United States Department of the Interior

FISH AND WILDLIFE SERVICE
911 NE. 11th Avenue
Portland, Oregon 97232-4181

In reply refer to:
AFWO
1-14-2003-F-1479.1

Rodney R. McInnis
Acting Regional Administrator
National Marine Fisheries Service, Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

Dear Mr. McInnis:

This document transmits the Fish and Wildlife Service's (Service) biological opinion based on our review of the National Marine Fisheries Service's (NOAA Fisheries; formerly referred to as NMFS) proposed approval of the Pacific Fishery Management Council's (PFMC) Fisheries Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) and its effect on the endangered short-tailed albatross (*Phoebastria albatrus*) and the endangered brown pelican (*Pelecanus occidentalis*). This biological opinion was prepared in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act). Your September 22, 2003, request for formal consultation was received on September 24, 2003.

This biological opinion is based on the following information: (1) the summary biological assessment (BA) for the proposed action that was provided with your September 22, 2003, request for formal consultation; (2) the final FMP and Environmental Impact Statement (FMP/FEIS), dated August 2003; (3) NOAA Fisheries' proposed rule to prohibit shallow longline sets in the Pacific Ocean east of 150° W longitude (68 FR 70219-70223); (4) biological opinions issued to NOAA Fisheries by the Service in 1999, 2000, and 2002 for longline fishing within the western and central Pacific Ocean; (5) the literature cited at the end of the document; and (6) other information sources cited herein. The administrative record for this consultation is maintained at the Service's Arcata and Ventura Fish and Wildlife Offices.

CONSULTATION HISTORY

On June 4, 2003, the Service formally transmitted staff points-of-contact for technical assistance on this consultation to NOAA Fisheries.

On September 24, 2003, the Service received NOAA Fisheries' September 22, 2003, request for formal consultation on the proposed FMP.

On December 10, 2003, the National Oceanographic and Atmospheric Administration (NOAA) published a proposed rule in the Federal Register requesting comments on the final FMP. In this proposed rule, NOAA disclosed that substantial evidence exists that the FMP, as proposed by the PFMC, has potentially significant adverse effects on listed sea turtles, and that the final proposal by the PFMC rejected NOAA Fisheries' suggested restrictions on longline sets to minimize the potential for take of threatened and endangered sea turtles.

On February 4, 2003, the Service provided a draft biological opinion on the proposed action to NOAA Fisheries for review and comment.

On February 19, 2004, NOAA Fisheries' Southwest Region provided comments to the Service clarifying the proposed action and the likely effects of the proposed action on the short-tailed albatross and brown pelican. These comments summarized recent changes to management of the pelagic fishery resulting from the implementation of special measures and closures designed to protect and conserve listed sea turtles.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

NOAA Fisheries' Sustainable Fisheries Division, Southwest Region, requested ESA section 7 consultation on the fisheries to be managed under the HMS FMP as proposed by the PFMC for approval and implementation by the Secretary of Commerce. Therefore, the management regime, as described in the proposed FMP and proposed for adoption by the Secretary of Commerce, constitutes the main action being considered in this biological opinion. Among the fisheries being considered are those that operate (even occasionally) on the high seas and that consist of vessels with High Seas Fishing Compliance Act of 1995 (HSFCA) permits issued by NOAA Fisheries. These include the U.S. West Coast-based HMS longline fishery that operates exclusively on the high seas, the albacore troll fishery, and the Eastern Tropical Pacific (ETP) purse seine fishery, all of which fish on the high seas as well as occasionally within the exclusive economic zone (EEZ) off the U.S. West Coast. The biological opinion also evaluates the likely impact of a proposed rule to implement longline fishery controls in waters outside of the EEZ and east of 150° W longitude.

The purpose of fishery management plans, including the HMS FMP, has been established by the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1801 *et seq.*).

The stated purpose of the HMS FMP is to maximize the net benefits of the fisheries to the nation and to the eastern Pacific region. Background information on Federal fisheries policy and management under the MSA, fishery management plan development process, and HMS FMP is described in the August 2003 HMS FMP. The FMP is a "framework" FMP which includes some fixed elements and a process for implementing or changing regulations without amending the FMP. Changes to any of the fixed elements in the FMP require an amendment. The framework procedures are described in Chapter 8 of the FMP/FEIS.

The HMS FMP may also provide an implementing mechanism for the U.N. Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas (Agreement), which was adopted by the U.N. Food and Agriculture Organization (FAO) in November 1993. The Agreement established the responsibility of each nation for the actions of vessels fishing under that nation's flag on the high seas. The Agreement requires that vessels have specific authorization from their flag nation to participate in high seas fishing. Furthermore, nations must maintain a registry of authorized vessels, ensure that those vessels are marked for identification, and ensure that they report sufficient information on their fishing activities. As mentioned briefly in the previous section, the HSFCA is the domestic legislation enacted in 1995 to provide authority to the Secretary of Commerce to implement the FAO Agreement.

NOAA Fisheries has implemented regulations requiring U.S. vessel operators fishing on the high seas to maintain and submit records of catch and effort on their high seas fishing activities. The reporting requirement would be met if a vessel operator is reporting in compliance with regulations under another Federal statute (*e.g.,* MSA requirements). Thus, longline vessel operators fishing outside of the EEZ but based on the West Coast must maintain and file an HSFCA logbook, and West Coast albacore trollers must maintain and file a troll HSFCA logbook. NOAA Fisheries provides the required forms or logbooks. Fishermen are not required to report catch and effort within the EEZ under this requirement. The HMS FMP would supercede the HSFCA reporting requirements and thus provide a mechanism to harmonize eastern and western Pacific fishery reporting and monitoring mechanisms.

The proposed management regime under the HMS FMP would regulate commercial and charter recreational fisheries for tuna, billfish, dorado (mahi mahi) and selected sharks. The gear types under the FMP are longline, drift gillnet (mesh >14" stretched mesh), purse seine, troll/jigboat, harpoon, and charter/commercial passenger carrying vessels. Existing State conservation and management programs would for the most part be maintained; this is most important for nearshore time/area closures affecting certain gear types. Initial conservation and management measures under the HMS FMP would be limited to new controls on pelagic longline fishing and maintaining (but under MSA authority) existing measures to limit drift gillnet fishing. All fisheries would be subject to Federal permit and reporting requirements and observer coverage.

The HMS FMP includes initial estimates of maximum sustainable yields (MSY) for fished stocks and sets overfishing control rules under MSA for these fisheries in the EEZ.

Final Rules to Implement the HMS FMP

The measures that would be implemented under the HMS FMP are:

1. Owners and operators of vessels registered for use of longline gear may not use longline gear to fish for or target swordfish *(Xiphias gladius)* west of 150° W longitude and north of the equator (0° N latitude).

2. A person aboard a vessel registered for use of longline gear fishing for HMS west of 150° W longitude and north of the equator (0° N latitude) may not possess or deploy any float line that is shorter than or equal to 20 m (65.6 ft or 10.9 fm). As used here, float line means a line used to suspend the main longline beneath a float.

3. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not use longline gear in waters bounded on the south by 0° latitude, on the north by 15° N latitude, on the east by 145° W longitude, and on the west by 180° longitude.

4. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not receive from another vessel HMS that were harvested by longline gear in waters bounded on the south by 0° latitude, on the north by 15° N latitude, on the east by 145° W longitude, and on the west by 180° longitude.

5. From April 1 through May 31, owners and operators of vessels registered for use of longline gear may not land or transship HMS that were harvested by longline gear in waters bounded on the south by 0° latitude, on the north by 15° N latitude, on the east by 145° W longitude, and on the west by 180° longitude.

6. No light stick may be possessed on board a vessel registered for use of longline gear during fishing trips that include any fishing west of 150° W longitude and north of the equator (0° N latitude). A light stick as used in this paragraph is any type of light emitting device, including any flourescent glow bead, chemical, or electrically powered light that is affixed underwater to the longline gear.

7. When a conventional monofilament longline is deployed in waters west of 150° W longitude and north of the equator (0° N latitude) by a vessel registered for use of longline gear, no fewer than 15 branch lines may be set between any two floats. Vessel operators using basket-style longline gear must set a minimum of 10 branch lines between any 2 floats when fishing in waters north of the equator.

8. Longline gear deployed west of 150° W longitude and north of the equator (0° N latitude) by a vessel registered for use of longline gear must be deployed such that the deepest point of the main longline between any two floats, *i.e.,* the deepest point in each sag of the main line, is at a depth greater than 100 m (328.1 ft or 54.6 fm) below the sea surface.

9. Owners and operators of longline vessels registered for use of longline gear may land or possess no more than 10 swordfish from a fishing trip where any part of the trip included fishing west of 150° W longitude and north of the equator (0° N latitude).

10. As described in the August 2003 FMP/FEIS, fishing vessels using longline gear to catch managed species beyond (*i.e.,* west of) the EEZ and east of 150° W longitude would not be prohibited from making shallow water sets of the type used to target swordfish, and would not be subject to the limitations of items 2, 6, 7, 8, and 9 above. However, in their review of the PFMC proposed FMP, NOAA Fisheries disapproved this measure. NOAA Fisheries is instead promulgating a rule to prohibit such sets under its Endangered Species Act authority. In the absence of such a rule, that portion of the longline fishery would be unregulated until the PFMC can address this issue for the long term, and would result in continued mortality of sea turtles and seabirds under shallow set longline fisheries. Thus, under this proposed action, NOAA Fisheries may prohibit swordfish sets (shallow sets) by longline vessels operating out of U.S. west coast ports and licensed under the FMP in all waters east and west of 150° W longitude for the foreseeable future. These regulations may go into effect at the end of March or early April of 2004. The FMP would prohibit such sets west of 150° W longitude and the ESA rule would prohibit such sets east of 150° W longitude. In the future, the PFMC may develop a revised management regime that could be approved by NOAA Fisheries, allowing limited longline fishing and providing necessary protection to sea turtles, but this would probably take nearly a year.

The proposed regulations also include measures intended to protect against or mitigate interactions with sea turtles and seabirds to the extent they are encountered, as follows:

Sea Turtle Conservation Measures

1. Owners and operators of vessels registered for use of longline gear must carry aboard their vessels line clippers meeting the minimum design standards specified in (2) of this section, dip nets meeting minimum standards specified in (3) of this section, and wire or bolt cutters capable of cutting through the vessel's hooks. These items must be used to disengage any hooked or entangled sea turtles with the least harm possible to the sea turtles and as close to the hook as possible in accordance with the requirements specified in (4) through (6) of this section.

2. Line clippers are intended to cut fishing line as close as possible to hooked or entangled sea turtles. NOAA Fisheries has established minimum design standards for line clippers. The Arceneaux line clipper (ALC) is a model line clipper that meets these minimum design standards and may be fabricated from readily available and low-cost materials. The minimum standards are as follows:
   a. The cutting blade must be curved, recessed, contained in a holder, or otherwise afforded some protection to minimize direct contact of the cutting surface with sea turtles or users of the cutting blade.

  b. The blade must be capable of cutting 2.0-2.1 mm monofilament line and nylon or polypropylene multi-strand material commonly known as braided mainline or tarred mainline.
  c. The line clipper must have an extended reach handle or pole of at least 6 ft (1.82 m).
  d. The cutting blade must be securely fastened to the extended reach handle or pole to ensure effective deployment and use.

3. Dip nets are intended to facilitate safe handling of sea turtles and access to sea turtles for purposes of cutting lines in a manner that minimizes injury and trauma to sea turtles. The minimum design standards for dip nets that meet the requirements of this section are:
  a. The dip net must have an extended reach handle of at least 6 ft (1.82 m) of wood or other rigid material able to support a minimum of 100 lbs (34.1 kg) without breaking or significant bending or distortion.
  b. The dip net must have a net hoop of at least 31 inches (78.74 cm) inside diameter and a bag depth of at least 38 inches (96.52 cm). The bag mesh openings may be no more than 3 inches x 3 inches (7.62 cm 7.62 cm).

4. All sea turtles brought aboard for dehooking and/or disentanglement must be handled in a manner to minimize injury and promote post-hooking survival.
  a. When practicable, comatose sea turtles must be brought on board immediately, with a minimum of injury, and handled in accordance with the procedures specified in paragraphs (5) and (6) of this section.
  b. If a sea turtle is too large or hooked in such a manner as to preclude safe boarding without causing further damage/injury to the turtle, line clippers described in paragraph (2) of this section must be used to clip the line and remove as much line as possible prior to releasing the turtle.
  c. If a sea turtle is observed to be hooked or entangled by longline gear during hauling operations, the vessel operator must immediately cease hauling operations until the turtle has been removed from the longline gear or brought on board the vessel.
  d. Hooks must be removed from sea turtles as quickly and carefully as possible. If a hook cannot be removed from a turtle, the line must be cut as close to the hook as possible.

5. If the sea turtle brought aboard appears dead or comatose, the sea turtle must be placed on its belly (on the bottom shell or plastron) so that the turtle is right side up and its hindquarters elevated at least 6 inches (15.24 cm) for a period of no less than 4 hours and no more than 24 hours. The amount of the elevation depends on the size of the turtle; greater elevations are needed for larger turtles. A reflex test, performed by gently touching the eye and pinching the tail of a sea turtle, must be administered by a vessel operator, at least every 3 hours, to determine if the sea turtle is responsive. Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance may be placed into a container holding water. A water-soaked towel placed over the eyes, carapace, and flippers is the most effective method to keep a turtle moist. Those that revive and become active must be returned to the sea in the manner described in paragraph (6) of

this section. Sea turtles that fail to revive within the 24-hour period must also be returned to the sea in the manner described in paragraph (6)(a) and (b) of this section.

6. Live turtles must be returned to the sea after handling in accordance with the requirements of paragraphs (4) and (5) of this section:
   a. By putting the vessel engine in neutral gear so that the propeller is disengaged and the vessel is stopped, and releasing the turtle away from deployed gear; and
   b. Observing that the turtle is safely away from the vessel before engaging the propeller and continuing operations.

7. In addition to the above sea turtle mitigation requirements, a vessel operator shall perform sea turtle handling and resuscitation techniques consistent with Title 50, Code of Federal Regulations, Section 223.206 (d)(1), as appropriate.

<u>Seabird Conservation Measures</u>

1. Seabird mitigation techniques. Owners and operators of vessels registered for use of longline gear must ensure that the following actions are taken when fishing north of 23° N latitude:
   a. Employ a line setting machine or line shooter to set the main longline when making deep sets west of 150° W longitude using monofilament main longline;
   b. Attach a weight of at least 45 g to each branch line within 1 m of the hook when making deep sets using monofilament main longline;
   c. When using basket-style longline gear, ensure that the main longline is deployed slack to maximize its sink rate;

2. Use completely thawed bait that has been dyed blue to an intensity level specified by a color quality control card issued by NOAA Fisheries;

3. Maintain a minimum of two cans (each sold as 0.45 kg or 1 lb size) containing blue dye on board the vessel;

4. Discharge fish, fish parts (offal), or spent bait while setting or hauling longline gear, on the opposite side of the vessel from where the longline gear is being set or hauled;

5. Retain sufficient quantities of fish, fish parts, or spent bait, between the setting of longline gear for the purpose of strategically discharging it in accordance with paragraph (a)(6) of this section;

6. Remove all hooks from fish, fish parts, or spent bait prior to its discharge in accordance with paragraph 4 of this section; and

7. Remove the bill and liver of any swordfish that is caught, sever its head from the trunk and cut it in half vertically, and periodically discharge the butchered heads and livers in accordance with paragraph 6 of this section.

8. If a short-tailed albatross is hooked or entangled by a vessel registered for use of longline gear, owners and operators must ensure that the following actions are taken:
   a. Stop the vessel to reduce the tension on the line and bring the bird on board the vessel using a dip net;
   b. Cover the bird with a towel to protect its feathers from oils or damage while being handled;
   c. Remove any entangled lines from the bird;
   d. Determine if the bird is alive or dead.
   (I) If dead, freeze the bird immediately with an identification tag attached directly to the specimen listing the species, location and date of mortality, and band number if the bird has a leg band. Attach a duplicate identification tag to the bag or container holding the bird. Any leg bands present must remain on the bird. Contact NOAA Fisheries, the Coast Guard, or the U.S. Fish and Wildlife Service at the numbers listed on the Short-tailed Albatross Handling Placard distributed at NOAA Fisheries' protected species workshop, inform them that you have a dead short-tailed albatross on board, and submit the bird to NOAA Fisheries within 72 hours following completion of the fishing trip.
   (ii) If alive, handle the bird in accordance with paragraphs 9 through 14 of this section.

9. Place the bird in a safe enclosed place;

10. Immediately contact NOAA Fisheries, the Coast Guard, or the U.S. Fish and Wildlife Service at the numbers listed on the Short-tailed Albatross Handling Placard distributed at NOAA Fisheries' protected species workshop and request veterinary guidance;

11. Follow the veterinary guidance regarding the handling and release of the bird.

12. Complete the short-tailed albatross recovery data form issued by NOAA Fisheries.

13. If the bird is externally hooked and no veterinary guidance is received within 24-48 hours, handle the bird in accordance with paragraphs 17(d) and (e) of this section, and release the bird only if it meets the following criteria:
    a. Able to hold its head erect and respond to noise and motion stimuli;
    b. Able to breathe without noise;
    c. Capable of flapping and retracting both wings to normal folded position on its back;
    d. Able to stand on both feet with toes pointed forward; and
    e. Feathers are dry.

14. If released under paragraph 13 of this section or under the guidance of a veterinarian, all released birds must be placed on the sea surface.

15. If the hook has been ingested or is inaccessible, keep the bird in a safe, enclosed place and submit it to NOAA Fisheries immediately upon the vessel's return to port. Do not give the bird food or water.

16. Complete the short-tailed albatross recovery data form issued by NOAA Fisheries.

17. If a seabird other than a short-tailed albatross is hooked or entangled by a vessel registered for use of longline gear, owners and operators must ensure that the following actions are taken:
    a. Stop the vessel to reduce the tension on the line and bring the seabird on board the vessel using a dip net;
    b. Cover the seabird with a towel to protect its feathers from oils or damage while being handled;
    c. Remove any entangled lines from the seabird;
    d. Remove any external hooks by cutting the line as close as possible to the hook, pushing the hook barb out point first, cutting off the hook barb using bolt cutters, and then removing the hook shank;
    e. Cut the fishing line as close as possible to ingested or inaccessible hooks;
    f. Leave the bird in a safe enclosed space to recover until its feathers are dry; and
    g. After recovered, release seabirds by placing them on the sea surface.

To ensure full understanding of the sea turtle and sea bird protection measures and enhance their effectiveness, each year both the owner and the operator of a vessel registered for use of longline gear must attend and be certified for completion of a workshop conducted by NOAA Fisheries on mitigation, handling, and release techniques for turtles and seabirds and other protected species. A protected species workshop certificate will be issued by NOAA Fisheries annually to any person who has completed the workshop. An owner of a vessel registered for use of longline gear must have on file a valid protected species workshop certificate or copy issued by NOAA Fisheries in order to maintain or renew their vessel registration. An operator of a vessel registered for use of longline gear must have on board the vessel a valid protected species workshop certificate issued by NOAA Fisheries or a legible copy thereof.

The proposed rule also requires that longline vessels be equipped with vessel monitoring system units, as in the western Pacific.

Drift Gillnet Fishery Controls

The proposed regulations would not affect the gear restrictions resulting from the Pacific Offshore Cetacean Take Reduction Plan established under the authority of the Marine Mammal Protection Act of 1972. These measures can be found at 50 CFR 229.31.

The proposed regulations would maintain, but under MSA authority, conservation and management measures now in place under the authority of the Endangered Species Act and the State of California Fish and Game Code as follows:

1. The maximum length of a drift gillnet on board a vessel shall not exceed 6,000 feet.

2. Up to 1,500 feet of drift gillnet in separate panels of 600 feet may be on board the vessel in a storage area.

Protected Resource Area Closures

1. 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:
   a. Pt. Sur at 36° 18.5' N latitude;
   b. to 34° 27' N latitude 123° 35' W longitude;
   c. to 34° 27' N latitude 129° W longitude;
   d. to 45° N latitude 129° W longitude;
   e. thence to the point where 45° N latitude intersects the Oregon coast.

2. No person may fish with, set, or haul back drift gillnet gear in U.S. waters of the Pacific Ocean east of 120° W longitude during the months of June, July, and August, during a forecasted or occurring El Niño event off Southern California. The Assistant Administrator will publish a notification in the Federal Register that an El Niño 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. The Assistant Administrator will rely on information developed by NOAA offices that monitor El Niño 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 June 1 through August 31 will remain effective until the Assistant Administrator issues a notice that the El Niño event is no longer occurring.

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 (nm) 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 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.

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.

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 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, California to Noonday Rock, to Southeast Farallon Island to Pillar Point.

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° 00' 00" N latitude	125° 10' 30" W longitude
42° 25' 39" N latitude	124° 59' 09" W longitude
42° 30' 42" N latitude	125° 00' 46" W longitude
42° 30' 23" N latitude	125° 04' 14" W longitude
43° 02' 56" N latitude	125° 06' 57" W longitude
43° 01' 29" N latitude	125° 10' 55" W longitude
43° 50' 11" N latitude	125° 19' 14" W longitude
44° 03' 23" N latitude	125° 12' 22" W longitude
45° 00' 06" N latitude	125° 16' 42" W longitude
45° 25' 27" N latitude	125° 16' 29" W longitude
45° 45' 37" N latitude	125° 15' 19" W longitude
46° 04' 45" N latitude	125° 24' 41" W longitude
46° 16' 00" N latitude	125° 20' 32" W longitude

8. In the portion of the U.S. EEZ north of 46° 16' N latitude (Washington coast).

Channel Islands Area Closures

The following areas off the Channel Islands are closed to driftnet gear:

1. San Miguel Island closures.
   a. Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nm west of Point Bennett and a line extending 6 nm east of Cardwell Point.
   b. Within the portion of the U.S. EEZ south of San Miguel Island between a line extending 10 nm west of Point Bennett and a line extending 10 nm east of Cardwell Point.

2. Santa Rosa Island Closure. Within the portion of the U.S. EEZ north of San Miguel Island between a line extending 6 nm west from Sandy Point and a line extending 6 nm east of Skunk Point from May 1 through July 31.

3. San Nicolas Island closure. In the portion of the U.S. EEZ within a radius of 10 nm of 33° 16' 41" N latitude, 119° 34' 39" W longitude (west end) from May 1 through July 31.

4. San Clemente Island closure. In the portion of the U.S. EEZ within 6 nm of the coastline on the easterly side of San Clemente Island within a line extending 6 nm west from 33° 02' 16" N latitude, 118° 35' 27" W longitude and a line extending 6 nm east from the light at Pyramid Head.

Regulations in place under the MMPA would be unchanged. The TRT process would continue to be the principal mechanism for considering regulatory changes to meet MMPA requirements.

No new conservation and management measures are proposed for purse seine, harpoon, surface hook-and-line, or charter and recreational fisheries except the permit and logbook requirements.

However, large vessels (>400 st) in the U.S. purse seine fleet must also abide by the following conditions required under the Incidental Take Statement for the December 8, 1999, biological opinion on the interim final rule to continue authorization of the U.S. tuna purse seine fishery in the ETP under the Marine Mammal Protection Act (MMPA), as revised by the International Dolphin Conservation Program Act (regulations at 50 CFR 300.29(e) Bycatch reduction measures. (66 FR 49320):

All purse seine vessels must apply special sea turtle handling and release procedures, as follows:

(i) Whenever a sea turtle is sighted in the net, a speedboat shall be stationed close to the point where the net is lifted out of the water to assist in the release of the turtle;

(ii) If a turtle is entangled in the net, net roll shall stop as soon as the turtle comes out of the water and shall not resume until the turtle has been disentangled and released;

(iii) If, in spite of the measures taken under paragraphs (e)(3)(i) and (ii) of this section, a turtle is accidentally brought onboard the vessel alive and active, the vessel's engine shall be disengaged and the turtle shall be released as quickly as practicable;

(iv) If a turtle brought on board under paragraph (e)(3)(iii) of this section is alive but comatose or inactive, the resuscitation procedures described in 223.206(d)(1)(i)(B) of this title shall be used before release of the turtle.

HMS Fisheries by West Coast Vessels

This section provides a general descriptive overview of the physical, economic and social environment for HMS fisheries off the West Coast.

The HMS fisheries consist of the fish stocks and participants involved in their commercial harvest, commercial use, recreational harvest, and recreational use. The principal HMS harvested by vessels based on the West Coast and fishing in the EEZ or beyond the EEZ include: north Pacific albacore (*Thunnus alalunga*), yellowfin tuna (*T. albacares*), bigeye tuna (*T. obesus*), skipjack tuna (*Katsuwonus pelamis*), northern bluefin tuna (*T. orientalis*), swordfish

(*Xiphias gladius*), common thresher shark (*Alopias vulpinus*), pelagic thresher shark (*A. pelagicus*), bigeye thresher shark (*A. superciliosus*), shortfin mako shark (*Isurus oxyrinchus*), blue shark (*Prionace glauca*), striped marlin (*Tetrapturus audax*) and dorado (*Coryphaena hippurus*).

HMS are taken directly in fisheries that use many types of gears and vessels. Gears used to harvest HMS by directed commercial fisheries are primarily: surface hook-and-line, drift gillnet, harpoon, purse seine, and pelagic longline.

The recreational fishery for HMS targets albacore, yellowfin, skipjack, bigeye and northern bluefin tunas, striped marlin, swordfish, dorado, and mako, blue and thresher sharks using hook-and-line gear. The fisheries are composed of both private angler vessels and charter vessels (also known as "head boats" and commercial passenger fishing vessels (CPFV)).

Most HMS and the fisheries they support are distributed internationally with components in the EEZs of Canada and Mexico as well as in international waters outside of any country's EEZ. U.S. vessels' participation may reflect not only changes in domestic fishery conditions, but also changes in conditions, including the status of stocks, resulting from international fishing. Also, landings may be affected as much by market conditions as by stock conditions. These factors give rise to considerable variability in annual U.S. landings of HMS and corresponding exvessel revenues.

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. The bulk of the HMS fisheries occur off California. These fisheries make up a small portion of the HMS fisheries of the Pacific Ocean, accounting for less than 5 percent of total catches.

Characteristics of the Domestic Fisheries

This section describes the characteristics of the domestic fisheries: (a) the albacore fishery using surface hook-and-line gear by trolling and bait-fishing techniques; (b) the longline fishery based in California fishing for swordfish, tuna, and sharks beyond the EEZ; (c) the swordfish and shark drift gillnet fishery (>14 inch stretched mesh nets); (d) the tropical tuna fisheries using purse seine, including the coastal purse seine fishery (small vessels) that concentrates on small pelagic species, especially northern anchovy and Pacific sardine, but which also harvests northern bluefin and yellowfin tuna when they migrate into the Pacific EEZ; (e) the swordfish and shark harpoon fishery; and, (f) the charter and private boat HMS sport fisheries.

Albacore Surface Hook-and-Line Fishery

The West Coast-based U.S. albacore fishery is comprised of vessels that predominantly troll for albacore using jigs and, to a lesser extent, live bait. Together, these gears and other hook and line gears used to target albacore are known as surface hook-and-line gear and account for the bulk of West Coast albacore landings and exvessel revenues. U.S. troll vessels have fished for albacore in the north Pacific since the early 1900s.

The basic troll vessel gear consists of between 8 and 12 (a few vessels use more) lines towed up to 30 meters (m) behind the vessel. Lateral spacing of the lines is accomplished by using outriggers or long poles extended to each side of the vessel with fairleads spreading 3 or more lines to each side, with the remainder attached to the stern. Terminal gear is generally chrome-headed jigs with varying colored plastic fringed skirts and a double barbless undulated hook. The gear is relatively inexpensive. Retrieval is done by hand or by powered gurdies, similar to salmon troll vessels. Fishing effort continues throughout the day, with lines retrieved when target species or bycatch are hooked.

Albacore may be discarded because they are undersized. Albacore troll vessels catch minor amounts of other fish species, usually while in transit to or from the fishing grounds. The primary species caught incidentally include skipjack tuna, bluefin tuna, yellowfin tuna, dorado, billfish, and sharks.

A few troll vessels carry small amounts of live bait, which is chummed under some conditions to aggregate albacore and improve catches. Very few vessels operate with bait only. Transshipment at sea is used by some vessels to extend the effective length of a fishing trip which might otherwise be limited due to carrying capacity. Catches are landed at ports along the U.S. West Coast, in Hawaii, or at canneries in American Samoa or Tahiti. Transshipped fish is generally landed in American Samoa. The bulk of the U.S. catch is canned as white meat tuna at canneries in American Samoa and Puerto Rico. A small amount of the catch finds its way into the fresh fish trade, which is a significant income to these participants.

In recent years, the north Pacific albacore troll season has begun as early as mid-April in areas northwest of Midway Island. In July and August, the fleet moves eastward, fishing near 45° N latitude, 150° W longitude and along the West Coast of North America from Vancouver Island to southern California. Fishing can continue into November if weather permits and sufficient amounts of albacore remain available to troll gear.

The troll fleet is composed of a varying number of vessels ranging from 16 ft to over 100 ft in length. The vast majority of vessels are 25 ft or greater. Both big and small vessels fish inside the EEZ. The smaller vessels more likely make short trips (1-3 days) and fish 25-100 miles from shore; the larger vessels may fish on trips across the north Pacific and well beyond the EEZ for 90 days or more. The total estimated number of vessels landing albacore peaked at more than

2,000 in the mid-1970s. Fewer vessels have been active in recent years with 741 reporting landings in 1996; 1,244 in 1997; 913 in 1998; and 775 in 1999. The number of larger vessels (greater than 50 ft) is relatively steady, ranging from 285 to 372 in the 1996 to 1998 period.

The north Pacific albacore stock has rebounded from low levels in the 1980s, but it is not known how long the increased availability of albacore to the West Coast fleet will continue. Albacore (like most tunas) have variable recruitment dependent in part on environmental conditions, and their migratory patterns may bring them closer to shore in some years than in others. Further, the industry's occasional difficulty marketing its catch when canneries have large supplies and thus offer low prices, is buffered by more of the catch entering the fresh and frozen product market. Overall, it does not appear likely that the West Coast albacore fishery will change substantially in the next few years. The fishery is expected to remain fairly stable with a fleet of 800-1,000 vessels making total landings averaging about 10,000 metric tons (mt), and valued at about $20 million per year.

The top five albacore ports in California based on average annual landings during the 1981-99 period were Terminal Island, Moss Landing, San Francisco Bay area, Eureka and San Diego. Through the U.S.-Canadian albacore treaty, U.S. vessels can fish in Canadian waters and land in certain Canadian ports. A reciprocal arrangement holds for Canadian vessels. Thus, in any given year, U.S. troll vessels may fish a portion of the year in the U.S. EEZ, a portion on the high seas, and a portion in Canada's EEZ. For example, in 1997, effort by U.S. trollers took place 29 percent in the U.S. EEZ, 4 percent in Canada's EEZ and 67 percent on the high seas (from Table 2-16 in the HMS FMP).

West Coast-based Longline Fishery

The High Seas Fishing Compliance Act, passed to implement the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas and adopted by the United Nations in 1993, requires logbooks and permits for U.S. vessels fishing beyond the EEZ, but no management measures are currently proposed pursuant to that statute.

The longline fishery based on the West Coast fishes outside the EEZ and targets mainly swordfish. 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. Oregon does allow the harvest of swordfish and blue shark within the EEZ under a developmental fishery permit; however, no landings have occurred under the permits. Up to 10 permits are allowed for blue shark and 20 for swordfish. Since 1995, the number of blue shark permits issued in a year has ranged from none to six and the number of swordfish permits issued has ranged from one to nine. Permit stipulations restrict the harvest from within 25 miles of the shore. Washington prohibits longline fishing by State vessels in the EEZ.

In 1991, three longline vessels 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. 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 Hawaii-based vessels in the area around 135° W longitude during the months of September through May.

In 1995, only six longline vessels made a high seas trip from a California port, although 22 vessels made at least one longline landing. The group of vessels that came to California from the Gulf of Mexico in 1993 and 1994 left the California-based fishery and either returned to the Gulf of Mexico fishery, or acquired Hawaii-based longline permits in order to have fishery options for the months from June to September, when fishing within range of California ports drops off substantially. Many of the vessels that participated in the California fishery had discovered productive swordfish fishing grounds in the fall and winter that were farther east than the Hawaii-based fleet usually operated. Therefore, these vessels continued to move east later in the year, and operated out of California ports only when it became closer to the point of the end of the fishing trip than the distance to return to Hawaii. These vessels fished from California until about January, when the pattern of fishing moved to the west, and operating from Hawaii again became more convenient. Consequently, beginning in the latter part of 1995, a number of vessels from the Hawaii-based fleet began a pattern of fishing operations that moved to California in the fall and winter and then back to Hawaii in the spring and summer. This pattern continued until 2001, when the swordfish targeting prohibition and other restrictions were implemented for Hawaii vessels. Because of the prohibition, about 20 vessels removed themselves from their western Pacific longline limited entry permit and shifted to California.

The number of boats comprising the West Coast fleet total has ranged between 21 and 44 vessels since 1997. Table 1 shows the fleet composition and effort since 1995.

Table 1. Western Pacific longline logbook summary for 1995 through 2002.

Effort	1995	1996	1997	1998	1999	2000	2001	2002
Vessels	10	15	25	28	37	44	39	21
Trips	36	71	55	70	101	137	128	91
Sets	311	678	663	922	1,430	2,104	1,937	1,294
Hooks set	251,704	550,420	518,841	738,739	1,143,066	1,608,593	1,443,029	948,657
Light sticks	137,756	193,050	90,140	206,960	150,369	170,135	487,525	352,834

Source: http://www.NOAA Fisheries.hawaii.edu/fmpi/fmep/hilong/westcoast.htm

The number of longline vessels fishing in the West Coast fleet has ranged between 21 and 44 vessels since about 1997. Vessels vary in length from 20 to 35 m. Longline fishing gear consists of a main line strung horizontally across 1-100 kilometers (km) (< 1-62 mi) of ocean, supported at regular intervals by vertical float lines connected to surface floats. Descending from the main line are branch lines, each ending in a single, baited hook. The main line droops in a curve from one float line to the next and bears some number (2-25) of branch lines between floats. Fishing depth is determined by the length of the float lines and branch lines, and the amount of sag in the main line between floats. The depth of hooks affects their efficiency at catching different species. When targeting swordfish, vessels typically fish 24 to 72 km (15-45 mi) of 600 to 1,200 pound test monofilament mainline per set. Mainlines are rigged with 22 m branch lines at approximately 61 m intervals and buoyed every 1.6 km (1 mi). Between 800 and 1,300 hooks are deployed per set. Large squid (*Illex spp.*) are used for bait; various colored light sticks are also used. The mainline is deployed in 4 to 7 hours and left to drift (unattached) for 7 to 10 hours. Radio beacons are attached to the gear for recovery. Retrieval requires 7 to 10 hours. Fishing occurs primarily during the night when more swordfish are available in surface waters. Longline gear targeting swordfish is set at sunset at depths less than 100 m, and hauled at sunrise.

A typical longliner carries a crew of six, including the captain, although some of the smaller vessels operate with a four-man crew. Fishing trips last around 3 weeks. Some vessels do not have built-in refrigeration equipment, limiting their trip length. They take on ice at the docks, but this only supports relatively shorter trips (10-14 days). Some vessels have ice-making equipment such that they can refresh ice supplies and maintain fish quality with iced brine for long periods (up to 60 days).

Swordfish has been the principal target species. Other marketable species in the longline catch include opah (*Lampris regius*), dolphin fish (*Coryphaena hippurus*), and escolar (*Lepidocybium flavobrunneum*). Relatively few sharks, in proportion to those caught, have been marketed from this fishery. The major shark bycatch is blue shark, which is discarded. Other bycatch includes striped marlin, turtles, birds, and marine mammals.

The West Coast-based longline fishery mainly targets swordfish and is estimated to have fished a total of about 1 million hooks in 2002. This estimate is based on dock observation records of vessel departures and returns, from which estimates of days at sea and days fishing are derived based on NOAA Fisheries' observers' records of search and fishing time by observed vessels. Effort has been deployed over a large area, including occasional trips from California to waters north of Hawaii. The principal fishing area is east of 150° W longitude).

Swordfish landings by California-based longline vessels increased from 28 mt in 1991 to 497 mt in 1994, with swordfish accounting for 78 percent, tunas 9 percent and sharks 6 percent of total longline landings in 1994. The overall trend for West Coast longline landings since 1991 is decidedly increasing, with total landings ranging from a 1991 low of 56 mt to the 1999 high of 1,524 mt, and swordfish landings increasing from 28 mt to 1,287 mt. There is a developmental pelagic longline fishery authorized off Oregon, but it has produced negligible landings. California receives virtually all of the high seas longline catch. In 1994, West Coast swordfish landings by California-based longline vessels represented 35 percent of total swordfish exvessel revenues; by 1999 this share had risen to 56 percent.

