of these destructive gear types off the California and Oregon coasts.

Sincerely,

Robert Ovetz, PhD
Save the Leatherback Campaign Coordinator
Sea Turtle Restoration Project

Charlie Levine
Managing Editor
Marlin Magazine

Larry M. Brown
Owner
Brown & Associates, Inc.

Phillip Friedman
Owner
976TUNA.com

Sharon B. Young
Marine Issues Field Director
The Humane Society of the U.S.

Monica Engebretson
Senior Program Coordinator
Animal Protection Institute

Susan Millward
Research Associate
Animal Welfare Institute

Linda Hanes
Board President
Coastwalk

Jim Ayers
Vice President
Oceana

Robert Wintner
Executive Director
The Snorkel Bob Foundation

Agenda Item J.3.d Suppl. Comment 3

Comments to PFMC by Robert Ovetz, PhD
3/9/06

Save the Leatherback Campaign Coordinator
Sea Turtle Restoration Project
robert@seaturtles.org

Dear Mr. Chairman and members of the Council:

Thank you for the opportunity to address you concerning the issues of the EFPs for the drift-gillnet and longline fisheries and regulatory amendments to the time/area closures on drift-gillnets. I am speaking on behalf of 10 recreational, animal welfare and marine conservation NGOs with about 9 million members, 133 scientists (74 from the U.S.) from 24 countries and about 2,038 citizens who sent letters opposing the measures.

A. Conservation measures widely opposed by the public and scientists

The Council received public comments by its deadline at a ratio of 2,200 to one against these measures—only 2 DGN fishers commented out of 96 permit holders in 2004.

B. Conservation measures work

1. No observed takes of leatherbacks since 2001
Closures North of Pt. Conception are critical for reducing bycatch of leatherbacks. 90% of leatherbacks are caught in this area and since the closures the catch of leatherbacks has been successfully reduced by 100%.[1]

2. Leatherbacks that interact with these fisheries belong to the last remaining significant nesting population in Papua which has declined by about 75% since 1984.

3. Conservation measures for sea turtles are a national and international model in compliance with the FAO Technical Consultation and Guidelines on Sea Turtle Bycatch and UNGA resolutions on sustainable fisheries.

C. Impact on sea turtles is a grave threat to their survival

The Environmental Assessment (EA) agrees with a recent assessment by NOAA's Endangered Species Division that:

"The death of an additional 4 to 8 adult females each year to the Hawaii-based longline fishery would represent a chronic source of mortality and reduced fecundity that can be expected to reduce the population's likelihood of surviving and recovering in the wild."[2]

D. There is no economic benefit to the DGN EFPs and changes to T/A closures

1. The EA concludes that: "the economic impact of the an increase in DGN effort is likely to differ little from zero," or "negligible."

---

[1] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 140
[2] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 123; and Craig Johnson, Endangered Species Division, Briefing Paper, Prepared for Acting Director-F/PR, September 5, 2003, p. 3.

2. The total benefits would be between about $25,000 and $149,000.

3. Biggest beneficiary will be area buyers and processors who will have an increased supply of locally caught swordfish and thresher shark.[3]

E. The 2001 time/area closures not cause of the decline of DGN fishery

1. The decline of the DGN fishery begun long before the 2001 closures

The oft repeated claim by the petitioner "the DGN fishery is now in serious decline because of that time/area closure"[4] is not accurate.

2. Rather, the decline in both the number of vessels and the ex-vessel value of the catch actually began in 1994—long before the time and area closures were implemented.

From 1994-2000, before the time/area closures went into place, the number of vessels had already declined from 138 to 78, percentage of permits used from 85% to 61% and the ex-vessel value of the catch also declined from $6.6 m to $4 m.[5]

	# vessels	# permits	% permits used	ex-vessel value
1994	138	162	85%	$6.6 m
2000	78	127	61%	$4 m

2. Vermont-based FISH applicant admits the DGN fishery has been in decline a decade before the closures

FISH's EFP quotes Dr. B. Gallaway's review of 2000 Biological Opinion, California Seafood Council: "DGN fishing effort for the 11-year period from 1990-2000 reflects a statistically significant trend of decline...."[6]

3. The EA identifies the decline starting in the mid-1980s

"...the West Coast DGN fishery has undergone a pattern of long-term economic decline since the middle 1980s, a brief resurgence in the early 1990s...."[7]

4. DGN was already declining even with 4 times the effort North of Pt. Conception from 1997-2000 than it has had since 2001[8]

---

[3] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 123; and Craig Johnson, Endangered Species Division, Briefing Paper, Prepared for Acting Director-F/PR, September 5, 2003, p. 147, 148, 150-1, 155-56.

[4] Vermont based Federation of Independent Seafood Harvesters, Draft Exempted Fishing Permit Application, October 6, 2005, PFMC Briefing Book, Exhibit J.3, Attachment 2, November 2005; Vermont based Federation of Independent Seafood Harvesters, Exempted Fishing Permit Application, PFMC Briefing Book, Agenda Item J.4, Situation Summary, March 2006, p. 4; and Pete Dupuy, Exempted Fishery Permit, Agenda Item J.4.a, Attachment 2, March 2006, p. 2; (Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 3 and 145.

[5] Status of the U.S. West Coast Fisheries for Highly Migratory Species Through 2004: Stock Assessment and Fishery Evaluation, PFMC, 2005 HMS SAFE, October 2005, p. 12.

[6] Vermont based Federation of Independent Seafood Harvesters, Exempted Fishing Permit Application, PFMC Briefing Book, Agenda Item J.4, Situation Summary, March 2006, p. 3.

[7] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regualtory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 82.

[8] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment,

	# vessels	% of annual effort
1997	108	29%
2000	78	29%
2001	69	7%

5. There is no causality between the time/area closures and the decline of the DGN fishery. Just because the 2 are happening simultaneously doesn't mean they are causally linked.

6. There are many other factors that still need to be investigated in the EA to determine the causes of the decline

1. Impact of operating a closed fishery in which no new permits are issued
2. International conservation measures requiring limits, freezing or reduction in capacity
3. Changes in catch
4. Rising proportion of imports
5. Rising gas prices
6. Declining demand for target species
7. Increasing labor costs
8. Changes in subsidies
9. Increasing homeland security regulations

F. Scientific data shows replacing DGN with longlines would be an economic failure

1. There is still a significantly large risk it could still be shut down

The example of replacement of DGN with longlines in the N. Atlantic discussed in the EFP fails to include the important detail that the longline fishery in the Northeast Distant waters was shut down shortly thereafter and not reopened until 2004.[9]

2. Longlining is unprofitable

A 2005 study of 20 Hawai'i based longline vessels found an average *loss* of $39,897 per vessel. If these vessels had remained in California, where they temporarily relocated from 1999-2004 after being banned in Hawai'i, they would have had an average *loss* of $100,164 per vessel.[10] Another study of longlining in the Atlantic and Gulf of Mexico found that full-time longline vessels *lost* on average a total of about $3,500 per year and part-time longline vessels lost $23,500 per year, although these losses may not be apparent due to subsidization of the longline fishery.[11]

G. The EFPs and regulatory amendments waste limited agency resources to revisit the issue over and over again

---

Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service. March 2006. pp. 101-102.
[9] Pete Dupuy, Exempted Fishery Permit, Agenda Item J.4.a, Attachment 2, March 2006. p. 2.

[11] C. Dumas, *The Economic Impacts of Banning U.S. Pelagic Longline Fishing*, unpublished report for Pew Charitable Trusts, January 15, 2005, Ch. 2, pp. 11 and 21; Porter, R. M., Wendt, M., Travis, M. D., and I.E. Strand. "Cost-earnings study of the Atlantic-based U.S. pelagic longline fleet," unpublished paper, SOEST 01-02, JIMAR Contribution 01-337, Pelagic Fisheries Research Program, Joint Institute for Marine and Atmospheric Research, University of Hawai'i, Honolulu, HI, 2001; and C. Dumas, "The economics of pelagic longline fishing in the U.S. and Canada—A brief overview," presentation notes submitted at the International Leatherback Survival Conference, April 22-25, 2002, p. 11.

The Vermont based Federation of Independent Seafood Harvesters is unhappy with the dataset used for the 2004 ESA required Section 7 Consultation and is wasting time and taxpayer money to revisit a settled issue.

H. Expanding drift-gillnet and longline fishing would damage much more valuable industries

1. Recreational fishing much more valuable on the West Coast than both fisheries combined

Recreational fishing in California generates $2.9 billion in sales, $5 billion in personal income and $5.7 billion in value added to the economy. It is estimated that 153,849 people are employed in the state in jobs related to recreational fishing while only 20,820 are employed in commercial fishing.

2. Marine tourism to Monterrey would suffer.

According to the EA, Monterrey is one of the "communities that would primarily benefit from an increase in commercial catch due to the EFP...."

I. Exp drift-gillnet and longline fishing would undermine international tuna conservation measures by the IATTC and WCPFC

Adding between 71 to 131 new longline vessels would worsen stocks of bigeye, yellowfin and N. Pacific albacore:

1. overfished bigeye is subject to quotas in the E. Pacific and a recent US closure and a freeze in capacity in the Western and Central Pacific
2. yellowfin is already at 120% average maximum sustainable yield and subject to a freeze in capacity in the Western and Central Pacific
3. N. Pacific albacore is considered fully exploited or being fished above sustainable levels and is subject to a freeze on effort in both the E. Pacific and in the Western and Central Pacific. (the DGN fishery catches 10 x more North of Pt. Conception, catches 20% more than swordfish and retains >80%)[12]

J. EFPs and regulatory amendment to the time/area closures violate the following Magnuson Stevens Act National Standards:

1. Does not prevent overfishing
3. Does not manage a fish stock as a "unit throughout its range"
9. Does not minimize bycatch and mortality by eliminating successful conservation measure for leatherbacks and increasing bycatch of marine mammals, sharks and tunas

K. The scope of EA fails to identify adverse impacts to public health

Expanding these two fisheries would promote increased consumption of high mercury swordfish and tuna species which poison an estimated 300,000-600,000 children/year in the US at the costs of about $9 billion a year.[13]

---

[12] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 5, 103, 108.
[13] Management of the Drift Gillnet Fishery Exempted Fishing Permit And/Or Regulatory Amendment: Environmental Assessment, Regulatory Impact Review & Regulatory Flexibility Analysis, PFMC and NMFS Fisheries Service, March 2006, p. 4; *Environmental Health Perspectives*, 2005 May; 113(5): 590-596. Published online 2005 February 28. doi: 10.1289/eh, p. 7743.

J.3

Advocates for Wild, Healthy Oceans

Pacific Regional Office
116 New Montgomery Street
Suite 810
San Francisco, CA 94105

415.979.0900 Telephone
415.979.0901 Facsimile
www.oceanconservancy.org

Formerly the Center for
Marine Conservation

The Ocean Conservancy

March 3, 2006

Mr. Donald McIsaac
Executive Director, Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: Drift-Gillnet Management and EFP Application for Pelagic Longlines

Dear Mr. McIsaac and the Council:

The Ocean Conservancy is submitting the following comments opposing the proposals before the Council to expand the current drift gillnet fishery and reestablish a Pacific longline fishery. At your March 6-10, 2006 meeting, the Pacific Fisheries Management Council (PFMC) will take a final vote on proposals that, if implemented, will undermine successful conservation measures protecting the critically endangered leatherback sea turtle as well as billfish, seabirds, marine mammals and sharks and other fish by allowing drift-gillnets and pelagic longlines to be used in areas along the California and Oregon coastline in which these gear types are currently prohibited. We do not believe there is sufficient evidence to justify allowing increased drift-gillnet fishing or a renewed longline fishery. Therefore, we urge the PFMC and the National Marine Fisheries Service (NMFS) to reject any such proposals.

Since 2001, areas north of Point Conception to an intersect with the Oregon coast and out beyond the Exclusive Economic Zone (EEZ) to 129° West longitude have been closed to drift-gillnet fishing from August 15th through November 15th to protect leatherback sea turtles which seasonally inhabit these waters. Similarly, pelagic longline fishing has been banned within 200 miles of the California coast for well over a decade, and in March 2004 this ban was extended to the entire west coast EEZ for all pelagic longlining, and to the high seas beyond the EEZ for west coast-based shallow-set pelagic longlining. The proposals under consideration by the PFMC would allow drift-gillnets back into the seasonally closed area when leatherbacks are present, as well as permit an "exempted" longline fishery within the EEZ off of California.

In addition to our concerns regarding the potential threat posed by these pending proposals to endangered marine mammals, seabirds and overfished fish populations, we are gravely concerned by the risk to imperiled Pacific loggerhead and leatherback populations. In recent decades, incidental and intentional take throughout the Pacific has affected sea turtles to the point that some populations are hovering on the brink of extinction. Fisheries mortality has been especially problematic for loggerheads and leatherbacks, with overall nesting population reductions in excess of 80 percent. Although the World Conservation Union (IUCN) has not yet evaluated loggerheads regionally, Pacific loggerheads, like Pacific leatherbacks, will qualify as "Critically Endangered" on the Red List of Threatened Species, based on nesting population reductions of 80 percent or more in the last three generations. Both loggerheads and leatherbacks have suffered precipitous declines in less than three generations. The two major loggerhead populations in the Pacific are found in Japan and Australia, with less than 1,000 and 300 turtles, respectively, nesting annually. While the status of the leatherback has been the focus of much attention in recent years, conservation protection and support is as critical for the loggerhead as for the leatherback. According to the latest surveys, there are more nesting leatherbacks in the Pacific than nesting loggerheads.

The PFMC and NMFS should reject proposals to reestablish the California/Oregon drift-gillnet fishery in areas where the fishery is currently precluded.