As indicated, the longline fishery targets swordfish. However, it is conceivable that these vessels could attempt to fish for tuna as the proposed adoption of the FMP and associated regulations restrict swordfish opportunities. Tuna-target longline fishing is also known as deep-set longline fishing. A line shooter is used on deep-sets to deploy the mainline faster than the speed of the vessel, thus allowing the longline gear to sink to its target depth (400 m for bigeye tuna[1]). Deep-set longline gear is set in the morning and hauled in the afternoon. The main line is typically 30 km to 100 km (18 nm to 60 nm) longitude. A minimum of 15, but typically 20 to 30, branch lines (gangions) are clipped to the mainline at regular intervals between the floats. Each gangion terminates with a single baited hook. The branch lines are typically 11 to 15 meters (35 to 50 feet) longitude. *Sanma* (saury) or sardines are used for bait. No lightsticks are attached to the gangions on this type of longline set. A typical deep-set (one day of fishing) consists of 1,200 to 1,900 hooks. Data from observations on Hawaii-based vessels indicate that sea turtle interactions are much less frequent for deep-sets than for swordfish sets.

There are no observer records of sea turtle or seabird interaction rates for longline sets targeting tuna in the eastern Pacific. It seems unlikely, based on current information, that tuna targeting can provide an economically viable alternative to swordfish in the eastern Pacific. However, it cannot be ruled out. The FMP would require placement of observers at levels that provide statistically valid estimates of bycatch and protected species interactions. If tuna fishing occurs, NOAA Fisheries will be able to determine if bycatch of protected species is a problem that needs to be addressed.

NOAA Fisheries began placing observers on the West Coast-based swordfish longline fishery in October 2001 and began a mandatory observer program in August 2002, pursuant to the MMPA. From October 2001 through November 2003, 391 sets were observed. The purpose of the observer program for this fishery is to document the incidental take of marine mammals, sea turtles, seabirds, target and non-target fish species, and to collect biological specimens. Observers also collect socio-economic data from vessel owners/operators. During the 2002-03 fishing season, observer coverage was approximately 12 percent of total fleet coverage[2]

<u>Effort in the West coast-based longline fishery</u>

As shown in Table 1, the West coast-based longline fleet has comprised between 10 and 44 vessels since 1995. In 2002, 21 vessels actively fished, deploying nearly 1 million hooks. Effort for 2003 was similar, with 21 vessels actively fishing (D. Petersen, NOAA Fisheries, personal communication, December, 2003), based on high seas logbook data, PacFin landings, and observer contractor fishing effort determinations. The HMS FMP states that current fishing effort by the fleet is 1.5 million hooks. However, based on fishing effort during the last two

---

[1]400 meters is the average deepest depth, ranging from 100 to 400 meters.

[2]Unit and definition of fishing effort for purpose of estimating coverage: longline vessels in this fleet make a single gear haul (set) each day. The unit of effort is defined as the number of hooks deployed (*i.e.* 1,000 hooks - 1 unit of effort).

years, NOAA Fisheries has determined that an expected effort of 1 million hooks is more representative. NOAA Fisheries does not expect this effort to change in the coming years.

Recent actions by NOAA Fisheries may prohibit swordfish sets (shallow sets) by longline vessels operating out of West Coast ports and licensed under the FMP in all waters east and west of 150° W longitude for the foreseeable future. These regulations likely go into effect at the end of March or early April of 2004. The FMP would prohibit such sets west of 150° W longitude and the ESA rule would prohibit such sets east of 150° W longitude. In the future, the PFMC may develop a revised management regime that could be approved by NOAA Fisheries, allowing limited longline fishing and providing necessary protection to sea turtles, but this would probably take nearly a year. The immediate actions are expected to result in effectively closing the longline fishery out of the West Coast for the present time. There is no information that suggests that West Coast-based longline vessels can profitably pursue a fishery targeting tuna, especially on a year around basis. One or two vessels may try it on a seasonal basis. The final rule contains a provision to require longline vessel operators to contact NOAA Fisheries prior to departing on any trip so the agency can ensure that any such trips would be covered by observers. Longline fishing would continue to not be permitted at all within the EEZ.

NOAA Fisheries expects that West Coast-based vessels will not engage in longline fishing out of West Coast ports for an additional reason. The Western Pacific Council (based in Hawaii) has submitted a management proposal which includes effort limits, gear and fishing technique requirements, and other measures. It provides flexibility in timing for West Coast vessel owners to return to Hawaii if they have western Pacific longline limited entry permits that could be registered for use with their vessels. If this proposal is accepted, eligible West Coast vessels would likely return to Hawaii if that were the only area in which longline fishing for swordfish were permitted. Most longline vessels currently operating out of West Coast ports previously fished out of Hawaii, and the owners are almost all able to register their vessels for use in the Hawaii fishery.

As described earlier in this project description, recent actions by NOAA Fisheries may prohibit swordfish sets (shallow sets) by longline vessels operating out of West Coast ports and licensed under the FMP in all waters east and west of 150° W longitude for the foreseeable future. The FMP would prohibit such sets west of 150° W longitude and the ESA rule would prohibit such sets east of 150° W longitude. Therefore, the anticipated future condition is for no longline fishing or at most a minimal longline fishery to be operating out of the West Coast for at least the next year. The vessels that remain would not be permitted to fish for swordfish; this provision would be carried out by a limit (no more than 10 fish) on the number of swordfish that could be landed per trip. Longline fishing for tuna would be permitted, but little or no such fishing is anticipated. A pre-trip notification is required so that the NOAA Fisheries' Southwest Region would be in a position to place an observer on any such trip.

In the future, PFMC may develop a revised management regime to be approved by NOAA Fisheries, allowing limited longline fishing yet providing necessary protection to sea turtles.

West Coast Drift Gillnet Fishery

The California/Oregon (CA/OR) drift gillnet fishery targets swordfish and thresher shark. The fishery has been observed by NOAA Fisheries since July, 1990, and observer coverage has ranged from 4.4 percent in 1990 to an estimated 22.9 percent in 2000. Between July 1990 and January 31, 2003, NOAA Fisheries has observed a total of 6,720 sets. The fishery occurs primarily within 200 nautical miles of the California coastline and to a lesser extent off the coast of Oregon.

Drift gillnets capture by entanglement. Typically, besides an appropriate vessel, drift gillnet gear required for this fishery includes a net, 45 to 60 large inflatable ball buoys, a spar buoy called a "high flyer" affixed with a radar reflector and strobe light, a deck mounted hydraulically powered reel on which to store the net, and a reel mounted level wind to assist in deploying and retrieving the net. A large net guard of one of two basic styles, either resembling a catchers mask or resembling a football helmet's face guard, is affixed to the stern of the vessel and lowered into the water during retrieval to keep the net from becoming entangled in the propeller. A stern roller reduces net wear. Each net is custom-made from component parts that are often purchased separately from different suppliers. The basic components of a net include the webbing, a small diameter lead-cored braided line (leadline), a large diameter braided or three-strand buoyant line (floatline), small diameter braided hollow-core poly line (buoyline), and a large quantity of seizing twine to attach it all together. Nets are most commonly constructed with one size of twisted nylon strand meshes that typically measure 18 to 20 inches between opposing knots when the mesh is stretched together. The curtain of webbing ranges from 80 to 160 meshes deep (90 to 170 ft), and from 4,800 ft long to the legal maximum of 6,000 ft finished length. Webbing is hung loosely, much like a drapery, between the floatline at the top, and the leadline at the bottom. The looseness, or "slack," gives the net its entanglement properties and is built into the net by adjusting the amount of net captured with the hangings that attach the top of the webbing to the floatline so that the finished length of the net is about 40 to 50 percent less than the total length of webbing used if it were stretched out. A fisher chooses the depth/length combination for his net based on the size reel that it would require, and the amount of vessel stability sacrificed by carrying the weight of reel and a wet net. The net is suspended below the sea surface by the ball buoys to a depth equal to the length of the buoylines. This depth has historically ranged from 18 ft to as much as 90 ft, but is currently limited by regulations enacted under the MMPA to a minimum depth of 36 feet below the sea surface.

The length of drift gillnet trips range from 1 night to 1 month, but typically last 5 to 15 days. Fish availability, market price, weather conditions, phase of the moon, vessel fishing range, and fish-cooling capabilities dictate the timing, and length of fishing trips. Crew size is typically two or three persons, including the captain. Around sunset, the net is usually deployed starting at the upwind position of the set. The high flyer is attached to the end of the net and both are lowered into the water. The vessel proceeds slowly in a downwind direction reeling off net as it goes. As a series of buoylines that are attached to the floatline about 100 ft apart unwind from the reel, a ball buoy is attached to the buoyline and thrown overboard. At the end of the set, the vessel stops and drifts with the net attached throughout the night. Typically before sunrise, retrieval of the net begins. Fish-cooling capabilities vary widely from none to ice, spray brine, or blast refrigeration.

Fishers locate where to fish by looking for temperature fronts between cooler and warmer water masses, or turbidity fronts between green and blue water masses. Using prearranged high frequency radio channels, drift gillnet fishers often communicate in coded messages with other members of loosely organized "code-groups." However, in recent years, the accessibility of high-resolution satellite generated sea surface temperature data has greatly reduced the importance of code-group communications for locating the temperature fronts where swordfish are typically found.

California's drift gillnet permits are issued to individual fishers rather than to vessels. This practice separates the value of the permit from the value of the vessel, keeps the value of vessels from becoming inflated and allows permit holders to buy new vessels as needed. Permit holders are required to be onboard during fishing operations, and fishers are required to declare the fishing vessel being used.

Fishing effort has varied from season to season. Effort peaked in the 1986-87 season with over 11,000 sets, quickly declined to about 4,500 sets by 1990, and averaged about 3,500 sets per year through 1998 (Enriquez 2000 *in* a NOAA Fisheries' working paper: Observed Catch of HMS in the California/Oregon Drift Gillnet Fishery). However, effort has been declining annually since then, with only about 350 trips and 1,948 sets in the 2001-2002 fishing year.

Historically, the CA/OR drift gillnet fishery has occurred along much of the West Coast. The fishery now operates primarily outside of state waters to about 150 miles offshore, ranging from the U.S. Mexico border in the south to northward of the Columbia River, depending on sea temperature conditions. Because of seasonal fishing restrictions, and the seasonal migratory pattern of swordfish, about 90 percent of the annual fishing effort occurs between August 15 and December 31. Depending on where they fish, drift gillnet vessels primarily land fish in San Diego, San Pedro, Ventura, Morro Bay, Monterey, Moss Landing, and San Francisco Bay area ports where it is sold in the fresh fish market providing high quality, locally-caught fish for the restaurant trade.

The principal species of thresher sharks caught in this fishery are common, bigeye and pelagic thresher. Shortfin mako also constitutes an important incidental catch. They are not so abundant as to attract directed effort, but their market quality and ex-vessel value are good. Blue sharks are rarely landed or marketed. The incidental catch of non-target species in the drift gillnet fishery varies by year, but some of the predictable and saleable species include albacore and bluefin tunas, Pacific bonito (*Sarda chiliensis*), opah *(Lampris guttatus)*, and louvar *(Luvarus imperialis)*.

Bycatch (discarded fish) in the drift gillnet fishery is mainly comprised of ocean sunfish *(Mola mola)* and blue shark. In the period 1990-1998, ocean sunfish amounted to 26.1 percent of the total observed catch of which 80.6 percent were returned alive, and blue shark amounted to 15.2

percent of the total observed catch of which 14.5 percent were returned alive (Holts and Rasmussen 1999).

In order to protect gray whales, in 1985, California adopted a closure within 25 miles of the mainland coastline from December 15 through the season's end on January 31. Due to high marine mammal interactions, the drift gillnet fishery was listed as a Category I fishery under the MMPA. Placement in this category required the formation of the Pacific Offshore Cetacean Take Reduction Team in 1996 to develop a Take Reduction Plan (TRP) for the drift gillnet fishery aimed at reducing the level of marine mammal interactions to specified levels. In 1997, regulations implementing the TRP required all drift gillnet fishers to attach a number of acoustic "pingers" to the top and bottom of the net, lower the top of the net to a minimum of 36 ft below the sea surface, and attend annual "skipper workshops" to facilitate the exchange of information with NOAA Fisheries regarding marine mammal interactions in the fishery.

In the fall of 2000, NOAA Fisheries conducted an ESA-required section 7 consultation to examine the impacts of issuing an MMPA permit under section 101(a)(5)(E) for the incidental taking of ESA-listed marine mammals to the drift net fishery. The resulting biological opinion concluded that the issuance of the permit and the associated operation of the drift gillnet fishery was likely to jeopardize the continued existence of the leatherback and loggerhead sea turtles. The reasonable and prudent alternative required the imposition of additional time and area closures. Based on this biological opinion, NOAA Fisheries' implemented regulations that eliminated drift gillnet fishing effort from August 15th through November 15th in the area bounded by straight lines from Point Sur (34°18.5' N) to 34°27' N 123°35' W, to 34°27' N 129° W, to 45° N 129° W, to the point 45° N intersects land in order to reduce impacts to leatherback sea turtles. If an El Niño condition is predicted to occur, or is occurring, the area south of Point Conception will be closed to drift gillnet fishing from June 1st through August 31st to reduce impacts to loggerhead sea turtles. NOAA Fisheries published the final rule for this action on December 16, 2003.

Effort in the California/Oregon drift gillnet fishery

NOAA Fisheries does not expect additional drift gillnet vessels to enter the CA/OR drift gillnet fishery in the future because it is a limited entry fishery. Therefore, only a maximum of 185 permits for California and 10 permits for Oregon will be re-issued each year.

Fishing effort in the CA/OR drift gillnet fishery peaked (more than 11,000 sets per season) in the mid-1980s (Hanan *et al.*, 1993) and decreased to less than 3,000 sets per year in 1999 (CDFG, unpublished data). Legislation passed in 1982 established the fishery as a limited entry fishery with a maximum of 150 permits (California Code of Regulations, Title 14, §106). Because the legislation allowed those already involved in the fishery to continue fishing, the actual number of permittees initially exceeded the established cap of 150 permits. Consequently, no new entrants could enter the fishery until the number of permittees dropped to below 150. In 1984, an additional 35 permits, referred to as experimental swordfish permits, were established for taking swordfish north of Point Arguello (Hanan *et al.*, 1993). There were over 210 active permittees (those that caught and landed fish) participating in the fishery in the 1986-87 season (NOAA

Fisheries, 1997b). In 1989, the 35 experimental swordfish permits were combined with the 150 permits (185 permits). The number of drift gillnet permits issued by the California Department of Fish and Game (CDFG) has decreased from 167 permits in 1997 to 139 permits in 1999 (R. Read, CDFG, personal communication, June 2000). This number is expected to drop further as CDFG continues not to issue new permits and permits lapse because of retirement, illness, injury, and death.

The overall fishing effort trend has continued to decline during the last 16 years with the lowest fishing effort occurring in 2001 with only 1,667 total sets. Based on this trend, NOAA Fisheries anticipates that overall fishing effort for any of the next three calendar years will not exceed 2,000 sets. This annual estimate is supported by the fact that the fishing effort average for calendar years 2000 - 2002, is equal to approximately 1,800 sets per year. Furthermore, the number of vessels that have obtained Marine Mammal Authorization Certificates during the past three years have decreased from 126 vessels in 1997 to 97 vessels in 2000 to 92 vessels in 2002 (D. Petersen, NOAA Fisheries, pers. comm., January 2004). This reduction in the number of fishing vessels since the mid-1990s can be attributed partly to the larger vessels (greater than 50 feet) switching from fishing swordfish using a drift gillnet to fishing squid using a purse seine net and other vessels switching to longline gear. In addition, the number of fishing days was further reduced during the mid-1990s when many of the larger vessels began targeting albacore tuna during the summer months and into late September rather than target swordfish using drift gillnet gear. This reduction in the number of fishing vessels participating in the fishery, the reduced fishing days by vessels targeting albacore, and the number of permits lapsing because of retirement, illness, injury, and death is expected to keep the overall fishing effort by the CA/OR drift gillnet fishery to below 2,000 sets for each subsequent calendar year.

<u>Eastern Tropical Pacific Tuna Purse Seine Fishery</u>

The ETP is designated as the area bounded by 40° N latitude, 40° South latitude, 160° W longitude, and the west coast of the Americas. U.S. vessels primarily fish in the area between San Diego, California and 20°S and from the Central American coast out to 150° West or 160° West (A. Coan, NOAA Fisheries, personal communication, January 2004). The target species sought by the U.S. ETP tuna purse seine fishery are yellowfin and skipjack tuna, although bigeye has also become an important component in the fishery in recent years. Purse seining is currently the most efficient method of catching tuna. Tuna purse seine vessels, for the purposes of this analysis, typically vary in size from 400 to 1700 short tons (st) carrying capacity. Exceptions to this size range are rare; however, an occasional U.S. purse seine vessel less than 400 st may target tuna in the ETP year-round. The majority of these smaller U.S. purse seine vessels based on the West Coast focus on coastal pelagic species and only target tuna when they are seasonally available.

Purse seines are large nets that encircle the target species. Depending on the size of vessels, nets generally vary from 1/4 mile to one mile in circumference, and from 300 to 700 feet in depth. During deployment of gear, the net forms a circular wall of webbing around the school of fish. The net must be deep enough to reduce the likelihood of fish escaping underneath, and the encircling must be done rapidly enough to prevent the fish from escaping before the bottom is secured ("pursed") shut.

A set is initiated when a skiff is released from the stern of the purse seiner, anchoring one end of the seine. The targeted fish are contained in a vertical cylinder of webbing after the seine vessel encircles the targeted school and rejoins the skiff. The bottom of the net is then pursed by hauling the cable that is threaded through rings on the bottom of the net. After the net is pursed, it is retrieved until the diameter of the net compass and the volume of water inside the net decreases to a point when, in both space and time, fish are sufficiently concentrated that they can be hydraulically scooped ("brailed") into wells onboard the vessel.

For reasons that are still not clear, yellowfin tuna over 55 pounds are often found in association with schools of dolphin in the ETP. Tuna fishermen have taken advantage of this association between yellowfin tuna and dolphins by using the more easily detected dolphin schools to help find fish. Dolphin sets (which generally can only be carried out by large purse seine vessels with the capacity to carry speed boats and appropriate nets) yield relatively large yellowfin tuna and result in low bycatch relative to other types of sets: log sets and school sets. Log sets (sets on tuna schools associated with floating logs or fish aggregating devices (FADs)) tend to yield relatively small, pre-reproductive yellowfin tuna or skipjack tuna (or a mixture of both tuna), together with a wide variety and large quantity of other biota, including sea turtles, sharks, billfish, other sportfish, and a variety of other small non-commercial tunas. School sets (sets on tuna schools not associated with either floating objects or with dolphins) target free-swimming schools of yellowfin or mixed yellowfin and skipjack tuna that are generally moderately small, and result in relatively less bycatch than log sets. Traditionally, dolphin sets have been preferred by the majority of large vessel tuna fishermen because they yield large quantities of large yellowfin tuna that are economically valuable, relatively easy to locate and capture, not associated with unwanted fish, and generally receive a higher price per pound than the smaller tuna associated with school or log sets. Currently, no U.S. Class 6 tuna purse seine vessels in the ETP are setting on dolphins, and only one or two vessels occasionally fish in the EEZ or make landings into a West Coast port.

The bycatch of dolphins associated with large yellowfin tuna by purse seiners in the ETP prompted the United States to initiate action within the Inter-American Tropical Tuna Commission (IATTC), a regional fisheries management organization of which the United States is a member, to establish a program to address the tuna-dolphin issue. The IATTC, whose Convention is implemented domestically by the Tuna Conventions Act of 1950, is responsible for developing measures to conserve and manage tuna resources in the ETP, and also provides the Secretariat for the International Dolphin Conservation Program. A schedule of progressively decreasing annual limits on dolphin mortality was implemented and a research program was approved.

Vessel captains helped develop the "backdown" procedure, along with other techniques and gear modifications, in the 1970's to promote the safe release of dolphins encircled in the tuna purse seine fishery. The objective of performing the backdown is to allow the safe release of encircled dolphins without loss of tuna. Backdown is a complex technique that may vary from set to set, depending on the specific conditions (*e.g.,* currents, winds) present at any given time. Backdown occurs after the net has been pursed (rings along the bottom of the net are brought aboard the vessel, or "rings up") and consists of six mains steps (Coe *et al.*, 1984; NOAA Fisheries, 1986):

(1) Tie down at pre-established marks;
(2) With the wind at port beam, use the skiff and bow thruster to move the stern away from the net, then shift the vessel in reverse;
(3) Reverse slowly as the backdown channel (long narrow channel between the port bow of the purse seine vessel and the apex of the net) forms, then increase speed to sink the apex of the corkline;
(4) If fish move toward the apex, slow to allow the corks to rise. When the fish turn toward the vessel, shift back into reverse;
(5) Continue backdown until it is no longer possible to remove live marine mammals from within the net;
(6) Complete backdown with the wind on the port beam.

Backdown sinks the corkline of the seine net at the apex, which allows, with the aid of crew members deployed to the water and speed boats that hold the backdown channel open, dolphins to swim out over the top of the net and tuna to be retained. In many situations, the sunk corkline is actually pulled out from under dolphins, rather than the dolphins actively swimming out of the net.

In 1997, the U.S. Congress passed, and the President signed, the International Dolphin Conservation Program Act (IDCPA) of 1997. This legislation required changes to the dolphin-safe labeling standard in the Dolphin Protection Consumer Information Act. Under the proposed standard, dolphin-safe catches of yellowfin tuna would be identified on a per-set basis rather than on a per-fishing-trip basis, as under the current standard. Dolphin-safe would indicate the absence of dolphin mortality or serious injury in a set. Interim regulations carrying out the IDCPA are in effect, although court action has resulted in retention of the previous dolphin-safe standard for the time being; dolphin-safe tuna are those caught on a fishing trip during which no dolphins were intentionally encircled and no dolphins were seriously injured or killed. As a practical matter, changes in the dolphin-safe labeling standard will not significantly affect U.S. HMS purse seine fisheries, as no fishing on dolphin is occurring and all U.S.-caught tuna is dolphin-safe under the previous standard. However, it is important to note that as a result U.S. vessels are setting on free swimming schools or those associated with floating objects. Available data indicate that these two methods of purse seining for tuna result in higher rates of bycatch than setting on dolphin (Hall, 1998; IATTC, 2002).

The IATTC classifies vessels according to their carrying capacity into the following size classes: Class 1 = less than 51 st; Class 2 = 51-100 st; Class 3 = 101-200 st; Class 4 = 201-300 st; Class 5 = 301-400 st, Class 6 = more than 400 st (362.8 mt).

The U.S. fleet of purse seiners in the ETP reached approximately 144 vessels in 1979, but by 1999 it had decreased to 10 vessels of Class V or VI size. In 2002, only five U.S. Class 5 or 6 vessels actively participated in the fishery and were listed on the IATTC register of vessels qualified to purse seine for tuna in the ETP (Table 2). Until the 1990's, most of the U.S. purse seiners operating in the ETP were Class 6 vessels, targeting tuna year-round. However, in the mid-1990's smaller Class 1-5 purse seine vessels began to outnumber Class 6 vessels. Generally, Class 1-5 purse seine vessels only occasionally target tunas when they are seasonally available and their effort is focused on coastal pelagic species, so Class 6 vessels still comprise the majority of purse seine vessels targeting tuna in the ETP.

Table 2. Estimates of the number of U.S. purse seine vessels fishing in the ETP by year and size class.

	Size class						
Year	1	2	3	4	5	6	Total
1990	0	12	4	0	1	29	46
1991	0	5	5	0	1	13	24
1992	0	6	5	0	1	8	20
1993	0	10	5	0	2	8	25
1994	0	12	4	0	2	9	27
1995	0	7	4	0	2	5	18
1996	1	10	4	0	2	6	23
1997	1	12	4	0	2	6	25
1998	0	13	4	0	2	6	25
1999	0	4	3	0	2	5	14
2000	0	3	2	0	2	6	13
2001	0	0	1	0	2	5	8

(Source: IATTC, 1991, 1992, 1993, 1994, 1995, 1996 1997, 1998, 1999, 2000, 2001, 2002).

Most Class 6 vessels that previously fished in the ETP have either re-flagged or are active in the western Pacific Ocean, where a treaty with the south Pacific islands (the South Pacific Regional Tuna Treaty, signed in 1988) provides the U.S. fleet with access to richer fishing grounds. For purely economic reasons, the trend is not likely to change. In general, western Pacific tuna fishermen catch more tuna per set compared to ETP tuna fishermen, and thus make fewer and shorter trips. However, it should be noted that yellowfin tuna are the target of the purse seine fishery in the ETP, whereas skipjack tuna are targeted in the western Pacific Ocean. No association is known to occur between skipjack tuna and dolphins.

Tropical tuna caught in the U.S. purse seine fishery are canned as light meat tuna. Catches have historically been delivered or transshipped to canneries in California, Puerto Rico, American

Samoa, other canneries in the Pacific rim or to Europe. Today only four U.S. plants are in operation, two in America Samoa (conventional canneries) and one in Puerto Rico, with a small plant in California that cans only imported tuna loins.

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 only when they are seasonally available. As noted above, only one or two large purse seine vessels now fish in the EEZ at any time or make landings into a West Coast port.

Significant growth in the West Coast purse seine fishery for tuna is not expected, and declines seem more likely, but changes are difficult to predict with so many variables. Tropical tunas are not significantly abundant in the U.S. EEZ or available to current commercial fishing gear off the West Coast. U.S. vessels continue to be excluded from Mexico's waters where fishing is more productive. States' area closures and other fishery restrictions will likely remain in place without the FMP. Within the U.S. EEZ, the expected baseline for this fishery is no more than 5 part-time, small purse seine vessels with total landings of 1,000 mt or less valued at $1.5 million or less per year. Total employment in this fishery is expected to remain below 50 persons, with the fishery still centered in southern California.

In addition to the 5 small purse seine vessels that are expected to participate in the tuna fishery when fish are available in the EEZ, a maximum of 6 Class 6 U.S. purse seine vessels are likely to fish for tuna in the broader ETP but rarely in the EEZ. These large vessels target tuna on the high seas on a full-time basis.

<u>Effort in the ETP purse seine fishery</u>

As shown in Table 2, between 1996 and 2001, between 5 and 6 large U.S. vessels actively fished in the ETP, mainly on the high seas and landing their catch in foreign ports. During that same period, the number of small U.S. purse seiners in this fishery ranged between a low of 3 to a high of 19. Between 1999 and 2001, the number of small vessels making landings into West Coast ports has declined, from 9 in 1999, to 7 in 2000, and finally to 3 small purse seine vessels in 2001.

NOAA Fisheries does not expect additional large U.S. purse seine vessels to enter the ETP tuna purse seine fishery in the future because of historical trends in vessel participation and the high start-up costs for a new large vessel to enter the fishery, and fishing in the EEZ on a regular basis would not be expected. In the late 1980's and early 1990's, with the passage of the South Pacific Regional Tuna Treaty, most U.S. large purse seiners either re-flagged or moved to the richer fishing grounds of the central-western Pacific Ocean. With little incentive to fish in the ETP, NOAA Fisheries does not expect a future influx of large U.S. purse seine vessels. A recent IATTC resolution which set fleet limits and a voluntary U.S. commitment to limit participation of domestic vessels to a total 8,969 mt carrying capacity (Chris Fanning, NOAA Fisheries, pers.

comm., January 14, 2004) are also expected to limit or preclude future increases in large U.S. purse seine vessels.

NOAA Fisheries does not expect a significant influx of smaller vessels into the ETP tuna purse seine fishery. The coastal pelagic fishery is a limited entry fishery. Therefore, any small (≤ 400 st) purse seine vessels that potentially would enter the ETP tuna fishery would either be a brand-new purse seine vessel or a purse seine vessel that normally targets squid–squid is not a limited entry fishery. Squid purse seine vessels that originate from Washington generally fish for more profitable salmon in Washington and Alaska in the summertime, not for tuna in the ETP. Squid purse seine vessels also operate out of the ports at San Pedro and Monterey, California.

California Harpoon Fishery

The harpoon fishery for swordfish in California dates back 3,000 years when Native Americans fished with stone and wooden harpoons from driftwood canoes. The modern harpoon fishery off California began in the early 1900s, was the primary gear for swordfish from the early 1900s to the 1980s, and declined in 1980, when drift gillnet fishing started. Many vessels converted to drift gillnet fishing gear or obtained permits to use both types of gear. Today, only a handful of vessels continues to participate in the harpoon fishery.

The harpoon fishery targets swordfish, although small quantities of shark are also landed by harpoon gear, most often common thresher and shortfin mako. There have been infrequent reports of blue, hammerhead (*Sphyrna spp*), soupfin (*Galeorhinus zyopterus*), and white (*Carcharodon carcharias*) sharks being recorded as taken with harpoon gear[3].

Harpoon vessels are from 6 m to 26 m (20-87 ft) in length with a 6 m to 8 m bow plank and hold capacities up to 100 mt (Coan *et al.* 1998). When a fish is spotted, the plank is positioned above the swordfish and the harpoon thrown from the end of the plank. The fish is stored over ice for the rest of the trip. The hand-held harpoon consists of a 10-16 foot metal and/or wood pole attached to a 2-foot long metal shank and tipped with a 4-inch tethered bronze or iron dart. After harpooning, the handle is pulled free from the dart, and the mainline, marker flag, and floats are thrown overboard, leaving the fish to tire itself. The vessel then proceeds to search for and/or harpoon other fish. After the fish is tired, in approximately two hours, the vessel returns to retrieve it.

The harpoon fishing season typically begins in May, peaks in July to September, and ends in December, coincident with the annual northwesterly movement of the North Equatorial Countercurrent and during months of calm sea conditions that harpoon fishing generally requires. Fishing usually concentrates in the Southern California Bight (SCB) off San Diego early in the season and shifts to areas as far north as Oregon later in the season, especially in El Niño years. Swordfish are usually sighted basking at the surface of the water in temperatures between 12° to 26°C. In El Niño years, the range of water temperatures where the majority of swordfish

[3]Shark catches by harpoon gear are highly suspect according to industry and Coan *et al.* (1998).

sightings occur narrows and favors warmer temperatures between 20° and 22°C. Harpoon is legal gear in California and Oregon, but is not defined as legal gear in Washington.

Harpoon vessels work in conjunction with an airplane to spot swordfish basking at the surface beyond binocular range from a vessel or sub-surface swordfish. Spotter planes were introduced in the early 1970s. Spotter planes were banned by California Department of Fish and Game (CDFG) for one year during 1976. In 1984, spotter airplanes were allowed full-time in the fishery.

Confinement of the fishery to a relatively small area, principally the calm waters of the SCB, leaves it vulnerable to changing environmental conditions and competition from other gears. Environmental effects during El Niño events lead to decreased catches and CPUE. Competition from the drift gillnet fishery since 1980 has also led to decreased harpoon catches. Prices received for harpoon-caught swordfish generally exceed those of drift gillnet-caught swordfish, since the harpoon-caught swordfish do not spend the time in the net that the drift gillnet-caught swordfish do, and thereby generally allowing a fresher product. The harpoon season tends to taper off when the drift gillnet season begins because the substantial increase in swordfish volume lowers the ex-vessel swordfish price for harpoon-caught swordfish. The effects (if any) from recent increases in offshore longline fisheries are not yet seen.

Charter and Private Boat Recreational Fishing

Recreational fishing for large, migratory pelagic species began off southern California and Baja California, Mexico in the late 1800s. This fishery now operates year round with peaks in activity for tuna, billfish and pelagic sharks during the spring and summer and lasting into the fall. The fleet is composed of charter vessels, party boats, and head boats, collectively called commercial passenger fishing vessels (CPFV), and privately owned vessels. The HMS recreational fisheries off the Washington and Oregon coasts are solely targeting albacore tuna using hook-and-line gear. A recreational fishing license is not required to fish for albacore tuna in Washington but is required in Oregon. The Washington and Oregon recreational fishery is open year-round and there is no minimum size limit. In Washington, there is no catch or possession limit. In Oregon, albacore tuna come under the catch limit of 25 miscellaneous fish.

Biological and socioeconomic data available for HMS recreational fisheries pale in comparison to those for HMS commercial fisheries. State administered logbook programs are an important source of recreational fishing catch and effort data for CPFV patrons, including those participating on long-range trips aboard California based CPFVs into Mexican waters. NOAA Fisheries conducts the Marine Recreational Fishing Statistical Survey (MRFSS) which routinely collects recreational catch and effort data from West Coast marine anglers, including those targeting HMS from CPFVs and privately owned vessels, as well as occasional add-on surveys to collect angler socioeconomic data. The data available from MRFSS and the state recreational fishery monitoring programs are provided to the coast-wide recreational fishery network data system (RecFIN) where they are integrated into a comprehensive coast-wide marine recreational fishery data base. Recreational billfish fishery data are also collected by the Southwest Fisheries Science Center (SWFSC) through its Billfish Angler Survey and the Billfish Tagging Programs.

The data from these programs are published annually in the Billfish Newsletter (Holts and Prescott 2001).

West coast recreational fishing activity directed towards large, migratory pelagic species emanates mainly from CPFVs and privately owned vessels departing sportfish landings, marinas and launch ramps dotting the southern California coast from Los Angeles to San Diego, California. The Sportfishing Association of California (SAC) is the major industry organization representing nearly 200 CPFVs operating out of 23 landings from Morro Bay to San Diego. This fleet carries almost 1 million passengers annually to local and Mexican fishing grounds. The fleet and supporting shoreside facilities represent a monetary investment totaling close to $80 million, and a labor force of about 4,000 persons. In 2000, there were an estimated 876,000 trips taken aboard southern California based CPFVs resulting in a total catch of 2,941,000 fish, a 44 percent and 30 percent increase respectively from 1999 (RecFIN). Approximately 429,000, 49 percent, of all southern California based CPFV trips in 2000 accounted for total HMS catches of 99,000 fish, 3 percent of the total CPFV catch. This is 12 times the number of trips, and a 21 percent increase in HMS catch compared to 1999.

A large number of southern California based privately owned vessels are used to recreationally fish for HMS, upwards of 6,000 annually. These vessels cover a wide range of sizes and types, ranging in length from 17 ft skiffs to 90 ft or greater luxury yachts, with many vessels under 30 ft. In 2000, private vessels made approximately 1,760,000 fishing trips, of which 1,318,000, 75 percent, resulted in HMS catches. This was an increase of 51 percent and 100 percent in total trips and HMS trips from 1999 (RecFIN). The estimated total recreational catch of southern California based private vessels in 2000 was 2,594,000 fish of which 57,000, 2 percent, were HMS (RecFIN), up 37 percent and 150 percent respectively from 1999. Southern California based private vessels accounted for 75 percent of the total (CPFV plus private vessel) number of HMS trips, and 37 percent of total HMS catches in 2000, a decrease of 21 percent and an increase of 68 percent respectively from 1999.

Charter/Party Boat Fleet

Tropical tunas, billfish and sharks become available off the West Coast as they move seasonally eastward from oceanic waters and northward from Mexico. Except during periods of warm water, recreational catches of these species are almost exclusively from waters off southern California (Table 2-60 in the HMS FMP). Albacore and northern bluefin (more temperate water species) move into the coastal waters along the West Coast from more temperate waters offshore. The timing and extent of the species appearance is dependent on seasonal development of environmental and oceanographic conditions such as water temperature, coastal up welling, strength of the California Current, El Niño episodes and possibly longer decadal cycles. Albacore are one of the most important species caught by the West Coast charter and CPFV fleet.

The CPFV fleet offers short trips from one to two days and long-range trips of up to 15 days into Mexican waters. The fleet is made up about 300 vessels from about 8 to 40 m in length and target large pelagic species when quantities occur within their range.

The smaller and faster California sport fishers licensed to carry six passengers or less are called "six-packs." Six-pack vessels target tunas, billfish and coastal pelagic species on one or two-day trips. These vessels are more likely to spend the extra time necessary to catch billfish if requested by their clientele. The larger CPFV vessels may carry 40 or more passengers and target albacore, bluefin, yellowfin, skipjack, dorado and coastal pelagic species on long-range trips into Mexico and shorter trips of one or two days within the SCB. Few CPFV vessels with more than six passengers will take the time necessary to catch billfish or pelagic sharks because it limits fishing activity of other passengers.

In California, charter vessels are required to submit logbooks from each trip detailing the number of anglers and catch by species to Department of Fish and Game. Oregon and Washington do not require CPFV logbooks, but Washington does have a voluntary CPFV logbook. The state agencies also conduct occasional angler interviews to supplement catch and effort data. In addition, a specialized sector of this California fishery is the long-range and multi-day fleet that fishes extensively off Mexico. Mexico provides special permits, subject to payment of fees, certain port call requirements, and observer and reporting requirements.

California's CPFV catch for 1998, by CDFG block number indicates highest catches in the Southern California Bight, and south of San Clemente Island for albacore, yellowfin, bluefin, bigeye, skipjack, and dorado (see Figures 2-2 and 2-3 and Table 2-58 in the HMS FMP). Average catch of albacore was 90,000 fish annually over the 1980- 1998 period of which 80 percent were taken off Mexico. Strong El Niño conditions and possibly decadal shifts in oceanographic conditions have a strong influence on albacore distribution and movement patterns. Reported albacore CPUE increased in the 1980s and late 1990s when El Niño conditions were present. California CPFV vessels also conduct night fishing trips for blue and mako sharks during the spring and summer and daytime trips for thresher sharks in coastal waters when supported by adequate passengers/client interest.

The San Diego Bay long-range charter vessel fleet is comprised of approximately 57 vessels. The fleet is based at three sport fishing landings: H&M Landing, with 26 vessels; Point Loma Sport Fishing, with 13 vessels; and Fisherman's Landing, with 18 vessels (London Group 1999). The typical fishing season is March through October. During the off-season (November to February), about 15 percent of the vessels fish in more northerly waters and the remaining 85 percent remain in San Diego for repair and maintenance for the upcoming season.

A total of 154,567 fishers visited the three sportfish landings in San Diego Bay in 1998 (London Group 1999). Approximately 66,355 fished in U.S. waters and the remaining 88,212 fished the waters off of Mexico.

In Washington, the major port for charter vessels is Westport, which has seven charter offices with an average of fifteen charter vessels that routinely fish for albacore tuna in the summer months. The importance of albacore tuna to this fleet has risen in the last decade as other fishery opportunities (*e.g.,* salmon and rockfish) have declined. Based on information from charter vessel operators, the Washington recreational fishery has been fairly stable, with increases in catch in recent years. The distance from shore varies from year-to-year (in 2000, the average distance was 64 nm) and charter vessels often take two-day fishing trips for albacore. According to one charter operator, the number of anglers reserving tuna trips on his vessel nearly doubled from 1992 to 1998. The amount of tuna caught has also increased in proportion to the number of anglers, from about 1,300 in 1992 to about 3,000 in 1998.

Washington has a voluntary program for charter/party logbooks, which was instituted in 2000 with a 69 percent compliance rate. Based on the 2000 Washington logbook data, over 8,000 albacore were caught by over 1,300 anglers. The average number of albacore caught per person is six with an average weight of 14.5 pounds. Oregon does not have a logbook program.

In Oregon, it is difficult to separate the charter/party boat fishery from the private vessel recreational fishery (see the private sport description below for additional details). Albacore sport fishing off Oregon has increased in recent years due to improvements in navigational aids and marine equipment and greater appreciation of albacore as game fish. Depending upon the availability of albacore nearshore, recreational landings have ranged from 11 mt to about 80 mt in recent years, accounting for up to 2 percent of the total Oregon albacore harvest. Charter vessels account for 60-70 percent of the total recreational catch. The majority of effort and catch is concentrated along the central part of the Oregon coast, though landings occur in ports coast wide. The majority of the charter effort is out of Depot Bay and Newport, with less effort out of Garibaldi and Brookings.

Private Sport Fishing Fleet

The California recreational rod-and-reel fishery for tuna, striped marlin and swordfish developed about the turn of the century. The Tuna Club of Avalon, Santa Catalina Island, California was established in 1898, and set the standard for big game fishing in waters off California which is widely adhered to today, "fair play to game fishes" (United Anglers of Southern California 2001: From brochure Recreational Fishing in Southern California). To this end, strict rules were designed to give the fish an even chance, and these rules became the foundation for the International Game Fish Association's regulations for fish to qualify for its record books.

Highly migratory species continue to be highly prized by the recreational fishing community, although their catches of tuna and swordfish are relative low in quantity compared to the commercial catch. Swordfish and striped marlin were listed as game fish in 1931 and required a sport-fishing license issued by the CDFG. The California State legislature banned the use of harpoons to take striped marlin in 1935 and further curtailed the sale and import of striped marlin in 1937 thus preserving that southern California fishery entirely for recreational anglers. Private vessel anglers are not required to report their fishing activity or catches. Catch data from the private sport vessels are obtained through occasional CDFG monitoring and the MRFSS. There is little opportunity to recreationally fish for marlins and swordfish north of San Francisco. Most striped marlin fishing is from privately owned vessels based in local southern California marinas.

Many private vessel owners also possess Mexican fishing licenses and travel south looking for schools of tuna and billfish. Sport fishing vessels will target tuna when they move into southern California and northern Baja California waters. The estimated number of private vessels in southern California fishing large pelagic fish is 4,000 to 6,000 annually, although accurate census and economic information is currently unavailable for this fishery.

The rod-and-reel season for striped marlin and swordfish can begin as early as May and continue through November, although most fish are taken from July to October. Fishing locations are primarily in the SCB from Santa Barbara, south and into Mexico. Many California anglers will fish the productive waters around Mexico's Coronado Islands for tuna, marlin, dorado and coastal pelagic species. A few private vessel owners travel as far south as Magdalena Bay and Cabo San Lucas in the fall and winter.

California recreational anglers were allowed the use of hand-held harpoons to take swordfish until 1971. Catching swordfish with a rod-and-reel is difficult because they are usually not receptive to bait or artificial lures while finning at the surface. A few anglers now successfully target swordfish at night using techniques adapted from the East Coast that employ the use of light-sticks.

In Oregon, it is difficult to distinguish the charter/party boat fishery from the private vessel recreational fishery. Private vessels make up approximately 30-40 percent of the total recreational catch. The majority of effort and catch is concentrated along the central part of the Oregon coast, though landings occur in ports coast wide. The majority of private vessel effort is from Garibaldi to Newport, and Coos Bay and Brookings.

Most recreational albacore fishing in Oregon occurs within 50 miles of shore with most private vessels staying much closer. Fishing is usually limited to mid-July through early October, with most of the effort and catch occurring from mid-August through early September. Anglers fishing for albacore off Oregon will usually troll "tuna" jigs near the surface at 5-8 knots, and will concentrate their effort in waters with surface temperatures of 60° F or higher.

Observer Program

<u>California/Oregon Drift Gillnet Fishery</u>

An observer program was mandated by the California state legislation for the developing drift gillnet fishery in 1980, and observations began in October of that year through the CDFG. From 1980-86, observers recorded detailed fishing information, including numbers of each species in the catch, for a total of 443 sets, or only approximately 1 percent of the total effort. There were no systematic observations during the 1986-87 through 1989-90 fishing seasons, after which NOAA Fisheries established an observer program as mandated by the 1988 amendments to the Marine Mammal Protection Act (MMPA) (Hanan *et al*, 1993).

Since 1990, fishing effort has been observed from the waters off San Diego to the waters off Oregon, and out beyond 200 miles from shore. Observers record bycatch by taxon for fish, marine mammals, and sea turtles, collect specimens, and record data on environmental conditions and over 10 different net characteristics (NOAA Fisheries, 1997b). From 1990-2002, the percentage of observer coverage was 4.0 percent, 9.9 percent, 13.2 percent, 13.5 percent, 18.0

percent, 15.6 percent, 13.0 percent, 22.8 percent, 17.5 percent, 20.0 percent, 22.9 percent, 20.4 percent, and 20.2 percent for an annual average of approximately 17.25 percent from 1991-2002 (full year; CDFG unpublished data and D. Petersen, NOAA Fisheries pers comm., January 13, 2004). Between July, 1990, and January 31, 2003, NOAA Fisheries has observed 6,720 sets. Observer coverage is distributed equally along the coast based on expected effort. The observer coverage is representative of the effort occurring off the west coast. Vessels are selected on an opportunistic basis. A vessel is required to carry an observer about 20 percent of the time. Therefore, if a boat just had an observer, they are not required to carry another observer until it would approach their 20 percent requirement. Vessels are notified of this obligation when they report their arrival or departure information - or at the docks, by an observer monitoring vessel activity.

West coast-based longline fishery

NOAA Fisheries began placing observers on longline vessels based on the west coast of the U.S. in October, 2001. During that time, observer coverage was approximately 5 percent of the total effort. In January 2002, the fishery was categorized as a "Category II" fishery; subsequently, NOAA Fisheries had mandatory authority to place observers on west coast-based longline vessels. Between October 2001 and November 2003, NOAA Fisheries has observed 391 sets (295,904 hooks, Table 3).

Table 3. Observed sets in the West coast-based longline fishery (D. Petersen, NOAA Fisheries, pers. comm., January 13, 2004).

Year	Percent Observed	Hooks Observed	Sets Observed
2001-2002	5	49,150	59
2002-2003	12	161,210	221
2003-Nov 2003[1]	20 (projected)	85,544	111
Total		**295,904**	**391**

[1] 4 vessels with observers still at sea as of 12/31/03

ETP purse seine fishery

The 1999 Agreement on the International Dolphin Conservation Program (AIDCP), implemented domestically by the International Dolphin Conservation Program Act (IDCPA) of 1997, requires 100 percent observer coverage on trips by purse seiners with carrying capacities greater than 400 short tons (362.8 metric tons) that fish for tunas in the eastern tropical Pacific Ocean (see Tables 4 and 5 for the number of observed sets in this fishery). These large purse seine vessels comprised approximately 90 percent of the total well volume of the surface gear operating in the ETP during 2001.

This mandate for 100 percent observer coverage of large tuna purse seine vessels operating in the ETP is carried out by the AIDCP On-Board Observer Program, made up of the IATTC's international observer program and the national observer programs of Ecuador, the European Union, Mexico, and Venezuela. In 2002, the On-Board Observer Program covered over 99 percent of all trips for which observer coverage is mandated by the AIDCP. In 2003, the observer programs of the European Union, Mexico, and Venezuela sampled approximately half, and that of Ecuador approximately one-third, of the trips by vessels of their respective fleets, while IATTC observers sampled the remainder of those trips. IATTC observers cover the balance of all trips by vessels required to carry observers that are registered in other nations.

Observers keep counts of stock-specific dolphin mortalities and serious injuries that occur during fishing operations and provide the data to the IATTC. Data are also recorded on herds of dolphins sighted, which may be used to estimated relative dolphin abundance. In addition, since 1992, observers have recorded data on fish and other animals released or discarded from purse seine operations at sea.

Table 4. Number of observed sets in the international (U.S. and foreign) tuna purse seine fishery operating in the ETP (Source: Inter-American Tropical Tuna Commission 2002)

Year	Dolphin	Floating object	Unassociated school	Total
1997	8,977	5,653	4,693	**19,323**
1998	10,645	5,481	4,631	**20,757**
1999	8,648	4,620	6,143	**19,411**
2000	9,235	3,916	5,482	**18,633**
2001	9,577	5,659	2,973	**18,209**

Table 5. Number of observed sets in the domestic (U.S. only) tuna purse seine fishery operating in the ETP (Source: Pers. Comm., January 14, 2004, Inter-American Tropical Tuna Commission)

Year	Dolphin[1]	Floating object	Unassociated school	Total
1997	0	600	232	**832**
1998	0	290	221	**511**
1999	0	263	115	**378**
2000	0	255	193	**448**
2001	0	262	131	**393**

1 No intentional sets on dolphins or other marine mammals were made.

Description of the Action Area

The action area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The following fisheries operate within the areas described below and their effects occur primarily within these areas. Some effects from fishing effort, such as oil and gas leaks, trash and gear discards, or vessel noise impacts may occur outside of these areas but NOAA Fisheries cannot determine the geographic extent of these effects or if they do in fact travel beyond the general fishing area boundaries described below. For the purposes of this consultation, including the specific fishery accounts below, the action area does not include State waters between the mainland or islands and 3 miles out respectively.

Albacore Hook and Line Fishery

North Pacific albacore troll effort occurs in areas northwest of Midway Island and eastward, fishing near 45° N latitude, 150° W longitude and along the West Coast of North America from Vancouver Island to southern California. Fishing gear is found primarily at the surface or very shallow depths.

West Coast-based Longline Fishery

Longliners based out of the west coast of the U.S. fish outside of the EEZ (it is illegal for them to fish within the EEZ off California and Washington). Principal fishing area is east of 150° W longitude, although trips north of Hawaii have occurred. Under Protected Resource Division's proposed action, the area east of 150° W longitude would be closed to shallow-set longline gear. Vessels may switch to deep-set longline gear, however the action area is expected to stay approximately the same. Shallow-set longline gear typically fishes at depths less than 100 meters. Deep set longlining gear typically fishes at depths greater than 100 meters.

CA/OR Drift Gillnet Fishery

Fishing effort for swordfish by the CA/OR drift gillnet fishery primarily occurs in waters off San Diego, north to San Francisco, and within 300 miles of shore. Small numbers of swordfish are also caught between San Francisco and the California-Oregon border and within 125 miles of shore, and very few swordfish catches are made north of Oregon. Fishing effort for swordfish usually peaks in October and November and tapers off in December and January (Holts and Sosa-Nishizaki, 1998). Thresher shark are mainly targeted within 9 miles (8 nm) of the coast or near the Channel Islands, where mean water depth is approximately 400 fathoms. Thus the action area for this fishery is the body of water delineated by the California-Mexico border to the south (30° N latitude), the Oregon-Washington border to the north (45°N), extending as far west as 129°W (Julian and Beeson, 1998) excluding those areas that are closed to protect sea turtles between August 15 and November 15 and closed in June, July, and August during a forecasted or occurring El Nino event. Drift gillnet gear fishes at depths below 36 feet. Nets may be between 90 and 170 feet "deep."

ETP Purse Seine Fishery and Coastal Pelagic Purse Seine Fishery

The ETP is described in section II.B.1.d above. Large U.S. vessels, which do not currently set on dolphin, primarily fish beyond the EEZ though one or two vessels occasionally fish in the EEZ in the area between San Diego, California and 20° South latitude and from the Central American coast out to 150° West or 160° W longitude. Smaller U.S. purse seine vessels fish primarily within the EEZ off southern California when tunas are available. Purse seine gear fishes at depths between the surface and 300 to 700 feet deep.

Swordfish and Shark Harpoon Fishery

Harpoon fishing typically concentrates in the Southern California Bight (SCB) off San Diego early in the season and shifts to areas as far north as Oregon later in the season, especially in El Niño years. Swordfish are usually sighted basking at the surface of the water in temperatures between 12° to 26°C. In El Niño years, the range of water temperatures where the majority of swordfish sightings occur narrows and favors warmer temperatures between 20° and 22°C. Harpoon is legal gear in California and Oregon, but is not defined as legal gear in Washington. Harpoon gear is thrown from the fishing vessel to the target species basking on the surface of the ocean.

Charter Boat and Private Boat HMS Sport Fisheries

Tropical tunas, billfish and sharks become available off the West Coast as they move seasonally eastward from oceanic waters and northward from Mexico. Except during periods of warm water, recreational catches of these species are almost exclusively from waters off southern California (Table 2-60 in the HMS FMP). Albacore and northern bluefin (more temperate water species) move into the coastal waters along the West Coast from more temperate waters offshore. California's CPFV fishing effort occurs primarily in the Southern California Bight, and south of San Clemente Island. In addition, a significant amount of albacore fishing effort occurs off Mexico.

In Washington, the major port for charter vessels is Westport. The trip distance from shore varies from year-to-year (in 2000, the average distance was 64 nm) and charter vessels often take two-day fishing trips for albacore. The majority of effort and catch in Oregon is concentrated along the central part of the Oregon coast, though landings occur in ports coast wide. The majority of the charter effort is out of Depot Bay and Newport, with less effort out of Garibaldi and Brookings.

Many private vessel owners possess Mexican fishing licenses and travel south looking for schools of tuna and billfish. Sport fishing vessels also target tuna in southern California and northern Baja California waters. Fishing locations are primarily in the SCB from Santa Barbara, south and into Mexico. Many California anglers will fish the productive waters around Mexico's Coronado Islands for tuna, marlin, dorado and coastal pelagic species. A few private vessel owners travel as far south as Magdalena Bay and Cabo San Lucas in the fall and winter.

The majority of private vessel effort and catch in Oregon is concentrated along the central part of the Oregon coast, though landings occur in ports coast wide. The majority of private vessel effort is from Garibaldi to Newport, and Coos Bay and Brookings. Most recreational albacore fishing in Oregon occurs within 50 miles of shore with most private vessels staying much closer. Gear for these fisheries is fished at or very near the surface of the water.

STATUS OF THE SPECIES

Brown Pelican

Species Description

The brown pelican was federally listed as endangered in 1970 (35 *FR* 16047). The brown pelican recovery plan describes the biology, reasons for decline, and the actions needed for recovery of brown pelicans along the Pacific coast (Service 1983).

The California brown pelican (*P. o. californicus*), one of six recognized subspecies of the brown pelican (Wetmore 1945) which occur in tropical and subtropical waters of the Pacific and Atlantic oceans, is the subspecies that occurs in the action area. The breeding distribution of the California subspecies ranges from the Channel Islands of southern California southward to Isla Isabela, Islas Tres Marias and Isla Ixtapa off the coast of Mexico (Service 1983). Between breeding seasons California brown pelicans range north as far as Vancouver Island, British Columbia, Canada and south to Colima, Mexico. The eastern brown pelican (*P. o. carolinensis*) is the only other subspecies of brown pelican that occurs in North America. The breeding distribution of the eastern subspecies ranges from New Jersey south along the Atlantic coast to Florida and along the coast of the Gulf of Mexico from Florida to Texas. Post-breeding eastern brown pelicans occasionally disperse as far north as New England and Nova Scotia.

The brown pelican is a large marine bird weighing up to 4 kilograms (8 pounds) that is recognized by its large bill, a prominent, unfeathered throat pouch, and a wingspread up to 7 feet (Sykes 1983). Adults in non-breeding plumage have a white head and neck. During the breeding season, the hindneck and nape are dark brown. The body and wings are grayish brown, and the primaries and secondaries are dark brown. The bill is gray, and the throat pouch is black. Immature brown pelicans are mostly brown with a dark neck and head and white belly (Sykes 1983). The California brown pelican can be distinguished from the eastern brown pelican by having a larger size and darker hindneck while in breeding plumage (Wetmore 1945) and a bright red gular pouch during courtship and egg-laying period. They are rather clumsy on land and fly with their necks folded, heads resting on their backs, using slow, powerful wingbeats.

Life History

Brown pelicans feed almost entirely on surface-schooling fish caught by plunge diving in coastal waters. Feeding is often concentrated in relatively shallow waters of less than 50 fathoms (300 feet) (Gress *et al.* 1980). Their diet consists mainly of northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinopus sagax*), and other surface-schooling fish (Anderson *et al.* 1980, 1982, Anderson and Gress 1984). Sometimes brown pelicans dive from as high as sixty to seventy feet, although a height of thirty feet is more normal. Brown pelicans are often attracted to a particular foraging area by the feeding activities of other species and by other pelicans (Gress *et al.* 1980). As soon as pelicans begin plunging and feeding, they quickly attract the attention of others. Pelicans will often congregate in large numbers at these prey concentrations until the food source is gone (Gress *et al.* 1980). Brown pelicans are rarely found away from salt water and do not normally venture more than 32 kilometers (20 miles) out to sea.

Brown pelicans are social and gregarious. Males and females, juveniles and adults, congregate in large flocks for much of the year. Brown pelicans nest in colonies on small coastal islands that are free of mammalian predators and human disturbance and are associated with an adequate and consistent food supply. Nest sites are generally on steep, rocky slopes. Nests are constructed on the ground or in brush of whatever materials are available, including grasses, sticks, feathers, and seaweed. The nesting chronology of brown pelicans varies from year-to-year, although most nesting activity occurs between February and October. Nesting may be synchronous or may consist of sub-colony units breeding asynchronously over a period of several months (Service 1983).

A brown pelican pair attends a clutch of two or three eggs, which are incubated alternatively by both parents. Young are born altricial and are fed by both parents. Chicks take about 13 weeks to fledge, at which time they weigh about 20 percent more than adults. Brown pelicans reach breeding age in about three to five years.

Offshore habitat associated with island colony sites is also essential habitat for brown pelicans. Brown pelicans are dependent on food resources near the colony site during the breeding season. The offshore zone within 30 to 50 kilometers (18 to 30 miles) of the colony is critical to pelican food supplies, especially when young are being fed (Anderson and Gress 1984). Waters near colony sites are also important for wintering migratory birds and for newly-fledged young when they begin feeding for themselves. Offshore aquatic habitat, including the abundance and availability of brown pelican food resources, is a major factor in determining the population status of brown pelicans and the degree of breeding success (Service 1983).

During the non-breeding season, which varies between colonies but typically extends from July to January, brown pelicans roost communally. Roosting sites and loafing areas are essential habitat for breeding brown pelicans and non-breeding local and Mexican migrants. Brown pelicans are tropically-derived seabirds that have wetable plumage so they must have terrestrial roost sites to dry wet plumage after feeding or swimming (Jaques and Anderson 1987). Roost sites are also important for resting and preening. The essential characteristics of roosts include: nearness to adequate food supplies; presence of physical barriers to predation and disturbance; sufficient surface space for individuals to interact normally; and adequate protection from adverse environmental factors such as wind and surf (Jaques and Anderson 1987). Offshore rocks and islands; river mouths with sand bars; and breakwaters, pilings, and jetties are important roosting sites.

Adult brown pelicans are efficient predators, and therefore many individuals spend a considerable portion of the day on land and all congregate at night roosts during the dark hours (Jaques and Anderson 1987). Pelican concentrations shift in response to prey distributions. The dispersion of suitable roost sites influences bioenergetic considerations, not only for shelter, thermoregulation, and plumage maintenance, but for efficient travel time to food resources (Jaques and Anderson 1987). Communal roosts may also provide increased protection from potential predators, act as centers for social facilitation of food finding, and other functions yet to be identified.

Distribution and Population Status

Although nest predation may be a problem, adult brown pelicans have few natural enemies. Nests are sometimes destroyed by hurricanes, flooding, or other natural disasters; however, the biggest threat to brown pelican survival has historically been related to human activities. Brown pelicans experienced widespread reproductive failures in the 1960s and early 1970s. Much of the failure was attributed to eggshell thinning caused by high concentrations of DDE, a metabolite of DDT. Other factors implicated in the decline of this species include human disturbance at nesting colonies and food shortages. Brown pelicans have not nested north of the Channel Islands since the species' decline in the late 1950s and early 1960s. In 1972, the Environmental Protection Agency banned the use of DDT in the U.S. and placed restrictions on the use of other pesticides. Since then, the level of chemical contaminants in pelican eggs has decreased and brown pelican nesting success has subsequently increased. The brown pelican was the first species to apparently recover from the effects of pesticides.

Although food availability, human disturbance at breeding and roosting sites, and chronic levels of DDT in the marine environment may still be suppressing productivity, brown pelican population numbers have increased steadily in the Southern California Bight (SCB). After experiencing nearly complete reproductive failure during the late 1960s to the late 1970s, with nesting attempts often numbering less than 1,000 per year, brown pelican productivity started to improve following the ban on DDT. The increase in productivity that started in 1974 was correlated with an increase in eggshell thickness. Since 1974, food availability has become the most important limiting factor influencing brown pelican breeding success within the SCB and both nesting attempts and productivity can fluctuate greatly year-to-year based on the availability of small surface-schooling fishes.

Nesting colonies of the brown pelican on the Pacific coast range from the Channel Islands in the SCB south to the islands off Nayarit, Mexico. Prior to 1959, intermittent nesting was observed as far north as Point Lobos in Monterey County, California. Currently in southern California, brown pelican colonies are found only on Anacapa and Santa Barbara islands; they do not nest on any of the other Channel Islands. In addition, during 1996 and 1997 a small number of brown pelicans nested near Obsidian Butte at the Salton Sea.

The maximum breeding population of the California brown pelican throughout its range may number about 55,000 to 60,000 pairs. Breeding populations can be differentiated into geographically separate entities that are isolated from each other by long stretches of uninhabited coastline. About 90 to 95 percent of the California brown pelican population breeds on islands off the coast of mainland Mexico, Baja California, and in the Gulf of California (Anderson 1983, Service 1983, and Anderson pers. comm., 2002). In southern California, brown pelican colonies are found only on Anacapa and Santa Barbara islands; they do not nest on any of the other Channel Islands. The breeding population of brown pelicans in southern California is estimated at 4,500 to 6,000 pairs. Some genetic exchange occurs among colonies by the recruitment of new breeders. The largest breeding group is located on the Gulf of California, comprising approximately 68 percent of the total breeding population.

Dispersal between breeding seasons ranges from British Columbia, Canada, to southern Mexico and possibly to Central America. Post breeding dispersal patterns depend largely on oceanographic conditions, which in turn influence food availability (Anderson and Anderson 1976). During the non-breeding season, which varies between colonies but typically extends from July to January, the number of brown pelicans along the Pacific coast of the United States increases. Although only two breeding colonies exist along the coast of California, the majority of brown pelicans seen foraging along coastal California, Oregon, and Washington likely come from Mexico, as those pelicans tend to be more mobile. At this time of year, as many as 75,000-90,000 brown pelicans may occur along the California coast (del Hoyo *et al.* 1992). The central coast of California (Point Conception to Bodega Bay) and the offshore islands in the SCB comprise the center of the U.S. non-breeding range for the California subspecies (Briggs *et al.* 1983). There are at least 32 important brown pelican roosting areas between Point Reyes and Point Conception (Jaques and Anderson 1988).

Brown pelicans have recently extended their non-breeding range north along the Pacific coast. Range expansion began in the early to mid 1970's but seasonal migration of thousands of pelicans into Washington did not become regular until 1985 (Jaques *et al.* 1994). Brown pelicans were essentially absent north of 45° longitude during most of the 20th century, although accounts from early naturalists suggest that brown pelicans were abundant in Washington in the 1800's. The recent range expansion is thought to be due to the recovery of the SCB breeding population and a long-term warm water regime in the north Pacific Ocean beginning in 1976 (Jaques *et al.* 1994). The Oregon and Washington coastlines have become an important region for non-breeding brown pelicans. Nearly 13,000 brown pelicans were observed there during surveys in 1991 (Jaques *et al.* 1994).

Short-tailed Albatross

Species Description

George Steller provided the first record of the short-tailed albatross in the 1740s. The type specimen for the species was collected offshore of Kamchatka, Russia, and was described in 1769 by P.S. Pallas in Specilegia Zoologica (AOU 1998). In the order of tubenose marine birds, Procellariiformes, the short-tailed albatross is classified within the family Diomedeidae. Until recently, it was assigned to the genus *Diomedea*. Following results of the genetic studies by Nunn *et al.*(1996), the family Diomedeidae was arranged in four genera. The genus *Phoebastria*, North Pacific albatrosses, now includes the short-tailed albatross, the Laysan albatross (*P. immutabilis*), the black-footed albatross (*P. nigripes*), and the waved albatross (*P. irrorata*) (AOU 1998).

The short-tailed albatross is a large pelagic bird with long narrow wings adapted for soaring just above the water surface. The bill is disproportionately large compared to other northern hemisphere albatrosses; it is pink and hooked with a bluish tip, has external tubular nostrils, and has a thin but conspicuous black line extending around the base. Adult short-tailed albatross are the only northern Pacific albatross with an entirely white back. The white head develops a yellow-gold crown and nape over several years. Newly fledged birds are dark brown-black, but soon obtain pale bills and legs that distinguish them from black-footed albatross (Tuck 1978, Robertson 1980). Subadult birds have mixed white and brown-black areas of plumage, gradually getting more white feathers at each molt until reaching fully mature plumage.

Life History

Available evidence from historical accounts and from current breeding sites indicates that short-tailed albatross nesting habitat is characterized by flat or sloped sites with sparse or full vegetation on isolated windswept offshore islands with restricted human access (Arnoff 1960, Sherburne 1993, DeGange 1981). Current nesting habitat on Torishima Island is steep sites on soil containing loose volcanic ash; the island is dominated by a grass, *Miscanthus sinensis* var. *condensatus*, but a composite, *Chrysanthemum pacificum*, and a nettle, *Boehmeria biloba*, are also present (Hasegawa 1977). The grass probably stabilizes the soil, provides protection from weather, and minimizes mutual interference between nesting pairs while allowing for safe, open take-offs and landings (Hasegawa 1978). The nest is a grass or moss-lined concave scoop about 2 ft (0.75 m) in diameter (Tickell 1975).

Short-tailed albatross are long-lived and slow to mature; the average age at first breeding is about 6 years (Service 1999). As many as 25 percent of breeding age adults may not return to the colony in a given year (Service 1999). Females lay a single egg each year, which is not replaced if destroyed (Austin 1949). Adult and juvenile survival rates are high (96 percent), and an average of 0.24 chicks per adult bird in the colony survive to fledge at six months of age (Cochrane and Starfield, in press.). However, chick survival can be reduced severely in years when catastrophic volcanic or weather events occur during the breeding season.

At Torishima, birds arrive at the breeding colony in October and begin nest building. Egg-laying begins in late October and continues through late November. The female lays a single egg; incubation involves both parents and lasts for 64-65 days. Eggs hatch in late December and January, and by late May or early June the chicks are almost fully grown and the adults begin abandoning their nests (Service 1999; Hasegawa and DeGange 1982). The only known currently active breeding colonies of short-tailed albatross are on Torishima and Minami-kojima islands, Japan. The chicks fledge soon after the adults leave the colony, and by mid-July, the colony is deserted (Austin 1949). Non-breeders and failed breeders disperse from the breeding colony in late winter through spring (Hasegawa and DeGange 1982). There is no detailed information on phenology on Minami-kojima, but it is believed to be similar to that on Torishima.

Short-tailed albatross are monogamous and highly philopatric to breeding sites. Chicks hatched at Torishima return there to breed. However, young birds may occasionally disperse from their natal colonies to breed, as evidenced by the appearance of adult birds displaying courtship behavior on Midway Atoll that were banded as chicks on Torishima (Service 1999, Richardson 1994).

The diet of short-tailed albatross includes squid, fish, flying fish eggs, shrimp and other crustaceans (Austin 1949, Harrison *et al.* 1983, Hattori in Austin 1949, Service 1999). There is currently no information on variation of diet by season, habitat, or environmental condition. Short-tailed albatross are able to locate food using well-developed eyesight and sense of smell. Albatross feed at the ocean surface or within the upper three feet (one meter) by seizing, dipping or scavenging (Austin 1949, Harrison *et al.* 1983).

Short-tailed albatross face a significant threat at the primary breeding colony on Torishima due to the potential for habitat destruction from volcanic eruptions on the island. The threat is not predictable in time or in magnitude. Eruptions could be catastrophic or minor, and could occur at any time of year. A catastrophic eruption during the breeding season could result in chick and adult mortalities as well as destruction of nesting habitat. Significant loss of currently occupied breeding habitat or breeding adults at Torishima would delay and possibly preclude recovery of the species.

Torishima is an active volcano approximately 1182 ft (394 m) high and 1.5 mi (3 km) wide (Service 1999) located at 30.48° N and 140.32° E (Simkin and Siebert 1994). The earliest record of a volcanic eruption at Torishima is a report of a submarine eruption in 1871 (Simkin and Siebert 1994), but there is no information on the magnitude or effects of this eruption. Since the first recorded human occupation on the island in 1887, there have been four formally recorded eruption events: 1) on August 7, 1902, an explosive eruption in the central and flank vents resulted in lava flow and a submarine eruption, and caused 125 human mortalities; 2) on August 17, 1939, an explosive eruption in the central vent resulted in lava flow, and caused two human mortalities; 3) on November 13, 1965, a submarine eruption and; 4) on October 2, 1975, a submarine eruption 4.4 nautical miles (9 km) south of Torishima (Simkin and Siebert 1994). There is also reference in the literature to an additional eruption in 1940 which resulted in lava flow that filled the island's only anchorage (Austin 1949).

Austin (1949) visited the waters around Torishima in 1949 and made the following observations: "The only part of Torishima not affected by the recent volcanic activity is the steep northwest slopes where the low buildings occupied by the weather station staff are huddled. Elsewhere, except on the forbidding vertical cliffs, the entire surface of the island is now covered with stark, lifeless, black-gray lava. Where the flow thins out on the northwest slopes, a few dead, white sticks are mute remnants of the brush growth that formerly covered the island. Also on these slopes some sparse grassy vegetation is visible, but there is no sign of those thick reeds, or 'makusa' which formerly sheltered the albatross colonies. The main crater is still smoking and fumes issue from cracks and fissures all over the summit of the island."

In 1965, meteorological staff stationed on the island were evacuated on an emergency basis due to a high level of seismic activity; although no eruption followed, the island has since been considered too dangerous for permanent human occupation (Tickell 1973). In late 1997, Hasegawa observed more steam from the volcano crater, a more pronounced bulge in the center of the crater, and more sulphur crusts around the crater than were previously present (Service 1999).

The active volcano on Torishima began erupting again on August 12, 2002. Although the albatross' 2001 breeding season was over, the effects of this eruption on the colony site, on the next breeding season, and on the abundance and distribution of short-tailed albatross in the action area are not yet clear.

The eruptions in 1902 and 1939 destroyed much of the original breeding colony sites. The remaining sites used by albatross are on sparsely vegetated steep slopes of loose volcanic soil. The monsoon rains that occur on the island result in frequent mud slides and erosion of these soils, which can result in habitat loss and chick mortality. A typhoon in 1995 occurred just before the breeding season and destroyed most of the vegetation at the Tsubamesaki colony. Without the protection provided by vegetation, eggs and chicks were at greater risk of mortality from monsoon rains, sand storms and wind (H. Hasegawa, pers. comm. 1997, as cited in Service 2000). Breeding success at Tsubamesaki is lower in years when there are significant typhoons resulting in mud slides (Service 1999).

In 1981, a project was supported by the Environment Agency of Japan and the Tokyo Metropolitan Government to improve nesting habitat by transplanting grass and stabilizing the loose volcanic soils (Hasegawa 1991). Breeding success at the Tsubamesaki colony has increased following habitat enhancement (Service 1999). Current population enhancement efforts are concentrated on attracting breeding birds to an alternate, well-vegetated colony site on Torishima which is less likely to be affected by lava flow, mud slides, or erosion than the Tsubamesaki colony site (Service 1999). Japan's "Short-tailed Albatross Conservation and Management Master Plan" (Environment Agency 1996) identifies a possible long-term goal of establishing additional breeding grounds away from Torishima once there are at least 1,000 birds on Torishima. Midway Atoll has been identified as a possible site for establishing an additional breeding colony (Service 1999). Midway Atoll NWR is a logical candidate because it is visited by short-tailed albatross that have displayed reproductive capacity (*e.g.,* courtship dances and egg laying). Furthermore, Midway Atoll is currently under the authority and control of the Service's National Wildlife Refuge system, and the ability to regulate activities conducted on the atoll could promote expansion of the short-tailed albatross population. Until other safe breeding sites are established, short-tailed albatross survival will continue to be at risk due to the possibility of significant habitat loss and mortality from unpredictable natural catastrophic volcanic eruptions and land or mud slides caused by monsoon rains.

It should be noted that the risk of extinction caused by a catastrophic event at the breeding colony is buffered by adult and immature non-breeding birds. Each year, an average of 25 percent of breeding age adults do not return to breed (Service 1999), and immature birds do not return to the colony to breed until at least 6 years after fledging (Service 1999). As much as 50 percent of the current total worldwide population may be immature birds. If suitable habitat were still available on Torishima, these birds could recolonize in years following a catastrophic event.

Breeding-age population estimates come primarily from egg counts and breeding bird observations. There were 440 breeding adults present at the beginning of the 1999-2000 breeding season on Torishima, assuming 2 adults are present for each of the 220 eggs counted (H. Hasegawa, pers. comm. 2000, as cited in Service 2000). The most recent population estimate on Minami-kojima is 25 breeding pairs, or 50 breeding adults. Therefore, the unadjusted total worldwide estimate is 490. It has been noted that an average of approximately 25 percent of breeding adults may not return to breed each year. It is reasonable, therefore, to estimate that approximately 122 additional breeding-aged birds may not be observed on the breeding grounds. Therefore, 612 birds is the adjusted worldwide estimate of breeding age birds.

Numbers of immature birds are more difficult to estimate because these individuals do not congregate between fledging and returning to breed at approximately 6 years of age. An estimate can be calculated by totaling the number of known fledged chicks in the last 6 years, and the average juvenile survival rate of 96 percent (Service 1999; Cochrane and Starfield, in press). Dr. Hiroshi Hasegawa of Toho University, Japan, reported that 655 chicks were fledged from the Tsubamesaki colony on Torishima between 1994 and 2000 (H. Hasegawa, pers. comm. 2000, as cited in Service 2000). Based on an average juvenile survival rate of 96 percent, there are an estimated 629 birds in the immature population from Torishima Island. In 1998, Hasegawa estimated the total population at Minami-kojima to be 150 birds, containing an estimate of 100 immature birds. Combining the estimated number of immature birds from Torishima Island and the estimated number of immature birds from Minami-kojima yields a worldwide immature population estimate of about 729 individuals (based on data through the 1999-2000 breeding season at Torishima and 1997-98 breeding season at Minami-kojima).

At that time, the estimated world population of short-tailed albatross, calculated by combining estimated breeding age birds (612) and estimated immature birds (about 750), was about 1,362 birds. No measures of uncertainty are available for this estimate.

Based on more recent information, the world-wide short-tailed albatross population currently is estimated at 1,700 (NOAA Fisheries 2003b). Based on observations during the 2003-2004 breeding season, Hasegawa (pers. comm. 2003) estimated a total of 277 pairs laid eggs on Torishima, with an expectation of about 180 young to fledge in May 2004. The population at Torishima is estimated to be growing at a rate of between 6.5 and 8.0 percent per year (Service, 1999).