Despite management measures intended to reduce interactions between the California/Oregon drift-gillnet fishery and vulnerable bycatch species, catch and entanglement of seabirds, elephant seals, steller sea lions, California sea lions, dolphins, and Humpback, sperm, fin, grey, and pilot whales has continued over the last three years. As a legal matter, the drift-gillnet fishery is currently operating in violation of the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA) by fishing without authorization for takes of ESA-listed marine mammals. A permissible take of an ESA-listed marine mammal requires authorization under both a biological opinion issued pursuant to the ESA *and* Section 101 of the MMPA. The three-year take permit issued in October 2000 for the drift-gillnet fishery authorizing the take of ESA-listed marine mammals has since expired. 65 Fed. Reg. 64670. Despite the fact that no take of any ESA-listed marine mammal species is currently authorized for the drift-gillnet fishery, entanglement of ESA-listed species – including a humpback whale during the 2004-05 fishing season – continues in the Drift-Gillnet fishery. Continued operation and the proposed expansion of the drift-gillnet fishery into currently closed areas violates Section 9 of the ESA prohibiting such take.

The original drift-gillnet biological opinion emphasized the seriousness of the threat to the leatherback population noting that, "any additional impacts to the western Pacific leatherback stocks are likely to maintain or exacerbate the decline in these populations" and that such effects "would be expected to appreciably reduce the likelihood of both the survival and recovery of the Pacific Ocean population of the leatherback sea turtle." 2000 Biological Opinion at 94. Concluding that the estimated annual mortality of leatherbacks associated with the drift-gillnet fishery would likely jeopardize the species, NMFS instituted a seasonal closure to the drift-gillnet fishery in the waters off California and Oregon Coasts as a Reasonable and Prudent Alternative ("RPA"). 66 Fed. Reg. 44549. Observer data, which shows that there have been no recorded takes of leatherback sea turtles during the past three years, suggests that the drift-gillnet closures have been largely effective. Given the apparent success of these conservation measures, it would be inappropriate for the Council and NMFS weaken protections and allow drift-gillnet vessels to set their nets in areas where they are likely to entangle and kill this critically endangered species. Indeed, expansion of the drift-gillnet fishery would compromise sea turtle conservation progress and compound current ESA and MMPA violations.

The purpose of an EFP is, "for *limited* testing, public display, data collection, exploratory, health and safety, environmental cleanup, and/or hazard removal purposes, the target or incidental harvest of species managed under an FMP or fishery regulations that would otherwise be prohibited." 50 CFR 600.745(b) (*emphasis added*). However, the draft EFP proposal as written allows as much as two-thirds of the active fleet to participate, relying solely on turtle takes reaching the limit contained in the biological opinion to close the exempted fishery. This open-ended proposal does not meet the regulatory requirements for a "limited" EFP as described above. Furthermore, the ESA does not allow for this type of requested "quota" for turtle captures. Rather, any EFP properly approved by the Council must contain an accurate and concrete description of the action to be taken in terms of effort to be expended. The impact of that level of effort will be evaluated for compliance with the ESA's jeopardy prohibition. As an example, the Western Pacific Fishery Management Council capped effort in the Hawaii-based longline fishery for swordfish and stated that the fishery would close upon meeting either the limit on number of sets or the limit on number of turtles captured. While the drift-gillnet EFP application violates the ESA and the regulations and therefore must be denied, it also fails to establish effective caps and limits.

The EFP proposal also provides that "bycatch" species will be released alive when possible, but historically the drift-gillnet swordfish fishery has retained a long list of "marketable" species, including bullet mackerel, Pacific mackerel and skipjack tuna. We are concerned that increased effort in the northern region will place additional pressure on fish populations that: do not have harvest caps, such as striped marlin; are not actively managed by the Council, such as mackerel; and are currently the subject of scientific concern, such as albacore tuna.

The PFMC and NMFS should reject the re-establishment of a California-based longline fishery.

The Pacific longline fisheries out of California and Hawaii were both previously found to cause jeopardy to leatherback and loggerhead sea turtle populations under the ESA. Indeed, the moratorium on pelagic longline fishing east of 150 degrees West longitude was imposed by NMFS in 2004 to guard against jeopardy to loggerheads even after the Pacific Council banned longlining west of 150 degrees West longitude. These far reaching closures demonstrate just how vulnerable threatened and endangered sea turtles are to the impacts of fishing.

As the Council is well aware, the Hawaii-based shallow-set longline fishery was closed for a number of years because of its impacts on sea turtles. It was allowed to re-open in 2004 subject to the conditions that only large 18/0 circle hooks be used, that an effort cap be established to control the number of longline sets, and that a hard cap on turtle take be established to close the fishery if it approached the limits of its take authorization. The Ocean Conservancy supports these types of stringent measures and believes that all longline fisheries in U.S. waters should be required to fish with 18/0 circle hooks to reduce harmful and deadly interactions with sea turtles.

Although the EFP includes these essential conservation measures, we cannot support the reopening of the pelagic longline fishery without further significant analysis and safeguards. In particular, we have repeatedly called for a comprehensive evaluation of the impacts of all U.S. longlining in the Pacific on imperiled sea turtle populations. The Hawaii and California based fleets fish in the same manner, often in the same area, and catch the same turtles. See 69 Fed. Reg. 11540, 11543 (March 11, 2004) (preamble to final rule closing Pacific longline fishery east of 150 degrees West long.). Furthermore, the fleets consist of many of the same boats as they have had a history of moving back and forth to avoid the closures to protect sea turtles that have alternated between Hawaii and California in recent years. A standard "cumulative effects" analysis is not enough in this case where the fisheries often act as a single unit.

The EFP application suffers other defects. First, as with the drift-gillnet fishery, it is critical to establish a cap on effort upon which to base consultation and not just a request to fish until the species is in jeopardy. Second, the EFP application's reliance on sea turtle bycatch rates in the drift-gillnet fishery is completely misplaced. Rather than use the drift-gillnet fishery, NMFS has used the bycatch rates for the California and Hawaii longline fleets, and this would be a more appropriate point of reference for the impacts of the requested permit as well. 69 Fed. Reg. 11540, 11543 (March 11, 2004).

The current drift-gillnet and longline closures have provided a successful working balance between the interests of fishers and the urgent need to protect the critically endangered leatherback sea turtle. During the past three years of the drift-gillnet closures, this fishery, which targets swordfish, tuna and sharks, had no recorded takes of leatherback sea turtles. Such successful time/area closures, which eliminate the overlap of longline and drift gillnet fishing gear with the presence of leatherback sea turtles, should serve as a successful model that should be replicated elsewhere in the Pacific where the leatherback is at the greatest risk of extinction. It would be irresponsible to expand the drift-gillnet fishery in current protected areas or re-establish the longline fishery without the necessary conservation safeguards. The FMP amendment and EFP applications currently under review are not predicated on a comprehensive assessment of sea turtle populations and fishery interactions and do not adequately consider the associated impacts on endangered and overfished species and the marine ecosystem. Therefore, we respectfully request that the PFMC and NMFS reject the proposals to expand the drift-gillnet fishery and reestablish the Pacific longline fishery.

Sincerely,

Meghan Jeans
Pacific Fish Conservation Manager
The Ocean Conservancy

Marydele Donnelly
Sea Turtle Scientist
The Ocean Conservancy

Agenda Item J3d
Supplemental Public Comment 4

Wilsonville OR
Mary Pettinger
3/8/06

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Daniel Bowling	3303 Watson Ave Salem, 97303	503-363-3301	
[illegible]	365 W. Jackson St. #9 Monmouth, OR	503-838-4897	
Lindsey Faubole	595 Catron St N Apt #4 Monmouth, OR 97361	503-508-0742	
Francesca Cvralnick	1023 Clay St E Monmouth OR 97361	503-428-8001	
Laura Maddox	371 N. Ecols St Apt E Monmouth OR 97361	503-803-2946	
Jenna Melton	1169 N. Whitman St. Monmouth OR 97361	(503) 866-8022	viva_267@hotmail.com
Cinelya Mettingl	2875 White Salmon Ct	503-657-1541	
[illegible]	581 Maria Ave W Monmouth, OR 97361	503-550-4231	
Jesse O'Neil	16975 Falls City Rd Dallas OR 97338	(503) 551-0700	joneil@wou.edu
[illegible]	2245 Ladd Ave NE, Salem OR 97301	503-580-6629	TMoore@wou.edu
Evans05@hotmail.com	3453 4th Ave S. Salem, OR 97302	(503) 428-6521	
[illegible] Moreno	610 N Knox St #4, Monmouth OR	503 507 9468	selgiezabal@hotmail.com
Katherine Smith	262 S. Monmouth Ave Monmouth OR	503-510-3556	emilyplee@yahoo.com
Emily Plee	711 Bentley St Monmouth OR 97361	503-838-0941	
Annette M. Pettenger	1301 Old Wawawai Road Pullman WA 99163	509-334-3248	
Ryan W. Pettenger	1301 Old Wawawai Rd Pullman WA 99163	509-334-3248	
Soja Harp	2260 SE 117th	503-287-1576	actnow@pacifier.com
[illegible]	1795 Summer St. S.E Salem 97302	503-463-6233	fundraising.or@msn.com
Jeffrey R. Patten	8630 SW Fairway Dr.	503 284 9805	hpatten@bigplanet.com
Paula Person	555 W 8th St #430 Vanc WA	360-694-7609	pperson12@yahoo.com
Elaine H Nelson	6786 SW 204th Ave. Aloha, OR 97007	503-591-0160	elaine_nelson47@yahoo.com
Eleanor B. Hunting	4336 NE 40th Ave, Portland OR 97211	503-281-7089	ebhunting@juno.com
Diane Charlton	4336 NE 40th Ave Portland OR 97211	503 287-5222	diane.charlton@banfield.net
Christine A Allen	2655 Pheasant Ave SE Salem OR 97302	503-364-8225	callenedc@comcast.net
[illegible]	1971 S NE Couch PDX OR 97230	503 235 2073	
Tonya K. Willey	29627 SW Yosemite Way, Wilsonville, OR 97070	503-582-9534	tkwmep@comcast.net
Mary Pettinger	29627 SW Yosemite Way, Wilsonville OR 97070	503-582-9584	tkump@comcast.net
Deanne E Deane	22 Ivy Lane E Monmouth OR 97361	503-838-2278	jdathm@att.net
[illegible]	7540 NE Pettibone	541 745 7768	heakilm@wou.edu
Peter Callero	1270 21st NE Salem 97301	503-838-8352	

Signatures collected by [illegible] Wilsonville, O.

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

May Pittery
3/8/06

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Stacey Head	RSC 737 345 N. Monmouth Ave. Monmouth OR 97361	503-751-4865	wougal07@yahoo.com
Andrew Surber	RSC 724 347 N. Monmouth Ave Monmouth, OR	541-350-6519	asurber05@wou.edu
Seth Renne	1421 Westlake Loop Newberg OR	971-832-0467	SRenne1982@hotmail.com
Ted Bolt	12950 SW Westfall Rd Sherwood OR 97140	503-582-9276	WIZARDTB@EARTHLINK.NET
Katelyn Stewart	4675 Harcourt Ave. Keizer, OR. 97303	503-302-8836	Katelynmary7@yahoo.com
Kameron Giacchero	17340 Crownview Dr. Gladstone, OR. 97027	503-939-0003	KameronG@gmail.com
David Havens	16911 S. Hatton Rd. Oregon City, OR, 97045	503 720 7631	DEMH95@gmail.com
Amira Walcott			baby_chica36@hotmail.com
Shad Downey	1136 SW Montgomery St APT 608 PDX 97201	503 471 8868	shad.downey@gmail.com
Cassandra Kirk	PO Box 94 Dorena, OR 97434	541-729-0773	ckirk05@wou.edu
Austin Schultz	1379 Parkway dr Salem OR 97304	503-949-1269	bmwaustin@hotmail.com
Brad Meyer	307 SW Westwood Dr. Dallas OR 97338	503-623-9078	velnec_is_1@msn.com
Dave Fellows	10360 SW 135th AVE	503-869-2680	defdr101@aol.com
Sy Cullen	RSC Box 256 347 N. Monmouth Ave	808-479-9954	ers_bebe@yahoo.com
Kyle Beck	RSC Box 392 347 N. Monmouth Ave	808-392-5384	jmsbackaloose21@aol.com
Denton Badenoch	365 S. Monmouth Ave monmouth OR	503-881-5326	dentonatwestern@hotmail.com
Emily Goodman	RSC Box #491 347 N. Monmouth Ave	503-838-9088	bandgirl05@hotmail.com
Caterina Cortese	RSC Box #584 347 N. Monmouth Ave.	503-838-8497	ccortes@wou.edu
Zak Nussbaum	RSC Box # 478 347 N. Monmouth Ave	503-838-9078	Nuss504@hotmail.com
Nick Sheets			
Corinne Hues		(971) 732-9020	wavetothefreakshow@yahoo.com
Casey Roach			croach1@wou.edu
Teresa Lucas	RSC Box #295 347 N. Monmouth Ave.	(503) 838-9316	tlucas05@wou.edu
Kelly Rayson			
Erin Mackall			
Matthew Kirk	RSC Box #366 347 N Monmouth Ave	503-838-9397	mkirk05@wou.edu
Bri Berkeland	RSC Box #290 347 N Monmouth Ave 97361		
Brandon Claggett	RSC #101 347 N Monmouth Ave.		
Andrew Nerz	RSC #100 347 N. Monmouth Ave.		toad_salt@yahoo.com

Signatures collected by
Mary Pettenger, [illegible]onville OR
Mary Pettenger
3/8/06