Distribution and Population Status

The species once ranged throughout most of the North Pacific Ocean and Bering Sea, with known nesting colonies on numerous western Pacific Islands in Japan and Taiwan (Hasegawa 1979, King 1981). Though other undocumented nesting colonies may have existed, there is no conclusive proof that short-tailed albatross once nested at locations beyond the Japanese and Taiwanese colonies. Short-tailed albatross courtship behavior and reproductive activities have been observed at Midway Atoll NWR. The question of the future potential of Midway Atoll NWR to serve as a successful nesting colony, through either natural colonization or propagation efforts, remains unknown (Service 1999).

At the beginning of the 20th century, the species declined in population numbers to near extinction, primarily as a result of hunting at breeding colonies in Japan. Albatross were killed for their feathers and various other body parts. The feathers were used for writing quills, their bodies were processed for fertilizer, their fat was rendered, and their eggs were collected for food (Austin 1949). Hattori (in Austin 1949) commented that short-tailed albatross were "...killed by striking them on the head with a club, and it is not difficult for a man to kill between 100 and 200 birds daily." He also noted that the birds were "very rich in fat, each bird yielding over a pint."

Pre-exploration worldwide population estimates of short-tailed albatross are not known; the total number of birds harvested may provide the best estimate, as the harvest drove the species nearly to extinction. Between approximately 1885 and 1903, an estimated 5 million short-tailed albatross were harvested from the breeding colony on Torishima (Yamashina in Austin 1949), and harvest continued until the early 1930s, except for a few years following the 1903 volcanic eruption. One of the residents on the island, a schoolteacher, reported 3,000 albatross killed in December 1932 and January 1933. Yamashina (in Austin 1949) stated that "This last great slaughter was undoubtedly perpetrated by the inhabitants in anticipation of the island's soon becoming a bird sanctuary." By 1949, there were no short-tailed albatross breeding at any of the historically known breeding sites, including Torishima, and the species was thought to be extinct (Austin 1949).

In 1950, the chief of the weather station at Torishima, M. Yamamoto, reported nesting of the short-tailed albatross (Tickell 1973, 1975), and by 1954 there were 25 birds and at least 6 breeding pairs present on Torishima (Ono 1955). These were presumably juvenile birds that had been wandering the northern Pacific during the final several years of slaughter. Since then, as a result of habitat management projects, stringent protection, and the absence of any significant volcanic eruption events, the population has gradually increased. The average growth of the colony on Torishima Island (the colony is called "Tsubamesaki") between 1950 and 1977 was 2.5 adults per year; between 1978 and 1991 the average population growth was 11 adults per year. An average annual population growth of at least 6 percent per year (Hasegawa 1982; Cochrane and Starfield, in press) has resulted in a continuing increase in the breeding population to an estimated 440 breeding birds on Torishima in 1999 (Service 1999). Torishima Island is under Japanese government ownership and management and is managed for the conservation of wildlife. There is no evidence that the breeding population on Torishima is nest site-limited at this point; therefore, ongoing management efforts focus on maintaining high rates of breeding success.

Two management projects have been undertaken to enhance breeding success on Torishima. First, erosion control efforts at the Tsubamesaki colony have improved nesting success. Second, there are continuing attempts to establish a second breeding colony on Torishima by luring breeding birds to the opposite side of the island from the Tsubamesaki colony through the use of decoys and recorded colony sounds. Preliminary results of this experiment are promising; the first chick was fledged from this site in 1997. The expectation is that, absent a volcanic eruption or some other catastrophic event, the population on Torishima will continue to grow, and it will be many years before the breeding sites are limited (Service 1999).

In 1971, 12 adult short-tailed albatross were discovered on Minami-kojima in the Senkaku Islands, one of the former breeding colony sites (Hasegawa 1984). Aerial surveys in 1979 and 1980 resulted in observations of between 16 and 35 adults. In April 1988, the first confirmed chicks on Minami-kojima were observed, and in March 1991, 10 chicks were observed. In 1991, the estimate for the population on Minami-kojima was 75 birds, including 15 breeding pairs (Hasegawa 1991).

At-sea sightings since the 1940s indicate that the short-tailed albatross, while very few in number today, is distributed widely throughout its historical foraging range of the temperate and subarctic North Pacific Ocean (Sanger 1972; Service unpublished data) and is found close to the U.S. west coast. Recent satellite tracking of black-footed and Laysan albatrosses revealed that individuals of these species travel hundreds of miles from breeding colonies during the breeding season (Service 1999). If short-tailed albatross are similar in behavior to black-footed and Laysan albatrosses, short-tailed albatross foraging trips may extend hundreds of miles or more from colony sites.

In summer (*i.e.,* non-breeding season), individuals appear to disperse widely throughout the historical range of the temperate and subarctic North Pacific Ocean (Sanger 1972), with observations concentrated in the northern Gulf of Alaska, Aleutian Islands, and Bering Sea (McDermond and Morgan 1993; Sherburne 1993; Service unpublished data). Individuals have been recorded along the west coast of North America as far south as the Baja Peninsula, Mexico (Palmer 1962).

Short-tailed albatross have been observed on Midway Atoll since the early 1930's (Berger 1972, Hadden 1941, Fisher in Tickell 1973, Robbins in Hasegawa and DeGange 1982). There is one unconfirmed report of a short-tailed albatross breeding on Midway in the 1960s (Service 1999), but no subsequent reports of successful breeding exist. In the years following the reported observation, tens of thousands of albatross were exterminated from Midway Atoll to construct an aircraft runway for the Department of the Navy, and to provide safe conditions for aircraft landings and departures. It is possible that short-tailed albatross on the island could have been killed during this process (Service 1999). Since the mid-1970s, approximately thirty-five sightings of short-tailed albatross have occurred during the breeding season on Midway Atoll. In March 1994, a courtship dance was observed between two short-tailed albatross (Richardson 1994), and one lone bird has occupied a nest site and laid eggs in 1993, 1995, and 1997, none of which has hatched (Service 1999). A dancing ritual was observed by Service biologists between two short-tailed albatross (band numbers 015 yellow and 057 blue) on Sand islet, Midway Atoll, on November 17, 1999. The U.S. Government transferred Midway Atoll from the Navy to the Department of the Interior in 1996, and has designated the Service as the conservation agency to manage Midway Atoll National Wildlife Refuge (NWR).

Observations of short-tailed albatross have also been made during the breeding season on Laysan Island, Green Island at Kure Atoll, and French Frigate Shoals, but there is no indication that these occurrences represent breeding attempts (Sekora 1977, Fefer 1989). Between 1976 and 1994, approximately six short-tailed albatross have been sighted from these islands. It is possible that short-tailed albatross could have occurred at these locations during the latter part of the 19th century and first part of the 20th century. If so, they would have been vulnerable to Japanese egg and feather collectors as thousands of black-footed and Laysan albatross were killed to support this trade during this period. In 1909, the Hawaiian Islands Bird Reservation was established by President Theodore Roosevelt (Executive Order 1019) to protect birds and their habitat, among other things.

Between the 1950s and 1970, there were few records of the species away from the breeding grounds, according to the AOU Handbooks of North American Birds (Vol. 1, 1962) and the Red Data Book (Vol. 2, Aves, International Union for the Conservation of Nature, Morges, Switzerland, 1966) (Tramontano 1970). In the northern Pacific, there were 12 reported marine sightings in the 1970s, 55 sightings in the 1980s, and over 250 sightings reported in the 1990s to date (Sanger 1972; Hasegawa and DeGange 1982, unpublished data). This observed increase in opportunistic sightings should be interpreted cautiously, however, because of the potential temporal, spatial, and numerical biases introduced by opportunistic shipboard observations. Observation effort, total number of vessels present, and location of vessels may have affected the number of observations independent of an increase in total numbers of birds present.

The short-tailed albatross is not on the State of California, Oregon or Washington list of threatened and endangered species. However, the short-tailed albatross is considered endangered by the State of Alaska (Alaska Statutes, Article 4, Sec.16.20.19). This classification was supported by a letter to Commissioner Noerenberg from J.C. Bartonek, in which he recommended endangered status because the short-tailed albatross occurs, or was likely to occur, in State waters within the 3-nautical mile (5.6-km) limit of State jurisdiction (Sherburne 1993).

The Japanese government designated the short-tailed albatross as a protected species in 1958, as a Special National Monument in 1962 (Hasegawa and DeGange 1982), and as a Special Bird for Protection in 1972 (King 1981). Torishima was declared a National Monument in 1965 (King 1981). These designations have resulted in tight restrictions on human activities and disturbance on Torishima (Service 1999). In 1992, the species was classified as "endangered" under the then-newly implemented "Species Preservation Act" in Japan, which makes Federal funds available for conservation programs and requires that a 10-year plan be in place, which sets forth conservation goals for the species. The current Japanese "Short-tailed Albatross Conservation and Management Master Plan" outlines general goals for continuing management and monitoring of the species, and future conservation needs (Environment Agency 1996). The principal management practices used on Torishima are legal protection, habitat enhancement, and population monitoring. Since 1976, Hasegawa has systematically monitored the breeding success and population numbers of short-tailed albatross breeding on Torishima.

Prior to its current listing as endangered throughout its range, the short-tailed albatross was listed as endangered under the Act, throughout its range, except in the U.S. During this period, the

Service considered the short-tailed albatross to be afforded protection under the Act in all portions of its range farther than 3 nautical miles (5.6 km) from U.S. shores, and included those waters of the EEZ (3-200 mi [5.6-370 km] from shore).

The exclusion of the U.S. from the range in which the species was listed resulted from an oversight in administrative procedures, rather than from any biological evaluation of the species' status within the U.S. The species was originally listed as endangered in accordance with the Endangered Species Conservation Act of 1969 (ESCA). Pursuant to the ESCA, two separate lists of endangered wildlife were maintained, one for foreign species and one for species native to the United States. The short-tailed albatross appeared only on the List of Endangered Foreign Wildlife (35 Federal Register [FR] 8495; June 2, 1970). When the current Act became effective on December 28, 1973, it superseded the ESCA. The native and foreign lists were combined to create one list of endangered and threatened species (38 FR 1171; January 4, 1974). When the lists were combined, prior notice of the action was not given to the governors of the affected States (Alaska, California, Hawaii, Oregon and Washington) as required by the Act, because available data were interpreted as not supporting resident status for the species. Thus, native individuals of this species were not formally proposed for listing pursuant to the criteria and procedures of the Act.

On July 25, 1979, the Service published a notice (44 FR 43705) stating that, through an oversight in the listing of the short-tailed albatross and six other endangered species, individuals occurring in the U.S. were not protected by the Act. The notice stated that it was always the intent of the Service that all populations and individuals of the seven species should be listed as endangered wherever they occurred. Therefore, the notice stated that the Service intended to take action as quickly as possible to propose endangered status for individuals occurring in the U.S.

On July 25, 1980, the Service published a proposed rule (45 FR 49844; July 25, 1980) to list, in the U.S., the short-tailed albatross and four of the other species referenced above. No final action was taken on the July 25, 1980, proposal. The Service designated the species as a candidate for listing in the U.S. (62 FR 49398; September 19, 1997). The Service published a proposal to list the short-tailed albatross as endangered in the U.S. (63 FR 58692) on November 2, 1998. A final rule was published on July 31, 2000 (65 FR 46643), listing the species as endangered throughout its range.

There are no known diseases affecting short-tailed albatross on Torishima or Minami-kojima today. However, the world population is vulnerable to the effects of disease because of the small population size, the extremely limited number of breeding sites, and the genetic consequences of going through a severe population bottleneck within the last century. Hasegawa (Service 1999) reports that he has observed a wing-disabled bird every few years on Torishima, but the cause of the disability is not known. An avian pox has been observed in chicks of albatross species on Midway Atoll, but it is unknown whether this pox infects short-tailed albatross or whether there is an effect on survivorship of any albatross species (Service 1999).

Historically, several parasites were documented on short-tailed albatross on Torishima: a blood-sucking tick that attacks its host's feet, a feather louse, and a carnivorous beetle (Austin 1949).

However, current evidence suggests that there are no parasites affecting short-tailed albatross on Torishima, and there is no evidence that parasites caused mortality or had population-level effects in the past (Service 1999).

Sharks may take fledgling short-tailed albatross as they desert the colony and take to the surrounding waters (Harrison 1979). Shark predation is well-documented among other albatross species, but has not been documented for short-tailed albatross. The crow, *Corvus* sp., is the only historically known avian predator of chicks on Torishima. Hattori (in Austin 1949) reported that one-third of the chicks on Torishima were killed by crows, but crows are not present on the island today (Service 1999). Black, or ship, rats (*Rattus rattus*) were introduced to Torishima at some point during human occupation; their effect on short-tailed albatross is unknown. Cats (*Felis cattus*) were also present, and were most likely introduced during the feather-hunting period. They have caused damage to other seabirds on the island (Ono 1955), but there is no evidence to indicate an adverse effect to short-tailed albatross. Cats were present on Torishima in 1973 (Tickell 1975), but Hasegawa (1982) did not find any evidence of cats on the island in 1979-1981.

Seabird collisions with airplanes have been documented by the Service on Midway Atoll NWR since operation of the airfield was transferred from the Department of Defense to the Department of Interior in July 1997. Since acquiring the airfield, the Service has implemented several precautionary mechanisms to reduce and document seabird collisions. Currently, flights depart and arrive from Midway at night, except for emergencies, and air traffic is significantly reduced since the closure of the visitor use program in 2002. Because of the current changes at Midway Atoll NWR, at present air traffic is significantly reduced, and the risk of seabird collision with aircraft is reduced commensurately.

Another potential threat is damage or injury due to oil contamination, which could cause physiological problems from petroleum toxicity and by interfering with the bird's ability to thermoregulate. Oil spills can occur in many parts of the short-tailed albatross' marine range. Oil extraction and industrial development would introduce the risk of local marine contamination, or pollution due to blow-outs, spills, and leaks related to oil extraction, transfer and transportation. Historically, short-tailed albatross rafted together in the waters around Torishima (Austin 1949) and small groups of individuals have occasionally been observed at sea (Service, unpublished data). An oil spill in an area where individuals are rafting could affect the population significantly. The species' habit of feeding at the surface of the sea makes them vulnerable to oil contamination. Hasegawa (Service 1999) has observed some birds on Torishima with oil spots on their plumage.

Consumption of plastics may also be a factor affecting the species' survival. Albatross often consume plastics at sea, presumably mistaking the plastics for food items, or in consuming marine life such as flying fish eggs which are attached to floating objects. Hasegawa (Service 1999) reports that short-tailed albatross on Torishima commonly regurgitate large amounts of plastic debris. Plastics ingestion can result in injury or mortality to albatross if sharp plastic pieces cause internal injuries, or through reduction in ingested food volumes and dehydration (Sievert and Sileo 1993). Young birds may be particularly vulnerable to potential effects of plastic ingestion prior to developing the ability to regurgitate (Fefer 1989, *in litt.*). Auman (1994) found that Laysan albatross chicks found dead in the colony had significantly greater plastic loads than chicks injured by vehicles, a sampling method presumably unrelated to plastic ingestion, and therefore representative of the population. Hasegawa has observed a large increase in the occurrence of plastics in birds on Torishima over the last 10 years (Service 1999), but the effect on survival and population growth is not known.

Distant water longline fleets, such as those from Japan, Russia (minor fishery), Korea, and Taiwan, traverse the waters of the north Pacific Ocean in search of swordfish and tuna. Swordfish can be found at frontal zones: where the Kuroshiro Current converges with the coastal waters of Taiwan and Japan; where the Kuroshiro Extension Current converges with the Oyashio Current; where the Equatorial Counter Current converges with the Peru Current; and along Baja California (Mexico) and California (Sakagawa 1989). Bigeye tuna, which commands among the highest prices per pound for tuna species, are distributed from 40° N latitude and south of the equator, from Japan east to the United States and Mexico (Hampton et. al. 1998).

In 1999, the Western Pacific Regional Fishery Management Council (WPRFMC) reported that most catches of swordfish during 1997 by distant water longline fleets occurred between 20° and 40° N latitude, and 140° and 175° E. longitude (WPRFMC 1999). The greatest concentration of tuna catches by distant water longline fleets appeared north and east of the Hawaiian archipelago, west and north of Wake Atoll, and along the equator between 140° east and 135 ° W longitude (WPRFMC 1999).

In 1995, swordfish catches by Japanese longline vessels was about 10,120 metric tons and were caught by vessels operating in the western, central, eastern and south Pacific (Dinardo 1999). From 1992-1994, swordfish catch by coastal longline vessels ranged between 1,181 and 1,394 metric tons (Dinardo 1999).

Recent fishing effort for bigeye tuna by Japanese longline vessels appears to have declined in the western Pacific from 150,761,600 hooks set in 1995 to about 144,444,800 hooks set in 1996. Fishing effort in the eastern Pacific appears to have stabilized at about 125,000,000 hooks set in 1995 and 1996. Overall fishing effort has decreased from 360,522,000 total hooks set in 1980 to about 269,444,800 hooks set in 1996 (Hampton *et al.*1998).

Clearly, the Japanese longline fishing fleet represents a tremendous amount of fishing effort that in many instances overlaps with the currently known foraging range of the short-tailed albatross. Understanding foreign distant water fishing fleet effort is an integral part of analyzing the threat of foreign longline fishing activities to short-tailed albatross. However, in many fisheries, fishers may not be required to report seabird bycatch, may not be able to identify seabirds, or may have significant disincentives to do so for fear of consequences to the future of the fishery. To our knowledge, reporting seabird bycatch and the rates at which seabirds are caught is not reported by the foreign fishing nations mentioned in this section.

U.S. groundfish fisheries in Alaska are monitored by fishery observers who collect data on seabird bycatch (Service 1999). Reports of seabird bycatch are also occasionally received directly from fishermen. There were two reported fishery-related mortalities of short-tailed albatross in the 1980s. The first bird, a recently fledged juvenile, was found dead in a fish net north of St. Matthew Island in July 1983. The second bird, also a fledgling, was killed by a vessel fishing for halibut in the Gulf of Alaska on October 1, 1987. In 1989, NOAA Fisheries began consulting with the Service on the effects of Alaska's groundfish fisheries on short-tailed albatross. Since 1990, there have been five reported kills of short-tailed albatross in Alaska's fisheries. A sub-adult (< 2 years) killed south of the Krenitizin Islands in the hook-and-line fishery on August 28, 1995. A sub-adult (3 years) was killed in the Bering Sea Aleutian Islands (BSAI) hook-and-line fishery on October 8, 1995. A sub-adult (5 years) was killed in the Pacific Cod hook-and-line fishery on September 27, 1996. An adult (8 years) was killed in the BSAI Pacific cod hook-and-line fishery on September 21, 1998. A sub-adult bird of unknown age was killed in the BSAI Pacific cod hook-and-line fishery on September 28, 1998.

A paper describing seabird bycatch estimation methods for Alaska longline fishing vessels and procedures developed by the Service, in consultation with NOAA Fisheries, is in preparation (Service 1999). Standard statistical procedures for estimating population size from a sample are used. Bycatch estimates are based on the number of seabirds by species in samples from observed hauls and the total commercial fish catch as estimated by NOAA Fisheries' Blend program (the Blend program estimates total catch from a variety of data sources). The unobserved weight of fish was calculated by subtracting the weight of fish on observed hauls from the known total weight of fish. The estimated total number of birds caught was the sum of observed birds in the catch plus the estimated unobserved birds. The number of unobserved birds was estimated by multiplying the ratio of number of birds caught per weight of fish caught from observed hauls by the total estimated weight of fish caught on unobserved hauls. Unobserved birds were assigned to species in proportion to the species composition of observed hauls averaged over all 5 years of data for each region and month. Both the catch rate of birds (number of birds per weight of fish, or birds per thousand hooks) and the catch rate of fish (total weight of all fish species per hook) are assumed to be equal for observed and unobserved hauls. These assumptions may not hold, not necessarily because the presence of the observer may change the fishing practices of the skipper or crew, but rather because, for some other operational reason, the smaller (unobserved) vessels may have different catch rates than the large or mid-sized vessels. The constant catch rates for birds and/or fish among vessel size categories are untested and critical assumptions. If different catch rates exist for different vessel size categories, the average area catch rates and estimates of total seabird bycatch may be over- or underestimated.

Preliminary estimates of the annual seabird bycatch for the Alaska groundfish fisheries, based on 1993 to 1997 data, indicate that approximately 14,000 seabirds are killed annually in the combined BSAI area and Gulf of Alaska (GOA) groundfish fisheries (11,600 in the BSAI; 2,400 in the GOA) at average rates of 0.09 and 0.057 birds per 1000 hooks in the BSAI and in the GOA, respectively (Service 1999). In general, the calculated expansion factor between observed bird mortalities and total estimated bird mortalities is 4 in the Bering Sea and 8 in the GOA (Service 1999). These numbers are preliminary and may change with further analysis and additional data, but represent the best available information at this time.

There have been three short-tailed albatross mortalities reported since 1993 (when fishery observers began reporting bird mortalities by species) during observed portions of the haulback. All three mortalities in the 6 year period since 1993 occurred in the Bering Sea. Applying an expansion factor of 4 to the 3 mortalities results in a total estimated mortality of 12 birds over 6 years, or 2 birds per year. In other words, 3 observed mortalities over a 6 year period probably represented 12 actual mortalities. The estimate for total short-tailed albatross mortalities in the GOA is 0 because no kills have occurred there in the observed sample. Therefore, the best available information indicates that the total mortality for short-tailed albatross in the GOA and BSAI hook-and-line fisheries since 1993 has been 2 birds per year. The incidental take anticipated and authorized is 4 short-tailed albatross during the 2-year period of 1999 and 2000, as a result of the hook-and-line groundfish fishing activities in the GOA/BSAI areas regulated by NOAA Fisheries (Service 1999).

The halibut fishery in Alaskan waters is managed separately from the groundfish fishery. A separate formal section 7 consultation was conducted on the halibut fishery in 1998. The Service determined that commercial halibut longline fishing in U.S. waters off Alaska within the International Pacific Halibut Commission regulatory zones 2B, 2C, 3A, 4A, 4B, 4C, 4D, and 4E is likely to adversely affect, but not likely to jeopardize, short-tailed albatross. The incidental take statement accompanying the biological opinion for effects of this fishery on short-tailed albatross sets the expected level of incidental take of short-tailed albatross at 2 birds every 2 years (Service 1999).

The Alaskan groundfish observer coverage is designed to collect fisheries data deemed by the Regional Administrator to be necessary and appropriate for management, compliance monitoring, and research of groundfish fisheries for the conservation of marine resources or their environment (50 CFR Part 679.50). In the Alaskan groundfish fishery, vessels that measure 125 feet in length or longer must carry a NOAA Fisheries' observer 100 percent of the time. About 60 - 70 percent of all haulbacks conducted by these vessels are sampled by NOAA Fisheries' observers (Shannon Fitzgerald, pers. comm. 2000, as cited in Service 2000). A fishing vessel that measures between 60 and 124 feet must carry observers at least 30 percent of its fishing days.

Hasegawa (Service 1999) reported that 3-4 birds come ashore on Torishima Island per year entangled in fishing gear, and that some may have died as a result. He also stated that some mortalities caused by Japanese handliners may occur near the nesting colonies, although no such mortality has been reported. There is no additional information on the potential effects of fisheries near Torishima on the species.

The Service has authorized a recreational rod and reel fishery at Midway Atoll NWR. The fishery is primarily a catch-and-release activity where most fish caught are released. Target species are reef fish and pelagic fish. Certain pelagic species, such as marlin, are considered "trophy fish." If the catch is potentially record size, it is landed and recorded.

There is accidental interaction between seabirds and the line/gear used by recreational fishers at Midway Atoll. In 1999, about 9 Laysan albatross were accidentally caught on recreational line or gear. About 8 birds were entangled in the line and 1 bird was hooked by recreational lures. All birds were successfully released and there was no mortality associated with these interactions (N. Hoffman, Service, pers. comm. 2000, as cited in Service 2000).

The Laysan albatross population on Midway Atoll NWR is estimated at about 1.5 million birds over half of which are breeding adults (Rob Shallenberger, Service, pers. comm. 2000, as cited in Service 2000). The rate at which Laysan albatross were injured in 1999 as a result of the Midway recreational fishery is about (9/757.5) injuries per fishing hour (N. Hoffman, Service, pers. comm. 2000, as cited in Service 2000). This activity impacted about 0.0006 percent of the Laysan albatross population on Midway Atoll in 1999. No injuries were reported for black-footed albatross as a result of the recreational fishery.

Short-tailed albatross are most frequently observed at Midway between October and April. No short-tailed albatross have been observed at sea near Midway, by fishers or other boaters, during 1999 and 2000. The recreational fishery occurs primarily between April and October, so the overlap between the presence of short-tailed albatross and recreational fishing activities at Midway is only two months. In light of the above information, the Service believes that adverse effects from the recreational fishery at Midway on the short-tailed albatross are insignificant (*i.e.,* extremely unlikely to occur).

A small number of Laysan and black-footed albatross are killed at Midway Atoll NWR due to collisions with ironwood trees, power lines, or buildings and due to entrapment in confined spaces (*e.g.*, seawalls). Refuge staff have been taking steps to minimize these hazards by removing ironwood trees and unnecessary wires and poles. This effort can reduce, but never eliminate, these hazards (R. Shallenberger, Service, pers. comm. 2000, as cited in Service 2000).

ENVIRONMENTAL BASELINE

The environmental baseline describes the status of the species and factors affecting the environment of the species or critical habitat in the proposed action area contemporaneous with this formal consultation. The baseline usually includes State, local, and private actions that affect a species at the time the consultation begins. Unrelated Federal actions that have already undergone formal or informal consultation are also a part of the environmental baseline. Federal actions within the action area that may benefit listed species or critical habitat are also included in the environmental baseline.

Brown Pelican

Status of the Species Within the Action Area

The action area for this consultation is all portions of the Pacific Ocean wherein U.S. West Coast-based fishing vessels conduct highly migratory species fishery-related activities that overlap the range of the brown pelican in Federal waters. Waters within 3 miles of the mainland and any islands are under State control, and therefore, are not within the action area. For the purposes of this analysis, we are assuming that actions occurring in Federal or EEZ waters will not spill over into State waters. Based on the known distribution of the pelican, proposed activities could occur in those portions of the pelican's Pacific coast distribution where these activities are feasible. Therefore, the effects of the action on this species can occur wherever the action area overlaps with its range. The environmental baseline for this consultation includes the status of this species as a whole, as described above, including the current known natural and anthropogenic threats to the species within the action area.

The brown pelican nests primarily on offshore islands throughout its breeding range from Sinaloa, Mexico, to southern California. The mainland Mexican population also nests in mangroves on mangrove islands and marshes close to the Sinaloa coast. These nesting areas and major communal roosting areas that are found throughout the range of the species as far north as British Columbia are the primary habitat areas recognized in the California Brown Pelican Recovery Plan as needing protection. Threats to these areas that have been identified in the past include human disturbance, low-level civilian and military flights, and possible oil spills (Service 1983).

In California, nesting occurs on West Anacapa and Santa Barbara Islands. The National Park Service (NPS) administers these islands and has designated West Anacapa Island as a research natural area. Human activities in and adjacent to these breeding locations are restricted to closely monitored research. The California Department of Fish and Game (CDFG) has designated the offshore area adjacent to the Anacapa Island breeding colony as an Ecological Reserve and has closed these waters to fishing and other boating activities during critical nesting periods. In addition, CDFG has passed regulations closing the air space below 1,000 feet to flights over the colony.

The majority of brown pelicans gather in communal roosts during non-nesting periods. These roosts are found along the Pacific Coast as far north as British Columbia. Major roosts are found on jetties and other manmade structures, offshore islands and rocks, and the beach at the mouths of estuaries (Jaques and Anderson 1987). Many of these habitats are relatively undisturbed, although some are subject to human disturbance.

As the human population has grown along the Pacific coast of North America, the rate of habitat alteration has increased. Some brown pelican habitat has been destroyed, such as the many wetlands drained in recent years that were previously used by pelicans for loafing or roosting areas during the summer and fall. On the other hand, brown pelicans have utilized man-made structures such as piers, breakwaters, and jetties for loafing and roosting sites in close proximity to urban areas. Therefore, some forms of habitat modification have negatively affected brown pelicans while other forms have benefitted them. It would be difficult to estimate the net, overall effect of habitat modification upon the subspecies throughout its range. While the rate of habitat modification within the range of the brown pelican along the Pacific coast has increased in recent decades, the number of pelicans occupying the region has increased substantially since the late 1960's or early 1970's. Throughout the SCB, the number of breeding pairs has increased rapidly with a fairly stable long-term mean productivity.

Human disturbance has the potential for serious disruption of breeding pelicans. Brown pelican colonies on Isla San Martin and Islas Todos Santos are no longer active due to repeated disturbance. West Anacapa Island, Santa Barbara Island, and the Los Coronados are rugged and relatively inaccessible, but fishermen, birders, photographers, educational groups, and egg collectors (in past years) have on occasion disturbed colonies at critical times in the breeding cycle. Human disturbance has not had a measurable impact on the colonies at West Anacapa Island and Santa Barbara Island due in part to NPS regulations.

The greatest impact from disturbance occurs during the early stages of nesting when brown pelicans will easily abandon their nest when disturbed (Service 1983). Unattended eggs and young chicks (to about 3 weeks of age) are vulnerable to loss by predation from western gulls and common ravens if disturbance occurs early in the breeding cycle (Service 1983). Hyper- or hypothermia in young can also occur when nesting adults are away from the disturbed nest site for a prolonged period. Older, more mobile young may suffer injury or be trampled and even impaled on vegetation when panicked. Young can starve if they are displaced from their nest sites and incapable of returning. The growth of young birds can also be affected by the loss of food through regurgitation in a fright response. Young pelicans near fledging age, but not yet fully developed, may be forced to fly prematurely and can die from broken limbs or starvation. A colony or sub-colony may be abandoned with even a one-time disturbance at a critical time of the breeding season (Service 1983). Repeated disturbance over several breeding seasons may cause pelicans to eventually give up colony sites completely (Service 1983).

Loud noises (aircraft, sonic booms, boats, etc.) may also cause desertion of colony sites. Military helicopters and small private aircraft flying low over the pelican colony at Anacapa Island and nearby roosting areas were a recurring source of disturbance (Service 1983). Roosting brown pelicans flush easily when aircraft flying overhead is too low. Birds on nests are more tenacious and rarely flush, although agitation and fright response are noticeable. Flights over the colony are now regulated and the U.S. Navy has cooperated to divert helicopter flights from colony locations.

Formerly, there were concerns over the possibility of adverse impacts to brown pelicans from Space Shuttle flights leaving and returning to Vandenberg Air Force Base (Vandenberg). The primary concern was the potential for sonic booms to impact breeding pelicans on West Anacapa Island. West Anacapa Island was expected to be only minimally affected since it lies outside the primary pathway of launches and returns. There are few data on the effects of sonic booms on wildlife, hence it is difficult to predict impacts. Currently, there are no plans to have shuttle launches or returns at Vandenberg at this time. There are plans to develop a commercial spaceport on Vandenberg where there is the potential to have a maximum of 24 launches a year (Watkins, Service, pers. comm. 1995). These launches and their associated helicopter security flights may cause disturbance to brown pelicans roosting along this part of California's central coast.

Some human intrusions into brown pelican nesting areas occurs for scientific and commercial purposes. Brown pelican researchers have long recognized that human disturbances can adversely affect reproduction (Schreiber 1979, Anderson and Keith 1980). Therefore, research efforts on nesting success of the SCB breeding population are limited to visual observations from safe distances during the critical early part of the nesting season. Entry into nesting colonies occurs only when the smallest nestlings are at least 3 weeks of age or the nesting colony has been abandoned (Anderson and Gress 1983). These entries are necessary for accurate censussing, collection of eggshell fragments and addled eggs, banding, and other relevant scientific purposes. These methods are strictly enforced in California where research activities are subject to state and federal permits.

The adverse effects of disturbances by recreationists, educational groups, and fishermen to nesting brown pelicans have been well documented (Anderson 1988, Anderson and Keith 1980). Disturbances cause severe adverse effects to the productivity of colonies, and may lead to eventual abandonment of the site. Colonies along the west coast of Baja California and in the Gulf of California are particularly susceptible to such disturbances as the area grows in popularity with recreational and educational tour groups from the United States. Efforts have been undertaken by the Mexican government, under the direction of the University of Mexico, in cooperation with Conservation International to implement a management program for the islands in the Gulf of California (Service, in litt., 1985). Although disturbance is a problem in Mexico, the colonies in the United States have had no measurable impacts from disturbance due in part to NPS Regulations.

Like other animal species, brown pelicans are susceptible to diseases and parasitic infections. Disease, parasites, and predation may be limiting factors in isolated situations, but probably do not impact long-term population trends. During the winter of 1987/88, several hundred or more brown pelicans died off the California coast due to the disease erysipelas, which is caused by the bacterium *Erysipelothrix rhusiopathiae* (Hunter, in litt., 1987). The outbreak was thought to have been caused by unusually warm waters combined with the increased number of brown pelicans along the California coast. No outbreaks have occurred in subsequent years. An unquantified number of sick and dying pelicans were found near Santa Cruz, California during October of 1991. These birds had apparently been poisoned by ingesting domoic acid, a toxin produced by the diatom *Nitzschia pseudoseriata* that was blooming in great numbers at that time. Another diatom outbreak in the spring of 2002 is suspected to have caused the mortality of approximately 800-1,000 brown pelicans along the south coast of California and the Channel Islands. Avian botulism has also resulted in dieoffs of brown pelicans at the Salton Sea. A total of 2,136 dead and 2,961 sick individuals have been recorded there since 1994.

Brown pelicans generally choose colony sites that are free of mammalian predators that could attack eggs or young. Western gulls (*Larus occidentalis*), common ravens (*Corvus corax*), and other avian predators occasionally destroy unguarded pelican nests, but if brown pelicans are undisturbed, at least one member of the breeding pair usually remains close to the nest to protect the eggs and vulnerable nestlings. There is no significant predation on adult brown pelicans.

Yearly variations in historical colony sizes in the SCB were most likely caused by food availability. Breeding success was also possibly affected by severe storms and natural habitat degradation (*e.g.,* landslides). The impacts of high levels of DDT residues in brown pelicans masked the effects of the other limiting factors during the 1960s and early 1970s. The SCB brown pelican population maintained an extremely low level of productivity for at least ten years during this time.

There are indications, particularly on Anacapa Island, that productivity has not achieved a maximum level. This conclusion is drawn because overall productivity in the SCB has not attained that reached in brown pelican populations in Florida and the Gulf of California. The historical productivity of SCB colonies may have been lower than that observed in Florida or the Gulf of California, but it is assumed that the SCB colonies have lower productivity because of recent environmental change. Brown pelicans breeding in the Gulf of California and eastern brown pelicans have had maximum annual productivity ranging from 1.3 to 1.7, with a long-term mean of about 1.0 (over a decade). A mean productivity of 1.0 has been suggested as a conservative index for a stable, self-sustaining population. Anacapa productivity has reached 1.0 only in 1985 since studies began in 1969. The large increases in breeding pairs and numbers of fledged young in the SCB are encouraging, even though productivity has not been as high as those attained in other populations of brown pelicans.

Since 1974, food availability has become the most important limiting factor influencing pelican breeding success within the SCB. Brown pelicans in the SCB have been almost entirely dependent on northern anchovies for food following the declines of several important forage species in this region. Some fish species that could be major brown pelican diet components are currently showing population increases. After a long decline, Pacific mackerel populations in southern California began recovering in 1976. Pacific mackerel biomass probably exceeded 200,000 mt (220,500 short tons) every year during the 1980's (CPSFMP Development Team 1994) which in general was higher than at any time since 1936. There is also an indication that Pacific sardines could return as a significant fishery element in southern California waters. Pacific sardine resurgence started around 1983 and reached an abundance of 20,000 mt (22,050 short tons) of spawning biomass in 1985 (MacCall, in litt., 1985) and in excess of 100,000 mt (110,250 short tons) in 1990 (CPSFMP Development Team 1994). Because of their larger mean size, Pacific sardines could be a superior brown pelican food item over northern anchovies.

Brown pelicans are affected by short-term as well as annual changes in northern anchovy abundance during the breeding season (Service 1983). Pelican productivity is generally low if food supplies are scarce throughout the breeding season. Nest abandonment and starvation of young is likely if food becomes scarce after nesting has commenced. Peaks of local northern anchovy availability can stimulate successive breeding efforts and prolong the breeding season (Service 1983). Brown pelicans may have flexibility in responses to food supplies through variable reproductive rates, but less ability to integrate their food supply over time through extensive energy reserves (Anderson and Gress 1984). Pelican breeding success (productivity) is largely determined by local abundance and availability of northern anchovies, whereas the breeding effort (nesting attempts) may be dependent to a greater extent on overall levels of northern anchovy abundance within the SCB (Gress *et al.* 1980). Brown pelicans appear to depend ultimately on regional anchovy availability, but proximally on local availability (Service 1983).

Brown pelicans respond to biomass of prey, but only to a small geographic portion of it. A much larger prey population size than that actually consumed is needed to produce availability levels in which an adequate ration can be obtained by individual pelicans in the breeding population (Anderson and Gress 1984). Decreases in the mean, long-term abundance of the prey base could alter brown pelican population levels and perhaps even slow or hinder the present recovery of the SCB brown pelicans (Anderson and Gress 1983).

Changes in winter populations from year to year in the SCB are also related to changes in northern anchovy abundance in the preceding breeding season (Anderson and Gress 1984). Since the food supply is variable in amount and not diverse, any changes in the population of the dominant prey species will have the potential to cause variation in seabird populations.

El Niño events may cause "natural"' reductions to brown pelican prey bases. El Niños weaken the California current and upwellings, flooding the coast with warm, nutrient-poor water. Biological effects of an El Niño can be severe--reduced primary productivity may lead to fish die-offs, and ultimately to extensive mortality of seabirds, a characteristic sign of El Niño (MacCall 1982). Such natural events have apparently affected seabird life history. Compared to that of landbirds, the life table for seabirds is characterized by low reproductive rate and high survivorship.

Therefore, fluctuations in brown pelican productivity are not uncommon from year to year and region to region. A complete local reproductive failure in one season in one locality is not an uncommon occurrence and no cause for immediate alarm, if the brown pelican population is at safe levels overall and the causes are largely natural fluctuations of their environment. The brown pelican is a long-lived species that has evolved with this "boom or bust" reproductive strategy.

The primary reason for endangerment of the brown pelican along the Pacific coast was nearly total reproductive failure (SCB colonies only) caused by excessive thinning of eggshells, a result of physiological responses to high levels of DDT/DDE in the SCB in the late 1960's and early 1970's (Service 1983). Eggs collected on Anacapa in 1962 and measured in 1969 showed a 26 percent reduction in shell thickness from pre-1943 values (Anderson and Hickey 1970).

Although the sewage input of DDT into the SCB dramatically decreased by 1971, depressed productivity from eggshell thinning continued through at least 1973. Decline of DDE (metabolite of DDT) residues in brown pelicans along the Pacific coast began leveling off in 1972, and the improvement in reproductive success began stabilizing in about 1974 (Anderson *et al.* 1977). DDT/DDE levels in the SCB have stabilized to a point where pelican reproductive success has also leveled off although indices of eggshell thinning still occur. Acute contamination of the SCB by DDT compounds has thus been replaced by a low-level, chronic situation.

The primary source of DDT into the SCB has essentially stopped and contaminants are now monitored. Natural processes must now be relied upon to reduce DDT/DDE levels in the SCB.

Management of pelican food resources, therefore, is important in areas of chronic DDT/DDE contamination.

Eggshells from the SCB continue to show a reduction in the degree of thinning that had caused the reproductive failure that led to serious population declines. Eggshell measurements from pre-1969 to about 1973 reflected the high levels of DDT/DDE in the SCB marine environment and were as much as 50 percent thinner than pre-1947 averages (Gress 1994). After oceanic DDT input declined, acute reproductive problems decreased, but eggshell thinning remained at about 20 percent thinner from 1974 to 1984; a level that has been shown to reduce reproductive rates and cause population declines (Gress 1994). After 1984, DDE concentrations slowly declined and perhaps reached a lower-level stasis. Mean shell thickness between 1986 and 1990 appears to have leveled off below the pre-1947 historical mean (Gress 1994).

The degree to which current organochlorine residue concentrations and associated eggshell thinning are affecting brown pelican populations in the SCB is not completely understood (Gress 1994). The continued presence of DDE and DDE-induced eggshell thinning is probably contributing to lowered fledging rates. Current reproduction supports an expanding population despite chronic organochlorine residue concentrations and associated eggshell thinning in some areas.

Although the use of organochlorine pesticides has been restricted in the United States and Canada since the early 1970's, use continues in much of Latin America. However, pesticide use in Latin America has apparently never been great enough to cause a decline in the number of brown pelicans nesting in Mexico. The widespread reproductive failure and population crash in the SCB coincided with the period of heavy organochlorine use in the United States. Although there was not an immediate lowering of pesticide residues in eggs following restrictions on the use of organochlorines north of Mexico, residues gradually declined following the restrictions, and acute reproductive problems decreased and population recovery began (Gress 1994). Despite the continued use of organochlorines in Latin America, most local subpopulations of brown pelicans in North America have recovered substantially in recent years. In fact, the Atlantic coast population of the eastern brown pelican recovered to the point that the subspecies was removed from the list of threatened and endangered wildlife on February 4, 1985 (50 FR 4938).

Commercial northern anchovy and Pacific sardine harvests have the potential to affect brown pelican population dynamics. There are well-known examples where intensive, yield-oriented commercial fishery programs have caused severe declines in seabird reproduction and population levels in Peru and South Africa. In these situations where fisheries have gone unregulated and overfishing has occurred, commercial fishing has had adverse effects on seabird populations prior to the crash of the fishery itself.

Established quotas for the anchovy fishery within California have not been met in recent years because of--1) high fuel costs, 2) increased processing costs, and 3) dwindling markets for fishmeal. These reasons have caused the profit margin to become too low to encourage an expansion of the southern California commercial northern anchovy fishery. As of 1985, the northern anchovy reduction fishery had essentially ceased due to the depressed market and appears to be long-term or possibly permanent (Mais, in litt., 1985). The Pacific mackerel has been increasing in southern California since 1976 and has been providing a more profitable harvest than northern anchovy.

Because northern anchovy harvest quotas in California have not been met, the California commercial northern anchovy fishery has had little impact on brown pelicans. If fishery conditions change there would be an increased probability of interaction between brown pelicans and the northern anchovy harvest. In recent years, the waters offshore of southern California have effectively acted as a pelican/anchovy refuge (Service 1983).

Concern has been expressed over the SCB anchovy population because of steady downward trend and deterioration of older age-classes since 1975. The decline may be the result of increasing harvest in Mexico which may be having a negative effect on the U.S. fishery. The Mexican catch of northern anchovies has surpassed and far exceeded the California fishery since 1977. Northern anchovy harvest is more profitable in Mexico since the Mexican government subsidizes fuel costs for fishermen and processors (Service 1983). Fisheries in the past have had no measurable negative effect on brown pelican reproductive success or population although potential problems were becoming evident with the Los Coronados breeding population during the late 1970s (Anderson and Gress 1984). Signs of deterioration of brown pelican reproductive success and breeding populations at the Los Coronados Islands beginning in 1979 were speculated to have been caused by increasing harvests by the commercial fishery in Mexico (Anderson and Gress 1984).

There is no bilateral agreement between the U.S. and Mexico regarding the management of the central subpopulation of anchovies. The AFMP addresses this issue by specifying the OY for the stock as a whole then allocating 70 percent to the U.S. and 30 percent to Mexico. However, Mexico is not bound by this formula and has landed over 90 percent of the total harvest in recent years, frequently exceeding the quota set by NOAA Fisheries. This problem led to overcapitalization in the combined harvests during the 1989/1990 season. In this way, the plan has been inadequate for reflecting the reality of harvest and maintaining a forage reserve.

The three principal segments of the anchovy fishery in the U.S. are reduction, live bait and non-reduction commercial segments. The total catch of northern anchovy in the U.S. has been less than 10,000 metric tons (mt) per year since 1983 and reduction quotas were zero for U.S. fishermen during 1992 and 1993. In contrast, landings in Mexico were greater than 79,000 mt per year after 1983 until the fishery collapsed in 1991 and catches fell to less than 100 mt.

The Pacific sardine stock has increased since the early 1980's while the U.S. fishery was tightly regulated and environmental conditions favorable. Pacific sardines are a relatively variable stock that undergoes extended periods of low and high biomass even in the absence of fishing. Mexican harvests have recently increased, however, and may affect the ability of the species to return to high biomass levels even in the absence of a U.S. fishery.

There is little information on brown pelican interactions with commercial fishing operations. It is unlikely that brown pelicans will interact with most of the fisheries covered by the proposed FMP. Because the principal target species rarely migrate through nearshore waters, the fisheries generally occur 15 miles or farther from shore with the exception of the drift gillnet fishery (NOAA Fisheries 2003). Brown pelicans do not normally venture more than 20 miles out to sea (except in and around island rookeries) and feeding is often concentrated in relatively shallow waters of less than 50 fathoms (300 ft) (Gress *et al.* 1980). There are no known brown pelican interactions with pelagic longline, albacore surface hook and line and baitboat, and harpoon fisheries, however, there is no definitive data to indicate whether or not there are interactions. In addition, because brown pelicans feed on surface-schooling fish, it is unlikely that they will have any adverse interactions with the drift gillnet fishery which is required to set their nets deeper than brown pelicans forage.

Brown pelicans have been observed diving on fish within and adjacent to purse seines when they are set around a school of fish (NOAA Fisheries 2003). Individuals diving in or adjacent to purse seine sets could become entangled in nets and be injured or killed. However, entanglements in netting for tuna sets have not been documented. Large purse seine vessels > 400 short tons (with 100 percent observer coverage) have no documented bird interactions so it is unlikely that interactions would be more frequent in small vessels' tuna fishing nets. There have been occasional interactions with seabirds when small purse seine vessels set on coastal pelagic species such as Pacific mackerel (*Scomber japonicus*) and Pacific sardine, but these fish species tend to be at the surface and vulnerable to seabird attack from above, while tuna tend to be lower in the net and are not known to attract diving seabirds. We are unaware of any available data to quantify interactions between pelicans and small purse seine vessels.

Recreational fishing can have a direct effect on brown pelicans through physical injury caused by fishing tackle. Mortality from this source may be a significant cause of injury/mortality to newly fledged pelicans near colony sites during the summer months when large numbers of migrant and young of the year are present (Service 1983). Inexperienced (at getting food) young pelicans readily flock around sport fishing boats that regularly anchor near Anacapa and Los Coronados, etc. After one of the breeding seasons during the early 1980s, approximately 10 percent of fledged brown pelicans captured near West Anacapa Island for radio tagging purposes were hooked or entangled with monofilament fishing line (Gress pers. comm. 1995). Other island rookeries are likely also at risk from exposure to this fishery.

People fishing from piers or small boats occasionally hook pelicans. This is generally not a serious problem to brown pelicans although some popular fishing areas have a high frequency of hooking pelicans and injury is common (Service 1983). During the summer of 2001, 162 brown pelicans were injured by hooks or fishing line at the Santa Cruz City Pier. Of these, 47 were euthanized due to injury severity. These types of incidents are more pronounced near colony sites. Live anchovies are used for bait and chumming. The bait attracts young pelicans and they often swallow baited hooks and get hooks embedded in their bills or pouches (Service 1983). Superficially embedded hooks can be removed without damage. Mortality is likely if a hook is swallowed or there is substantial injury from hook removal. Relatively small tears in a pouch can hinder feeding and death from starvation may occur (Service 1983). When 141 brown pelicans were captured for cleaning during the Huntington Beach oil spill in 1990, at least 20 percent of them had fish hook injuries. Pelicans also become ensnared in monofilament fishing line which can cause serious injury, impair movement and flight, prevent feeding, cause infection from cuts, and lead to starvation (Service 1983).

The effects of recreational fishing upon brown pelicans is a problem, but since it has not been examined in depth it is difficult to make an accurate assessment of its significance. Several pamphlets have been developed and distributed by NOAA Fisheries, in conjunction with the Service, NPS, and CDFG, to inform recreational fishermen about the impact of hook and line injuries to brown pelicans and other seabirds. These pamphlets also give step-by-step instructions for removing hooks and fishing lines from entangled birds.

The Santa Barbara Channel has been the site of offshore petroleum drilling. The potential of oil well blowouts and the effects of resultant oil spillage in the Channel Islands area was observed in the 1969 Santa Barbara oil spill, although the spill did not reach Anacapa Island and had little impact on breeding pelicans (Service 1983). Further oil development in the Santa Barbara Channel may pose a threat to the brown pelican colony at West Anacapa Island. There are several lease tracts overlapping with Channel Islands Marine Sanctuary boundaries.

Pelicans and their eggs fouled with oil have been observed on numerous occasions in the SCB and Gulf of California. During February of 1990, the oil tanker American Trader spilled over 398,000 gallons (9,045 barrels) of Alaskan crude oil at Huntington Beach, California which affected 200 brown pelicans. The pelicans were affected by either ingesting oil, having oiled plumage, or both (Gress pers. comm. 1995). Fifty oiled pelicans were found dead by rescuers. Of the 141 pelicans captured and taken to rehabilitation centers, 39 died or were unreleaseable (Gress pers. comm. 1995). The remaining 102 pelicans were cleaned and subsequently released into the wild. The effects of this spill to the brown pelican population in the SCB was probably insignificant, but a spill of larger magnitude at this time of year could have disastrous effects on breeding brown pelicans. Trace amounts of fresh oil transferred from feathers to eggs is lethal to embryos in a variety of waterfowl species. If an oil spill occurred during fledging time when young pelicans congregate in large numbers on the water near colony sites and washed up on shore, the impact could be detrimental to young pelicans and mortality could certainly occur (Service 1983). The Santa Barbara Channel also has numerous natural oil seeps which represent another source of fouling (Service 1983). The risks to pelicans associated with an oil spill is not limited to the breeding season. During the fall and winter thousands of migrant pelicans from Mexico flood the SCB and could be greatly affected by a major oil spill. The impact of an oil spill on brown pelicans is influenced by the size of the spill, the time of the year, the type of oil, the distance offshore of the spill, and the environmental conditions at the time of the spill.

The Santa Barbara Channel and the coast just north of Point Conception have current petroleum development in local proximity to brown pelican colony or roost sites. There has been a concern about the potential adverse environmental effects of oil and gas development in these coastal areas which has led to a moratorium on new oil and gas development and drilling along the California coast. The Channel Islands National Marine Sanctuary has helped buffer the West Anacapa Island colony from the threats of petroleum industry accidents (Service 1983). In the event of an oil spill, the buffer zone would provide time and distance for break-up of oil discharges before reaching nearshore communities, as well as increase available response time. The sanctuary provides a 6-mile (9.7 km) zone within which new petroleum operations are prohibited. The sanctuary has little effect on development of the few existing leases within sanctuary boundaries that existed prior to the creation of the marine sanctuary in 1980. However, for a variety of reasons, major activities (*e.g.,* construction of a new platform) are unlikely to occur on these leases (McCrary, Minerals Management Service, in litt. 1995). Currently there are no platforms within the marine sanctuary.

Marine sanctuary regulations allow cargo-carrying vessels, including oil tankers, to operate to within one nautical mile of Anacapa island. Most cargo vessels stay within the established shipping lanes in the Santa Barbara Channel, but their compliance is not mandatory. The northbound shipping lane passes within 8 to 9.7 km (5 to 6 mi) of Anacapa Island while the southbound shipping lane passes within a 1.6 to 3.2 km (1 to 2 mi) distance of East Anacapa Island. Because of greater probability of a spill occurring from a tanker than from a platform, the possibility of tanker traffic outside the established sea lanes as close as one nautical mile from Anacapa poses a potential threat to brown pelicans (Service 1983).

Federal laws regulating offshore oil and gas operations have also been more stringent in recent decades. The oil content of water produced from offshore operational discharges is limited by effluent guidelines promulgated by EPA, which are enforced by National Pollution Discharge Elimination System permits. The Minerals Management Service (MMS) is responsible for day-to-day inspection and monitoring of Outer Continental Shelf (OCS) oil and gas operations and monitoring hydrocarbon discharges resulting from such operations. Additionally, an Environmental Impact Statement must be prepared for all MMS and OCS lease sales.

Short-tailed Albatross

Status of the Species Within the Action Area

The range of the species includes the Pacific Ocean, mostly north of approximately 20° N latitude, and including the Bering Sea. Since the action area is defined as that portion of the Pacific Ocean east of 160° W longitude and north of the equator, the action area includes only a portion of the range of the species. This overlap area represents approximately 30 percent of the area within the range of the species overall distribution.

The known breeding sites of the species, Torishima and Minami-kojima Islands off the coast of Japan, are several thousand miles outside the action area, so will not be directly or indirectly affected by the proposed action.

Only a portion of the species population is likely to occur within the action area at any one time during the year. A portion of the population is expected to be within the action area at all times. As the species is slow to mature, juveniles and subadults may wander throughout the species range until reaching sexual maturity, for up to several years. Adults may also wander into the action area outside the breeding season, or during years when they do not nest.

The species' actual distribution within this overlap area is not exactly known. Observations of the species suggest that its distribution within this area is more densely concentrated along the southern coast of Alaska, the west coast of the U.S., and near the Hawaiian Islands. However, these observed concentration areas coincide roughly with areas of greater ocean productivity; increased observations of albatross in these areas may be a factor of albatross responding to higher food availability, observer concentrations on vessels, or both. No quantitative conclusions can be made regarding geographical preferences within this area.

Factors Affecting Species' Environment Within the Action Area

Although predation by sharks is a known source of mortality for some species of albatross, especially for recently fledged juveniles near breeding islands, and may be a source of predation for short-tailed albatross, the actual effect of predation for this species in the action area is only poorly understood. Sharks may scavenge albatross that have been already injured or killed by longline fishing methods within the action area, but the actual effect of this activity on short-tailed albatross cannot be quantified at this time. Other sources of predation (crows, cats, rats) previously documented for the nesting islands are not expected to be of consequence within the action area.

Within the action area, oiling of short-tailed albatross due to spills occurring in the marine environment remains a risk. This risk is most prevalent in areas subject to offshore drilling, tanker transport of crude oil, or shipping lanes. To date, there have been no documented circumstances of oil contamination of this species rising to the level of injury or mortality in the action area, so it is not possible to quantify the risk to the species, or the interaction of the proposed action with this threat. For the purposes of this consultation, we are assuming that actions taken in Federal or EEZ waters will not have a spill over effect into State waters.

The rate at which short-tailed albatross ingest or otherwise interact with plastics in the action area may also be a factor affecting the species' survival, but at this time is not quantifiable. The distribution of disposed plastics in the open ocean is unknown but presumed to be ubiquitous, therefore having the potential to affect albatross throughout the action area. As the population of short-tailed albatross increases in the future, this problem may increase. However, the extent of this problem and its synergistic effect with the proposed action is unknown at this time.

Other than what has already been reported under the Status of the Species section, no action area-specific information regarding the effect of Pacific fisheries by other nations on short-tailed albatross is available. Certainly, a substantial portion of the overall pelagic fishing effort by Japan, Korea, Russia and other nations occurs within the action area. No specific information is available at this time that would document a disproportionately large or small effect of this fishery in relation to the overall effect of this activity to albatross in general, let alone the short-tailed albatross.

U.S. groundfish fisheries in Alaska are monitored by fishery observers, who reported fishery-related mortalities of short-tailed albatross in the 1980s. One observation, a fledgling, was killed by a vessel fishing for halibut in the Gulf of Alaska on October 1, 1987.

Preliminary estimates of the annual seabird bycatch for the Alaska groundfish fisheries, located partially within the action area, based on 1993 to 1997 data, indicate that approximately 14,000 seabirds are killed annually in the combined BSAI area and GOA groundfish fisheries (11,600 in the BSAI; 2,400 in the GOA) at average rates of 0.09 and 0.057 birds per 1000 hooks in the BSAI and in the GOA, respectively (Service 1999). In general, the calculated expansion factor between observed bird mortalities and total estimated bird mortalities is 4 in the Bering Sea and 8 in the GOA (Service 1999). These numbers are preliminary and may change with further analysis and additional data, but represent the best available information at this time.

The estimate for total short-tailed albatross mortalities in the GOA is 0 because no kills have occurred there. Therefore, the best available information indicates that the total mortality for short-tailed albatross in the GOA and BSAI hook-and-line fisheries since 1993 has been 2 birds per year. The incidental take anticipated and authorized is 4 short-tailed albatross during the 2-year period of 1999 and 2000, as a result of the hook-and-line groundfish fishing activities in the GOA/BSAI areas regulated by NOAA Fisheries (Service 1999).

Recreational fishing may result in some risk to short-tailed albatross within the action area, but this risk is unknown at this time. To date, there have been no documented observations of short-tailed albatross having been wounded or killed by this method. However, there would seem to be a similar problem as with longline fishing in the risk of seabirds becoming wounded or killed by hooking on fishing gear, albeit at a much smaller scale. Therefore, there is no quantitative estimate of the risk of mortality of this species from this activity in the action area.

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action and its interrelated and interdependent activities on the covered species. This discussion is written specific to each affected species so as to focus the effects analysis on each species unique distribution, its life history, its response to direct and indirect impacts associated with the action, the analytical methods available to quantify those effects, and the Service's conclusion as to whether those cumulative effects are likely to jeopardize the continued existence of the species.

Brown Pelican

Brown pelicans occur in substantial numbers along the Pacific coast as described earlier in this biological opinion. It is unknown how many brown pelicans are injured or killed annually by HMS fisheries, but it is known that brown pelicans are injured or killed in places where they interact with recreational fisheries (HMS or otherwise). Brown pelicans occur in areas where the HMS recreational fisheries will be occurring and it is likely that they will interact with this fishery and others proposed under the HMS FMP. Seabird deterrent devices are not currently employed in the west coast-based fishery. The chances of observing the injury or death of brown pelicans is highly remote, because very little to no time is typically spent observing seabird interactions. However, based on limited evidence and the factors discussed below, we believe injury and death of brown pelicans is likely to occur.

Factors to Be Considered

The probability of brown pelicans being injured or killed by west coast-based HMS fishing activities and reported is a function of many factors, including: (1) temporal and spatial overlap of the distribution of brown pelicans at sea and the distribution of west coast-based HMS fishing vessel activity; (2) observer coverage; (3) brown pelican foraging behavior; (4) total number of baited hooks set per unit time, and the species targeted by recreational fishing vessels (*i.e.*, swordfish set, mixed set or tuna set); (5) location and intensity of other FMP-covered fishing methods; and (6) use and effectiveness of seabird deterrent devices. There are numerous other factors that contribute to the probability that individual birds will be hooked, otherwise injured, or killed, including: (1) type of fishing operation and gear used; (2) length of time fishing gear is at or near the surface of the water during the set, and to a lesser degree during the haulback; (3) length of time gear is employed; (4) behavior of the individual bird; (5) water and weather conditions (*e.g.,* sea state); (6) availability of food (including bait and offal); and (7) physical condition of the bird. The number of birds affected by recreational and other HMS fishing methods is also a function of population size and seasonal distribution; as the number of brown pelicans increases along the Pacific coast of the U.S., an increase in number of birds injured or killed by this activity is likely to occur.

Temporal and Spatial Overlap

Brown pelicans breed on the Channel Islands, Baja California, off the coast of mainland Mexico, and in the Gulf of California. Along the Pacific coast during the breeding season (approximately February-June), brown pelicans primarily occur near the colonies on the Channel Islands and the western coast of Baja California with scattered non-breeding individuals potentially occurring along the entire coast. The breeding population along the Pacific coast, including Mexico, is approximately 11,000 pairs. During the non-breeding season, primarily between July and January, up to 100,000 or more brown pelicans disperse into southern California and northward to southern British Columbia. Important roost sites for the species are found along the entire Pacific coast from northwest Mexico to Washington. Brown pelicans are a nearshore marine species. They do not normally venture greater than 20 miles from shore and often confine their feeding activity to waters less than 50 fathoms. However, island rookeries can occur beyond 20 miles from the mainland, and pelicans are expected to travel among the islands and between the islands and the mainland. Pelican foraging activities are expected to be most common within 3 miles of the mainland and islands. The action area excludes State waters along the mainland and adjacent to islands. While the areas within 3 miles of the mainland and islands are where the highest potential for exposure to effects are likely to occur from recreational fisheries, HMS recreational fishing activities under the jurisdiction of the subject plan occur outside these areas.

Although data is available on the numbers of brown pelicans that occur at breeding colonies and important roosting and loafing areas, there is no estimate of density of brown pelicans at sea within the action area. The offshore distribution of the species is dependent on oceanographic conditions and the distribution of prey species. Due to the lack of quantifiable density information to determine actual distribution of the species within the action area, the Service uses a generalized proportion of the range of the brown pelican where it overlaps with the generalized area in which the west coast-based HMS fishery operates to derive an approximate estimate of the proportion of the brown pelican (adult and subadult) population which may prove vulnerable to the proposed fishing activities.

Observer Coverage

We are not aware of any data regarding the numbers of brown pelicans recorded by observers monitoring seabird bycatch on fishing vessels. NOAA-F and the State of California have developed or are developing a monitoring program for charter vessels, but specific information about this program was not provided to us by NOAA-F. The biological assessment does not cite any brown pelican interactions or incidents of bycatch with the drift gillnet and longline fisheries. It was unclear whether brown pelicans have been observed interacting with the troll and baitboat albacore fishery. It does acknowledge that brown pelicans are occasionally observed near purse seines (with no known injuries or mortalities), and that they are hooked by recreational fishing activities. Increased monitoring would improve our ability to predict the extent of exposure to adverse effects resulting from interactions with these fisheries.

Foraging Behavior

Brown pelicans feed almost entirely on surface-schooling fish caught by plunge diving in coastal waters. Feeding is often concentrated in relatively shallow waters of less than 50 fathoms (300 ft) (Gress *et al.* 1980). Sometimes brown pelicans dive from as high as sixty to seventy feet, although a height of thirty feet is more normal. Brown pelicans are often attracted to a particular foraging area by the feeding activities of other species and by other pelicans (Gress *et al.* 1980). As soon as pelicans begin plunging and feeding, they quickly attract the attention of others. Pelicans will often congregate in large numbers at these prey concentrations until the food source is gone (Gress *et al.* 1980). Brown pelicans are rarely found away from salt water and do not normally venture more than 32 km (20 mi) out to sea.

The bait and chum used for recreational fishing attracts young pelicans and they often swallow baited hooks and get hooks embedded in their bills or pouches (Service 1983). Interactions such as these may be a significant cause of injury/mortality to newly fledged pelicans near colony sites during the summer months when large numbers of migrant and young of the year are present (Service 1983). Superficially embedded hooks can be removed without damage. Mortality is likely if a hook is swallowed or there is substantial injury from hook removal. Relatively small tears in a pouch can hinder feeding and death from starvation may occur (Service 1983). Brown pelicans also become ensnared in monofilament fishing line which can cause serious injury, impair movement and flight, prevent feeding, cause infection from cuts, and lead to starvation (Service 1983).

Hooks Set Per Unit Time and Trip Type

West coast recreational fishing activity directed towards large, migratory pelagic species emanates mainly from commercial passenger fishing vessels (CPFVs) and privately owned vessels departing sportfish landings, marinas and launch ramps dotting the southern California coast from Los Angeles to San Diego, California. The Sportfishing Association of California (SAC) is the major industry organization representing nearly 200 CPFVs operating out of 23 landings from Morro Bay to San Diego. This area overlaps with the center of the brown pelican's breeding and non-breeding range along the Pacific coast. This fleet carries almost 1 million passengers annually to local and Mexican fishing grounds. In 2000, there were an estimated 876,000 trips taken aboard southern California based CPFVs resulting in a total catch of 2,941,000 fish, a 44 percent and 30 percent increase respectively from 1999 (RecFIN). Approximately 429,000, or 49 percent, of all southern California based CPFV trips in 2000 accounted for total HMS catches of 99,000 fish, or 3 percent of the total CPFV catch. This is 12 times the number of trips, and a 21 percent increase in HMS catch compared to 1999.

A large number of southern California based privately owned vessels are used to recreationally fish for HMS, upwards of 6,000 annually. These vessels cover a wide range of sizes and types, ranging in length from 17 ft skiffs to 90 ft or greater luxury yachts, with many vessels under 30 ft. In 2000, private vessels made approximately 1,760,000 fishing trips, of which 1,318,000, or 75 percent, resulted in HMS catches. This was an increase of 51 percent and 100 percent in total trips and HMS trips from 1999 (RecFIN). The estimated total recreational catch of southern California based private vessels in 2000 was 2,594,000 fish of which 57,000, or 2 percent, were HMS (RecFIN), up 37 percent and 150 percent respectively from 1999. Southern California based private vessels accounted for 75 percent of the total (CPFV plus private vessel) number of HMS trips, and 37 percent of total HMS catches in 2000, a decrease of 21 percent and an increase of 68 percent respectively from 1999.

Many private vessel owners possess Mexican fishing licenses and travel south looking for schools of tuna and billfish. Sport fishing vessels also target tuna in southern California and northern Baja California waters. Fishing locations are primarily in the SCB from Santa Barbara, south and into Mexico. Many California anglers will fish the productive waters around Mexico's Coronado Islands for tuna, marlin, dorado and coastal pelagic species. The Coronado Islands are a brown pelican breeding site.

The Marine Recreational Fisheries Statistics Survey (MRFSS) program funded by NOAA-Fisheries and administered by the Pacific States Marine Fisheries Commission provides a different look at the same data (see www.psfmc.org), and allows us to differentiate activities in EEZ vs. State waters. This data combines all trips in private boats or charter/CPFVs. For instance, during the five year period between 1998 and 2002, average annual recreational HMS fishing trips in State waters was estimated at 1,213,798. In EEZ (non-State) waters, the average annual recreational HMS fishing trips during the same period was estimated at 313,913. Trips in EEZ waters were significantly fewer than those in State waters. Therefore, any measurable exposure to effects of the proposed action, in EEZ waters, is likely limited to the number of those EEZ trips that occurred between islands and between the islands and the mainland where pelican activity is fairly dispersed and far less frequent than in State waters.

Although we have no reasonable means to estimate the number of interactions with this fishery that is harmful to pelicans, based on anecdotal accounts, such interactions with HMS recreational fisheries are uncommon in the open ocean. However, other anecdotal accounts indicate such interactions may be common near island rookeries and less so in areas between islands, therefore, we assume harmful interactions are likely to occur in EEZ waters that are in between islands and also between islands and the mainland. There is no available data to support how many of the EEZ trips occur where pelican may be exposed to adverse effects. However, if only 1 in 1000 fishing trips in EEZ waters occurred where pelicans are exposed to effects, and death or injury to pelicans actually occurred one time in every 10 efforts, it would be reasonable to assume that over 30 pelicans could be killed or significantly injured annually by interactions with this fishery. However, in truth, we have no idea how many birds would be affected. Therefore, we cannot provide a reliable estimate of injury or death.

Seabird Deterrent Measures

A review of the conservation measures in the project description intended to address seabird interactions with the HMF fisheries, that to some degree are addressed in the short-tailed albatross section below, measures relevant to the brown pelican are quite modest. In fact, there are no specific measures provided in the HMS plan that would apply to the recreational fishery that would result in avoidance of adverse effects to the brown pelican.

Analyses for Effects of the Action

The anticipated adverse effects of the proposed action is injury and mortality of brown pelicans. Birds attempting to steal bait may be hooked, pulled underwater, and drowned. Birds may sustain injuries from interactions with baited hooks, which could seriously impair their ability to fly or forage, and may result in mortality. In addition, the Service has concerns that there is some risk that other fishing methods adopted under this FMP may result in mortality of brown pelicans. Our concerns are supported, in the case of the brown pelican, by the frequently documented injury and mortality of brown pelicans resulting from interactions with recreational fishing activities outside of the action area.

Species Response to the Proposed Action

The likelihood of brown pelican interactions with most of the fisheries covered by the proposed FMP is low. The fisheries generally occur 15 miles or farther from shore with the exception of the drift gillnet and recreational fisheries. Brown pelicans do not normally venture more than 20 miles out to sea and usually feed in waters depths less than 50 fathoms. Therefore, it is unlikely that brown pelicans will have a significant number of interactions with the pelagic longline, albacore surface hook and line and baitboat, and harpoon fisheries. In addition, because brown pelicans feed on surface-schooling fish, it is unlikely that they will have any interactions with the drift gillnet fishery which is required to set their nets deep.

Brown pelicans may be affected by the purse seine fishery. Brown pelicans have been observed diving on fish within and adjacent to purse seines when they are set around a school of fish. Individuals diving in or adjacent to purse seine sets could become entangled in nets and be injured or killed. However, entanglements in netting for tuna sets have not been documented. Large purse seine vessels > 400 short tons (with 100 percent observer coverage) have no documented bird interactions so it is unlikely that interactions would be more frequent in small vessels' tuna fishing nets. There have been occasional interactions with seabirds when small purse seine vessels set on coastal pelagic species such as Pacific mackerel (*Scomber japonicus*) and Pacific sardine, but these fish species tend to be at the surface and vulnerable to seabird attack from above, while tuna tend to be lower in the net and are not known to attract diving seabirds. Therefore, while it is difficult to estimate how frequently brown pelicans may interact with the purse seine fishery, we anticipate that if interactions do occur, it may be few rather than many.

Recreational fishing during charter or private recreational fishing activities can have a direct effect on brown pelicans through physical injury caused by fishing tackle. Brown pelicans can be hooked by recreational fishers and in most instances the bird either breaks free from the hook, breaks the fishing line, or is brought close to the vessel and released. Some popular fishing areas have a high frequency of hooking pelicans and injury is common (Service 1983). Fishing tackle injuries may be a significant cause of injury and mortality to newly fledged pelicans near colony sites during the summer months when large numbers of migrant and young of the year are present (Service 1983). Inexperienced (at getting food) young pelicans are attracted to live anchovies used for bait and chumming and readily flock around sport fishing boats that regularly anchor near breeding colonies or roosting sites. Young pelicans often swallow baited hooks and get hooks embedded in their bills or pouches. Superficially embedded hooks can be removed without damage. Mortality is likely if a hook is swallowed or there is substantial injury from hook removal. Relatively small tears in a pouch can hinder feeding and death from starvation may occur (Service 1983). When 141 brown pelicans were captured for cleaning during the Huntington Beach oil spill in 1990, at least 20 percent of them had fish hook injuries. Pelicans also become ensnared in monofilament fishing line which can cause serious injury, impair movement and flight, prevent feeding, cause infection from cuts, and lead to starvation (Service 1983). Intentional injuries to brown pelicans, primarily the severing of bills, has been documented widely along the Pacific coast and have been linked to recreational fishers, but these intentional injuries are not considered incidental to the proposed action.

Disturbance from fishing activities in the direct proximity of breeding colonies and roosting sites could have effects to brown pelicans. Repeated disturbance over several breeding seasons may cause pelicans to eventually give up colony sites completely (Service 1983). These types of effects, although a significant issue in State waters, is not likely to be a significant effect of the proposed action unless the fisheries' activities in Federal waters (greater than 3 miles from shore) occur at the nearest food source to island or mainland colonies. Otherwise, we have been provided limited information to base our assessment of potential impacts to breeding birds.

There is little information available on the number of interactions between brown pelicans and HMS fisheries. Anecdotal information appears to be somewhat contradictory. Nevertheless, we anticipate that there will be far fewer brown pelican interactions with this fishery in Federal waters than occurs with those that focus fishing activities in nearshore areas of the mainland and offshore islands in State waters. It is difficult to estimate how frequently brown pelicans may interact with the HMS recreational fishery, but we anticipate that if interactions occur, they will be at a relatively low level. A focused observer program would provide valuable information with which to test our assumptions.

The FMP acknowledges that some level of observer placements will be necessary to ensure reliable bycatch assessments in most if not all sectors, including determination of interactions with protected species such as seabirds and sea turtles. Logbooks alone are not likely to result in complete and accurate information on total catches and discards (alive or dead). Landings receipts only document fish actually brought to shore or transshipped. Interviews of fishermen can fill some gaps. However, at least some at-sea observer coverage is necessary in most cases to obtain accurate records on total catches and discards from a sample large enough to provide reliable extrapolations of total catches and discards. What will vary is the level of observer coverage needed by fishery sector.

Under the FMP, NOAA-Fisheries would be required to place observers on a sample of fishing vessels in each sector to document total and retained catch, bycatch, and disposition of bycatch (released alive, released injured, released dead) by species, and protected species interaction data. If practicable, consistent with the need to collect bycatch and protected species interaction data, the observer also would collect other fishery dependent data (e.g., size, sex ratio, biological samples). The sample level in each sector will depend on the characteristics of the fishery, the likelihood of bycatch, the magnitude of bycatch and potential associated mortality, and the extent to which other monitoring elements are likely to result in reliable estimates of bycatch and bycatch mortality. Sampling designs serving as the basis for appropriate levels of coverage would be developed by NOAA-Fisheries, in consultation with the Council, the states, and industry, but the sampling program must be at a level sufficient (in combination with other monitoring efforts) to provide reliable estimates of bycatch in each sector. The sampling designs are to be completed within 6 months of approval of the FMP.

In the context of recreational fisheries, it should be noted that the MRFSS program has included placement of observers on charter and private recreational fishing vessels for some years. These observers have not recorded interactions with pelicans or other seabirds, however, as indicated above, there has not been a set requirement for any protected species observer time or collection of such data.

Short-tailed Albatross

NOAA Fisheries began estimating the number of Laysan and black-footed albatross killed in the Hawaii-based longline fishery in 1994. Since then, several thousand Laysan and black-footed albatross are estimated to be killed each year by fishing gear deployed by the Hawaii-based longline fishery. Sighting data indicate that short-tailed albatross have been observed in the northwestern Hawaiian Islands since the 1930s, and along the west coast of the U.S. since the 1980s. Recent information indicates that short-tailed albatross have been observed at sea where the U.S. West Coast-based HMS fishery conducts fishing operations, and where Laysan and black-footed albatross have been reported to be killed by fishing gear. The precise effect on short-tailed albatross can, at this time, be only generally estimated as the short-tailed albatross population number is very low compared to historical estimates (current estimate: 1,700+ birds;

historical estimate: as high as five million birds). Furthermore, the fraction of the short-tailed albatross population that temporarily resides within or passes through areas where the U.S. West Coast-based HMS fishery conducts fishing operations is unknown, and can only be generally estimated.