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Jennifer Quillen	17770 Orchard View Rd McMinnville, OR 97128	(971) 237-0178	jeng@onlinemac.com
LaVina Billyeu	2464 NW Garryanna St. Apt. 12 Corvallis, OR 97330	(541) 908-2594	Vina-2003@yahoo.com
Ryan Savage		(541) 680-6597	savage1212@hotmail.com
Jonni Moore	166 Jackson St. E #4 Monmouth	(541) 401-9939	Jonnikay2003@yahoo.
		~~(541) 401-9939~~	~~Jonni Kay~~
Bethany Fandrey	336 Whiteseil #2	541 991 2556	bfandrey927@yahoo.com
Amanda Fletcher	347 Monmouth Ave Monmouth OR 97361	541-301-0970	afletcher05@wou.edu
Maria Acosta	415 S. College St. Monmouth, OR 97361	503 476-5261	macosta@wou.edu
Jenni Brozovich	479 S. Monmouth #16 Monmouth, OR 97361	(503) 606-0173	JBrozovich05@wou.edu
Alison Crumb	474 S. Monmouth #16 Monmouth, Or 97361	(503) 606-0173	alizison@hotmail.com
Kathleen Stuart	RSC Box #269, 347 N. Monmouth Ave, 97361	(503) 334-9516	k_s86@hotmail.com
Danielle Bitz	RSC BOX 540, 345 N. Monmouth Ave 97361	(503) 833-9199	DBITZ05@WOU.edu
Allison Sirrensawy	RSC BOX 534, 347 N. Monmouth Ave 97361	(253)-278-9063	shootingstar210@hotmail.com
Jessica Patterson	RSC Box 539 347 N Monmouth AVE 97361	(541) 410-0961	jpatterson05@wou.edu
Debbie Anderson	RSC 538 347 N Monmouth Ave 97361	(541) 377-3177	debra_dawnielle@hotmail.com
Ian Moley	RSC box 580 347 N Mon	503 939-7908	imoley@wou.edu
Michael Allard-Abora	RSC box 382 "	503 838 9147	mallardabora@wou.edu
Chris Rivers	RSC Box ~~59~~ 579	503 753-2352	Blkchild5@yahoo.com
Holly Clark	RSC Box #432	503-510-0162	hclark05@wou.edu
Sarah Konkolewski	RSC #510	503-838-9203	skonkolewski05@wou.edu
Stephanie Miller	RSC #511	503-838-9514	smiller05@wou.edu
Maegan Poole	347 N. Monmouth Ave 97361	503-949-7828	meeganos@comcast.net
Amber Amonak		503-269-8537	amb4441@aol.com
Megan Daugherty	RSC #541	541-[illegible] 918-9154	mdaugherty05@wou.edu
Brittany Ferguson	RSC #535	503-838-9175	bferguson05@wou.edu
Danielle Fotsch	3118 Lakeview Dr NW	503-363-6167	foolishangel88@aol.com
Denise Jones	211 SE Stonelane Dallas OR	503-831-1867	dkj123@aol.com
Tiffani McCoy	292 N. Knox St Monmouth OR 97361	541-310-0612	tmccoy05@wou.edu
Crystal Beck	19871 Summit Hwy Blodgett, OR 97326	541-456-2015	icywindblowing@hotmail.com
Zach Crowe	207 NE Spencer Ct.	503 881 3024	zcrowemanz5@hotmail.com

Signatures collected by
Mary Pettenger, Wilsonville

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

Mary Petten

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

3/8/06

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Frank Kolwicz	311 Cherry Lane S. Monmouth OR	503 838 1269	Kolwicz@exchangenet.net
Dale Cannon	287 N Warren St., Monmouth, OR	503-838-3489	cannodw@wou.edu
Brian Johnson	450 S Walnut Dr, Monmouth OR	503-838-4115	Brian.Johnson@state.or.us
Craig Johnson	~~[illegible]~~	503-420-7050	hoplites@hotmail.com
Mark Spencer			mespencer1938@yahoo.com
Morris Johnson	271 Walnut Dr Monmouth, OR	503-838-3995	morrisjm@aol.com
Jeanne DeWong	39107 Military Rd Monmouth OR	541-745-5933	wilkinsa@peak.org
Melanie Ball	311 Cherry Ln. S. Monmouth OR	503-838-1269	mball@exchangenet.net
Terry Manning II	511 W Main St. Monmouth OR	503-851-6934	manningt@wou.edu
Irene McCorkle	189 Wineger Ave E Monmouth OR	503-838-2137	irenemc@juno.com
David V. McCorkle	189 Wineger Ave E Monmouth 97361 OR	503-838-2137	mccorkd@wou.edu
Lowell Spring	25 Ivy Lane, Monmouth, OR	503-838-8337	springl@wou.edu
Kami Haberman	2500 NW Princess St. #302, Corvallis, OR	(541) 766-8426	habermk@wou.edu
Carolyn Menke	1138 NE Conser Pl. Corvallis OR	541 752-5642	menkec@wou.edu
Bryan Dutton	1817 Bentley St, Monmouth, OR	503 838-0288	bedutton@earthlink.net
Kolly Hattebere	362 Park Place Monmouth, OR	503 838-0194	khattrb@wou.edu
Stacy Cooke	362 Park Place Monmouth, OR	503 838 0194	Manate4me@hotmail.com
Alexa Kellogg	10425 SW Kiowa St. Tualatin, OR	971.506.9627	akellog@wou.edu
Daniel Asakawa	140 Acorn St Monmouth		danasakawa@hotmail.com
Rose Peels	340 Broad St N Monmouth	503 838 0222	rclaub@wou.edu
Holly Tucker		971-216-3030	htucker@wou.edu
Danielle Williamson	1387 E St. Independence	971-645-6331	sweetsc+@yahoo.com
Hannah Vowell	110 Monmouth Ave #206 Monmouth OR	503 838 4391	hvowell@wou.edu
Lindsey Hansen	710 Cleveland Ave. McMinnville, OR	971-237-9042	lindseyrose143@hotmail.com
Niki Winslow	11230 Mistletoe Rd Monmouth OR	503-838-4633	winslon@wou.edu
William D. Smith	405 SW Crider St, Dallas, OR 97338	503-516-9653	smithw@wou.edu
Joseph Brainard	363 Monmouth St Independence OR 97351	503-838-2290	jbraina@wou.edu
DEAN M. BRAA	11370 Riverview, Independence OR 97351	503-838-5249	braad@wou.edu
Jeff Baldwin	1724 Lawrence Eugene, OR 97401	(541) 344-0152	baldwij@wou.edu
Christian Rogers	823 N Russel Portland OR 97217	(503) 367 3616	Djcashmoney@hotmail.com

Signatures collected wilsonville R.

Mary Pettey 3/8/06

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Molly Mayhead	15970 Airlie Rd, Monmouth, OR 97361	(503) 838-8536	mmayhead@wou.edu
Elizabeth Chambers	RSC 715 347 N Monmouth Ave 97361	751-4613	xTenshiko@hotmail.com
Carl Fish	RSC 1727 347 N. Monmouth Ave.	751-4619	
Steven Sharp	4472 Del Rio Place	928-6232	
Michael Sharp	4472 Del Rio Place	928-6232	
Jon Tucker	475 Madrona Ave S Salem OR 97302	838-8063	
Rachel Johnson	848 S. Monmouth Ave	910-7237	rachel_lee04@hotmail.com
Thomas Bell	1479 E Street, Independence 97351	737-9815	orionkoo@hotmail.com
Cristina Pryor	1479 E Street, Independence	804-3672	cpryor@wou.edu
Pablo Bravo	1479 E Street, Independence	541-206-8787	pbravo@wou.edu
Lindsay Wegner	270 S Warren St #6 Monmouth, OR 97361	503.351.0053	lwegner@wou.edu
Dan Carillo	347 N Monmouth Ave RSC #122	503.701.0110	dcarillo05@wou.edu
Bryan Beck	347 N Monmouth Ave RSC #519	503 507 8727	bbeck05@wou.edu
Carrie Elmer	460 Ecola St S Monmouth OR 97361	503-522-2265	[illegible]@hotmail.com
Kelly Gordon	347 N Monmouth Ave.	503-751-4852	cerealfactory@gmail.com
Tina Fuchs	59 Davis Lane, Monmouth OR 97361	503-838-2206	tinamfuchs@msn.com
Ivan Hurtado	3453 4th Ave S Salem OR 97302	(503) 428-6524	Ivans05@hotmail.com
Amy O'Conner	12485 SW 133rd Ave.	(503) 808-0181	Amy4U213@yahoo.com
Alison Michalek	864 E. Main St.	541) 643-2546	amichalekos@wou.edu
Kerry L Duker	345 N Monmouth Ave	(503) 939-8221	dukerg@wou.edu
Adam Bernot	RSC 146 345 N. Monmouth Ave.	(503) 708-5124	ABernot@wou.edu
Richard Rogers	RSC 771 345 N Monmouth Ave	(503) 286-7698	rrogers@wou.edu
Christy Lowe	1470 18th Street NE Salem, OR 97303	503 589 7200	SororLuna@gmail.com
[illegible]	3505 NW Harrison Blvd, Corvallis, OR 97330	(541) 753-2336	geierm@wou.edu
John L. Rector	2640 High St. SE, Salem 97302	503-371-8848	
Melinda Jette	P.O. Box 3370 PDX, OR 97208	503-653-8893	jette@wou.edu
Mark Beach	1940 Berry St Salem OR 97302	503-581-6802	
Mark Moritz	788 Cateron St N.	503-606-2137	Markscott54@Hotmail.com
[illegible] Lowe	1470 18th St. NE, Salem OR 97303	503 589-7200	loweb@wou.edu
Rob Moore	10995 Mistletoe Rd Monmouth, OR 97361	503-606-9732	bromly_falco@yahoo.com

Mary Pat
3/8/06

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
Nancy Kikendall	1422 N. Murray LN, Liberty Lake, WA [illegible]	509-891-9120	nkikendall@hotmail
Emily Selee	1071 Church St W #5, Monmouth, OR 97361	971-219-4937	eselee@wou.edu
Sarah Shorten	404 N. Ecols St # 1 Monmouth, OR 97361	(541) 915-3867	Jimminy20@Yahoo.com
Susan Crabill	5336 Liberty Rd. S. Salem OR 97306	(503) 587-8892	—
Danielle Bradford	166 E Jackson St. Apt #1 Monmouth, OR 97361	(503) 351-1295	d_smiles18@yahoo.com
Brooke Nobles	366 W. Whiteseil #2 Monmouth OR 97361	503-510-7508	—
Meghan McReynolds	234 Whitesell Apt 104 Monmouth OR 97361	253-906-4719	nutmeg465@yahoo.com
Emily Decker	819 E. Main St. Monmouth OR 97361	971-506-7532	irishgurl[illegible]@yahoo.com
Sarah Decker	739 W Jackson #6 Monmouth, OR 97361	503 642 3687	sdecker@wou.edu
Jodie Cherry	739 W Jackson #6 Monmouth, OR 97361	503-692-6476	jcherry@wou.edu
Ben Cavaletto	376 Park PL Monmouth OR 97361	(503) 999-4967	bcavale@wou.edu
Susanne Weatherly	340 Broad St N Monmouth OR	(503) 838 6222	susie_cue1@hotmail.com
Hanson S. Mendiola	292 ~~S.~~ College St #6 Monmouth, OR 97361	(541) 212-6706	~~[illegible]~~ hsform187@yahoo.com

Mary Petter
3/8/06

We, the undersigned, urge the Pacific Fisheries Management Council to do the following:

1. Maintain the ban on longline fishing and keep drift gillnets out of the existing time area closures.

2. Regarding drift gillnets, the Council should explore the need to protect threatened and endangered marine wildlife from being injured and killed outside the time and area closures, and during the months when it is not in place.

Name	Address	Phone Number	Email
[illegible]	Division of Social Sciences WOU	503-838-8264	
[illegible]	4520 18th Pl S Salem OR	503-838-8317	
William Brown	1098 34th Ave NW Salem, OR 97304	503-588-5052	brownw@wou.edu
Megan Lee Matheis	220 Knox St. E.	503-939-7271	VioletMLee@aol.com
Kathie Hindemit	4118 Sunnyview NE Salem, 97305	503-569-6659	
Chelsie Taresh	Box #277 347 N. Monmouth ave. Monmouth OR. 97361	541-282-4257	
Kelley McCann	4321 Independence HWY Independence 97351	425-743-5821	kelleylynn14@hotmail.com
Alison Crumb	479 S. Monmouth apt. 16 Monmouth, Or 97361	360-461-9230	alizison@hotmail.com
Patrick Ferrari	1434 1st Ave Albany OR 97321	541-223-3420	
Andrew Collins	334 N Stadium dr #3 Monmouth OR 97361	971-506-7359	Drewc2002803@yahoo.com
Sayaka Onodera	705 Church St. W Monmouth, OR 97361	503-838-1354	
[illegible]	Western Oregon University	503-838-8853	
SRIRAM KHÉ	WESTERN OREGON U.	503-838-8852	
Shaun Hustoft	Western Oregon University	503 838.8296	hustofts@wou.edu
David Doellinger	Western Oregon University, HSS 212	503-838-1202	doellind@wou.edu
Bernie Olson	WOU HSS 202	503/838-8410	
Vivian Amantana	WOU HSS 244	503 838 8358	amantav@wou.edu
Narasingha P. Sil	WOU HSS 218	503-838-8464	siln@wou.edu

Pacific Fishery Management Council

Drift Gillnet Management

OCEANA

Ben Enticknap. March 9, 2005

Species	Estimated Mortality
Dall's porpoise	44
Pacific whitesided dolphin	61
Risso's dolphin	19
Common dolphin (shortbeaked)	861
Common dolphin (longbeaked)	54
Northern right whale dolphin	151
Shortfinned pilot whale	7
Sperm whale	7
Fin whale	5
Minke whale	12
Gray whale	11
California sea lion	553
Northern elephant seal	150
Unidentified pinniped	11
Leatheraback turtle	33
Loggerhead turtle	18
Northern fulmar	13
Unidentified bird	6

Estimates of Marine Mammal, Sea Turtle, and Seabird Mortality in the California Drift Gillnet Fishery, 1996-2002

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).

Catch of marine mammals in pingered nets

Dolphin, short-beaked common	112
Dolphin, long-beaked common	6
Dolphin, northern right whale	22
Dolphin, Pacific white-sided	7
Dolphin, Risso's	9
Dalls Poropoise	1
Sea lion, California	84
Seal, Northern Elephant	17
Whale, Fin	1
Whale, Gray	3
Whale, Humpback	2
Whale, Minke	1
Whale, short-finned pilot	1
Whale, Sperm	2

PFMC/ NMFS March 2006. DGN EA, at 135

Total catch of managed and monitored fish species, May 1 – January 31, 2003/2004 & 2004/2005

	2003/2004		2004/2005	
	Caught	**Discarded**	**Caught**	**Discarded**
Swordfish	309	8	561	48
Striped Marlin	27	27	2	2
Albacore Tuna	163	9	163	16
Skipjack Tuna	1093	623	492	302
Blue Shark	373	373	250	250
Bat Ray	1	1	4	4
Common Mola	1720	1720	2787	2787
Pacific Bonito	46	37	263	209

PFMC HMS SAFE, at 120-121.

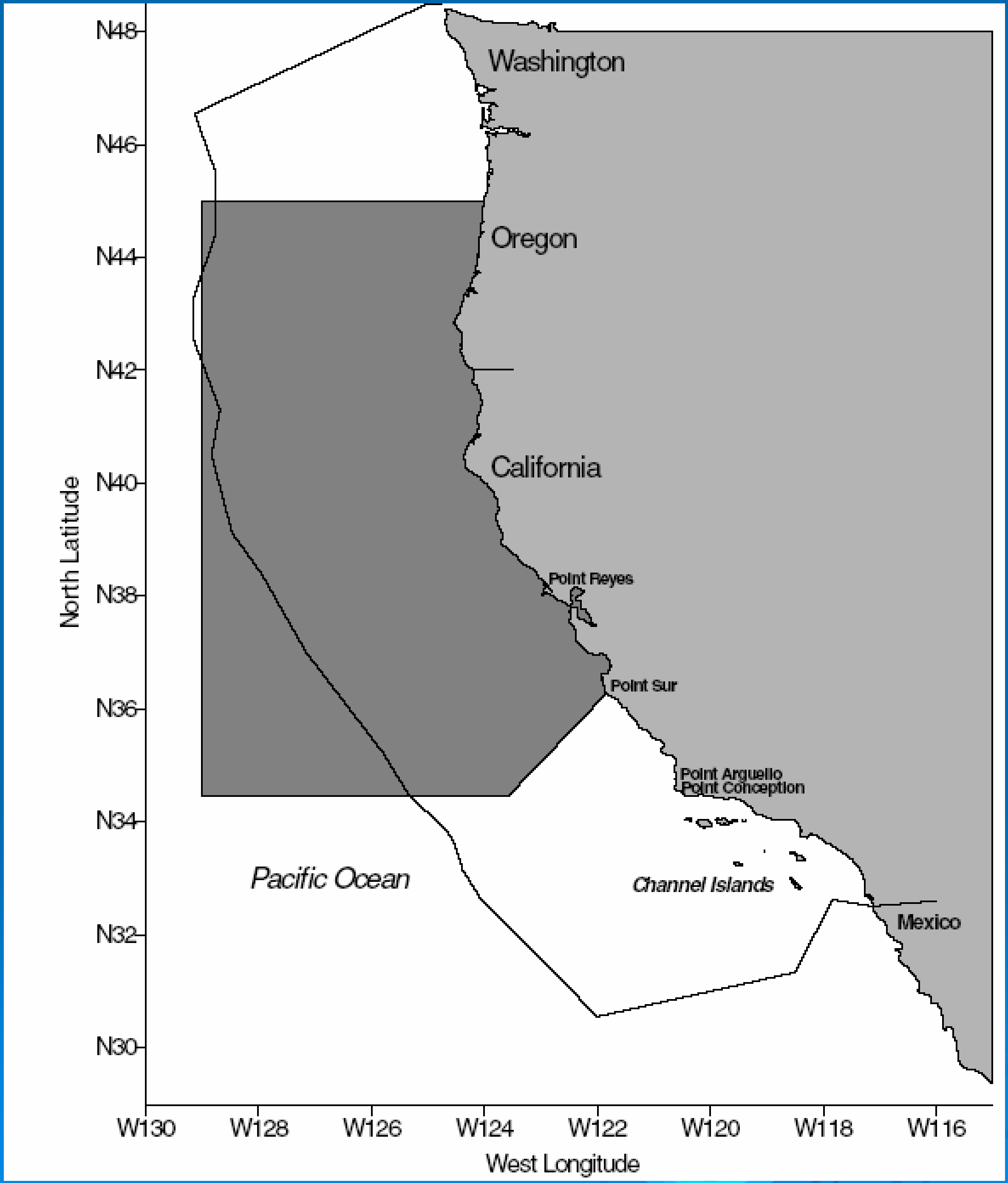
"Specifically the goal of the EFP is to:

- Demonstrate the existing DGN regulations requiring the top of the net to be a minimum distance of 36 feet below the surface reduces the incidental take of leatherback sea turtles to an anticipated level." – EFP applicant, September 11, 2005

"DGN fishermen contend that the 36-ft extenders reduced leatherback entanglement rates, but there are insufficient data to support this." – DGN Draft EA, March 2006

Between 1991 and 1999:

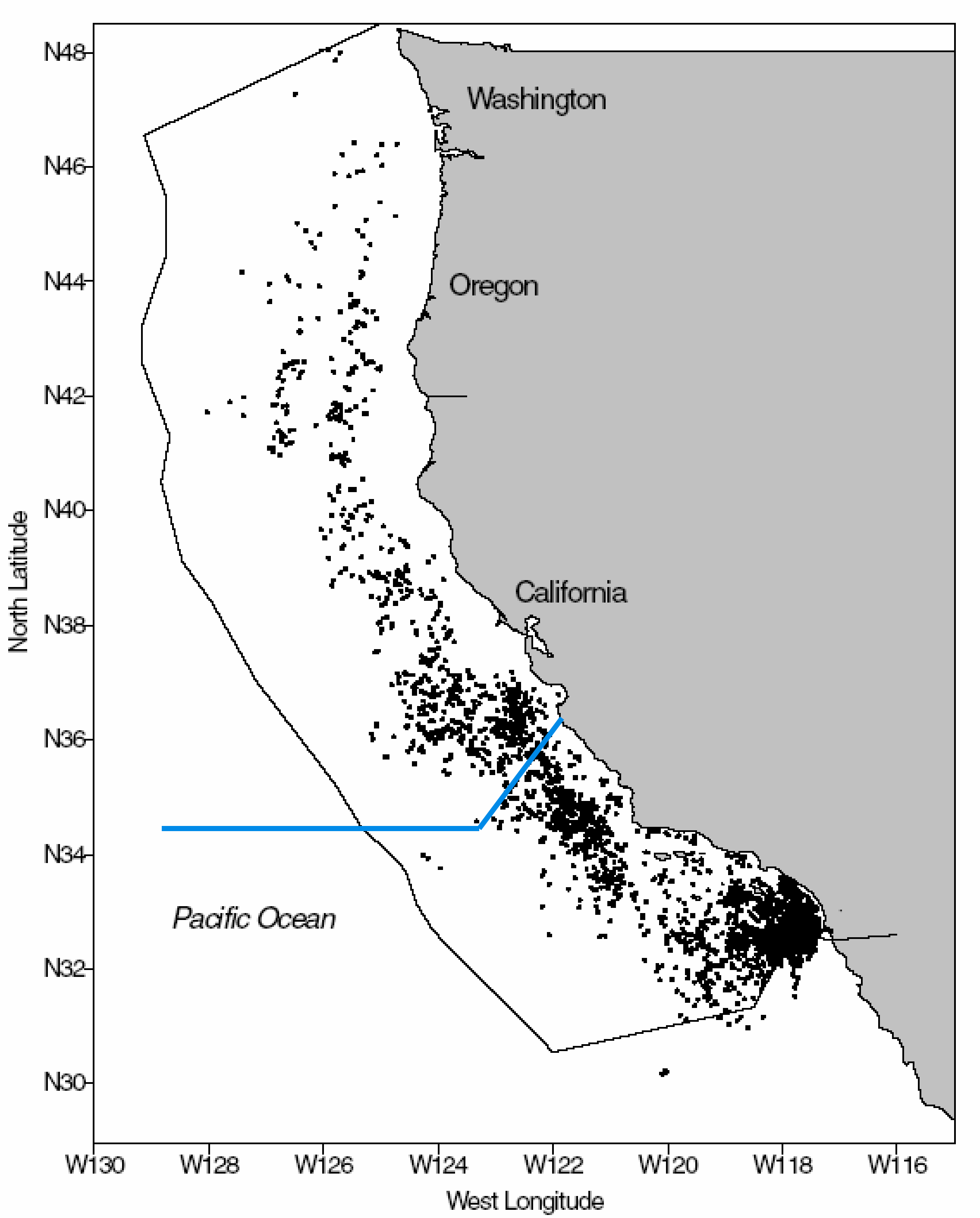
- 17 leatherback takes with 36' extender lines
- 6 takes with less than 36' extender lines



California/ Oregon drift gillnet time/area closure

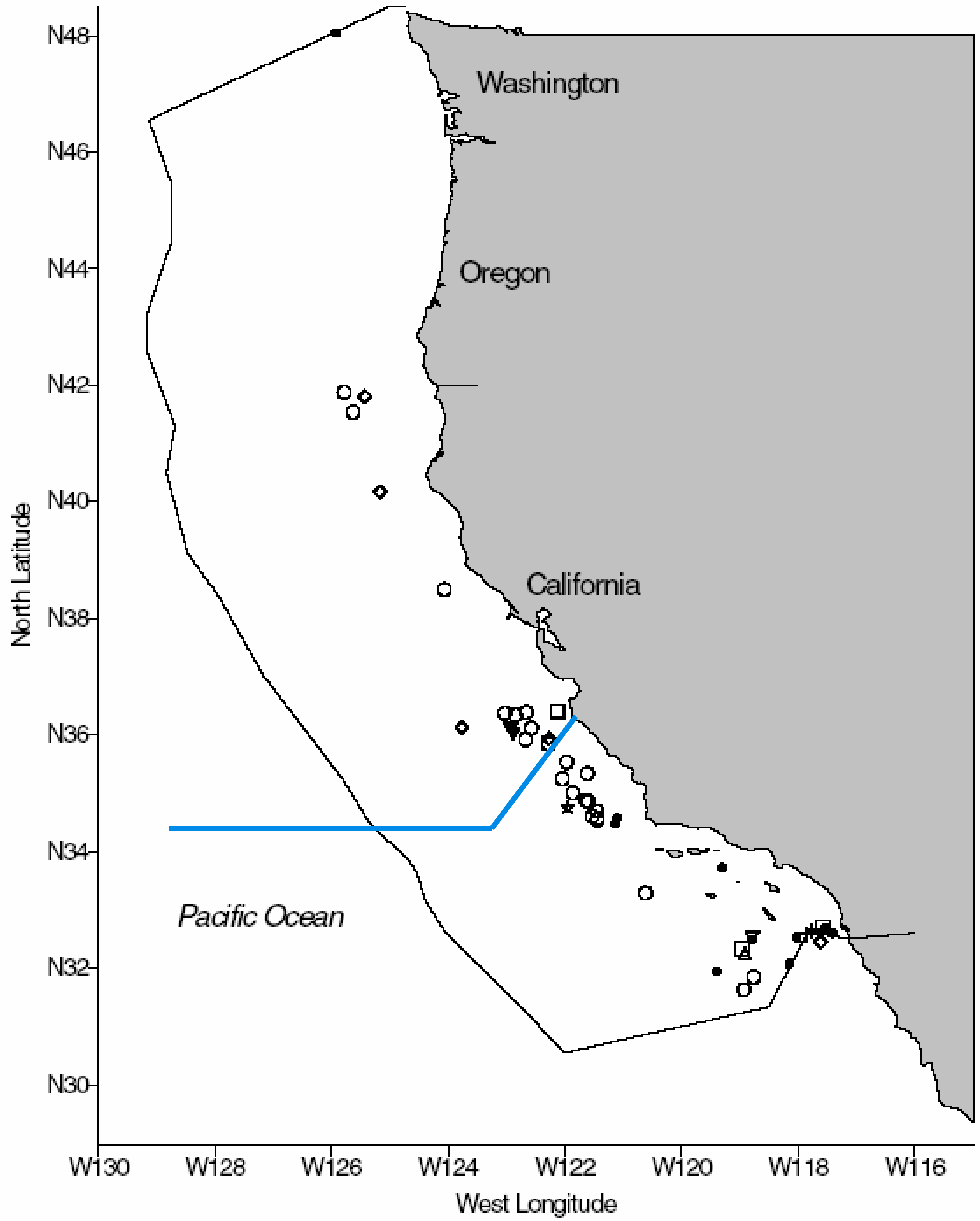
August 15-Nov 15 each year since 2001

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).