NOAA Fisheries reported (NOAA Fisheries 2003a) that during the period 1999 to 2001, efforts to estimate the actual injury and mortality of black-footed albatross and Laysan albatross by the Hawaii-based longline fleet have been confounded by rapidly changing protection measures and observation requirements during the period. Reductions in documented mortality during this period corresponded in part to closures and other restrictions in parts of the Hawaii-based fishery, notably the closure of the swordfish-target sector of this fishery in 2001. Increases in documented fishery-related mortality of these species during some periods may actually correspond to movement of the fishery closer to the breeding colonies of the species, thus further complicating the interpretation of the data. Overall, mortalities of black-footed albatross declined from 1,301 in 1999 to 258 in 2001; similarly, mortalities of Laysan albatross declined from 1,301 to 258 in this same period. Observer coverage during this period increased to 22.5 percent of the fishery, with observer rate exceeding the 5 percent rate operating north of 23° N latitude for both 2000 and 2001. There were no observations of injured or dead short-tailed albatross during this period.

NOAA Fisheries (2003b) reported low rates of injury and mortality of black-footed and Laysan albatross during the 2002 reporting year. This low level was likely the result of the closure of the swordfish longline fishery, with deterrent measures in place for the tuna fishery having a lesser influence on the interaction rates of albatross. As with the 1999 to 2001 data, it is difficult to separate out the precise effects of various deterrent measures in the absence of research controls and changing conditions. No short-tailed albatross was observed in the Hawaii-based pelagic longline fishery or reported injured or killed by either swordfish or tuna sets during 2002.

NOAA Fisheries requires that federal fishery observers cover 20 percent of all Hawaii-based longline fishing trips to record fishery and protected species information. The Service requires that at least 5 percent of all trips north of 23° N latitude include observers dedicated to observing protected species and seabird interactions with fishing gear. (Historically, only a fraction of NOAA Fisheries' observer time has been spent actually observing the interaction between seabirds and longline gear, *e.g.*, baited hooks and line). Most interactions between seabirds and longline gear have been observed to occur when the longline gear is deployed, but interactions also may occur while the longline is retrieved.

The likelihood of observing the accidental wounding or killing of a short-tailed albatross is highly remote, because very little time is spent observing seabird interactions, and only a few short-tailed albatross have been observed to occur in the vicinity of the fishing grounds within the action area. However, despite the very low probability such an interaction will be observed, a low but not discountable probability of wounding or mortality exists.

Factors to Be Considered

The probability of short-tailed albatross being wounded or killed by U.S. West Coast-based HMS fishing activities is a function of several factors, including: (1) temporal and spatial overlap of the distribution of short-tailed albatross at sea and the distribution of U.S. West Coast-based HMS fishing vessel activity, (2) albatross foraging behavior, (3) total number of baited hooks set per unit time, (4) the species targeted by the longline fishing vessels (*i.e.*, swordfish set, mixed set or tuna set), (5) location and intensity of other FMP-covered fishing methods, and (6) use and effectiveness of seabird deterrent devices.

Numerous other factors contribute to the probability that individual birds will be hooked, otherwise injured, or killed, including: (1) type of fishing operation and gear used, (2) length of time fishing gear is at or near the surface of the water during the set, and to a lesser degree during the haulback, (3) length of time gear is employed, (4) behavior of the individual bird, (5) water and weather conditions (*e.g.,* sea state), (6) availability of food (including bait and offal), and (7) physical condition of the bird. The number of birds affected by longline and other HMS fishing methods is also a function of population size; as the short-tailed albatross population increases during future years, an increase in number of birds killed by this activity is likely to occur.

The probability that the injury or mortality of a short-tailed albatross will be reported is also a function of observer coverage.

Temporal and Spatial Overlap

Short-tailed albatross have been observed in the vicinity of the Northwest Hawaiian Islands (NWHI) between November and March. Since 1938, approximately 46 incidental observations of about 15 different birds sighted from land have been recorded. Short-tailed albatross have been observed from Midway Atoll (Sand and Eastern Islets), Laysan Islet, French Frigate Shoals (Tern Islet) and Kure Atoll (Green Islet). Sightings of short-tailed albatross from land represent the majority of all sightings. The Pacific Ocean Biological Survey Program produced no at-sea observations of short-tailed albatross in the vicinity of the NWHI, but this survey program was conducted at a time (1960s) when the short-tailed albatross population was very low. Only two marine observations near Hawaii of short-tailed albatross have been recently recorded by NOAA Fisheries' employees.

Short-tailed albatross have also been observed in the Pacific Ocean within the U.S. EEZ along the U.S. West Coast of the U.S. and adjacent international waters where HMS fishing activities may occur. At least 32 documented sightings of short-tailed albatross occurred along the coasts of British Columbia (4), Washington (2), Oregon (8), and California (18) between the years 1961 and 2003. Twenty-four of those observations occurred between 1993 and 2003. This increase in number of recent sightings may indicate an increase in short-tailed albatross activity in this area in recent years, may be a function of an increased number of trained and casual observers, or both. These observations occurred from as far as 270 mi from shore to as close as sighting distance from the mainland. Where distances from shore were estimated occurred beyond 15 miles from the mainland, in the area where HMS fishing will primarily occur. Those albatross observed less than15 miles from the mainland likely traversed the primary fishing zone during their pelagic migrations.

Of 32 recorded observations of short-tailed albatross in the four state/province area, at least one observation occurred in each calendar month of the year. However, 22 of the total 32 observations occurred during the months of August through January, with only 9 of 32 observations occurring during the period February through July, suggesting a somewhat seasonal occurrence of the species in the action area. Of 11 California records for which detailed information or photos are available between 1977 and 2000, all represent immature birds.

Currently, no formal surveys for the species exists for these waters, and no estimate of density for the area is available. While the apparent increase in sightings of the species along the west coast correlates to known increases in the species range-wide population, the increase in trained observers and bird enthusiasts available to document sightings of the species confounds any attempt to extrapolate the available sighting data into a precise estimate of population size or density within the affected area. Recent work by Cousins *et al.* (2001) maps the known distribution of short-tailed albatross throughout the north Pacific. However, they hypothesize that the species migrates and forages disproportionately within highly productive portions of the ocean or in close proximity to continental shelves, such as the Bering Sea, the North Pacific Transition Zone, and along the west coast of North America, rather than more centrally located in the open ocean. Therefore, the density of short-tailed albatross may be highest in these areas than in the less productive central area of the North Pacific. These same areas of high productivity also attract longline fishing operations. Due to the lack of quantifiable density information to determine actual distribution of the species within the action area, however, for purposes of this consultation, the Service uses a generalized proportion of the range of the short-tailed albatross where it overlaps with the generalized area in which the U.S. West Coast-based HMS fishery operates to derive an approximate estimate of the proportion of the short-tailed albatross (adult and subadult) population which may prove vulnerable to the proposed fishing activities.

A short-tailed albatross with band "white 000" was banded as a chick at Torishima in 1978. It was first recorded at Midway Atoll on 15 December 1984. After that, it returned each year in December and left each spring, usually in April, until its disappearance in the fall of 1994. "White 000" returned again in the fall of 1994 but failed to return after a routine foraging trip soon thereafter. There was heavy longline fishing activity and high black-footed and Laysan albatross mortality as measured by the observer program north of Midway Atoll during 1994. The bird has never been sighted again in any of the NWHI nor at Torishima. This bird was a young adult that had consistently established a territory over 10 years at Midway Atoll, and short-tailed albatross have no natural at-sea predators while foraging. Therefore, the Service maintains there is a possibility that "white 000" was killed in the Hawaii-based longline fishery, and that other short-tailed albatross could be killed by similar fishing activities associated with U.S. West Coast-based HMS fishing activities.

Additional information regarding interactions between species of albatross, including the short-tailed albatross, with the Hawaii-based longline fishery is documented in detail in two biological opinions previously issued by the Service (Service 2000, Service 2002). In these biological opinions, the Service provides additional evidence of the potentially adverse interactions between albatross and longline fishing operations that support our conclusions that these interactions can lead to injury and mortality of short-tailed albatross. This information supports our conclusions here regarding the potential effects of similar fishing operations, permitted by this proposed action, on short-tailed albatross.

Observer Coverage

A March 30, 2001, court decision required an increase in observer coverage to 20 percent of all Hawaii longline vessels. This decision applies to the entire fishery, not only to those trips north of 23° N latitude. Currently, 5 percent of trips north of 23° N latitude required observer coverage dedicated to protected species observation, w/fishery duties a second priority.

NOAA Fisheries' observers have been deployed aboard Hawaii-based longline fishing vessels since 1994 to collect fishery-related information and to record sightings of marine mammals and turtles (on Protected Species Interactions and Sighting Record forms). Until 2001, NOAA Fisheries' Hawaii Longline Observer Program Field Manual specifically instructed observers not to record seabird sightings unless birds interacted with the fishing gear (NOAA Fisheries 1999). In the June, 2001 revised manual, observers are instructed to record no general seabird sightings except for sightings of short-tailed albatross (NOAA Fisheries 2001). The probability is remote that short-tailed albatross, if present, were noted by observers because until recently observers did not record seabird observations unless birds were in contact with fishing gear, and historically they did not allot a portion of their time to observing seabirds.

NOAA Fisheries defines interaction to be contact with the gear including leaders trailing off the stern of the vessel within 300 ft (100 m) of the boat. Evidence of this contact includes observations of animals at the gear, animals stealing fish from the gear or coming in contact with the gear, and evidence of fresh marine mammal or seabird damage to the catch (not by presence of damaged fish only). Protected species retrieved during haulback are documented by observers on a separate form, called the Protected Species Tally Sheet.

Between 1994 and 1996, observers had three options for describing deterrents that might be used by fishermen to keep birds away from fishing gear. Observers could record "yes" or "no" under "streamer," "bomb," or "other." They then were asked to describe the use of this deterrent and the results in the narrative section of their data form. In 1997, the data form was amended to include 12 different bird-catch reduction devices and techniques that could be checked off. Along with interaction and deterrent data, observers collected a suite of other information about environmental conditions, time, type of gear, technique, and location of fishing effort, which could be related to levels of bird catch.

On November 17, 1998, a new instruction was issued for observers to collect and return to port any short-tailed albatross retrieved dead during longline fishing operations. The same memorandum asked that any seabirds that are retrieved alive have any line and hook removed if possible, be described and the characteristics recorded, have their leg band data recorded, be photographed, and released.

The Service has provided training in seabird identification for NOAA Fisheries' observers on many occasions since the mandatory observer program started. An hour of instruction in seabird identification using slides was provided for the first group of observers in February of 1994. Again in 1996, the Service presented classroom instruction in identification techniques and then assisted at a session at the Bishop Museum, where new observers were able to look at actual specimens of the seabirds in question. Subsequent training sessions have taken place at NOAA Fisheries' Pacific Islands Regional Office (PIRO), where observer training courses are held roughly three or four times each year. A Service biologist gives observers a 90-minute overview of seabird identification techniques, with an emphasis on distinguishing among albatross species. NOAA Fisheries provides observers with seabird field guides and a laminated identification card for the three species of north Pacific albatross. NOAA Fisheries' personnel present a slide show on handling and release techniques for short-tailed and other albatross that was developed by Service personnel in Hawaii.

There was an annual average of 1,078 longline trips during the period 1994-1999. Of this, there was an annual average of 46 observed fishing trips (4.3 percent). NOAA Fisheries' observers work about 10 hours per day, and reserve enough time to observe about 10 percent of each set during tuna trips and 3 percent of each set during swordfish trips (L. Van Fossen, NOAA Fisheries, pers. comm. 1999, as cited in Service 2000). The peak interaction period when seabirds interact with longline gear is during the set, although some interaction does occur during the haulback (Garcia and Associates 1999). At present, very little time is dedicated to looking for short-tailed albatross during the set, when seabirds are most likely to interact with longline fishing gear.

Foraging Behavior

Similar to Laysan and black-footed albatross, short-tailed albatross are able to locate food using well-developed eyesight and sense of smell. All three species of albatross feed at the ocean surface or within the upper three feet (one meter) by seizing, dipping or scavenging (Austin 1949, Harrison *et al.* 1983). Their diet consists primarily of squid, fish, and flying fish eggs (Harrison *et al.* 1983, Austin 1949).

As demonstrated in the Alaska fishery, short-tailed, Laysan, and black-footed albatross have been documented by NOAA Fisheries to be killed as a result of interaction with demersal longline gear (Shannon Fitzgerald, NOAA Fisheries, pers. comm. 1999, as cited in Service 2000). Birds attempting to steal bait may be hooked, pulled underwater as the mainline is set at its fishing depth, and drowned. In a similar manner, birds may also be killed during haulback operations. Also, if birds that attempt to steal bait are not hooked, they may be injured during the process of attempting to steal bait either from the hook, branch-line or mainline.

Hooks set per unit time and trip type

Information in this section specifically referring to tuna (deep set), swordfish (shallow set) and mixed set longline fishing is relevant to our subsequent calculation of estimated mortality.

NOAA Fisheries has documented the number of killed Laysan and black-footed albatross observed during haulbacks since 1994 through its Observer Program for the Hawaii-based longline fishery. The methodology used to estimate the number of birds killed, at 95 percent confidence intervals, is described in the NOAA Technical Memorandum NOAA-TM-NMFS-SWRSC-257 (NOAA Fisheries 1998b).

For both species of albatross, the Service (Service 2000, Table 18) summarizes the annual (1994-1998) estimated rate at which birds may be killed per thousand hooks, the total kill estimate, the 95 percent confidence interval, and the total number of hooks set in the entire Hawaii-based longline fishery (*e.g.*, swordfish trips, mixed trips and tuna trips) (WPRFMC 1999). This table represents the conservative, or low, end of the range of birds that may be killed per thousand hooks in the Hawaii-based longline fishery. At that time, the Service estimated that between 30 and 95 percent of the birds caught on the fishing gear during deployment and haulback may fall off the hook as a result of gear deployment/haulback operations, strong currents, scavenged by predators during the soak, or cut-off by fishers during the haulback (Gales *et al.* 1998). Therefore, the minimum rate at which birds are estimated killed per thousand hooks for the years 1994 - 1998 respectively was: for Laysan albatross - 0.1523 (1994), 0.1026 (1995), 0.0727 (1996), 0.0739 (1997), and 0.0887 (1998); and for black-footed albatross - 0.1662 (1994), 0.1394 (1995), 0.1063 (1996), 0.0739 (1997) and 0.1177 (1998) (K. Foster, Service, pers. comm. 1999, as cited in Service 2000). Conceivably, the rates at which seabirds interact with Hawaii-based longline gear may be higher.

This information can be further refined by reporting bycatch ratios by set type, based on information from NOAA Fisheries' observer database (1994-1998). When fishers targeted swordfish (shallow sets), about 370 birds were observed caught after 488 observed sets, resulting in a 0.758 bird catch per set ratio. When fishers targeted both tuna and swordfish, known as a mixed set, about 472 birds were caught after 946 observed sets, resulting in a 0.499 bird catch per set ratio. When fishers targeted tuna (deep sets), about 16 birds were observed caught after 1,250 observed sets, resulting in a 0.01 bird catch per set ratio. The higher bird catch ratio associated with shallow or mixed sets is attributable to the near-surface availability of baited hooks and lines, resulting in seabird injury or mortality. However, it is evident that some risk of interaction persists when fishers target tuna, albeit at a much reduced rate.

Information in this biological opinion demonstrates that lethal interactions between Laysan and black-footed albatrosses and Hawaii-based longline vessels occur within the range of the short-tailed albatross. Similar lethal interactions are likely to occur within the area subject to this HMS FMP for U.S. West Coast-based fisheries, also within the range of the short-tailed albatross. The number of observations of short-tailed albatross along the U.S. west coast exceeds the number observed in the area of the Hawaii-based fishery. Therefore, it is likely that the number of short-tailed albatross subject to injury or mortality from the currently proposed action may be higher than from the Hawaii-based fishery.

Because Laysan, black-footed and short-tailed albatross species exhibit similar feeding behavior and have been documented to be killed in other U.S. fisheries, it is reasonable to assume that short-tailed albatross are at risk of injury or mortality through contact with longline fishing gear and other HMS fishing methods where the U.S. West Coast-based fishery overlaps the range of the short-tailed albatross.

Seabird Deterrent Measures

PFMC's August 2003 proposed action (see "Description of the Proposed Action") specifies use of seabird deterrent measures and includes most of the measures that should be implemented that reduce, in part, the interaction between short-tailed albatross and U.S. West Coast-based HMS longline fishing vessels.

The Service has reviewed the Garcia and Associates (1999) report, "Final Report, Hawaii Longline Seabird Mortality Mitigation Project, September 1999," commissioned and funded by the WPRFMC, and the NOAA Fisheries' study conducted by C. Boggs, "Deterring Albatrosses from Contacting Baits During Swordfish Longline Sets" (*in press*). In addition, recent research by Cousins *et al.* (2003) and Gilman *et al.* (2003) shed additional light on the effects of deterrent methods and albatross interactions with longline fishing, and propose alternative deterrent methods to further reduce injury or mortality of albatross to longline fishing.

Gilman *et al.* (2003) report the results of studies done to assess the effectiveness of side setting, underwater chute setting, and blue-dyed bait in minimizing injury and mortality of black-footed and Laysan albatrosses in the Hawaii-based longline fishery. Side setting, which entails the deployment of longline gear from the side of the boat instead of the stern, had the lowest mean seabird interaction rates of the three methods tested. This method was effective because albatross tended to avoid close approach to the side of the vessel. Deploying longline gear using an underwater setting chute (9 m or 6.5 m in length) to deposit the branch lines and baited hooks deep enough below the ocean surface to be out of reach of surface-feeding albatross resulted in the second lowest mean seabird interaction rates. However, some technical problems were encountered with the use of the device. This method also required the greatest capital cost for installation, approximately $5,000 per vessel, its use is difficult to enforce, and the chutes are not generally available at this time for pelagic longline fisheries. Blue-dyed bait was generally less effective at avoiding seabird interactions than side setting or underwater chute, but this research was not specifically designed to test the effectiveness of this deterrent. Gilman *et al.* (2003) stated that side setting with adequate line weighting (60 g swivels within 1 m of the hook) holds significant promise for minimizing seabird mortality in longline fisheries. They also encouraged longline tuna and swordfish fleets to employ side setting as far forward on the vessel as possible, in combination with a bird-scaring curtain, to further minimize interactions.

Kiyota *et al.* (2003) recently reported on efforts in Japanese tuna longline fishing to reduce the injury or mortality of seabirds and other non-target species. In their research, blue-dyed bait proved effective in nearly eliminating the catch of seabirds, while having little adverse effect on the catch rates of target southern bluefin tuna. Blue-dyed squid was shown by both the Garcia Assoc. & Boggs studies to significantly reduce albatross injury or mortality in shallow-set longlining. Use of tori poles to haze seabirds away from baits reduced catch rates of seabirds by 65 percent or more. Based on the information about seabird distribution collected by sighting surveys and experimental fishing operations, Japan's National Plan of Action requires the longlining vessels which operate north of 20° N latitude in the Pacific to adopt at least one mitigation measure to avoid interactions with birds. Longlining vessels that operate within 20 miles off Torishima Island must adopt two or more mitigation measures during the breeding season (October to May).

These reports provide the best available information regarding the effectiveness of various measures in minimizing seabird interactions, injuries, and mortalities associated with the longline fishery. These reports support reasonable measures that the U.S. West Coast-based longline fishery is not required to implement under the proposed action, but should implement to reduce the potential interaction between the fishing gear and the short-tailed albatross and other seabirds. Furthermore, the Service concurs with NOAA Fisheries that proposed measures, including night setting, blue-dyed and thawed bait, towed deterrent, weighted branch lines, line-setting machine and weighted branch lines, and strategic discharge of offal are, to various degrees, successful in reducing interaction and mortalities between longline gear and seabirds (Attachment K).

Ed Melvin, Marine Fisheries Specialist for the University of Washington Seagrant Program, is evaluating the effectiveness of deterrents to reduce the injury or mortality of seabirds in Alaskan fisheries. The seabird deterrent study uses results collected from observations of Laysan and black-footed albatross interactions to gauge the effectiveness of seabird deterrent devices that could possibly work to deter short-tailed albatross from baited hooks (E. Melvin, pers. comm. 1999, as cited in Service 2000). Fishery activities should be modified when a short-tailed albatross is observed in the area to avoid taking the bird. The study does not directly evaluate seabird deterrent devices on short-tailed albatross, but uses Laysan and black-footed albatross as indicators of risk. Information from this report may provide useful information that could be applied to seabird deterrent strategies in the U.S. West Coast-based HMS fishery.

Analyses for Effects of the Action

For the purposes of this biological opinion, the Service defines "interaction" as an observation of a short-tailed albatross striking at the baited hooks or mainline gear when the vessel conducts setting or haulback operations. An interaction is a behavior that has been documented to likely result in injury or mortality of Laysan and black-footed albatrosses. Therefore, such interactions must be recorded, although for the purposes of this biological opinion an interaction does not constitute a take of a short-tailed albatross without documentation of actual injury or death from that interaction.

The anticipated adverse effects of the proposed action on short-tailed albatross include direct mortality, or injury likely leading to mortality. Birds attempting to steal bait may be hooked, pulled underwater as the mainline is set, and drowned. Birds may sustain injuries from interactions with baited hooks during the process of setting and hauling back the main line, which could seriously impair their ability to fly or forage, and may result in mortality. In addition, the Service has concerns that there is some risk that other fishing methods (drift gillnet, purse seine, commercial hook and line, and recreational) adopted under this FMP may result in adverse effects to the short-tailed albatross.

An indirect effect expected to occur as a result of the proposed action is reduction in population growth rate as a result of lost future reproductive success of the birds killed, and the temporary loss of reproductive success of the mates of any adult birds killed by this action. A further indirect effect of albatross-fisheries interactions is the lowered future reproductive and survival potential suffered by those individuals who may suffer short- or long-term debilitating injuries that do not necessarily result in mortality.

Effects of Longline Fishery

The Service determined in a 2002 biological opinion (Service 2002) that short-tailed albatross are at risk of injury or mortality from Hawaii-based longline fishing operations based on the following information: 1) the documented mortality of Laysan and black-footed albatrosses in the fishery; 2) similarities in foraging behaviors and distributions of Laysan, black-footed, and short-tailed albatrosses in the action area; 3) the observation of a short-tailed albatross "actively looking for bait on hooks in haulback" behind the NOAA R/V Townsend-Cromwell in 1997, which supported the initial discussions about the need for formal section 7 consultation; 4) the disappearance of "white 000" in 1994 and the possibility of mortality related to the Hawaii-based longline fishery; and 5) repeated sightings of individuals over several months each year in the Northwest Hawaiian Islands, especially Midway Atoll. There are no documented instances of short-tailed albatross killed in the Hawaii-based fishery, probably because of a combination of factors, including low observer coverage in the fishery, the allocation of observers' duties during that period, and the fact that short-tailed albatross occurrences are likely to be relatively rare because of their low population numbers world-wide.

In this biological opinion, the Service similarly concludes that short-tailed albatross may be subject to injury or mortality from fishing methods permitted by the proposed action. This conclusion is based on the facts that short-tailed albatross occur within the area subject to this proposed FMP, and that behavior of short-tailed albatross associated with pelagic fishing is anticipated to be similar between Hawaii-based longline fishing and the methods proposed under this FMP (which includes longline fishing and several other methods).

The absence of observed and documented wounding or killing of short-tailed albatross in the fishery confounds our attempts to estimate the amount of such adverse effects likely to occur as a result of the proposed action. Historical information is lacking on which to base an estimate of take in the U.S. West Coast-based fishery. Therefore, based on the similarities in foraging behavior between short-tailed, Laysan and black-footed albatross, we considered using the hooking rate of Laysan and/or black-footed albatrosses to estimate the total annual kill of short-tailed albatross. Although crude, this represents the best available information on the number of short-tailed albatross likely to be killed in this fishery until such time that observer coverage of short-tailed albatross interaction with the fishery operations is increased.

Laysan and black-footed albatross appear in the area subject to the proposed FMP in greater numbers than short-tailed albatross because their world-wide population numbers are significantly higher, and because the primary breeding colonies for these two species are substantially closer to U.S. West Coast-based fisheries than are those for short-tailed albatross, off the coast of Japan. Due to the differences in geographic locations of these breeding colonies, we would not expect to see the worldwide population of short-tailed albatross affected by the U.S. West Coast-based HMS fleet in exactly the same manner as the worldwide population of Laysan or black-footed albatross. However, because there is mortality of Laysan and black-footed albatross in the area affected by this proposed FMP, and we know short-tailed albatross have been sighted in this vicinity, we maintain that some small percentage of the population of short-tailed albatross may be adversely affected.

With a total range-wide population of approximately 1,700 individuals, only a few short-tailed albatross have been observed within the action area in the EEZ and adjacent international waters. The level of risk this species experiences as a result of U.S. West Coast-based HMS fishing activities is difficult to determine because of its low observed occurrence at fishing grounds frequented by this fleet. Because of the rarity of the short-tailed albatross, surrogate species may be used to assess the effect of the action (Section 7 Consultation Handbook, p. 4-47). Our knowledge of the foraging behavior of the three species of *Phoebastria* albatross that occur in the North Pacific (which includes the action area), and the existing data collected by NOAA Fisheries and Garcia and Associates, suggest that 1) these species behave similarly with respect to longline fishing, and 2) a deterrent that is effective for one species is likely to be similarly effective for all three. The use of specific data on the behaviors and mortality of Laysan and black-footed albatross, then, is a reasonable and prudent method of assessing and monitoring risk of measurable adverse effects and the use of measures to minimize wounding or killing of short-tailed albatross.

In 2002, the Service estimated the number of short-tailed albatross that may be killed as a result of the Hawaii-based longline fishery by comparing the number of individuals that may appear in the vicinity of the Hawaii-based longline fishing area with the estimated proportion of black-footed albatross that are killed by the fishery in this same area. We chose to compare the short-tailed albatross with black-footed albatross because both species are larger than the Laysan albatross and may outcompete Laysan albatross for food due to their size and behavior. Furthermore, NOAA Fisheries' observations of short-tailed albatross (March 1997 and February 2000) indicate that they were flying by primarily in the company of black-footed albatross. In March, 1997 a juvenile short-tailed albatross was observed in the company of about 30 black-footed albatross by a NOAA Fisheries' fishery biologist from the R/V Townsend Cromwell. During February 2000, a juvenile short-tailed albatross was observed in the company of 10-15 black-footed albatross by a NOAA Fisheries' fishery observer from a Hawaii-based longline fishing vessel.

Based on the analysis which follows, we expect a maximum of 1 short-tailed albatross per year to be killed or wounded sufficiently to significantly impair behavioral patterns of breeding, feeding or sheltering, as a result of the continued operation of the U.S. West Coast-based HMS fishery, as estimated using the methodology which follows. Based on the NOAA Fisheries (1998) report, "Seabird Take Estimates for the Hawaiian Longline Fishery 1994-1996," we can estimate the number of birds (Laysan and black-footed albatross) per thousand hooks that are killed in the U.S. West Coast-based HMS fishery. We acknowledge that those rates are not exactly comparable to the entire population of short-tailed albatross because of inter-species differences, including breeding colony location and the resultant difference in distribution; however, they provide a basis for estimating likely adverse effects to short-tailed albatross for purposes of this consultation.

The following discussion summarizes the methods, assumptions, and calculations used by the Service to estimate the wounding or mortality of short-tailed albatross in this biological opinion. The estimation of the actual number of injured or killed short-tailed albatross resulting from implementation of the proposed action is a function of several factors. These factors include: (1) the total population size of the species (population number, N); (2) the proportion of the population that may be exposed to the sources of injury or mortality (availability, A); the proportion of exposed individuals that may be injured or killed by the proposed fishing activities (fishery injuries or mortalities per 1,000 hooks, R); and, the proportion of injuries or mortalities attributable to specific, authorized methods (extent, E). The estimated number of injuries and mortalities (T) likely to occur to short-tailed albatross from the fishery is calculated as the multiplication of these factors:

$$T = N * A * R * E.$$

The actual methodology and calculations as used in the estimation of mortality in the Hawaii-based longline fishery, including their derivation, are described in the Service's 2002 biological opinion for that action (Service 2002). That biological opinion forms the methodological basis, with minor modifications, for the estimation of mortality to short-tailed albatross likely to occur as a result of implementing the currently proposed action.

To apply this model to the currently proposed action affecting U.S. West Coast-based HMS longline fisheries, we applied currently available data from within the action area, where available. The application of the model, and the estimated mortality of short-tailed albatross from this fishery, are described as follows.

Because short-tailed albatross mortalities had not yet been observed in the Hawaii-based fishery, the model used by the Service (2002) to estimate mortality of short-tailed albatross by the commercial longline fishery hypothesized an annual mortality based on the average 1994-1998 annual black-footed albatross mortality, and assumed that the Hawaii-based fishery affects only the fraction of the short-tailed albatross population that is present within the area where that fishery operates.

The following discussion describes the information and data we used for purposes of this consultation to estimate the number of short-tailed albatrosses that are likely to be injury or killed as a result of implementing the proposed action, based on the species current population size (population number), the proportion of the rangewide population that may occur within the action area (availability), the rate at which the species could be injured or killed through interactions with longline gear in the action area (rate of injury or mortality), and the extent of the fishery when compared to known sources of injury and mortality (extent of the proposed action).

Population Number (N). We based our estimate of short-tailed albatross population number on a recent (Hasegawa, pers. comm. 2003) estimate of the population rangewide: 1,700.

Availability (A). Short-tailed albatross range from Torishima as far away as the Bering Sea, the Aleutian Islands and southern Alaska, the western coasts of Canada, the U.S. mainland and Mexico. The Service acknowledges that occurrences of short-tailed albatross in the Pacific are not necessarily evenly or randomly distributed throughout their range. However, we can use the generalized proportion of the range of the short-tailed albatross where it overlaps with the generalized area in which the U.S. West Coast-based HMS fishery operates to derive a crude estimate of the proportion of the short-tailed albatross (subadult and adult) population which may be vulnerable to U.S. West Coast-based HMS fishing activities.

The range-wide distribution of the short-tailed albatross is approximately 4,040,441,000 hectares. Because most observations of short-tailed albatross in the action area occur in the vicinity of the coastal waters of the North American continent, an "oceanic flyway" may exist between the breeding colony and North America. However, most efforts to observe and record locations of short-tailed albatross also occur disproportionately in the vicinity of coastal waters. In addition, the distribution of HMS fishery effort is also not uniformly distributed across the species range within the action area. It is impossible to determine, without additional study, any unbiased correction factor by which the overall density of the species may be adjusted to support a more precise estimation of albatross distribution in the action area. The Service can only estimate the proportion of the total short-tailed albatross population that may transit through this general area. For purposes of this consultation, the Service assumes no particular distribution of the species across the action area within its known range, nor does the Service presume any particular similarity between the distribution of the species and the distribution of fishing effort within the action area.

We adjusted the availability data to calculate the proportion of the total short-tailed albatross population that might occur within the area in which the U.S. West Coast-based HMS longline fishery operates. We derived this number by estimating the proportion of the range of the short-tailed albatross that overlaps the assumed action area (all portions of the Pacific Ocean east of 160° W longitude and north of the equator). The resulting assumed area of overlap (approximately 1.21 billion hectares) represents approximately 30 percent of the 4.04 billion hectares within the total range-wide distribution of the species. The Service acknowledges the actual area of the north Pacific Ocean that may be used by U.S. West Coast-based HMS longline fisheries can only be approximately determined. We also acknowledge that the actual use of the area by the fisheries is not uniformly distributed across this estimated 1.21 billion hectares. However, we believe our estimate to be a reasonable approximation of the fraction of the short-tailed albatross population that overlaps with the U.S. West Coast-based HMS longline fishery for purposes of this consultation.

The Service understands that the U.S. West Coast-based HMS fishing fleet may operate, on occasion, well beyond this area (*e.g.,* in the western Pacific Ocean). Therefore, this analysis is a best-estimate calculation of mortality that may occur due to the U.S. West Coast-based HMS fishery, based on the assumption that the longline fishing effort west of 160° W longitude is an insignificant component of the overall fishing effort of this fleet.

The estimated number of individuals in the worldwide population of black-footed albatross is about 277,675 (E. Flint, Service, pers. comm. 2000, as cited in Service 2002). This estimate is based on calculations and assumptions (including survivorship and reproductive success) in Cousins and Cooper (2000). Using these methods and assumptions, we determined that there are approximately 138,963 breeders and about 138,712 non-breeders in the population. This estimate is based on the proportion of the black-footed albatross world population (95 percent) that was counted in 1999.

Rate of Injury or Mortality. Using the average of the total estimated kill figures for the years 1994-1998, we initially estimated (Service 2000) the percentage of the black-footed albatross population killed in the Hawaii-based longline fleet over time. The 5-year average annual mortality estimate for black-footed albatross by the Hawaii-based longline fishery is about 1,831. Thus, an average of approximately 0.66 percent (1,831/277,675) of the total black-footed albatross population is killed each year by the Hawaii-based longline fishery.

We estimated that 6,681-10,219 black-footed albatross (sum of 95 percent prediction intervals calculated for data collected by fisheries observers) were killed by Hawaii-based longliners fishing for both tuna and swordfish between 1994 and 1999[4]. The average annual rate of mortality predicted for the black-footed albatross, in proportion to its population size, and an adjustment for the suspension of shallow-set longlining, are used as proxy variables for determining the risk of incidental mortality for the rare short-tailed albatross. Shallow set longlining was calculated to account for approximately 60 percent of the estimated mortality of albatross in the fishery. Mixed set longlining, which includes sets with varying proportions of shallow and deep lines, accounts for an addition 39 percent of the estimated mortality in the fishery. Only approximately one percent of mortality is attributable to deep sets Service 2002).

The Service (2002) adjusted (R) to reflect data on the fall-off or removal (by sharks or other scavengers) of hooked birds prior to the haulback. Studies of fall-off in other regions and in draft study reports were cited in the 2000 and 2002 biological opinions (Service 2000, Service 2002). The Service adjusted (R) in this biological opinion to reflect new data on the fall-off or removal of hooked birds prior to the haulback, based on data in the Hawaii longline fishery. Gilman *et al.* (2003) reported the fall-off and removal rate at 28 percent of the estimated fishery mortality. This fall-off and removal affects the rate of fishery mortality to seabirds by underestimating the actual number of seabirds killed by longline fishing. By accounting for this effect, the rate at which the fishery mortality to seabirds actually occurs can be estimated more accurately. The 5-year average annual mortality of black-footed albatross by the Hawaii-based longline fishery operating without seabird deterrents is estimate as 2,543 birds (1,831 birds, adjusted by a fall-off or removal rate of 28 percent) divided by the estimated population size of 227,675 birds. This

[4] Data from NOAA Fisheries' SWFSC Honolulu Laboratory, as cited in WPRFMC (2002). A model of estimated mortality that includes data collected since 1998, and adjusted for suspension of swordfish-target operations, is not yet available.

translates to approximately 1.12 percent (a proportion of 0.0112) of the population of black-footed albatrosses being lost each year to this fishery.

This estimate is based on the Hawaii-based fishery that set an average of 13,443,060 longline hooks each year during the period 1991-1998. The number of hooks set during this period ranged from a low of 10,946,721 (1992) to a high of 17,365,852 (1998). The U.S. West Coast-based fishery is likely to set far fewer hooks. NOAA Fisheries reports an average of 900,381 longline hooks set each year during the period 1995-2002 by U.S. West Coast-based longline fisheries. The number of hooks set during this period ranged from a low of 251,704 (1995) to a high of 1,608,593 (2000).

The August 2003 proposed FMP states that current annual fishing effort by the fleet is 1.5 million hooks. However, based on fishing effort during the last two years, NOAA Fisheries has determined that an expected annual deployment of 1 million hooks is more representative of effort likely to occur under full implementation of the proposed FMP. NOAA Fisheries does not expect this effort to change in the coming years, should the FMP be approved and implemented in full. This reduced number of hooks in the west coast fishery must be accounted for by an appropriate reduction in the likelihood of capture of albatross. Since the number of hooks set in the U.S. West Coast HMS longline fishery is approximately 7.4 percent (1,000,000/13,443,060) of that set in its Hawaii counterpart, the revised estimate of the proportion of the population injured or killed as a result of this proposed fishery, accounting for the estimated number of hooks set, is 0.00083 (0.0112 * 0.074).

<u>Extent of the Fishery (E)</u>. The action as proposed includes both deep set and shallow set longline fisheries. These methods constitute the methods for which the rate of fishery mortality to seabirds was calculated earlier in this section. Therefore, for purposes of assessing the overall injury and mortality of short-tailed albatross due to proposed shallow and deep set longline fisheries in U.S. West Coast-based HMS longline fisheries, the factor (E) is one (1.0).