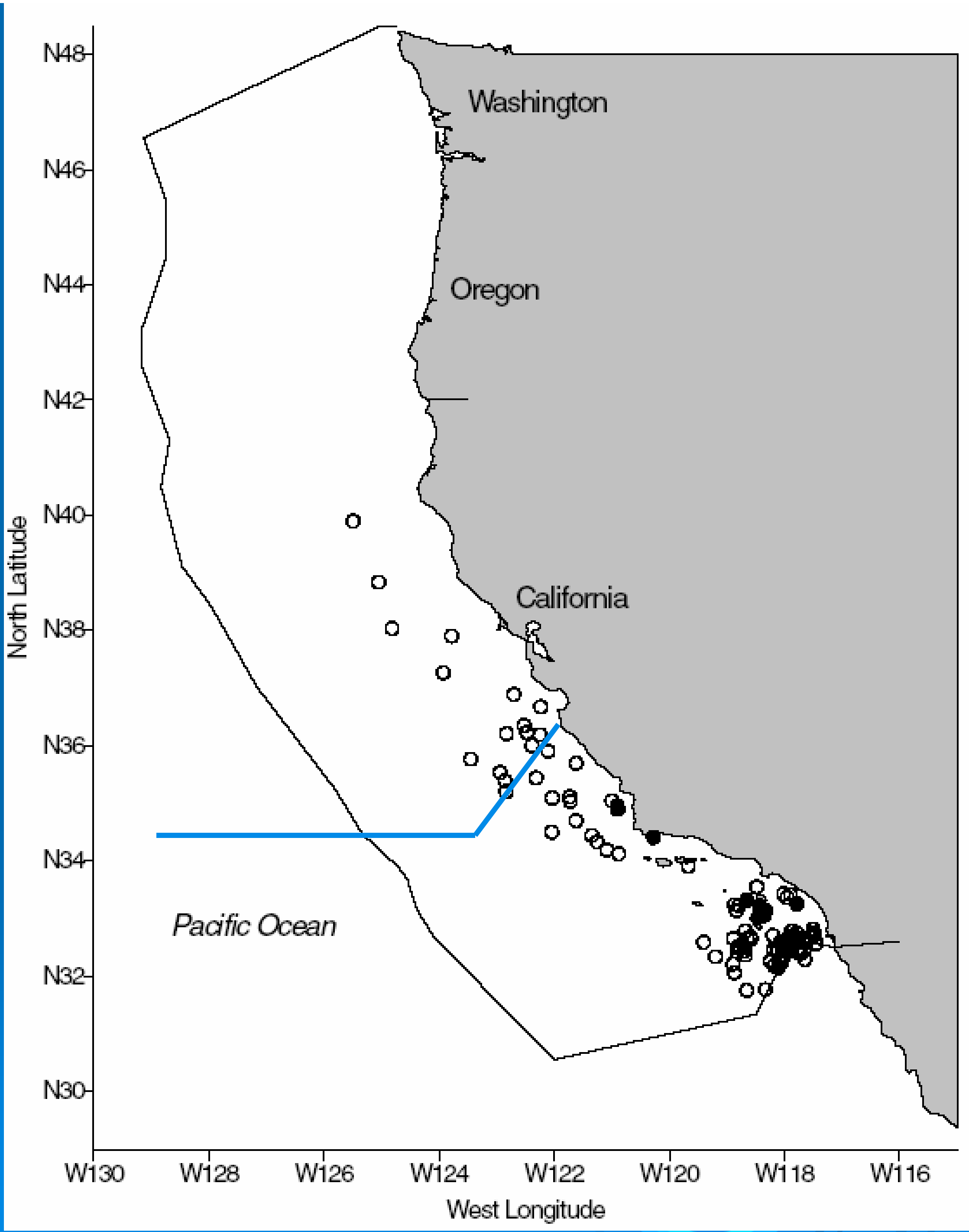
Locations of 3,369 observed sets in the drift gillnet fishery, 1996-2002

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).



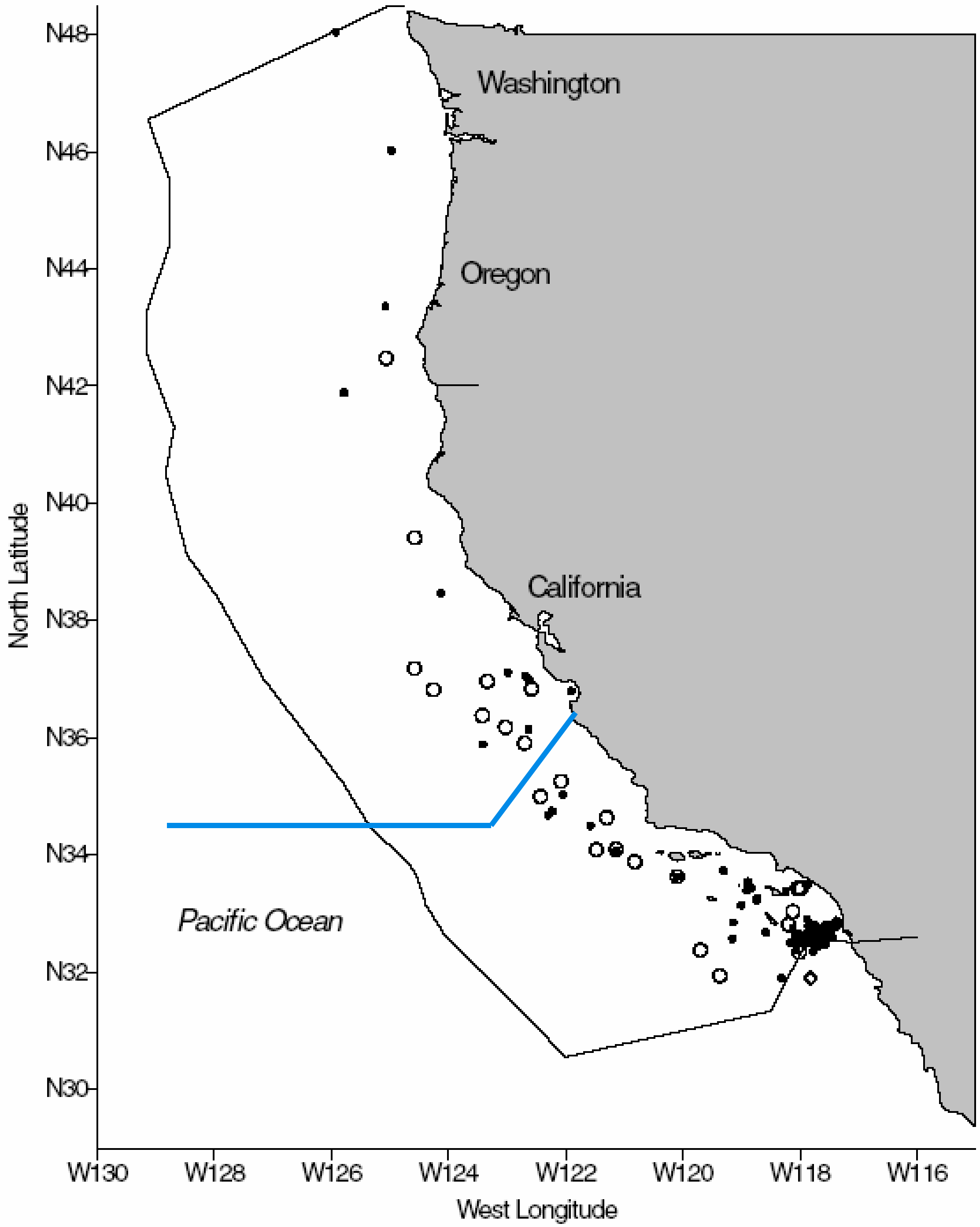
Locations of observed cetacean kills in the drift gillnet fishery

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).



Locations of observed common dolphin kills in the drift gillnet fishery

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).



Locations of observed pinniped kills in the drift gillnet fishery

Carretta, J.V., et al. 2005. Mar Fish Rev. 66(2).

OCEANA

EXEMPTED FISHING PERMIT (EFP) APPLICATIONS FOR HIGHLY MIGRATORY SPECIES

At their November meeting the Council adopted an interim protocol for reviewing EFP applications for the 2006 fishing year (April 1, 2006–March 31, 2007). (A permanent protocol applies to EFPs in years thereafter.) The Council received two EFP applications for consideration under the interim protocol, which stipulates a preliminary review at the November 2005 meeting and final action at the March 2006 meeting. The Council approved both applications for public review. At this meeting the Council is scheduled to finalize their recommendations on these two applications. The Council recommendations are forwarded to the National Marine Fisheries Service (NMFS), which has the permitting authority.

The first EFP application is linked to the drift gillnet (DGN) fishery action the Council takes up under Agenda Item J.3. Under that agenda item, the Council identifies a preferred alternative for management changes to the DGN fishery, based on an environmental assessment (EA) (Agenda Item J.3.a, Attachment 1). Five of the alternatives evaluated in the EA include an EFP fishery as a means to allow testing, under controlled conditions, of a DGN fishery in a time/area closure implemented to protect endangered leatherback sea turtles. The EFP proposal that is the basis for a permit under those alternatives is provided as Attachment 1. Obviously, the choice of a preferred alternative under Agenda Item J.3 represents a decision in principal about the Council recommendation on this EFP application. However, if the DGN EA preferred alternative includes an EFP fishery, under the current agenda item the Council can provide additional, specific recommendations on the terms under which this EFP would be granted. By the same token, if the Council does not choose a preferred alternative that includes an EFP fishery then it would not be appropriate to recommend approval of the EFP under this agenda item.

The second EFP application is for a related purpose, to conduct a small-scale pelagic longline fishery (involving one vessel) within the West Coast Exclusive Economic Zone (EEZ) to determine if longline gear is an economically viable highly migratory species (HMS) harvest substitute for DGN gear. Use of pelagic (floating) longline gear within the West Coast EEZ is currently prohibited under the Council's HMS Fishery Management Plan. The proposal notes that in the North Atlantic side-by-side testing of DGN and longline gear in the swordfish fishery demonstrated that longline gear is more selective, environmentally safe, and cost effective. This led to the eventual prohibition of DGN gear on the East Coast and the conversion of DGN permits to pelagic longline permits.

Taken together, these two EFP applications offer the Council the opportunity to gather information to support an eventual policy decision about long-term management of the DGN fishery. One approach evaluates the viability of continued prosecution of the DGN fishery with management measures to limit adverse environmental impacts. The second approach evaluates the feasibility of transitioning the fishery to a different gear type.

Council Action:

Consider EFP applications, make recommendations on approval with any specific terms for conditioning approval.

Reference Materials:

1. Agenda Item J.4, Attachment 1: Federation of Independent Seafood Harvesters Exempted Fishing Permit Application.
2. Agenda Item J.4, Attachment 2: Pete Dupuy Exempted Fishing Permit Application.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action:** Final Recommendations for Approving EFP Applications

PFMC
02/15/06

Federation of Independent Seafood Harvesters

PO Box 352
Bridgewater Corners, VT 05035

EXEMPTED FISHING PERMIT (EFP) APPLICATION

1. *Date of application*:

February 13, 2006

2. *Applicant's name, address, and telephone numbers*:

Federation of Independent Seafood Harvesters
P.O. Box 352
Bridgewater Corners, VT 05035
(802) 672-3412
FAX (802) 672-1163
Contact: Chuck Janisse (cjanisse@vermontel.net)

3. Statement of the purpose and goals of the exempted fishing for which an EFP is needed, including a general description of the arrangements for the disposition of all species harvested under the EFP:

Highly Migratory Species (HMS), which includes swordfish, is managed by the Pacific Fishery Management Council (Council) under a federal fishery management plan (FMP). In part, the management goals of the HMS FMP are to:

A. (2.) Provide a long-term, stable supply of high-quality, locally caught fish to the public.
B. (3.) Minimize economic waste and adverse impacts on fishing communities to the extent practicable when adopting conservation and management measures.
C. (4.) Provide viable and diverse commercial fisheries and recreational fishing opportunity for highly migratory species based in ports in the area of the Pacific Council's jurisdiction, and give due consideration for traditional participants in the fisheries.

D. (17.) Manage the fisheries to prevent adverse impacts on any protected species covered by the Marine Mammal Protection Act (MMPA), and the Migratory Bird Treaty Act (MBTA), and promote the recovery of any species listed under the Endangered Species Act (ESA) to the extent practicable.

The purpose of the EFP is to assist the Council in achieving the above referenced goals of the FMP for the swordfish drift gillnet (DGN) fishery by collecting data on the incidental take of ESA protected leatherback sea turtles to allow for informed management decisions in determining appropriate protective measures thereby balancing the HMS FMP's management goals of providing a long-term, stable supply of high-quality, locally caught fish to the public, minimizing economic waste and adverse impacts on fishing communities, and providing viable and diverse commercial fishing opportunity for highly migratory species, while also managing the DGN fishery to prevent adverse impacts, and promote the recovery, of protected species.

.

Specifically the goals of the EFP are to:

1. Test the economic feasibility of the drift gillnet fishery operating within the current closed area under turtle take/mortality limits and 100% observer coverage

2. Collect biological and oceanographic information on bycatch and sea turtle interactions

Disposition of the species harvested under the EFP will be as follows:

- All marketable finfish species caught during the EFP may be retained and sold as prescribed through current regulations for DGN gear.
- Prohibited species may not be retained or sold.

4. Justification explaining why issuance of an EFP is warranted:

Although managed since 1982 under California statutory provisions, DGN fishery management issues since 1996 have been driven by MMPA requirements to protect marine mammals and ESA listed species. When the HMS FMP incorporated the DGN fishery, it adopted existing federal DGN regulations for gear configuration and marine mammal deterrent requirements recommended by the Pacific Offshore Cetacean Take Reduction Team in 1996 and implemented through a Take Reduction Plan (TRP) [1] in 1997 to reduce the number of incidentally caught marine mammals. These regulations require DGN fishermen to deploy electronic warning devices called "pingers" attached to the net in a prescribed manner, and to use net buoy extenders with a minimum length of 36 feet to maintain the top of the net at that distance below the surface when the

[1] TRP regulations can be found at 50 CFR §229.

gear is set. The HMS FMP also adopted the DGN closure implemented in 2001;[2] to protect ESA listed leatherback sea turtles.

Due to the implementation of the TRP in 1997, an ESA required Section 7 Consultation was initiated in which the Biological Opinion determined that between 1991 and 1995, the leatherback take rate for nets with extenders less than 36' in length was .005 per set as opposed to a take rate of .004 per set for nets with extenders equal to or greater than 36', and used the latter rate for estimating leatherback takes. This resulted in an estimated level of leatherback entanglement and mortality in the DGN fishery that NMFS determined would not jeopardize their continued existence.

In 2000, due to the issuance of an MMPA permit authorizing the incidental take of ESA listed marine mammals in the DGN fishery, another ESA required Section 7 Consultation was initiated in which the Biological Opinion did not use the .004 take rate, established in 1997 for estimating future leatherback takes. Although the DGN fishery had been operating under TRP regulations requiring a minimum net depth of 36', a worst-case scenario leatherback entanglement rate of .009 per set, observed in 1995, was used to estimate leatherback takes. This resulted in an estimated level of leatherback entanglement and mortality in the DGN fishery that NMFS determined would jeopardize their continued existence. As a reasonable and prudent alternative to mitigate this jeopardy, the current time/area closure was proposed and implemented.

In an independent scientific review of the 2000 Biological Opinion commissioned by the California Seafood Council, Dr. Benjamin Gallaway identified four questionable areas in the Biological Opinion's analysis:

1. The population status of leatherbacks in the Western Pacific is substantially underestimated.
2. The temporal/spatial risk of leatherback interaction with the DGN fishery does not correspond with the overbroad time/area restriction that was imposed. (Dr. Gallaway's assertion on this point has since been demonstrated: The 2000 Biological Opinion's estimate of leatherback incidental take and mortality for the five years since the closure was implemented was 15 and 10 respectively. In fact, no takes have been observed for this time period.)
3. Estimated levels of leatherback entanglement and mortality were based on 3,000 sets annually even though the fishery had not seen anywhere near that level in recent years. (Dr. Gallaway pointed out that the total DGN fishing effort for the 11-year period from 1990-2000 reflects a statistically significant trend of decline with the effort reduction being on the order of 289 sets per year. Based on these data, the average fishing effort for the period 2001-2003 would be 1,697 sets.)
4. A sharp decline in leatherback entanglement rate corresponding with implementation of TRP regulations was not considered. (In the 1997

[2] Found at 50 CFR §660.713 (c)(1),

Biological Opinion, NMFS stated that it expected that the TRP's buoy line extender length requirement would have substantial benefits for sea turtles. This expectation appears to be borne out by the data. The observed take rate for leatherbacks in 1998 to 2000 was 80% lower than observed over 1995-1997, 66% lower than observed over 1992-to 1994, and 58% lower than observed over 1990-1991.)

Based on Dr. Gallaway's analysis, FISH petitioned NMFS to reevaluate the 2000 Biological Opinion. NMFS asserted that it had no authority under the law to conduct a reevaluation of leatherback takes by the DGN fishery absent a new management action to base it on. The Council's HMS FMP was being developed at this time, and FISH assumed that the Biological Opinion required for the FMP would also include a new evaluation of leatherback impacts by the DGN fishery. However, FISH learned that the ESA required Section 7 Consultation to be conducted in 2004 due to the implementation of the HMS FMP was going to evaluate leatherback impacts by the DGN fishery with the time/area closure in place. By so doing, the 2004 Biological Opinion would not reevaluate the basis for the 2000 time/area closure.

Before the 2004 Section 7 Consultation was initiated, FISH urged the Council to specify the scope of review for the DGN fishery, [3] or alternatively, reframe the management action [4] in order to provide a reevaluation of the basis for the time/area closure. The Council chose not to pursue this alternative and the time/area closure was adopted as an HMS FMP regulation.

The DGN fishery is now in serious decline because of that time/area closure. In 2000, before the time/area closure was implemented, 81 DGN vessels made 1,766 sets. The following year, 2001, after implementation of the closure, 65 vessels made 1,665 sets. In 2002, 54 vessels made 1,482 sets. In 2003, 46 vessels made 1,467. In 2004, 36 vessels made 1,084 sets.

FISH believes that sufficient new information is now available to warrant a review of the DGN time/area closure. The HMS Management Team has identified a number of management measures; the Team's preferred mechanism to implement some of these alternatives is within the context of issuing an EFP

[3] In a May 4, 2003 letter to the Council, FISH requests: "Without changing the scope or intent of the management measure proposed for the CA/OR drift-gillnet fishery, for purposes of conducting the Section 7 Consultation, base the scope of review for the Biological Opinion on the implementation of the Pacific Offshore Cetacean Take Reduction Plan regulations for the CA/OR drift-gillnet fishery under current conditions, but without the leatherback and loggerhead closures."

[4] In a May 28, 2003 letter to the Council, FISH attorney Eldon Greenberg ask the Council to consider adopting as its proposed action the management measures as they existed in the fishery *prior* to the implementation of the time/area closures which would ensure that the new Biological Opinion examined the DGN fishery under the same regulatory conditions that were evaluated in the 2000 Biological Opinion.

5. *Statement of whether the proposed exempted fishing has broader significance than the applicant's individual goals:*

If successful, the proposed EFP could result in longer-term regulatory action (i.e., allow fishing in the current closed area subject to the provisions in the EFP, including 100% observer coverage and turtle mortality caps), which could provide fishing opportunity to all DGN permit holders.

6. *Expected total duration of the EFP (number of years proposed to conduct exempted fishing activities):*

The EFP is proposed for a one-year period with the option for continuing it on an annual basis for up to three years pending review and evaluation.

7. *Number of vessels covered under the EFP and a copy of each vessel's USCG documentation, state license, and any other registration required for participation in the fishery:*

It is expected that between 10 and 25 vessels will participate in the EFP.

8. *Description of species (target and incidental) to be harvested under the EFP and the amount(s) of such harvest necessary to conduct the exempted fishing; this description should include harvest estimates of overfished species and effects on marine mammals and protected species:*

Regarding target species, swordfish, the principle species, is not subject to any harvest limits or controls. Other marketable species that may be caught include shortfin mako shark, common thresher shark, opah, louvar, albacore tuna, bigeye tuna, and bluefin tuna. None of these species, except shortfin mako shark and common thresher shark, are subject to harvest limits or controls. Bigeye tuna overfishing is occurring, and is addressed through regulations restricting the catch by purse seine and longline, but bigeye tuna are rarely caught by the DGN fishery.
(a total of 20 observed from 1990 to 2002).

No specific harvest limits are necessary for the EFP; however, there are harvest guidelines for common thresher shark and shortfin mako shark specified in the HMS FMP. All common thresher shark and shortfin mako shark caught in the EFP would count against those harvest guidelines. Additionally, thresher shark caught in the EFP will be subject to a landing limit of one thresher shark permitted for every two swordfish.

Regarding bycatch, the most common bycatch species is blue shark and common mola. Other likely bycatch species may include Pacific mackerel, bullet mackerel, and skipjack. They will be released alive when possible. None of these species are subject to bycatch limits or controls. See Chapter 5.3.1 (page 3) of the HMS FMP for a complete list of bycatch species observed caught by DGN gear.

Regarding marine mammal impacts, a number of marine mammals have been observed entangled in DGN gear. Marine mammal mortality and serious injury have significantly decreased since the TRP was implemented in 1997 requiring the use of "pingers", and deploying nets at a minimum of 36' below the surface. Under the MMPA, the impact a fishery has on any specific stock is gauged by an upper limit known as the Potential Biological Removal (PBR) level for that stock. The immediate goal of the MMPA is to reduce fishery impacts to below PRB, with a secondary goal to reduce impacts to 10% of PBR or below. Currently, most species impacted by the DGN fishery remain below 10% of PBR, all but one species, the pilot whale, are below 50% of PBR, and the pilot whale is below PBR. NMFS has also determined that estimated mortality and serious injury to ESA listed marine mammals are negligible and do not jeopardize the continued existence of these species. See HMS FMP Chapter 6.2.1.1 (pages 13 – 16) for a complete list of marine mammals that have been observed taken in the DGN fishery.

Regarding seabird impacts, observer data from 1990 to 2000 show interactions with 16 northern fulmar, and 4 unidentified sea birds. Seabird impacts are rare and not expected to occur under the EFP.

Regarding sea turtle impacts, although loggerhead, leatherback and green sea turtles have been observed taken in the DGN fishery, only the leatherback has ever been observed taken in the area where the EFP will occur. This EFP will be subject to an annual cap on the number of leatherback takes and/or mortalities. The exact number will be the incidental take limit established by the Biological Opinion for this action. Should this cap be reached, all fishing under the EFP will cease for the remainder of the year.

9. Description of mechanism, such at at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted for:

Mechanisms to ensure that a harvest limit or leatherback take/mortality limit is not exceeded include 100% observer coverage as well as real-time reporting for mandatory daily observer check-in each morning by equipping observers with portable satellite phones. Observers would keep a running tally of all shortfin mako shark, common thresher shark, or leatherback sea turtle mortalities in the EFP to ensure limits are not exceeded.

10. Description of proposed data collection and analysis methodology:

NMFS will provide 100% observer coverage to monitor compliance with provisions of the EFP, note fishing location, and interactions with turtles, marine mammals, and seabirds, including species identification and disposition of released animals. Other data collected will include current fishery reporting data (i.e., logbooks and fish receiving tickets) by the state and NMFS.

11. Description of how vessels will be chosen to participate in the EFP:

The EFP will be open to any FISH member vessel operating under a valid California or Oregon DGN permit that is not otherwise ineligible. Pending approval of the EFP, FISH will submit a list of participating vessels including all required documentation.

12. For each vessel covered by the EFP, the approximate time(s) and place(s) fishing will take place, and the type, size, and amount of gear to be used.

The time and place covered by the EFP will correspond with the current leatherback time/area closure as may or may not be modified by Council action. The length of a trip is limited to 10 sets or 14 days, whichever comes first. Each trip, and all sets must occur under EFP terms and conditions and within the time/area closure. All DGN gear, and fishing operations will conform to all applicable regulations.

13. Signature of applicant:

EXEMPTED FISHERY PERMIT

1. *Date of application*:

February 13, 2006

2. *Applicant's name, address, and telephone numbers*:

Pete Dupuy
18212 Rosita St.,
Tarzana, CA 91356

(818) 343-9927
FAX: (818) 881-5003
lapazkd@aol.com

3. Statement of the purpose and goals of the exempted fishing for which an EFP is needed, including a general description of the arrangements for the disposition of all species harvested under the EFP:

The purpose of this EFP is to conduct a small scale (1 vessel) pelagic longline fishery within the West Coast EEZ to determine if longline gear is an economically viable HMS harvest substitute for drift gillnet (DGN) gear.

If pelagic longline proves to be an economically viable substitute for DGN, this information enables the Council to make informed management decisions regarding the phasing out of DGN and substituting longline thereby balancing the HMS FMP's management goals of providing a long-term, stable supply of high-quality, locally caught fish to the public, minimizing economic waste and adverse impacts on fishing communities, and providing viable and diverse commercial fishing opportunity for highly migratory species, while also managing the DGN fishery to prevent adverse impacts, and promote the recovery, of protected species.

Disposition of the species harvested under the EFP will be as follows:
- All marketable finfish species caught during the EFP may be retained and sold as prescribed through current regulations.
- Prohibited species may not be retained or sold.

4. Justification explaining why issuance of an EFP is warranted:

In 1996, the U.S. ratified a U.N. agreement [1] concerning HMS which requires nations to "minimize pollution, waste, discards, catch by lost or abandoned gear, catch of non-target species,…[and] to the extent practicable, <u>the development of selective environmentally safe and cost effective fishing gear and techniques</u>."

Closure of the DGN swordfish fishery, and substitution with pelagic longline, occurred in the North Atlantic because, with the two gears fishing side by side, longline was deemed to be a more selective, environmentally safe and cost effective fishing gear. The federal rule proposing a prohibition of DGN gear by NMFS in 1998 states: "The proposed rule is intended to reduce the take of marine mammals in the Atlantic swordfish fishery. Observer and vessel logbooks indicate that, in the Atlantic swordfish fishery, driftnet gear results in a significantly higher rate of take of protected marine mammals relative to other gear (i.e. pelagic longline and harpoon)." [2] Also noted is that the Atlantic driftnet fishery has had takes of protected sea turtles, that the high take rates necessitate high levels of observer coverage, and that the fishery is difficult and costly to manage. The final rule prohibiting the use of driftnet gear in the north Atlantic swordfish fishery reiterates: " The intent of the rule is to reduce marine mammal bycatch in the swordfish driftnet fishery while increasing the net benefits to the nation." [3] This was accomplished by converting the Atlantic swordfish DGN permits to Atlantic pelagic longline permits.

In the Southern California Bight, a study evaluating an experimental drift longline shark fishery found that: " This drift longline gear appeared to bring in less bycatch than the California drift gill net fishery. Observers recorded a total of 9 species captured on drift longline gear, whereas 71 species were documented from the drift gill net fishery (Hanan et al. 1993). Unlike fish caught in drift gill nets, most of the longline bycatch can be released alive." [4]

The California/Oregon DGN fishery continues in steep decline since the closure of a huge portion of its historic fishing grounds in 2000 to protect leatherback sea turtles. It continually operates under a threat of complete closure. A single observed mortality of a sperm, humpback, or fin whale, all of which have been previously taken in the DGN fishery, would revoke the MMPA §101(a)(5)(E) permit. **[5]** Given this level of vulnerability, the DGN fishery would be well served if an alternative fishery were available.

---

[1] The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.

[2] 55998 Federal Register/ Vol. 63, No. 202 / Tuesday, October 20, 1998.

[3] 4055 Federal Register / Vol. 64, No. 17 / Wednesday, January 27, 1999.

[4] A Review Of The Southern California Experimental Drift Longline Fishery For Sharks, 1988-1991, John W. O'Brien and John S. Sunada, CalCOFI Rep., Vol. 35, 1994.

[5] Under current MMPA guidelines, fishery takes above PBR for any ESA listed marine mammal would prohibit issuance, or revoke an existing §101(a)(5)(E) permit. With observed DGN takes extrapolated five times, one observed take equals 5. The PBR is 2.1 for sperm whales, 3.1 for

In fact, as indicated by HMS FMP permit DGN endorsements, California/Oregon DGN fishermen are interested in a longline option. Of the 131 HMS fishermen selecting a DGN endorsement on their HMS commercial fishing permit, 71 (54%) also selected a pelagic longline endorsement.

Comparing what is known about marine mammal, sea turtle and finfish bycatch in the DGN fishery to what is known about such takes in longline fisheries, it can be reasonably assumed that takes and/or mortalities of marine mammals will be substantially reduced with longline gear; sea turtle mortalities, if not overall takes, will also be substantially reduced with longline gear; and finfish bycatch (especially unmarketable shark), and mortality will be substantially reduced with longline gear.
There is little question that pelagic longline gear has less of an impact on sea tutrtles, marine mammals, and finfish bycatch. The only question is whether or not pelagic longline gear is economically viable as a substitute for DGN gear.