The information and data described above provide the basis for the Service to estimate the number of short-tailed albatross that would likely be subject to injury or mortality per year as a result of interactions with the U.S. West Coast-based HMS longline fishery. The factors described in detail above are summarized below as support for the calculation which follows:

Population (N) = 1,700 birds	Based on Hasegawa's 2003 estimate of the short-tailed albatross population (pers. comm. 2003, as cited in NOAA Fisheries 2003).
Availability (A) = 0.30	Estimated as the proportion of the short-tailed albatross population that overlaps with the U.S. West Coast-based longline fishery, and could be subject to interaction with longline fishery.
Fishery mortality (R) = 0.00083/yr	Based on the 5-year average of the estimated annual mortality rate of individual black-footed albatross by the

Hawaii-based longline fishery operating without seabird deterrents, adjusted for fall-off/removal, and reduced number of hooks in the U.S. West Coast fishery.

Extent of the fishery (E) = 1.0 — The proportion of the original estimated mortality calculated to occur as a result of tuna (deep-set), swordfish (shallow-set), or mixed-set longline operations.

The number of injuries and mortalities (T) likely to result in mortality of short-tailed albatross from proposed U.S. West Coast-based HMS deep- and shallow-set longline fishing is estimated as:

Mortality (T) = 1,700 * 0.30 * 0.00083 * 1.0 = 0.41 short-tailed albatrosses per year.

The resulting estimated mortality of short-tailed albatross in the U.S. West Coast-based HMS longline fishery is 0.41 animals. Through informal discussions between NOAA Fisheries and Service staff during 2002, the agencies agreed, in part because these estimates are based on various assumptions, that any fractional results of a quantitative estimate of mortality should be rounded up to the next whole number. Thus, in this case, the Service conservatively determines that the U.S. West Coast-based HMS longline fishery (shallow set and deep set) may result in the mortality of one (1) short-tailed albatross per year.

The available evidence indicates that shallow set longline results in far higher numbers of albatross interactions during setting and hauling operations (Service 2000), and results in far more injuries and mortalities to seabirds, than do deep sets. In an effort to determine the relative contribution of shallow sets to the estimated mortality of short-tailed albatross, we have recalculated our estimate of mortality based solely on the extent of interaction associated with shallow and mixed sets. To use this model to estimate short-tailed albatross mortality in the shallow-set-only portion of the U.S. West Coast-based HMS longline fishery, the Service estimated the extent of the proposed action (E) to account for the shallow- and mixed-set fishery:

Extent of the proposed action (E) = 0.993 — The proportion of the original estimated mortality calculated to occur as a result of swordfish (shallow-set or mixed-set) longline operations, based on the 1994-98 average rate per set at which albatross were killed in tuna-target (deep) sets (approximately 0.7 percent; Service 2000, p. 37).

The modified calculation is as follows:

Mortality (T) = 1,700 * 0.30 * 0.00083 * 0.993 = 0.41 short-tailed albatrosses per year.

The resulting estimated mortality of short-tailed albatross in the U.S. West Coast-based HMS shallow-set longline fishery is 0.41 animals (1, when rounded to the nearest whole number as described earlier). As expected, the vast majority of mortality associated with the proposed action is attributable to the swordfish (shallow set) longline fishery, and that the tuna (deep set) fishery contributes a very small risk of injury or mortality to short-tailed albatross.

NOAA Fisheries recently proposed a rule prohibiting the use of shallow-set longline fishing east of 150° W longitude for the purposes of reducing the mortality of sea turtles in this area. The effect of this rule would be to virtually eliminate shallow- and mixed-set longline fishing in the action area, as subject to this FMP and this consultation. Therefore, the level of mortality of short-tailed albatross in the action area is likely to be reduced proportionately. To account for this prohibition, the value for extent (E) for the proposed action is modified in the equation to 0.007, the proportion of albatrosses killed by tuna (deep-set) longline fishing. The calculation of mortality based on this new information is as follows:

Mortality (T) = 1,700 * 0.30 * 0.00083 * 0.007 = 0.003 short-tailed albatrosses per year.

Thus, the rate of mortality of short-tailed albatross resulting from activities proposed by this FMP, as modified by NOAA Fisheries recent decisions to prohibit shallow longline sets, is likely to be very low. Even allowing for a conservative rounding up to the nearest whole number, the Service does not anticipate the number of short-tailed albatross killed or injured per year to exceed one (1).

The rate at which HMS longline fishing results in the mortality of black-footed albatross (a surrogate species) forms the basis for the calculation of mortality for the short-tailed albatross. The rate of injury of black-footed albatross that did not result in immediate death is not included directly in the calculation of likely mortality of short-tailed albatross, and may represent a significant source of adverse effects to the species. This impact would be in the form of injuries serious enough to result in short-term or long-term debilitating injury that could reduce the lifespan of the injured bird, or reduce the reproductive potential of the injured bird or its potential mates.

The estimate of mortality alone has been calculated above as 0.41 short-tailed albatross per year. This figure has been conservatively rounded up to one (1) short-tailed albatross per year, as per agreement between the agencies, and forms the foundation for our finding of the effects of the action on this species. In estimating the amount of nonfatal injury on short-tailed albatross, the Service assumes that the rate at which individuals of the species suffer debilitating injuries would be not be more than the rate at which the species suffers mortalities from interactions with the longline fishery, after adjustment for fall-off or removal by scavengers. If true, this suggests that the total rate of mortality plus injury of short-tailed approaches 0.82 albatross per year. As already noted, a conservative rounding up of this figure results in an identical estimate of one (1) short-tailed albatross killed by the longline fishery per year. Thus, accounting for an assumed rate of injury to short-tailed albatross equal to the observed mortality rate does not alter the Service's overall conservative estimate for the species as calculated strictly from mortality rates, and does not alter the effects of mortality on the overall conservation of the species as described later in this document.

The estimate of serious injury plus mortality in the absence of shallow-set longline fishing, under the assumptions discussed above, would be approximately 0.006 short-tailed albatross per year. Similar to the previous discussion, accounting for serious injury does not increase the total estimate (one) of injury plus mortality per year for this species, when accounting for rounding up to the next whole number.

Effects from Fishing Methods Other than Longline

Other fishing methods covered under this proposed action (drift gillnet, purse seine, commercial hook and line, and recreational) have a lesser potential to result in injury or mortality of short-tailed albatross than longline fishing. While no injuries or mortalities of this species has been documented, to our knowledge, from purse seine, harpoon, commercial hook-and-line, or recreational fisheries in the area of the U.S. West Coast-based HMS fishery, the possibility of adverse effects rising to the level of injury or mortality has at least a low likelihood of occurrence. Short-tailed albatross could become entrapped in a purse seine during foraging activities near such vessels, especially in situations where bait fish may be forced to the surface by tuna and other target HMS species. Commercial hook-and-line and recreational fisheries have some potential to injure or kill short-tailed albatross similarly to pelagic longline activities, albeit on a much reduced scale, should short-tailed albatross attempt to steal baits from fishing gear near the sea surface.

While the Service believes that some potential for significant adverse effects due to injury or mortality from these fishing methods is a valid concern, to date no mortalities have been observed or documented in the action area. The risk is assumed to be quite low, likely to be not more than one (1) short-tailed albatross over the foreseeable future. Therefore, while acknowledging this risk of injury or mortality, the Service is not prepared at this time to quantify adverse effects due to drift gillnet, purse seine, harpoon, commercial hook and line, and recreational fisheries, other than to conclude that no more than a single mortality is likely to occur from these combined methods during the life span of this consultation.

The expected mortality of short-tailed albatross associated with U.S. West Coast-based HMS longline fisheries was estimated, above, to be 0.41 per year. This value was conservatively rounded up to one (1) short-tailed albatross per year. The admittedly minor additional risk of mortality of albatross from methods other than longline would not alter the already somewhat conservative estimate of likely adverse effects for the species. Therefore, the expected level of mortality of short-tailed albatross for all fishing methods associated with the U.S. West Coast-based HMS fishery would be one (1) per year.

Species Response to the Action

The Service's finding relies substantially on the effects that such a loss would have on the species reproductive capability and its ability to recover in a reasonably short period of time. The following population viability analysis was described in detail in the 2002 biological opinion (Service 2002), and was used to support the finding in that biological opinion. It is applied here, incorporating action-specific information as applicable, to lend support to our finding for the currently proposed action.

Population Viability Analysis

In an effort to better understand the impacts of the fisheries' likely adverse effects on the short-tailed albatross population that breeds on Torishima Island, the Service prepared, in 2002, a preliminary Population Viability Analysis (PVA). Data and general information for this analysis was obtained from Hiroshi Hasegawa (pers. comm. 2000, as cited in Service 2000) and from Cochrane and Starfield (in press). The PVA was done using VORTEX Version. 7.2, which is produced and maintained by Robert Lacy, Department of Conservation Biology, Chicago Zoological Society, Brookfield Zoo and can be obtained at no cost at the internet web page: http://pweb.netcom.com/~rlacy/vortex.html.

The PVA used the following values as the best available data on the current life-history traits of Torishima Island short-tailed albatross. Variances and average values for juvenile and adult mortalities, and for breeding rate of adults were obtained from Cochrane and Starfield (in press).

Age at first reproduction for males and females = 7 years
Maximum life span = 50 years
Annual fecundity = 1 egg
Initial population size = 1,170 birds in a stable age distribution
Breeding rate of adults = 75 ± 10 percent of all adults breed each year

Baseline Adult and Juvenile Survivorship:

1. Annual Adult Survivorship = 95.5 percent (4.5 percent mortality) ± 2.0 percent.
2. Annual Juvenile Survivorship = 91.0 percent (9 percent mortality) ± 4.0 percent ; note that this is for years 1-7.
3. Year 0-1 Survivorship = 56.2 percent (43.8 percent mortality) ± 5.8 percent This is determined from the first 6 months of survivorship from egg to fledgling and survivorship of juveniles during the first 6 months of juvenile life. Survival from egg to fledgling is determined from Hasegawa's data for years (1980-1996) without storms (58.9 ± 7.742 percent); very similar to the Cochrane and Starfield (in press) estimate of 55 percent average for nest success rate. Survivorship of juveniles during the first 6 months of juvenile life is the same as the baseline juvenile survivorship.

The PVA has not been updated for this consultation to include more recent estimates of short-tailed albatross population size, age composition, or survivorship. Since the population has continued to increase since development of this initial PVA, the Service assumes that the conclusions reached in this PVA would continue to hold true, for purposes of this consultation. Further, the Service assumes that a comparison of expected injury and mortality rates resulting from implementation of the proposed action with projected juvenile and adult mortality rates remains valid.

It should be noted that there are no available data on variances in the mortalities of juvenile and adult short-tailed albatross. Consequently, the comparatively low variances given above may underestimate real-world fluctuations in the size of the Torishima Island population. This underestimate may be compounded by the fact that the impacts of tropical storms or the potential eruption of the Torishima volcano are not specifically addressed in this PVA. A brief examination of Hasegawa's data indicates that storms can reduce breeding success by approximately 15 percent. A volcanic eruption on or near Torishima Island during the breeding season could have catastrophic effects on breeding success for that year or future years, and may also result in the death of many of the adult birds sitting on nests at the time of the eruption, as occurred during previous eruptions. These factors should be taken into consideration when evaluating the long-term dynamics of the short-tailed albatross population.

Fisheries-related kills are a significant factor in juvenile and adult short-tailed albatross mortality. Of the 7 observed kills in the Alaska fishery, 6 were juveniles and 1 was an adult. Fishery related kills were modeled as increases in juvenile and adult mortalities. These increases were maintained at the observed 6 to 1 ratio and were modeled at five levels:

- 9 percent annual juvenile mortality and 4.5 percent annual adult mortality (current mortality estimates);
- 11 percent annual juvenile mortality and 4.83 percent annual adult mortality;
- 13 percent annual juvenile mortality and 5.17 percent annual adult mortality;
- 15 percent annual juvenile mortality and 5.5 percent annual adult mortality;
- 17 percent annual juvenile mortality and 5.83 percent annual adult mortality.

The population size results for these varying levels of mortality are presented in Attachment G.

While the PVA analysis indicates that the Torishima Island short-tailed albatross population is resilient, it is apparent from the analysis that impacts from fisheries represent a significant hurdle to reestablishing a large population with multiple breeding sites, the historic condition of this species (see Attachment G: PVA of the effects of fisheries related mortality on juveniles and adults). The PVA analysis also indicates that relatively small increases in the mortality of juvenile and adult birds can significantly slow population growth:

- A 2 percent increase in the annual juvenile mortality (total 11 percent) and a 0.33 percent increase in the annual adult mortality (total 4.83 percent) will increase the time to double the current population from approximately 16 years to 21 years;
- A 4 percent increase in the annual juvenile mortality (total 13 percent) and a 0.67 percent increase in the annual adult mortality (total 5.17 percent) will increase the time to double the current population from approximately 16 years to 27 years.
- A 6 percent increase in the annual juvenile mortality (total 15 percent) and a 1 percent increase in the annual adult mortality (total 5.5 percent) will increase the time to double the current population from approximately 16 years to 50 years.
- An 8 percent increase in the annual juvenile mortality (total 17 percent) and a 1.33 percent increase in the annual adult mortality (total 5.83 percent) will increase the time to double the current population from approximately 16 years to 130 years.

- If annual mortality increases by more than 8 percent for juveniles and 1.33 percent for adults, then the species will most likely go extinct, given the conservative parameters used in the model.

As indicated above, there is a significant jump in the time required to double the current population size when juvenile and adult mortalities exceed 13 percent and 5.17 percent, respectively: a 4 percent increase in the annual juvenile mortality (total 13 percent) and a 0.67 percent increase in the annual adult mortality (total 5.17 percent) increases the time to double the current population by approximately 6 years, whereas a 6 percent increase in the annual juvenile mortality (total 15 percent) and a 1 percent increase in the annual adult mortality (total 5.5 percent) increases this time by approximately 23 years. An 8 percent increase in the annual juvenile mortality (total 17 percent) and a 1.33 percent increase in the annual adult mortality (total 5.83 percent) increases the time to double the current population by approximately 80 years. Consequently, annual juvenile and adult mortalities that do not exceed 13 percent and 5 percent, respectively, for the Torishima Island population, should sustain the short-term rebuilding of this species.

In evaluating long-term growth of the short-tailed albatross population, it is important to note that the population growth trajectories discussed above continue to diverge through time. For instance, growth to a population size of 15,000 birds will require approximately 58 years at current levels of mortality. A 2 percent increase in the annual juvenile mortality (total 11 percent) and a 0.33 percent increase in the annual adult mortality (total 4.83 percent) will increase the time to reach 15,000 birds by approximately 21 years; a 4 percent increase in the annual juvenile mortality (total 13 percent) and a 0.67 percent increase in the annual adult mortality (total 5.17 percent) will increase this time by approximately 50 years. Consequently, a total annual mortality of around 11 percent for juveniles and 4.83 percent for adults might include both short-term reductions in population growth and longer-term rebuilding of the historic short-tailed albatross population.

Additional breeding sites can greatly assist in the rebuilding of the short-tailed albatross population from its dangerously small current size. More importantly, increasing the number of breeding sites will ameliorate the effects to the species' population of any future catastrophic eruption of Torishima, and active volcanic island subject to irregular and sometimes catastrophic eruptions as recently as 2002. Establishment of additional short-tailed albatross breeding sites should be considered on Pacific islands that can be managed to protect the birds. The NWHI that are on secure Service Refuge lands are an example of potential breeding sites. These U.S.-owned islands are currently managed to protect seabirds and represent a unique opportunity for conservation of short-tailed albatross. Additionally, known historic sites should be evaluated as possible sites for reintroduction of short-tailed albatross. Current loss of reproductive contribution, or a small increase in loss, due to adverse effects by the fisheries may slow the building of the short-tailed albatross population, and new sub-populations would aid in buffering the species from stochastic processes or increased fisheries takings.

According to information provided by Hasegawa (pers. comm. 2003), the estimated rangewide current population size of short-tailed albatross is 1,700 birds; approximately half are juveniles and half are adults. Based on the PVA and its assumptions, an annual level of death of about 81.9 sub-adults (17 percent mortality) and 11.7 adults (5.83 percent mortality) would lead to eventual extinction of the species. Additional data may change the assumptions of our analysis. However, because the current annual estimated loss of reproductive contribution (*i.e.,* 1 short-tailed albatross [U.S. West Coast-based HMS (Service 2003)] + 1 short-tailed albatross [Hawaii-based longline fishery (Service 2002)] + 2 short-tailed albatross [Alaska] = 4 per year) due to adverse effects by U.S. fisheries falls short of those levels, the U.S. West Coast-based HMS fishery may slow population growth of the species, but is not anticipated directly or indirectly to cause an appreciable reduction in numbers (*i.e.,* the rangewide population) or distribution of the short-tailed albatross.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

A potential for oil spills exists in the action area which could affect short-tailed albatross or brown pelicans. Service refuge managers and biologists stationed at Midway Atoll NWR, Tern Islet (French Frigate Shoals) and Laysan Island - Hawaiian Islands NWR have observed that some seabirds from local breeding colonies die from oil-related impacts. The sources of the oil spills are unknown. However, it is speculated that oil released on the high seas by vessels transiting the Pacific Ocean may be responsible for some oil-related injuries. Vessels that have sunk or been damaged in the action area may periodically release oil from fuel tanks. Historically, oil spills have occurred along the west coast of North America and south coast of Alaska from a variety of sources, including shipwrecks and oil well blowouts. To date, no known deaths of short-tailed albatross can be directly attributable to oil contamination, although a significant threat exists. Brown pelicans remain vulnerable to oil spills along the west coast of the U.S. and Mexico. The Service is currently in informal consultation with the Environmental Protection Agency and the U.S. Coast Guard concerning the proposed use of chemical dispersants to disperse spilled oil within the EEZ off the coast of California. This methodology has some potential to lower the risk of contamination of seabirds, including albatross and pelicans, from oil spills.

Discarded plastic cigarette lighters and light sticks that drift away from longline gear, among other plastic debris, float in the water column and are consumed by seabirds while they are foraging. The ingestion of plastic may compromise seabirds and result in dehydration and starvation, intestinal blockage, internal injury, or exposure to dangerous toxins (Cousins 1998; Sievert and Sileo 1993). Both Laysan and black-footed albatross that occur within Hawaiian waters have been documented to be impacted by plastic debris (WPRFMC 1998).

Drift and trawl nets accumulate in the action area, and entangle protected species such as sea turtles, the Hawaiian monk seal and seabirds. As long as fisheries continue to lose fishing gear, protected species will continue to become entangled.

Japanese, Taiwanese, Korean and other fishing nations operate longline and other fishing vessels in areas which overlap with the known range of the short-tailed albatross and may interact with the short-tailed albatross. However, these nations do not report the rate at which seabirds are caught on longline or other gear.

West coast-based longline vessels targeting swordfish using shallow sets represent only a small fraction of pelagic longline effort in the North Pacific. Albatross will continue to be injured or killed by Japanese, Taiwanese and Korean longliners operating in the same vicinity. These 3,000+ vessels represent a significant threat to North Pacific albatross as they do not currently use deterrent measures as a standard practice. Although several multilateral fishery bodies and agreements identify cost-effective methods to significantly reduce the incidental catch of seabirds in longline fisheries, very few international or national fishery management organizations require longline fishers to employ these mitigation measures.

In order to estimate seabird bycatch rates, foreign vessels should report the rate at which seabirds are caught per thousand hooks fished. Without this information, the Service cannot estimate the fishery-related adverse effects that these fishing nations may have on the short-tailed albatross. At this time, there is not enough information about these activities and their impacts on short-tailed albatross to determine the level of impact they might have on the species.

Torishima Island, the largest and most productive of the two breeding colonies for short-tailed albatross, is volcanic in origin, and continues to erupt on an irregular basis. A minor eruption occurred as recently as 2002, with minor effects to the nesting colony. A major eruption, such as occurred in 1902 and 1939, at any time in the foreseeable future could have catastrophic effects on the breeding population, or on the ability of the surviving individuals to reproduce. Any significant reduction of the species rangewide population from mortality or failure to reproduce at Torishima could substantially alter the baseline of the species, and exacerbate the effects of injuries or mortalities resulting from HMS fisheries. Since eruptions of Torishima are not predictable in time or magnitude in the foreseeable future, the Service at this time cannot determine through any quantitative method the risk to the species from this threat, but may need to address the changed baseline of the species should a significant future eruption occur.

Ongoing efforts by researchers to improve habitat on Torishima and establish a second nesting colony on the island will improve and secure future reproduction by the species. Although the species does not appear to be limited by current nest site availability, habitat restoration efforts have reduced the incidence of nest, egg, and chick loss from rain-induced landslides. Establishment of a second nest colony on Torishima will also reduce the risk of catastrophic loss of the nesting colony during a major eruption of this volcanic island. These efforts continue to provide incremental improvement to the baseline of the species.

substantially delay the rate at which the species could recover in the absence of this injury or mortality.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be a prohibited taking under the Act provided such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NOAA Fisheries so that they become binding conditions of any authorization of the fishery as appropriate, for the exemption in section 7(o)(2) to apply. NOAA Fisheries has a continuing duty to regulate the activity covered by this incidental take statement. If NOAA Fisheries (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NOAA Fisheries must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(I)(3)].

Brown Pelican

Amount or Extent of Take Anticipated

The number of brown pelicans that interact with the fisheries covered under the FMP at any given time is the combined result of breeding success, weather, and seasonal changes in their movements. There is a reasonable likelihood that mortality or wounding may occur during interactions with the HMF fisheries, as described in the Effects of the Action section of this biological opinion. However, the potential for such an incident to occur is difficult to quantify without observer data.

The Service acknowledges the uncertainty of any estimate of wounding or mortality of brown pelicans associated with the HMF fisheries, in particular the recreational fishery. At this time, with the currently available data, a precise estimate of the current rates of interaction between brown pelicans and the recreational fishery cannot be made. Some background rate of interaction between the species and this partially regulated fishery currently exists that leads to injury and mortality of individual pelicans.

Based upon the information presented by NOAA Fisheries in the biological assessment and FMP/FEIS, we anticipate that several brown pelicans will be killed or wounded during interactions with the fisheries in any given year. Estimating a precise number is extremely difficult because of the variation in numbers of brown pelicans at sea at any one time and the unpredictability of brown pelican interactions with fishing activity.

The Service will not refer the incidental take of any migratory bird (in this case, brown pelican) for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Effect of the Take

The Service cannot provide a precise estimate of the number of brown pelicans per year may be taken in the form of killed or wounded birds as a result of the proposed action. The bird's behavior and distribution in the area of the west coast-based HMS fishery, when considered with the limited available information regarding their interactions with the fishery, make it difficult to estimate the precise number of brown pelicans that may be injured or killed by the proposed activities. We anticipate that some number will be killed or injured when hooked by fishers, and that some of these injuries will be debilitating, resulting in some loss (although possibly not measurable) of reproductive fitness or in some number of future mortalities.

The Service is unable to anticipate with a high level of certainty the precise number of brown pelicans likely to be injured or killed by the proposed action, however, we are concerned that the recreational fishery in particular is likely to result in take of this species. Therefore, as a means of monitoring and testing the assumptions of this analysis, NOAA Fisheries must reinitiate consultation if 100 brown pelicans have been hooked by HMS fishing activities, or if 40 brown pelicans suffer debilitating injuries or are killed by HMS fishing activities, or five years after initial implementation of the FMP, whichever comes first. We believe that if this level of take is observed during HMS fishery activities, it will surpass the estimates by NOAA-Fisheries regarding the number of brown pelicans that are being taken by this fishery. Observer coverage will likely be limited to a small sample of HMS boats. So, as an example, if observer coverage occurs on 5 percent of the HMS charter fishing vessels, reinitiation will be required if 5 brown pelicans have been hooked by HMS fishing activities, or if 2 brown pelicans suffer debilitating injuries or are killed by HMS fishing activities. The Service recommends that NOAA-F reinitiate consultation in advance of exceeding the exemption limit identified above. At the time of reinitiation, it may be appropriate to consider whether any additional protective measures are required to minimize the amount or extent of take of brown pelicans.

The Service does not believe that this level of take is likely to result in jeopardy to the species, nor will it result in destruction or adverse modification of critical habitat, as critical habitat is not designated in the project area.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the amount or extent of the incidental take of brown pelicans during fishing activities covered by the FMP:

I. NOAA Fisheries must use well-defined operational procedures, monitoring and education programs.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, NOAA Fisheries must comply with the following terms and conditions, which implement the reasonable and prudent measures described above for brown pelican, and specify reporting requirements. These terms and conditions are non-discretionary.

The following terms and conditions implement reasonable and prudent measure I:

I.A. NOAA Fisheries will develop and distribute pamphlets or other educational materials to inform recreational fishermen about the impact of hook and line injuries to brown pelicans and other seabirds within one year of implementation of the HMF plan. These pamphlets must also give step-by-step instructions for removing hooks and fishing lines from entangled birds. The materials will be prepared in coordination with Service personnel and the Service will be provided with copies of all such materials.

I.B. NOAA Fisheries shall develop and implement, in coordination with the Service, during the first six months of program implementation, an at-sea observer program that will provide a consistent focused observation methodology to record and report any instances of brown pelicans becoming hooked or otherwise interacting with fishing gear in a manner that may result in injury or mortality of pelicans. NOAA-F will, in coordination with the Service, develop data forms that will record specific, critical data elements by which the Services can evaluate the nature and possible impact of any interactions; and to develop criteria by which interactions can be characterized as to the nature and seriousness of any resulting injury to the pelican and the likelihood of mortality. In carrying out this term and condition, NOAA Fisheries also will seek changes in the MRFSS program to ensure that observers under that program collect and report information on HMS fishery interactions with brown pelicans. Once the observer program is in place, NOAA Fisheries shall report the results to the Service annually on or before April 1, including an annual summary of all interactions with brown pelicans recorded by any observers placed on any HMS fishing vessels under provisions of the FMP.

I.C. NOAA Fisheries shall report annually on or before April 1 of the year following the reporting year, or such date as mutually agreeable to NOAA Fisheries and the Service, the observed and estimated total number of interactions of brown pelicans, and observed take of brown pelicans, by fishing set type.

Short-tailed Albatross

Amount or Extent of Take Anticipated

The Service anticipates that one (1) short-tailed albatross per year may be taken as a result of the U.S. West Coast-based HMS fishing activities regulated by NOAA Fisheries. The incidental take is expected to be in the form of wounded or killed short-tailed albatross. Because the Service defines take of short-tailed albatross to include wounding or killing resulting from physical interaction with longline gear or other authorized methods, it is not necessary to have a dead bird in hand to document take. The record of a short-tailed albatross physically interacting with gear and being hooked, entangled, and/or obviously killed is sufficient.

The Service expects that documentation of this take may be a rare event because of the incomplete observer coverage (about 12 percent during the 2002 season for the Hawaii-based fishery) but the increase in observer coverage in the past two years and the dedication of a proportion of observers to seabird observation north of 23° N latitude is a significant improvement over historical rates of coverage. The Service considers the observation of a short-tailed albatross in the vicinity of the vessel, actively looking for food, to represent an unknown number or index of short-tailed albatross that may be taken in the U.S. West Coast-based HMS fishery. Given NOAA Fisheries' historically low level of observer coverage and the absence of reported observed takes of short-tailed albatross by the U.S. West Coast-based HMS fishery, the Service is not able to calculate the rate at which short-tailed albatross attempt to forage for bait on hooks (strike a hook), or the number of birds actually killed or injured that these observations may represent. Because an interaction is a behavior that has been documented to precede take in the form of injury or mortality in Laysan and black-footed albatrosses, such interactions must be recorded, although for the purposes of this biological opinion an interaction does not necessarily constitute a take of a short-tailed albatross.

Due to the low rate of observer coverage in this fishery, the Service assumes that any observed or reported injury or mortality of short-tailed albatross attributable to the U.S. West Coast-based HMS fishery may represent the occurrence of up to several potential injuries or mortalities that may have gone unobserved or unreported. Documented injury or mortality of short-tailed albatross, based on the low rate of observer coverage, suggests that additional analysis of the effects of such take may be warranted if documented injury and mortality approach the anticipated annual rate of one per year.

The Service will not refer the incidental take of any migratory bird (in this case, short-tailed albatross) for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§703-712), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

Effect of the Take

The Service has estimated that one (1) short-tailed albatross per year may be taken as a result of the proposed action. This is only an estimate, based on certain assumptions relative to the bird's behavior and distribution in the area of the U.S. West Coast-based HMS fishery and its possible interaction with the fishery.

The Service does not believe this level of take is likely to jeopardize the continued existence of the species, nor will it result in the destruction or adverse modification of critical habitat, as critical habitat is not designated in the project area.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize the impact of the incidental take of short-tailed albatross:

I. Minimize the attraction of short-tailed albatross to, and consequent interactions with, fishing gear used by the U.S. West Coast-base HMS longline fishery.
II. Monitor the level of take of short-tailed albatross, and the measures to minimize such take.
III. Maximize survivability of injured short-tailed albatross.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, NOAA Fisheries must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and specify reporting requirements. These terms and conditions are non-discretionary.

The following terms and conditions implement reasonable and prudent measure I:

I.A. Implementation Timeframe: NOAA Fisheries shall promulgate regulations that require U.S. West Coast-based HMS fishing vessels to comply with all seabird deterrent-related measures in the terms and conditions of this biological opinion, where said fishing activities overlap with the known range of the short-tailed albatross, whether fishing activities occur within the EEZ or in international waters (*e.g.*, high seas). Final regulations shall be implemented no later than April 1, 2005.

I.B. Seabird Deterrent Measures: NOAA Fisheries shall require and implement the following mandatory seabird-deterrent measures for all U.S. West Coast-based longline vessels, according to set type, within the general range of the species, including vessels operating north of 18° N latitude. For the purposes of this biological opinion, the Service adopts the NOAA Fisheries' definition of set types for both deep sets and shallow sets, when deploying Hawaii-based longline gear. This definition is described in the *Federal Register* (Vol.. 65, No. 214, November 3, 2000, pages 66186 - 66188).

Summary of Seabird Deterrent Measures by NOAA Fisheries-defined Set Type

Seabird Deterrent Measure	Tuna (Deep) Sets	Swordfish (Shallow) Sets
Thawed, blue-dyed baits	Required	Required
Strategic discharge of offal	Required	Required
Night setting	Optional	Required
Line setting w/ weighted branch lines	Required	Optional
Sidesetting of longlines	Required [1]	Required [1]
Weighted branch Lines (minimum 45gm)	Not Applicable	Optional [2]
Towed deterrent	Optional [2]	Optional [2]

[1] Sidesetting may be required, as needed, based on future fishery monitoring
[2] Described under discretionary conservation recommendations

I.B. NOAA Fisheries must require the U.S. West Coast-based longline fishers to employ the following mandatory measures, by set type, when setting and hauling the longline gear north of 18° N latitude:

a. Thawed, blue-dyed bait (required for deep and shallow sets):
An adequate quantity of blue dye must be maintained on board, and only bait dyed a color that conforms to WPRFMC/NOAA Fisheries' standards may be used. All bait must be completely thawed and dyed blue before the longline is set. Blue-dyed and thawed bait shall be employed by all U.S. West Coast-based longline vessels that conduct tuna (deep), swordfish (shallow) or mixed sets.

b. Strategic discharge of offal (required for deep and shallow sets):
While gear is being set or hauled, fish, fish parts or bait must be discharged on the opposite side of the vessel from which the longline is being set or hauled. All hooks must be removed from offal and spent baits prior to discharge. If a swordfish is landed, the liver must be removed and the head must be severed from the trunk, the bill removed and the head cut in half vertically. The heads and livers must be periodically thrown overboard on the opposite side of the vessel from which the longline is being set or hauled. Because the supply of offal may be low when fish catch rates are low or tuna are the target species, this mitigation method requires the preparation and storage of offal for use during the longline set. Discharge offal strategically shall be employed by all U.S. West Coast-based longline vessels that conduct tuna (deep), swordfish (shallow), or mixed sets.

c. Night setting (required for shallow sets):
The longline set should begin at least one hour after sunset and the set must be completed by sunrise, using only the minimum vessel lights necessary for safety. Night Setting shall be employed by all U.S. West Coast-based longline vessels that conduct swordfish (shallow) or mixed sets.

d. Setting machine with weighted branch lines (required for deep sets):
The longline must be set with a line-setting machine (line shooter) so that the longline is set faster than the vessel's speed. In addition, weights of at least 45 grams must be attached to branch lines within one meter of each baited hook. Setting Machine with weighted branch lines shall be employed by all U.S. West Coast-based HMS longline vessels that conduct tuna (deep) sets.

e. Sidesetting (required on a limited basis)
Sidesetting has been shown in limited trials to be a highly effective method to reduce interactions resulting in injury to or mortality of black-footed and Laysan albatross. This deterrent would likely similarly reduce the risk of take of short-tailed albatross. Due to the prohibition of shallow swordfish targeting sets under the FMP and associated rules, longline fishing is expected to decline considerably from recent years' levels and may cease altogether (it should be noted that regulatory changes in Hawaii may provide greater incentive for vessels to return to Hawaii in 2004). Thus, the future risk of take of short-tailed albatross is expected to be greatly reduced from that experienced under the longline fishing effort of the recent past. To assess this anticipated risk, NOAA Fisheries shall work with the Service to monitor effort in the longline fishery after implementation of the final rule so that the agencies can determine, based on fishery patterns after the final rule has been implemented, whether it is necessary and appropriate to require that a portion of the fleet use sidesetting machines in a carefully designed and monitored project. That project may also require testing of heavier weights (e.g., 60 gm per hook) than are required under the regulations implementing the FMP.

I.C. Annual workshops: NOAA Fisheries shall conduct workshops to inform fishers of the risk of mortalities in the U.S. West Coast-based HMS longline fishery to short-tailed albatross. At least one workshop will be conducted annually for each year in which longline fisheries occurs, beginning in 2004. The workshops will include: information exchange between NOAA Fisheries, the WPRFMC, and fishers about: (1) the use of effective seabird deterrent devices in the fishery, (2) proper handling and release techniques for protected species that have been hooked or entangled in fishing gear and found alive, and (3) status of the short-tailed albatross population and observations of the bird in the vicinity of the U.S. West Coast-based longline fishing area. Translations will be provided to Vietnamese, Korean, and Spanish speaking fishers, as needed, with regards to all educational materials distributed to vessel captains.

NOAA Fisheries annually shall report to the Service the results of each workshop with respect to the: (a) topics discussed (*e.g.*, seabird deterrent devices/strategies), (b) list of participants, ©) date, time and location of the workshop.

I.D. Albatross species identification card: Develop plastic-coated, weatherproof, cards that illustrate albatross species (*e.g.*, short-tailed, Laysan and black-footed albatross) for identification purposes, and distribute them to all fishers in the U.S. West Coast-based longline fishing fleet. The card should be translated to the Korean, Vietnamese, and Spanish languages, as needed, and distributed to those fishers whose first language is either Korean, Vietnamese, or Spanish.

The following mandatory terms and conditions implement reasonable and prudent measure II:

II.A. Annual reporting: NOAA Fisheries shall report annually to the Service the observed and estimated total number of interactions by Laysan, black-footed and short-tailed albatross with the setting and hauling of longline gear, and the observed take of short-tailed albatross by fishing set type *(i.e.,* deep sets [tuna] or shallow sets [swordfish/mixed] as defined by NOAA Fisheries). The limited number of U.S. West Coast-based HMS fishing vessels carrying observers combined with the rarity of short-tailed albatross would result in few data documenting the rate of interaction between the species and longline fishing activity. Such limited information would not provide the Service or NOAA Fisheries with sufficient information to gauge the effectiveness of the various combinations of seabird deterrent measures/devices. Therefore, it is appropriate to include data using surrogate species (*e.g.*, Laysan and black-footed albatross) that exhibit similar foraging behavior to the short-tailed albatross. NOAA Fisheries currently records observed interactions and estimates total number of interactions for these species.

In addition to reporting interactions and any take as noted above, NOAA Fisheries shall evaluate the effectiveness of seabird deterrent measures in reducing interactions with short-tailed albatross by measuring the rate at which Laysan and black-footed (and short-tailed, if any) albatross are caught by U.S. West Coast-based HMS fishing vessels. NOAA Fisheries shall evaluate and report on the effectiveness of the seabird deterrent regime on an annual basis.

Within three months from the end of each fishing season, or on a timeframe mutually agreeable to NOAA Fisheries and the Service, NOAA Fisheries will report to the Service on the effectiveness of seabird deterrent measures. The report shall include (by each trip observed and summarized over all trips observed) all reported observations and mortalities of Laysan, black-footed, and short-tailed albatross, including date, time, location, vessel, vessel type, vessel size, trip type (*i.e.*, swordfish, tuna, or mixed), gear description, total number of hooks deployed, total number of trips observed, and all observer or reported comments. Annual reports shall be submitted on or before April 1 of the year following the reporting year (*i.e.*, the report for the calendar year 2004 would be submitted by April 1, 2005, etc.), or on a date mutually agreed upon by NOAA Fisheries and the Service to:

Field Supervisor, U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata CA 95521; telephone (707) 822-7201, facsimile (707) 822-8411.

In the event a NOAA Fisheries' observer sights a short-tailed albatross during an observed trip, NOAA Fisheries shall make arrangements for the Service to interview the observer. The interview will occur no later than 30 days from the time the fishing trip ended. NOAA Fisheries shall make available to the Service copies of all information (*e.g.*, records, pictures) collected by the observer about the sighting.