5. Statement of whether the proposed exempted fishing has broader significance than the applicant's individual goals:

If successful, the proposed EFP could result in longer-term regulatory action (i.e., substitution of DGN gear with longline) which could provide increased fishing opportunity, and economic benefit to all DGN permit holders.

6. Expected total duration of the EFP (number of years proposed to conduct exempted fishing activities):

EFP is proposed for a one-year period with the option for continuing it on an annual basis for up to three years pending review and evaluation.

7. *Number of vessels covered under the EFP and a copy of each vessel's USCG documentation, state license, and any other registration required for participation in the fishery:*

A single vessel, F/V Ventura II, will participate in this EFP. Ventura II is a 90' LOA steel hulled vessel, U.S. Document No. 536620. Copies of all required documents and permits will be submitted upon approval of the EFP.

8. Description of species (target and incidental) to be harvested under the EFP and the amount(s) of such harvest necessary to conduct the exempted fishing; this description should include harvest estimates of overfished species and effects on marine mammals and protected species:

---

humpback whales, and 3.2 for fin whales. Any single observed mortality of any of these endangered whales exceeds PBR.

Target species include swordfish (*Xiphias gladius*), bigeye tuna (*Thunnus obesus*), yellowfin tuna *(Thunnus albacares)*, northern bluefin tuna *(Thunnus orientalis)*, and albacore tuna *(Thunnus alalunga).* All are managed domestically under the PFMC HMS FMP. The Inter-American Tropical Tuna Commission also manages these species internationally, in the area east of 150ºW longitude. Bigeye tuna is currently subject to overfishing, and the IATTC has recommended harvest limits for longline which have been imposed by NMFS through 2006. No other target species are subject to harvest limits. Estimated harvests of swordfish are from 15,000 to 40,000 lbs. The potential for tuna harvest also exists but projected amounts are impossible to predict due to lack of data.

Marketable bycatch species include mahi-mahi (*Coryphaena hippurus*), opah (*Lampris regius*), and shortfin mako shark (*Isurus oxyrinchus*). Blue shark (*Prionace glauca*) will comprise most of the non-marketable bycatch. It is expected that a high percentage of hooked blue shark will be dehooked and released alive.

Marine mammals that are known to inhabit the area within the EEZ, and have been observed taken in the Hawaii longline fishery, include: bottlenose dolphin *(Tursiops truncates)*, Risso's dolphin, short-finned pilot whale *(Globicephala macrorhynchus)*, all hooked; and common dolphin *(Delphinus delphis)*, humpback whale *(Megaptera novaeangliae)*, and sperm whale *(Physeter macrocephalus)*, all entangled.[6]

The short-tailed albatross (*Phoebastria albatrus*) is a rare visitor in the EFP proposed area. Combined Hawaii ('97 to '01) and California ('01 to '03) longline fishery observer data for 586 sets (444,833 hooks) east of 140ºW longitude records no takes of Laysan albatross (*Phoebastria immutabilis*), and 41 takes of black-footed albatross (*Phoebastria nigripes*).[7] However, specific deterrents have been identified that provide significant levels of sea bird protection. These deterrents are required pursuant to federal regulations [8] and will be complied with under this EFP.

Due to the lack of take data by longline within the EEZ, impacts on sea turtles by longline gear can be somewhat projected from DGN observer data. Green turtles are rarely taken in the DGN fishery. Observer data from 1990 to 2000 records one take of a green sea turtle off south central California in November, 1999, and this take appears to be related to unusual environmental conditions.[9] There are no takes or mortalities of green turtles within the EEZ expected under the EFP. Olive ridley turtles are also rarely taken in the DGN fishery. Observer

---

[6] Hawaii Longline Fishery—Marine Mammal Interaction Summary, 1994-2002; Karin Forney, NMFS/SWFSC October 2002.

[7] PFMC Exhibit F.2.b, NMFS Report, June 2003; <u>An Analysis of Sea Turtle Take Rates in the High Seas Longline Fishery in the Eastern Pacific Ocean</u>; James V. Carretta.

[8] 50 CFR § 660.712(c)(1-17)

[9] Biological Opinion on Issuance of Permit under Section 101(a)(5)(E) of the MMPA to the DGN Fishery, October 23, 2000, p.73.

data from 1990 to 2000 records one take of an olive ridley turtle off southern California in 1999, and this take also appears to be related to unusual environmental conditions.[10] There are no takes or mortalities of olive ridley turtles within the EEZ expected under the EFP. Loggerhead turtles are infrequently taken in the DGN fishery. Observer data from 1990 to 2000 records 17 takes of loggerhead turtles, with 12 (70%) released alive, 1 (6%) injured, and 4 (24%) killed. All these takes occurred in a concentrated area south of San Clemente Island.[11] The proposed EFP will not operate in the vicinity of San Clemente Island. Therefore, there are no takes or mortalities of loggerheads within the EEZ expected under the EFP. DGN observer data from 1990 to 2000 records 23 takes of leatherback turtles, 14 were killed (61%), and 9 were released alive and uninjured (39%). All observed takes except one were north of Point Conception, and all were taken between September and January.[12] Worst-case scenario estimates of DGN take rate for leatherbacks is .009 per set. With an estimated 61% mortality from DGN gear, the estimated mortality rate is .005 per DGN set.[13] For any given level of leatherback population density in a given area, it is difficult to predict what the probability of interaction would be between DGN and longline gears. An average net covers 792,000 square feet of area (5,280 ft x 150 ft.). The probability of interaction for a leatherback in the vicinity of DGN gear is probably very high. On the other hand, the probability of interaction for a leatherback in the vicinity of longline gear, where 1,000 hooks are spaced 200 to 250 feet apart is probably considerably less—especially because leatherbacks are not typically attracted to bait, but tend to be hooked externally when swimming by the gear. Nevertheless, using the worst-case scenario DGN take rate of .009 per set, and assuming the probability of interaction for a longline set is equal to a DGN set, expected leatherback takes within the EEZ under the EFP for 1,000 hook sets and 14 set trips would be .126 per trip, or .504 per season (14 set trips x 4 trips). Based on leatherback post hooking mortality estimate values of 10% when hooked externally and released with all gear removed, 0.012 mortalities per trip, or 0.050 mortalities per season would be expected within the EEZ under the EFP. Additionally, longline fishing operations under this EFP will comply with existing sea turtle take mitigation measures found at 50 CFR §660.712(b)

9. *Description of mechanism, such at at-sea fishery monitoring, to ensure that the harvest limits for targeted and incidental species are not exceeded and are accurately accounted for:*

At sea monitoring at 100% will be employed.

---

[10] Biological Opinion on Issuance of Permit under Section 101(a)(5)(E) of the MMPA to the DGN Fishery, October 23, 2000, p.78.
[11] Biological Opinion on Issuance of Permit under Section 101(a)(5)(E) of the MMPA to the DGN Fishery, October 23, 2000, pp.75-76.
[12] This time period corresponds with the DGN season. DGN fishing is prohibited from January thru April.
[13] Biological Opinion on Issuance of Permit under Section 101(a)(5)(E) of the MMPA to the DGN Fishery, October 23, 2000, pp.73-75.

10. Description of proposed data collection and analysis methodology:

NMFS will provide 100% observer coverage to monitor compliance with provisions of the EFP, note fishing location, and interactions with turtles, marine mammals, and seabirds, including species identification and disposition of released animals. Other data collected will include current fishery reporting data (i.e., logbooks and fish receiving tickets) by the state and NMFS.

11. Description of how vessels will be chosen to participate in the EFP:

Applicant's vessel will be the only vessel participating in the EFP.

12. For each vessel covered by the EFP, the approximate time(s) and place(s) fishing will take place, and the type, size, and amount of gear to be used.

EFP fishing will utilize traditional longline gear consisting of a main line strung horizontally across 50 to 100km of ocean, supported at appropriate intervals by 18m vertical float lines connected to surface floats. Descending from the main line is some number (2-25) of 24m branch lines each ending in a single baited hook. Longline gear configuration will be consistent with regulations enacted for the Hawaii longline shallow-set swordfish fishery found at 50 CFR §660.33(d),(f) & (g). For targeting swordfish, hooks used will only be offset circle hooks sized 18/0 or larger, with a 10º offset. For targeting tuna, smaller circle hooks with no offset will only be used. For targeting swordfish or tuna, only mackerel-type bait will be used, and no lightsticks will be used. From 400 to 1,200 hooks may be deployed per set. EFP fishing will not occur within 30 miles of the coastline, or within the southern California bight. Each trip will consist of about 14 sets, approximately 14,000 hooks per trip (1,000 hooks per set x 14 sets). This EFP proposes 4 trips (56,000 hooks) during the period September thru December.

13. Signature of applicant:

____

Pete Dupuy

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON EXEMPTED FISHING PERMIT (EFP) APPLICATIONS FOR HIGHLY MIGRATORY SPECIES

The majority of the Highly Migratory Species Advisory Subpanel (HMSAS) supported the approval of the proposed longline EFP submitted by Pete Dupuy. They note that this EFP is intended to test the economic viability of such a fishery and that any potential expansion, if viable, would have to proceed through the regulatory process. If proved viable, any future fishery would be developed in a way to allow a portion of the drift gillnet fishery to switch to a different gear type under a limited entry program that would be developed by the Council.

A minority of the HMSAS did not support approval of the proposed longline EFP given 3 of 5 target species (bigeye, albacore, and yellowfin tuna) are currently experiencing or potentially approaching overfishing and are subject to international and domestic regulations intended to reduce effort and fishing mortality. In addition, according to the Highly Migratory Species Stock Assessment Fishery Evaluation (p. 106) “it is recommended that there be no further increases in F for any of the fisheries taking Pacific bluefin tuna.” Therefore, it is inappropriate to attempt to develop new fisheries for these species.

There was one vote on the HMSAS to abstain.

PFMC
03/09/06

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON EXEMPTED FISHING PERMIT (EFP) APPLICATIONS FOR HIGHLY MIGRATORY SPECIES

The Highly Migratory Species Management Team (HMSMT) focused its discussion on the proposed pelagic longline exempted fishing permit (EFP) submitted by Pete Dupuy, as our comments on the drift gillnet EFP were described in our report under Agenda Item J.3. The HMSMT would like to offer the following comments on the process and timeline and management issues of the longline EFP.

Process and Timeline

The approval of the longline EFP would require the development of an Environmental Assessment (EA), which would contain analyses of the alternatives. Therefore, the HMSMT recommends that the Council indicate whether to move forward with consideration of a longline EFP at this meeting. If the Council decides to move forward, then the HMSMT would develop an EA, which analyzes two alternatives—no action and the proposal described in the EFP application with delivery at the Council's September meeting for final approval. If the Council chooses to adopt the EFP alternative, then National Marine Fisheries Service (NMFS) would begin the Section 7 consultation process (which takes approximately three months). The HMSMT notes that, while the interim EFP protocol was followed to facilitate implementation in 2006, given these time constraints, the longline EFP could not begin this fall (as proposed in the application), but could occur in 2007.

If the Council decides at this meeting to not move forward with the longline EFP, then the HMSMT would not develop an EA and the Council's action would be considered final.

Number of Participants

The HMSMT notes the longline EFP would have one participant who proposes to take four trips, and expressed concern about the small sample size. The EFP applicant had previously proposed this EFP with a higher level of effort (i.e., 10 vessels). At that time, there was concern expressed about the high amount of effort and a suggestion was made that the applicant reapply and limit the EFP to only 1-2 participants.

The EFP applicant indicates that, in the future, he would like the longline EFP to be expanded to provide fishing opportunity for current drift gillnet holders to switch over to longline gear. To better assess whether to move in this direction, an experimental design could be developed to facilitate a comparison of drift gillnet and longline bycatch levels.

Protected Resource Issues

The HMSMT examined the NMFS observer data from the Hawaii-based longline fishery (see Attachment 1) and notes that the anticipated level of protected species interactions are higher than those presented in the EFP application, particularly for leatherback sea turtles.

Biological Issues

The HMSMT would like to point out that, under the EFP, catches of bigeye, yellowfin, and albacore tuna would likely occur. The Inter-American Tropical Tuna Commission has adopted resolutions to address potential overfishing on these stocks, and NMFS is in the process of addressing bigeye overfishing and has also indicated that increased U.S. effort on albacore would not occur.

Suggested Revisions

If the Council decides to move forward with consideration of a longline EFP, then the HMSMT recommends that harvest limits (i.e., caps) be considered for protected species, marine mammals, and other species, as appropriate.

HMSMT Recommendations:

1. Decide whether to approve the longline EFP:
   a. If yes, then direct the HMSMT to develop an EA and schedule final Council action for September.
   b. If no, then this would be considered as the Council's final action.

PFMC
03/09/06

Note: A large volume of public comment addressed both the Council action on the drift gillnet fishery, Agenda Item J.3, and review of exempted fishing permit application, Agenda Item J.4. Therefore, additional public comment relevant to this agenda item maybe found under Agenda Item J.3.

The following public comment is representative of ***12*** *copies sent to the Council via email:*

February 14, 2006

To: Council Members, Pacific Fisheries Management Council
Subject: Longline Exempted Fishing Permit Request

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there is no rational reason to even consider expanding existing fisheries. Do not recommend issuance of the proposed EFP for longline gear.

Sincerely,

Art Favre
P. O. Box 82285
Baton Rouge, LA 70884-2285
artf@performance-br.com

Subject: Longline Exempted Fishing Permit Request
From: "Inman's Auto Crash Repair Centre Ltd" <a.inman@inman.demon.co.uk>
Date: Fri, 10 Feb 2006 10:43:18 -0000
To: <pfmc.comments@noaa.gov>

Dear Sirs

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there is no rational reason to even consider expanding existing fisheries. Do not recommend issuance of the proposed EFP for longline gear.