II.B. (1). Observer coverage for short-tailed albatross and other endangered species: Due to the prohibition of shallow swordfish targeting sets, longline fishing is likely to decrease considerably from recent years' levels. Consequently, the risk of take of short-tailed albatross may be greatly reduced. However, NOAA Fisheries will continue to place observers on all longline vessels to ensure coverage of any longline fishing that occurs out of West Coast ports to record takes of sea turtles, seabirds, and other species of concern resulting from longline setting and hauling activities. NOAA Fisheries shall work with the Service to monitor effort in the fishery after implementation of the final rule so that the agencies can determine, based on fishery patterns after the final rule has been implemented, whether it is necessary and appropriate to require that a portion of the observer coverage for the fleet be specifically dedicated to observation of short-tailed albatross and other endangered species. If a short-tailed albatross is sighted on any trip, the observer shall record all behavior by the bird until it is no longer visible. NOAA Fisheries shall provide the Service with an annual summary of all observations and records of interactions with any species of albatross within 3 months of the end of each year.

(2). Observer coverage for short-tailed albatross and other endangered species: NOAA Fisheries' observers whose primary task is to observe short-tailed albatross and other endangered species shall observe all sets in which U.S. West Coast-based longline gear is deployed by the assigned vessel. Also, NOAA Fisheries' observers will observe at least every fourth haulback (*e.g.*, haulback #1, 5, 9 etc.), in its entirety, for short-tailed albatross and other endangered species. Details of specific seabird observer duties are described in II.C.

(3). Observer coverage for other endangered species and fishery related activities: NOAA Fisheries may employ observers whose primary duties may include observing other endangered species or fishery-related activities. As a secondary duty, these observers shall observe short-tailed albatross during longline gear deployment (set) and retrieval (haulback) to the maximum extent practicable, given their commitment to other primary duties. Details of specific seabird observer duties are described in II.C.

II.C. Short-tailed Albatross Observer Duties:

If, pursuant to II.B., it is determined by the Service and NOAA Fisheries that some portion of observer coverage should be dedicated primarily to seabird observations, the following duties apply to those observers dedicated to seabird observations. NOAA Fisheries shall deploy observers aboard U.S. West Coast-based HMS longline fishing vessels with the responsibility of recording seabird behavior and interaction with longline gear during the period of this consultation. In each class/cohort of fisheries observers trained, NOAA Fisheries in collaboration with Service personnel will identify qualified biologists that have received training or experience in ornithology, or extensive seabird observation experience, with emphasis on seabirds of the Pacific. NOAA Fisheries will ensure that these observers will be deployed on U.S. West Coast-based longline fishing vessels during regularly scheduled fishing trips at the rate described in II.B. above. If a trip is terminated prematurely, the observer will be placed aboard another U.S. West Coast-based longline fishing vessel as soon as possible. Observers will be placed on vessels that conduct a majority of their fishing operations within the known range of the short-tailed albatross. Observers will be placed aboard U.S. West Coast-based longline fishing vessels beginning with the implementation of seabird mitigation regulations for this fishery.

NOAA Fisheries' observers shall record sightings and behavior of short-tailed, Laysan and black-footed albatrosses during the set and haulback of the main line. Observers will record seabird sightings and behavior in the vicinity of the longline gear during longline setting operations, until the observer deems that seabirds are no longer observed in the vicinity of the deployed fishing gear or, in the case of night sets, that the observer can no longer distinguish between seabird species. Similarly, observers shall record seabird sightings and behavior in the vicinity of longline gear during longline haulback operations, until the observer deems that seabirds are no longer observed in the vicinity of the fishing gear being retrieved.

NOAA Fisheries' observers shall monitor sightings of short-tailed, Laysan, and black-footed albatrosses on or near longline gear. NOAA Fisheries' observers shall consider observations and takes of short-tailed albatross, and the observation of other threatened or endangered species, to be their first and second priorities, respectively, over other observer duties. The observer shall record the behavior of the short-tailed albatross and other seabirds observed, describing their location in relation to the longline gear, whether they attempt to strike at the gear to "steal bait," and whether they are either hooked onto or injured by the gear. The observer shall record their behavior, the species of each bird that attempts to strike at fishing gear, and record the number of strikes at the fishing gear per set and per haulback. The observer shall record the number of albatross, by species, that are hauled back on longline gear. The observer shall record whether the albatross was killed or injured during the haulback. If the albatross was recorded as injured, the observer shall describe the extent of the injury to the best of their ability. In addition to the above-mentioned information, written reports shall include: the date of the set, the type(s) of seabird deterrent measures used, weather conditions (wind velocity, visibility, and sea state), time set began and ended, latitude and longitude the set began and ended, number of hooks set, bait type (and whether it was frozen or thawed), amount of weight on hooks, number of birds within the vicinity of the vessel at the beginning of the set, bird behavior before and during set, time haulback began and ended, latitude and longitude haulback began and ended, a record of the number of birds, by species, touching the gear and their fate and condition. In the event a short-tailed albatross is taken, the handling guidelines shall be followed.

Written reports from the NOAA Fisheries' observer program will be submitted quarterly to: Field Supervisor, U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, CA 95521; facsimile (707) 822-8411; telephone (707) 822-7201. In the event that a short-tailed albatross is either taken or sighted, a written report containing all of the information described above shall be submitted to the same address within 60 days of the event or 14 days of the return of the vessel to port, whichever comes first. If a short-tailed albatross is taken, all details regarding the bird (as recorded on the short-tailed albatross recovery sheet) shall be included in this report.

In order to implement reasonable and prudent measure III, above, and as incidental take is permitted for this listed species, the following terms and conditions apply:

III.A. <u>Short-tailed Albatross Handling Guidelines:</u>

NOAA Fisheries shall advise fishers and observers that every reasonable effort must be made to save injured short-tailed albatross. If a short-tailed albatross is recovered alive, it must be retained until and unless it exhibits all of the following traits:

1. The bird is capable of holding its head erect, and the bird responds to noise and motion stimuli;
2. The bird breathes without noise;
3. The bird can flap both wings, and it can retract the wings to a normal folded position on the back; and
4. The bird is capable of elevating itself to stand on both feet, with its toes pointed in the proper direction (forward).

If a recovered albatross exhibits all of these traits, it should be held in a safe location until dry, and then released overboard. If the recovered bird fails to exhibit even one of the above traits, it must, by law, be retained aboard the vessel, and NOAA Fisheries contacted immediately. The U.S. Coast Guard may be contacted to facilitate communication between the vessel and NOAA Fisheries. The appropriate NOAA Fisheries personnel will be contacted at any one of the following telephone numbers (by availability, in the order listed)

Svein Fougner	562-980-4040
Donald Petersen	562-980-4024
Lyle Enriquez	562-980-4025

III.B. NOAA Fisheries shall instruct observers and fishers that every reasonable and safe effort must be made to recover any dead short-tailed albatross. Specimens shall be frozen immediately, with identification tags attached directly to the carcass, and a duplicate identification tag attached to the bag or container holding the carcass. Identification tags shall include the species name, date/time of mortality, name of vessel, location (latitude and longitude) of mortality, observer or captain's name (or both), and any band numbers if the specimen has a leg band. Leg bands must remain attached to the bird. The specimen should remain frozen at all times.

III.C. NOAA Fisheries shall inform observers and fishers that specimens must be surrendered as soon as possible to a NOAA Fisheries or Service office. Specimens must remain frozen and must be shipped as soon as possible to: Field Supervisor, U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 1655 Heindon Road, Arcata, CA 95521. This office should be contacted by telephone and/or fax prior to shipping any specimen. The contact numbers for the Arcata Fish and Wildlife Office are: (707) 822-7201 (telephone) and (707) 822-8411 (fax).

Summary of Reporting Requirements

Please note that the following is only a summary of reporting requirements. Reporting details are included in the terms and conditions above.

- NOAA Fisheries shall report to the Service the results of the annual workshop with respect to the: (a) topics discussed (*e.g.*, seabird deterrent devices/strategies), (b) list of participants, ©) date, time and location of the workshop (from Term and Condition I.C).
- NOAA Fisheries shall report annually on or before April 1 of the year following the reporting year, or such date as mutually agreeable to NOAA Fisheries and the Service, the observed and estimated total number of interactions of short-tailed, Laysan and black-footed albatross, and observed take of short-tailed albatross, by fishing set type (*i.e.,* deep set [tuna] or shallow set [swordfish/mixed] as defined by NOAA Fisheries) (from Term and Condition II.A).
- NOAA Fisheries shall evaluate annually the effectiveness of all required seabird deterrent devices by measuring the rate at which Laysan, black-footed, and short-tailed albatrosses are caught by Hawaii-based longline vessels, by set type (from Term and Condition II.A).
- NOAA Fisheries' observers shall record sightings of Laysan, black-footed, and short-tailed albatrosses during the set and haulback of the main line (from Term and Condition II.C).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

To keep the Service informed of actions that minimize or avoid adverse effects or benefit listed species or their habitats, the Service requests notification of the implementation of the following discretionary conservation recommendations:

1. NOAA Fisheries should coordinate with the governments of Japan, Korea and Taiwan the collection of fishery effort and seabird bycatch information from fishing vessels that conduct fishery operations similar to U.S. fisheries that deploy gear such as longline and hook-and-line gear. NOAA Fisheries should collect catch per unit effort (per thousand hooks) data from these countries through the period of this consultation. If historical catch per unit effort (per thousand hooks) is accessible to NOAA Fisheries, this information should be submitted to the Service. Concerning bycatch of protected species, NOAA Fisheries should seek to obtain any and all records of short-tailed albatross that are accidentally caught by fishing vessels from these countries, and the disposition of the bird upon release. NOAA Fisheries should also seek to obtain the rate at which seabirds are hooked per thousand hooks. These rates can be used to estimate the possible number of short-tailed albatross that may be hooked in these fisheries and the collective impact that longline fisheries may have on short-tailed albatross.

2. NOAA Fisheries should conduct additional studies to determine whether "C" hooks would reduce hooking related injuries to seabirds, and compare these results with hooking related injuries to seabirds caused by "J" hooks in the longline fishery. "C" hooks are designed to hook an animal on the jaw, thus avoiding damage to internal soft tissue. If the animal falls off the hook, it may have a greater chance at survival. If the study results indicate that "C" hooks cause fewer hooking related injuries to seabirds, then the Service would recommend that "C" hooks be selected as the only type of hook to be used in the U.S. West Coast-based longline fishery.

3. NOAA Fisheries should continue to support research into effective seabird deterrent devices and strategies that reduce risk of interaction between seabirds and U.S. West Coast-based longline gear and fishing-related activities. For example, underwater setting chutes or lining tubes that deploy gear at a depth sufficient to prevent birds from settling on baits and hooks during gear deployment could be tested for use as a seabird deterrent. Also, Japanese tarred mainline could be tested for its effectiveness as a seabird deterrent. NOAA Fisheries should coordinate with and communicate the results of these analyses to the Service. The Service would analyze the results of the research and make a determination to concur with NOAA Fisheries. If the Service concurs that the device or strategies reduces seabird interaction with U.S. West Coast-based longline gear, then the Service may amend this biological opinion and incorporate these new seabird deterrent devices or strategies into the terms and conditions.

4. NOAA Fisheries should investigate the rate at which Laysan and black-footed albatross "fall off" longline gear as a result of being injured, hooked, or entangled during the set. NOAA Fisheries' investigators should analyze the number of birds that may be injured, hooked or entangled during the set and compare this amount with the number of birds that are documented injured, hooked or entangled during the haulback. Understanding the rate

at which birds may "fall off" longline gear will influence the analyses that relate to estimating the number of Laysan and black-footed albatross that are killed in the U.S. West Coast-based longline fishery each year. Refining these analyses will help NOAA Fisheries and the Service gauge the effectiveness of the various seabird deterrent devices and ultimately, help reduce the risk of interaction between short-tailed albatross and U.S. West Coast-based longline gear.

5. Seabird Deterrent Measures

A. NOAA Fisheries, at their option, may require U.S. West Coast-based longline fishers to employ the following measures when setting and hauling the longline gear north of 18° N latitude:

I. Weighted branch lines for shallow and mixed sets:
At least 45 grams of weight attached to branch lines within one meter of each baited hook may be employed by U.S. West Coast-based HMS longline vessels that conduct swordfish (shallow) or mixed sets.

ii. Towed deterrents:
A line with suspended streamers (tori line) or a buoy that may conform to PFMC/NOAA Fisheries' standards may be deployed when the longline is being set and hauled. Towed deterrents may be employed by U.S. West Coast-based HMS longline vessels that conduct tuna, swordfish, or mixed sets.

B. NOAA Fisheries should encourage U.S. West Coast-based longline vessels to carry an underwater setting chute in addition to a line-setting machine (vessels may require retrofitting to use the chute). If a chute is used, its specifications should be comparable to those of the chute used in the experiments conducted during 2002 and 2003, and the chute should be used in the same manner as it was during this recent experiment (Gilman *et al.* 2003). NOAA Fisheries should provide information and training on the correct use of the chute. If a chute is used, it may be used to deploy all branch lines with baited hooks for the entirety of each set during the trip. The underwater setting chute has been shown to be a highly effective seabird deterrent. No seabirds were hooked during sets that employed the chute during the experiments (Gilman *et al.* 2003); when used correctly and consistently the chute likely is a highly effective seabird deterrent measure. The underwater setting chute ultimately should be considered as a required measure to minimize the risk of incidental take of the short-tailed albatross. The chute is not yet commercially available, however, and no standardized training for its deployment and use has yet been established.

C. NOAA Fisheries should support the development by stakeholders of commercially available underwater setting chutes for use by the U.S. West Coast-based longline fleet. NOAA Fisheries also should develop standardized training materials for the use of the chute and a program for training vessel operators and crews once the chute becomes commercially available.

D. To increase industry incentives to voluntarily use side setting and/or the underwater setting chute, NOAA Fisheries should support continued field trials and performance assessment of those methods in relation to bait retention and catch per unit effort. Such efforts would have the benefits of demonstrating that I) they perform consistently in a range of environmental conditions, on different fishing grounds, and under a range of gear configurations; ii) the methods are economically advantageous to fishers; and iii) they do not require major changes to existing longlining methods. These trials and assessments should not require control sets that increase the risk to protected species.

E. NOAA Fisheries should encourage the production of commercially available pre-dyed baits that would facilitate its consistent use and overcome significant problems in its preparation and application during line setting. Commercial availability should be encouraged until such time as more effective deterrent measures (sidesetting, chute setting) are required or voluntarily adopted on a broad basis by the longline industry. Pre-dyed baits also would facilitate effective enforcement of rules requiring possession of pre-dyed bait.

F. Once these methods are used commonly and voluntarily in the fishery, NOAA Fisheries should consider promulgating regulations to require its use in all U.S. West Coast-based longline operations.

6. NOAA Fisheries should encourage the development and trial of new seabird deterrents.

7. NOAA Fisheries should monitor the bycatch of northern anchovies and Pacific sardines (primary food species of the brown pelican) in the purse seine fishery to determine if stock reductions to these species are occurring.

8. The placement of observers on small recreational or charter fishing boats may represent a significant burden to operators of these vessels. As a means of collecting essential fisheries management data to monitor the effects of this fishery on the brown pelican, NOAA Fisheries should explore alternative means to obtain information on brown pelican interactions with HMS fisheries that would be equally effective as an on-boat observer program.

9. NOAA Fisheries should, in coordination with the appropriate State agencies and the Service, encourage State agencies to develop and implement seasonal or permanent restriction zones near breeding colonies and important roost areas at Anacapa Island, Santa Barbara Island, the Coronado Islands, and other areas deemed appropriate.

REINITIATION NOTICE

This concludes formal consultation on the U.S. West Coast Fisheries for Highly Migratory Species as regulated by NOAA Fisheries. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this biological opinion; (3) agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. The biological opinion satisfies section 7 requirements of the Act.

At the current population level and the current population growth rate, the level of mortality expected to result from this fishery as described under "Description of the Proposed Action," above, is not likely to jeopardize the species' continued existence. However, in the event of a future major population decline resulting from a natural (*e.g.*, volcanic eruption on one of the nesting islands, disease related die-off) or human-caused environmental catastrophe (*e.g.*, oil spill), the effects of HMS fisheries on short-tailed albatross and brown pelican could be serious. Independent of exceeding incidental take, such an event would represent new information, resulting in the need for reinitiation of this consultation.

If you have any questions concerning this biological opinion, please contact Larry Salata, Region 1 Section 7 Coordinator at (503) 231-2350; or Ray Bosch, Fish and Wildlife Biologist at the Arcata Fish and Wildlife Office at (707) 822-7201.

Sincerely,

Assistant Manager
California/Nevada Operations Office

Theresa E Rabot

Assistant Regional Director
Ecological Services

LITERATURE CITED

American Ornithologists' Union. 1998. Checklist for North American birds. 7th ed. Allen Press: Lawrence, KS.

Anderson, D.W. 1983. Seabirds: distribution and assemblages in the Gulf of California. Chap. 9, in: T. Case and M. L. Cody, eds., Island biogeography in the Sea of Cortez. University of California Press, Berkeley, California.

_____. 1984. Brown Pelicans and the anchovy fishery off southern California. pp. 128-135 *In*: Marine birds: their feeding ecology and commercial fisheries relationship. D.N. Nettleship, G.A. Sanger and P.F. Springer, eds. Canadian Wildlife Services, Ottawa, Canada.

_____. 1988. Dose-response relationship between human disturbance and brown pelican breeding success. Wildlife Society Bulletin 16(3):339-345.

_____ and I.T. Anderson. 1976. Distribution and status of brown pelicans in the California current. American Birds 30(1):3-12.

_____ and F. Gress. 1983. Status of a northern population of California brown pelicans. The Condor 85(1):79-88.

_____, F. Gress, and K.F. Mais. 1982. Brown Pelicans: influence of food supply on reproduction. Oikos 39:23-31.

_____, F. Gress, K.F. Mais, and P.R. Kelly. 1980. Brown pelicans as anchovy stock indicators and their relationships to commercial fishing. Calif. Coop. Oceanic Fish. Invest. Rep. 21:54-61.

_____ and J.J. Hickey. 1970. Oological data on egg and breeding characteristics of brown pelicans. The Wilson Bulletin 82(1):14-28.

_____, R.M. Jurek, and J.O. Keith. 1977. The status of brown pelicans at Anacapa Island in 1975. Calif. Fish and Game 63(1):4-10.

_____ and J.O. Keith. 1980. The human influence on seabird nesting success: conservation implications. Biological Conservation 18:65-80.

Arnoff, A.E. 1960. Some observations on birds at Torishima. Tori 15(76):269-279.

Auman, H.J. 1994. Plastic ingestion, biomarkers of health, PCBs and DDE in two species of albatrosses on Sand Island, Midway Atoll. M.S. Thesis. Michigan St. Univ., Department of Fisheries and Wildlife.

Austin, O.L., Jr. 1949. The status of Steller's albatross. Pacific Science 3:283-295.

Berger, A.J. 1972. Hawaiian Birdlife. University Press of Hawaii. Honolulu, HI.

Bigelow, K.A., C.H. Boggs and X. He. 1999. Environmental Effects on Swordfish and blue shark catch rates in the US North Pacific longline fishery. Fisheries Oceanography 8:3, p.178-198.

Boggs, C.H. *In press*. Deterring albatrosses from contacting baits during swordfish longline sets. National Marine Fisheries Service-Honolulu Laboratory, Honolulu, Hawaii, HI. In: E. Melvin (ed.) Proceedings of the Symposium on Seabird Bycatch: Trends, Roadblocks, and Solutions. Pacific Seabird Group - U. Washington and U. Alaska Sea Grant Program.

_____. 1999. National Marine Fisheries Service. Personal communication.

_____. and R. Ito. 1993. Hawaii's pelagic fisheries. Marine Fisheries Review 55(2):69-82.

_____. 1992. Depth, capture time, and hooked longevity of longline-caught pelagic fish: Timing Bites of fish with chips. Fishery Bulletin, U.S. 90:642-658.

Coastal pelagic species fishery management plan development team. 1994. Coastal pelagic species fishery management plan draft supplementary environmental impact statement, regulatory impact review, initial regulatory flexibility analysis, and requirements of other applicable laws. Prepared for Pacific Fishery Management Council meeting, October 1994.

Cochrane, J.F. and A.M. Starfield. *In press*. A simulated assessment of incidental take effects on short-tailed albatrosses. For U.S. Fish and Wildlife Service. 22pp.

Cook, Jim. 1999. Western Pacific Regional Fishery Management Council. Personal communication.

Cousins, K.L. 1998. Light sticks: a marine pollution problem for breeding seabirds. A paper presented to the WPRFMC, December 1998. 19pp.

_____ and J. Cooper. 2000. The population biology of the black-footed albatross in relation to mortality caused by longline fishing. Report of a workshop held in Honolulu, Hawaii, 8-10, October 1998 under the auspices of the WPRFMC. 120pp.

_____, P. Dalzell, and E. Gilman. 2001. Managing pelagic longline-albatross interactions n the North Pacific Ocean. http://www.wpcouncil.org/documents/managebird.pdf

Curran, D.S., C.H. Boggs, and X. He. 1996. Catch and effort from Hawaii's longline fishery summarized by quarters and five degree squares. NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-225, National Marine Fisheries Service. January 1996.

Dalzell, Paul. 1999. Western Pacific Regional Fishery Management Council. Personal communication.

DeGange, A.R. 1981. The short-tailed albatross, *Diomedea albatrus,* its status, distribution and natural history. U.S. Fish and Wildlife Service unpubl. rep. 36pp.

del Hoyo, J., A. Elliot, and J. Sargatal eds. 1992. Handbook of the Birds of the World. Volume 1. Lynx Edicions. Barcelona, Spain.

Dieli, Robert. 2000. U.S. Fish and Wildlife Service. Personal communication.

DiNardo, G.T. 1999. Proceedings of the Second International Pacific Swordfish Symposium. NOAA Technical Memorandum, NMFS - SWFSC - 263.

Dollar, R.A. 1991. Summary of swordfish longline observations in Hawaii, July 1990-March 1991. Southwest Fisheries Science Center, Administrative Report H-91-09. National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory, Honolulu, HI. June 1991.

Environment Agency, Japan. 1996. Short-tailed albatross conservation and management master plan. Environment Agency, Japan.

Fefer, S.I. 1989. Letter to Dr. Hiroshi Hasegawa, Biology Department, Toho University on April 26, from Stewart Fefer, U.S. Fish and Wildlife Service, Honolulu HI, regarding short-tailed albatross sightings on Midway Island and ingestion of plastics by birds. 2pp.

Fitzgerald, Shannon. 2000. National Marine Fisheries Service. Personal communication.

Flint, Elizabeth. 2000. U.S. Fish and Wildlife Service. Personal communication.

Foster, Kevin. 1999. U.S. Fish and Wildlife Service. Personal communication.

Garcia and Associates. 1999. Final report: Hawaiian longline seabird mortality mitigation project. Prepared for Western Pacific Regional Fisheries Management Council, Honolulu, HI, September 1999. 93pp. + appendices.

Gales, R., N. Brothers, and T. Reid. 1998. Seabird mortality in the Japanese tuna longline fishery around Australia, 1988-1995. Biological Conservation 85-101.

Gilman, E., N. Brothers, D. Kobayashi, S. Martin, J. Cook, J. Ray, G. Ching, and B. Woods. 2003. Performance Assessment of Underwater Setting Chutes, Side Setting, and Blue-Dyed Bait to Minimize Seabird Mortality in the Hawaii Pelagic Longline Tuna Fishery. Final Report. National Audubon Society, Hawaii Longline Association, U.S. National Marine Fisheries Service Pacific Islands Science Center, U.S. Western Pacific Regional Fishery Management Council: Honolulu, HI, USA. vi+42 pp.

Gress, F. 1994. Reproductive performance, eggshell thinning, and organochlorines in brown pelicans and double-crested cormorants breeding in the Southern California Bight. Unpublished report, U.S. Fish and Wildlife Service, Sacramento, California.

_____, P.R. Kelly, D.B. Lewis, and D.W. Anderson. 1980. Feeding activities and prey preference of brown pelicans breeding in the Southern California Bight. Administrative report, California Department of Fish and Game, Sacramento, California.

Hadden, F.C. 1941. Midway Islands. Hawaiian Planter's Record 45:179-221.

Hampton, J., K. Bigelow, and M. Labelle. 1998. A summary of current information on the biology, fisheries, and stock assessment of bigeye tuna (*Thunnus obesus*) in the Pacific Ocean, with recommendations for data requirements and future research. Secretariat of the Pacific Community. Oceanic Fisheries Programme Tech. Rep. No. 36. Noumea, New Caledonia. 46pp.

Harrison, C.S. 1979. Short-tailed albatross, vigil over Torishima Island. Oceans 12(5):24-26.

___ T.S. Hida and M.P. Seki. 1983. Hawaiian seabird feeding ecology. Wildl. Monogr. 85:1-71.

Hasegawa, H. 1977. Status of the short-tailed albatross on Torishima in 1976/77. Pacific Seabird Group Bull. 4(2):13-15.

_____. 1978. Recent observations of the short-tailed albatross, *Diomedea albatrus,* on Torishima. J. Yamashina Inst. Ornithol. Misc. Rep. 10, No. 1, 2 (no. 51, 52):58-68.

_____. 1979. Status of the short-tailed albatross of Torishima and in the Senkaku Retto in 1978/79. Pacific Seabird Group Bull. 6(1):806-814.

_____. 1981. Letter of 27 July to U.S. Fish and Wildlife Service from Biology Department, Toho University, Japan. 4pp.

_____. 1982. The breeding status of the short-tailed albatross *Diomedea albatrus,* on Torishima, 1979/80-1980/81. J. Yamashina Inst. Ornithol.14:16-24.

_____. 1984. Status and conservation of seabirds in Japan, with special attention to the short-tailed albatross. Pages 487-500 in Croxall, J.P.; Evans, G.H. Schreiber, R.W. (Eds.), status and conservation of the world's seabirds. International Council for Bird Preservation Technical Publication 2. Cambridge, UK.

_____. 1991. Red Data Bird: Short-tailed albatross. World Birdwatch 13(2):10.

_____. 1997. Discussion of breeding success and influences: Personal Communication at the Short-tailed albatross population workshop, U.S. Fish and Wildlife Service Field Office, Ecological Services, Anchorage, AK.

_____. 2000. Toho University, Japan. Personal communication.

_____. 2003. E-mail of January 13, 2003 to Holly Freifeld, U.S. Fish and Wildlife Service from Biology Department, Toho University, Japan.

_____. and A. DeGange. 1982. The short-tailed albatross *Diomedea albatrus,* its status, distribution and natural history. Am. Birds 6(5):806-814.

He, X., K.A. Bigelow and C.H. Boggs. 1997. Cluster analysis of longline sets and fishing strategies within the Hawaii-based fishery. Fisheries Research 31- pgs. 147-158.

Hoffman, Nancy. 2000. U.S. Fish and Wildlife Service. Personal communication.

Ito, R.Y. 2001. Annual Report of the Hawaii-Based Longline Fishery for 2000. Administrative Report H-01-07, December 2001. Southwest Fisheries Science Center.

_____ and W.A. Machado. October, 1999. Annual Report of the Hawaii-based longline fishery for 1998. National Marine Fisheries Service, Southwest Fisheries Science Center, Honolulu Laboratory, Honolulu, HI. Administrative Report H-99-06. 62pp.

Jaques, D.L. 1994. Range expansion and roosting ecology of non-breeding California brown pelicans. Unpublished Masters thesis, University of California, Davis, California.

_____ and D.W. Anderson. 1987. Conservation implications of habitat use and behavior of wintering brown pelicans (*Pelecanus occidentalis californicus*). University of California. Davis, California.

_____ and D.W. Anderson. 1988. Brown pelican use of the Moss Landing Wildlife Management Area: Roosting behavior, habitat use, and interactions with humans. Unpublished report, California Department of Fish and Game, Sacramento, California.

King, W.B. 1981. Endangered Birds of the World: the ICBP Bird Red Data Book. Smithsonian Institute Press and International Council for Bird Preservation, Washington, DC. 13pp.

Kiyota, M., H. Nakano, H. Matsunaga, and H. Minami. 2003. Research activities and fishery management for the solution of incidental catch of sharks, seabirds and sea turtles in Japanese tuna longline fishing. Working Paper SCTB16. 16th Meeting of the Standing Committee n Tuna and Billfish. National Research Institute for Far Seas Fisheries, Fisheries Research Japan. i+7 pp.

MacCall, A.D. 1982. Seabird-fishery trophic interactions in eastern Pacific boundary currents: California and Peru. Pages 136-148 in: Marine birds: their feeding ecology and commercial fisheries relationships. Nettleship, D.N., G.A. Sanger, and P.F. Springer eds. Proc. Pacific Seabird Group Symp., Seattle, Washington, 6-8 Jan. 1982. Canadian Wildlife Service Special Publication, Ottawa.

McDermond, D.K. and K.H. Morgan. 1993. Status and conservation of North Pacific albatrosses. Pages 70-81 in Veermeer, K. Briggs, K.T. Moran, K.H. and D. Seigel-Causey (Eds), the status, ecology, and conservation of marine birds of the North Pacific. Can. Wildl. Serv. Spec. Publ., Ottawa.

Melvin, Ed. 1999. University of Washington, Seagrant Program. Personal communication.

National Marine Fisheries Service. 1998a. Biological opinion/ formal Endangered Species Act section 7 consultation on the fishery management plan for the pelagic fisheries of the western Pacific region: impacts of the Hawaii-based longline fishery on listed sea turtles.

_____. 1998b. Estimation of sea turtle take and mortality in the Hawai'i-based longline fishery, 1994-1996. NOAA-TM-NMFS-SWFSC-257 (R.A. Skillman and P. Kleiber).

_____. 1998c. Estimating Annual Takes and Kills of Sea Turtles by the Hawaiian Longline Fishery, 1991 - 97, From Observer Program and Logbook Data. Southwest Fisheries Science Center Administrative Report H-98-08 (P. Kleiber).

_____. 1999. Hawaii Longline Observer Program Field Manual. Southwest Region, Pacific Islands Area Office, Honolulu, Hawaii.

_____. 2000. Estimation of Sea Turtle Take and Mortality in the Hawaiian Longline Fisheries. Southwest Fisheries Science Center Administrative Report H-00-06.

_____. 2000. Environmental Assessment for the Pelagic Fisheries of the Western Pacific Region - For an interim period pending completion of an Environmental Impact Statement. August, 2000 - Final. (Penny Dalton - Assistant Administrator)

_____. 2001(a). Biological opinion/formal Endangered Species Act section 7 consultation on the fishery management plan for the pelagic fisheries of the western Pacific region: impacts of the Hawaii-based longline fishery on listed sea turtles.

_____. 2001(b). Final Environmental Statement: Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. March 30, 2001.

_____. 2001(c). Hawaii Longline Observer Program Field Manual. Southwest Region, Pacific Islands Area Office, Honolulu, Hawaii.

______. 2003a. Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar years 2000 and 2001. Administrative Report AR-PIR-03-02. Pacific Island Regional Office. 43 pp.

______. 2003b. Annual report on seabird interactions and mitigation efforts in the Hawaii-based longline fishery for calendar year 2002. Administrative Report AR-PIR-03-03. Pacific Island Regional Office. 24 pp.

Nunn, G.B., J. Cooper, P. Jouventin, C.J.R. Robertson, and G.G. Robertson. 1996. Evolutionary relationships among extant albatrosses (Procellariiformes: Diomedeiadae) established from complete cytochrome-B gene sequences. Auk 113(4):784-801.

Ono, Y. 1955. The status of birds on Torishima; particularly of Steller's Albatross. Tori 14: pgs. 24-32.

Palmer, R.S. 1962. Short-tailed albatross (*Diomedea albatrus*). Handbook of North American Birds. Vol. 1: 116-119.

Richardson, S. 1994. Status of the short-tailed albatross on Midway Atoll. Elepaio 54:35-37.

Rivera, Kim. 1999. National Marine Fisheries Service. Personal communication.

Robertson, D. 1980. Rare birds of the west coast of North America. Woodcock Publications, Pacific Grove, CA. Pp. 6-9.

Sakagawa, G.T. 1989. Trends in fisheries for swordfish in the Pacific Ocean. In Planning the Future of Billfishes - Research and Management in the 90s and Beyond, (Marine Recreational Fisheries 13) Proceedings fo the Second International Billfish Symposium, Kailua-Kona, Hawaii (August 1 - 5, 1988), Part 1: Fishery and Stock Synopses, Data Needs and Management, Richard H. Stroud, (Ed.). Published by the National Coalition for Marine Conservation, Inc. Savannah, GA.

Sanger, G.A. 1972. The recent pelagic status of the short-tailed albatross (*Diomedea albatrus).* Pacific Grove, CA. Pp.6-9.

Schreiber, R.W. 1979. Reproductive performance of the eastern brown pelican, *Pelecanus occidentalis*. Contrib. Sci., Los Angeles County Museum 317:1-43.

Sekora, P.C. 1977. Report of Short-tailed Albatross *Diomedea albatrus* from Hawaiian Islands. J. Yamashina Inst. Ornithol. Misc. Rep. 9:28.

Shallenberger, Rob. 2000. U.S. Fish and Wildlife Service. Personal communication.

Sherburne, J. 1993. Status report the of short-tailed albatross *Diomedea albatrus*. U.S. Fish and Wildlife Service unpubl. rep., Alaska Natural Heritage Program. 33pp.

Sievert, P.R. and L. Sileo. 1993. The effects of ingested plastic on growth and survival of albatross chicks in Veermeer, K. *et al.*, eds. The status, ecology and conservation of marine birds of the North Pacific. Can. Wildl. Serv. Spec. Publ., Ottawa.

Simkin, T. and L. Siebert. 1994. Volcanoes of the world: a regional directory, gazetteer, and chronology of volcanism during the last 10,000 years. Geoscience Press, Inc. Tucson, AZ. and the Smithsonian Institution.

Sykes, P.W, Jr. 1983. ``Brown pelican" in The Audubon Society master guide to birding. J. Farrand, Jr., ed. Alfred A. Knopf, New York.

Tickell, W.L.N. 1973. A visit to the breeding grounds of Steller's albatross *Diomedea albatrus*. Sea Swallow 23:1-3.

_____. 1975. Observations on the status of Steller's albatross (*Diomedea albatrus)* 1973. Bulletin of the International Council for Bird Preservation XII: 125-131.

Tramontano, J.P. 1970. Winter observations of the short-tailed albatross in the western Pacific Ocean. Condor 72(1):122.

Tuck, G.S. 1978. A field guide to the seabirds of Britain and the world. Collins Co. Ltd., London. 17pp.

U.S. Fish and Wildlife Service. 1983. California brown pelican recovery plan. U.S. Fish and Wildlife Service, Portland, Oregon. 179 pp.

_____. 1999. Biological Opinion on the effects of hook-and-line groundfish fisheries in the Gulf of Alaska and Bering Sea/Aleutian Islands areas on short-tailed albatrosses (*Phoebastria albatrus*).

Van Fossen, Lewis. 1999. National Marine Fisheries Service. Personal communication.

Western Pacific Regional Fishery Management Council. March 23, 1987. Fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. November 21, 1990. Amendment 1 and environmental assessment - fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. February, 1991. Amendment 2 and environmental assessment, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. June 4, 1991. Amendment 3, regulatory impact review and proposed regulations, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. June, 1991. Amendment 4, extend the Hawaii longliner moratorium for a total of 3 years - environmental assessment and regulatory impact review, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. October 7, 1991. Amendment 5, fishery management plan for pelagic fisheries of the Western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. April 30, 1992. Amendment 6, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. January 14, 1994. Amendment 7, proposed limited entry program for the Hawaiian longline fishery, fishery management plan for pelagic fisheries of the western Pacific region. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. October 8-10, 1998. Black-footed albatross population biology workshop. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. 1998. Pelagic fisheries of the Western Pacific region, 1997 annual report. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. 1999. Pelagic fisheries of the Western Pacific Region, 1998 annual report. 1164 Bishop Street, Suite 1405. Honolulu, HI.

_____. 2000. Measures to Reduce the Incidental Catch of Seabirds in the Hawaii Longline Fishery - A Framework Adjustment to the Western Pacific Pelagic Fisheries Management Plan, Including an Environmental Assessment and Regulatory Impact Review/Regulatory Flexibility Analysis. December 13, 1999 - Revised March 2000. 1164 Bishop Street, Suite 1400, Honolulu, Hawaii 96813.

_____. 2000. The Population Biology of the Black-footed Albatross in Relation to Mortality Caused by Longline Fishing - Report of a workshop held in Honolulu, Hawaii, 8-10 October 1998 under the auspices of the Western Pacific Regional Fishery Management Council - Katherine Cousins and John Cooper (eds). 1164 Bishop Street, Suite 1400, Honolulu, Hawaii 96813

_____. 2002. Measures to Reduce the Incidental Catch of Seabirds in the Hawaii Longline Fishery: A Framework Adjustment to the Western Pacific Pelagic Fisheries Management Plan. Revised February 1, 2002. WPRFMC, Honolulu, Hawaii.

Wetmore, A. 1945. A review of the forms of the Brown Pelican. Auk 62: 577-586.