Regards

Andrew Inman.

Inman's Auto Crash Repair Centre Ltd.

THE BILLFISH FOUNDATION

CONSERVATION THROUGH RESEARCH, EDUCATION AND ADVOCACY

2161 E. Commercial Blvd, 2nd Floor • Fort Lauderdale, Florida 33308
177 Riverside Ave., Suite F, #1034 • Newport Beach, California 92663
(954) 938-0150 • (800) 438-8247 • Fax (954) 938-5311

RECEIVED
FEB 13 2006
PFMC

February 9, 2006

Mr. Donald K. Hansen, Chair
Pacific Fishery Management Council
7700 NE Ambassador Pl., Suite 200
Portland, OR 97220-1384

Dear Mr. Hansen:

I am taking this opportunity to comment on behalf of The Billfish Foundation on the application for a proposed Exempted Fishing Permit (EFP) that would allow for the use of longline gear in the EEZ under the jurisdiction of the Pacific Fishery Management Council (PFMC) submitted by Ocean Pacific Seafood. It is our understanding that this issue will be considered by the PFMC during your March meeting in Seattle.

TBF believes that it would be inappropriate to approve the requested EFP given the current condition of several stocks and the current context of international management of these fisheries. We note that, even thought the application requests an EFP for a single 90 foot longline vessel, the application in question raises the possibility of developing a future longline fishery with a potential of utilizing 71 to 134 vessels.[1] This potential application of latent effort to a new EEZ fishery for tuna species not currently targeted by the existing drift gill net (DGN) fishery is a real cause for concern to existing U.S. recreational and commercial fisheries and all those in our country interested in the conservation of our oceans' valuable resources.

We refer in particular to bigeye, yellowfin and albacore tuna, named as three of the five potential target species in the EFP application. As the Council is aware, all three of these species are currently being exploited at fishing mortality rates above levels estimated to produce average maximum sustainable yield (AMSY)[2] and all three are subject to management measures intended to constrain effort and fishing mortality under resolutions of the Inter-American Tropical Tuna Commission (IATTC). We strongly believe that any direct expansion of effort or mortality directed at these species is not consistent with the conservation goals established by the PFMC and the IATTC.

---

[1] Ocean Pacific Seafood Exempted Fishing Permit Application, p. 3; October 6, 2005.
[2] Fishery Status Report 3, Tunas and Billfishes of the Eastern Pacific in 2004; Inter-American Tropical Tuna Commission, La Jolla, 2005.

The most recent report by the IATTC's stock assessment working group reveals that current levels of fishing mortality for yellowfin tuna are at 120% of the level that would produce AMSY.[3] The report concludes that "... it is likely that the stock (biomass) is below the AMSY level." Bigeye tuna fishing mortality rates are at 175% of the level that would produce AMSY and the same report states that consequently total biomass and spawning biomass of the stock are at the lowest levels observed in the time period considered (1975-2005). This assessment report is by no means overly conservative. In fact the authors note that had spawner:recruit relationships been used in the baseline analyses the results would have been more pessimistic.

The same assessment report addressed north Pacific albacore tuna stocks. It concluded that current spawning stock biomass is below the level expected to produce AMSY and that biomass may decline if "...current levels of F persist." The assessment results for these three species are not new or unexpected, but rather have been predicted by previous assessments in recent years.

In response to this scientific advice the IATTC has enacted resolutions dealing with tuna conservation, concluding in 2004 that "... the studies of yellowfin and bigeye tuna presented at this meeting show that both stocks are at a level below that which would produce the average maximum sustainable yield (AMSY)."[4] Longline quotas are in place for bigeye tuna with the existing U.S. commercial fleet limited to its Pacific catch total from 2001. In fact, the U.S. fleet has been prematurely shut down in the last two years because this cap was reached. Seasonal closures to purse seine fishing for yellowfin and bigeye are also in place.

In the June 2005 meeting the IATTC concluded that the best scientific evidence on North Pacific albacore tuna from the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean indicates that the species is either fully exploited, or may be experiencing fishing mortality above levels that are sustainable in the long term. The Commission subsequently passed a resolution that calls for:

1) The total level of fishing effort for North Pacific albacore tuna in the Eastern Pacific Ocean not be increased beyond current levels, and

2) The CPCs shall take necessary measures to ensure that the level of fishing effort by their vessels fishing for North Pacific albacore tuna is not increased.[5]

Allowing for the development of anew albacore fishery in the Pacific EEZ would not be consistent with this measure.

The PFMC has responded to these actions and has asked that the HMSAS begin considering means of complying with the ban on increased albacore effort and, in November, deferred discussion of bigeye tuna conservation measures until the March meeting. Given the current status of bigeye, yellowfin and albacore stocks there is clearly no logical rationale for attempting to develop new sources of effort and fishing mortality through the issuance of an EFP for longline gear in the Pacific EEZ.

---

[3] Ibid.
[4] IATTC Resolution C-04-09
[5] IATTC Resolution C-05-02

TBF thanks you all for taking the time to consider our comments and trusts that the council will agree that the current biological condition of these stocks, taken into consideration in the context of existing U.S. fisheries does not warrant a recommendation to issue the requested EFP. TBF has supported the development and implementation of the PFMC's HMS Plan from the beginning and looks forward to continuing a constructive relationship with the Council.

Sincerely yours,

Ellen

Ellen M. Peel
President

EP:rsn

CC: Bill Hogarth
Rod McKinnis
Bill Fox
David Hogan

Donna Greenberg

RECEIVED
FEB 10 2006
PFMC

February 9, 2006

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384
VIA FAX

To: Council Members, Pacific Fisheries Management Council
Subject: Longline Exempted Fishing Permit Request

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there is no rational reason to even consider expanding existing fisheries. Do not recommend issuance of the proposed EFP for longline gear.

Thank you for your consideration to this important matter.

Sincerely,

Donna Greenberg

Donna Greenberg

550 Southeast 5th Ave Suite 604South Boca Raton, Florida 33432-5509

Subject: Longline exempted fishing permit
From: Cawlegend@aol.com
Date: Mon, 13 Feb 2006 13:35:39 EST
To: pfmc.comments@noaa.gov

Gentlemen
I oppose the issuance of this permit. Do not vote for it.
Craig Whitehead. M.D.
7606 Nacido Ct.
Tampa, FL 33615

Agenda Item J.4.c
Supplemental Public Comment
March 2006

Note: Much of the public comment addressed both the Council action on the drift gillnet fishery, Agenda Item J.3, and review of exempted fishing permit applications (including an application for longline), Agenda Item J.4. Therefore, additional supplemental public comment relevant to this agenda item may be found under Agenda Item J.3.

The following public comment is representative of 15 emails, faxes, and letters received by the supplemental public comment deadline (including 12 received by the February 15th briefing book deadline).

Subject: Longline Exempted Fishing Permit Request
From: "Chris Halliday"
Date: Sun, 19 Feb 2006 14:08:18 -0800
To:

To: Council Members, Pacific Fisheries Management Council
Subject: Longline Exempted Fishing Permit Request

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there is no rational reason to even consider expanding existing fisheries. Do not recommend issuance of the proposed EFP for longline gear.

Chris Halliday
5372 Doverton Dr
Huntington Beach, CA 92649
(714) 903-0608

RECEIVED
FEB 1 6 2006
PFMC

February 13, 2006

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, OR 97220-1384

RE: Longline Exempted Fishing Permit Request

Dear Council Members and Pacific Fisheries Management Council,

I am a concerned conservationist and angler and would like to take this opportunity to, again, voice my opposition to any attempts to develop a longline fishery off the coasts of California, Oregon and Washington. You have in the past acted prudently to keep this destructive gear out of our Pacific EEZ. Current attempts to open the door to as many as 131 new longline vessels in these waters would be disastrous for HMS stocks, both targeted and taken as bycatch. I support The Billfish Foundation in their opposition to this new source of fishing mortality. Given the current excess of fishing effort and fishing mortality applied to Pacific bigeye, yellowfin and albacore stocks there are no rational reason to even consider expanding existing fisheries.

Do not recommend issuance of the proposed EFP for longline gear. The future of healthy and sustainable pelagic fish stocks is in your hands. Please think to the future and what legacy you will leave based on the decisions you are making. I know my two young kids will look back and either say you made the right decision to protect the fishery and or were a major factor in destroying allowing it to be destroyed. The future is in your hands.

Thank you,

David Brackmann
West Coast Advisory Chairman for The Billfish Foundation
Pro Staff member for ESPN / Inside Sportfishing and West Coast Sportfishing Show

February 23, 2006

RECEIVED
FEB 27 2006
PFMC

Dr. Donald McIsaac
Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Ste. 200
Portland, OR 97220-1384

Dear Dr. McIsaac:

I am writing on behalf of World Wildlife Fund (WWF) to support Mr. Pete Dupuy's application for an Experimental Fishing Permit (EFP) to conduct a longline fishery in Council waters.

The current ban on longline fishing in Californian and PFMC waters is similar to the situation that existed in Hawaiian waters just a few years ago. Because of interactions with sea turtles and their declining populations, the swordfish longlining industry was closed in 2001. By working together, the industry, the Western Pacific Fisheries Management Council and NOAA, were able to adopt measures that enabled the longline fisheries to be reopened. These measures included set limits, mandatory observers, a cap on turtle interactions, the use of circle hooks, and selective use of bait species. These measures had previously been trialed in the North Atlantic, with NOAA and fishermen conducting three years of research testing these changes in gear and techniques. Turtle bycatch was reduced by as much as 90 percent in some cases, without significantly reducing the catch of target species of the fishery.

As outlined in his EFP application and in further discussions, Mr. Pete Dupuy has assured WWF that he plans to operate under similar restrictions to those implemented in Hawaii, as well as undertaking trials of gear sets and gear modifications to further reduce possible bycatch of non-target species. Approval of this EFP would provide further means of testing gear improvements, with funding already being appropriated by NOAA Southwest Fisheries Center to support this EFP. This would be used to place observers on board, create an experimental design, and perform data analysis. This is a move towards bringing consistency among the Hawaiian and West Coast fleets in this fishery.

The Hawaiian example has shown that a longline fishery can be substantially improved with gear and management modifications, rather than simply being shut down. The initiative in Hawaii is an important component of a larger international effort to eliminate the threat of longline fishing to sea turtles. World Wildlife Fund believes that the U.S. needs to lead by example. Improvements adopted and refined in the Hawaii fishery will

World Wildlife Fund
California Marine Office
171 Forest Avenue, Palo Alto, CA 94301-1615 USA
Tel: (650) 323-3538 Fax: (650) 325-2236
www.worldwildlife.org and www.panda.org
Affiliated with World Wide Fund for Nature

be instrumental in transforming other fleets. Given the trajectory of Pacific leatherbacks and loggerheads, it is essential that we reduce bycatch not only in the U.S. fleet, but in all fishing fleets fishing in the Pacific. International fishery management bodies have recognized this need and called on all fleets to improve fishing gear and techniques to reduce turtle bycatch. The problem is one of international dimension.

In contrast, World Wildlife Fund does not support the application for the issue of an EFP for the drift gillnet fishery. The time and area closure currently in place was originally imposed because of the fishery's turtle interactions, and, indeed, since the closure was put in place the fishery's interactions with turtles has decreased. The proposed EFP application does not reflect any gear modifications or techniques to attempt to overcome this problem. A reduction in the size of the fleet is not an experimental design and we believe the lack of effort in this proposal to attempt to make this a cleaner fishery cannot justify the issue of an EFP. This application simply appears to be an attempt to recreate the original situation, which necessitated the restrictions in the first place.

Thank you for the opportunity to comment on these applications.

Sincerely,

M. Osmond

Mike Osmond
Senior Program Officer
World Wildlife Fund

Subject: Proposed EFP for longline and gillnet operations in the West coast EEZ
From: "Kevin Beddoe" <klbeddoe@hotmail.com>
Date: Sat, 25 Feb 2006 05:43:13 -0800
To: Sandra.Krause@noaa.gov

Dear Ms Krause:

I am writing to voice my opposition to any and all efforts by the commercial fishing industry to open the West Coast EEZ to longline and gillnet operations. I respectfully ask that you do not issue any "Exempted Fishing Permits for Highly Migratory Species" that would endanger our fisheries and leave them open to explotation by commercial fishing interests.

Thank you for your consideration.

Kevin Beddoe
7130 Surfbird Circle
Carlsbad, Ca 92011

30

Subject: Proposal for the testing of longline and gillnet operations off the coast of California
From: "Beddoe, Kevin" <kbeddoe@circortech.com>
Date: Mon, 27 Feb 2006 08:17:06 -0800
To: <pfmc.comments@noaa.gov>

Dear Sir/Madam:

I am writing to voice my opposition to any and all efforts by the commercial fishing industry to open the West Coast EEZ to longline and gillnet operations. Please do not issue any "Exempted Fishing Permits for Highly Migratory Species" that would endanger our fisheries and leave them open to explotation by commercial fishing interests.

Best regards:

Kevin Beddoe
7130 Surfbird Circle
Carlsbad, Ca 92011

DEAR CHAIRMAN HANSEN

I am a recreational fisherman. The availability of migratory fish is extremely important to me. Please fund implementation of the West Coast Highly Migratory Species Plan. I and the other hundreds of thousands of recreational anglers spend in excess of a billion dollars a year for HMS on the West Coast. I also oppose allowing the use of unsustainable fishing gears such as pelagic longlines and drift gillnets. At risk HMS fisheries should not be unfairly targeted to serve the narrow financial interests of a few.

Signed Don H Crocker Date: 2-25-06

Address 2829 EUROPA DR.

City COSTA MESA. State CALIF Zip 92626-3525

Or send the above to United Anglers of Southern California and we will ensure each of the above gets a copy of your note.

United Anglers of Southern California
5948 Warner Ave.
Huntington Beach, CA 92649
(714) 840-0227

UNITED ANGLERS
of Southern California

2-24-06