# Biological Opinion of the U.S. Fish and Wildlife Service for the Operation of Hawaii-based Pelagic Longline Fisheries, Shallow Set and Deep Set, Hawaii

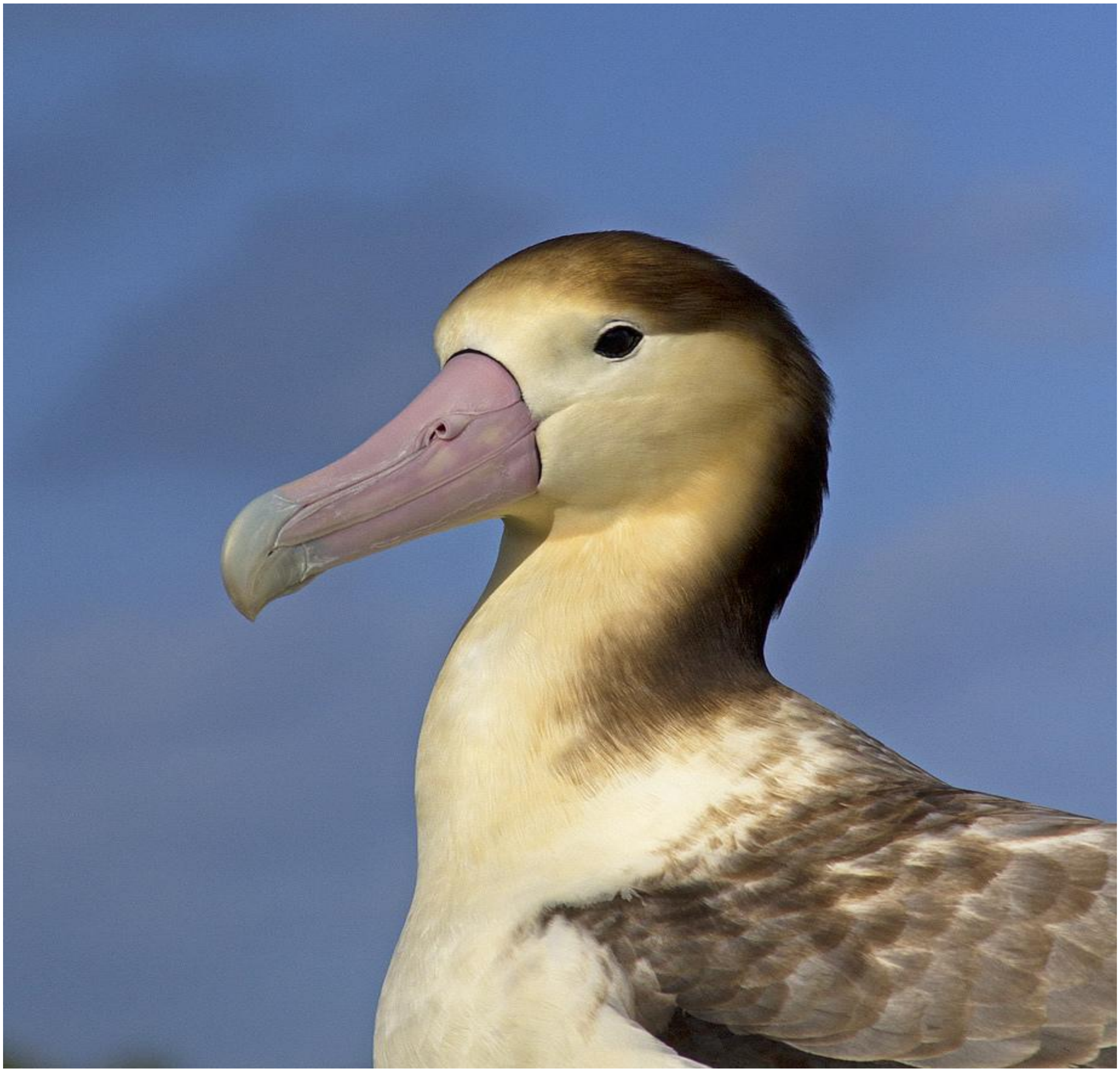

Photo Credit: Daniel W. Clark

**January 6, 2012**
**(2011-F-0436)**

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850


In Reply Refer To:
2011-F-0436

JAN 0 6 2012

Mr. Michael D. Tosatto
Regional Administrator
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700

Subject: Formal Consultation for the Operation of Hawaii-based Pelagic Longline Fisheries, Shallow Set and Deep Set, Hawaii

Dear Mr. Tosatto:

This Biological Opinion (BO) responds to the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NMFS) request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended, and implementing regulations of 50 CFR §402.14(c). This BO analyzes the impact of the operation of the two Hawaii-based pelagic longline fisheries [deep set fishery targeting bigeye tuna (*Thunnus obesus*) and shallow set fishery targeting swordfish (*Xiphias gladius*)] as they are currently being implemented pursuant to 50 CFR Part 665. This includes seabird deterrence and mitigation measures under 50 CFR 665.815 for the federally endangered short-tailed albatross (*Phoebastria albatrus*). Since 1994 when NMFS began its onboard observer program for the fisheries, there have been no observed interactions with the short-tailed albatross. However, there have been observed interactions (hooking or entanglement) between these fisheries and other albatross species including the black-footed albatross (*P. nigripes*) and Laysan albatross (*P. immutabilis*). The short-tailed albatross population is growing at a rate of 5% to 8% per year (Naughten *et al* 2007) and successfully nested on Midway Island National Wildlife Refuge in 2010 and 2011. As the population continues to grow and expand its range there is increased potential for interaction by the Hawaii-based pelagic longline fisheries with this listed species. NMFS has concluded the fisheries may affect the short-tailed albatross, and requested formal consultation on the continued operation of the two Hawaii-based pelagic longline fisheries.

The Hawaii-based pelagic longline fisheries previously operated under expired BOs issued by the USFWS. The first formal consultation entitled Effects of the Hawaiian Longline Fishery on the Short-tailed Albatross (*Phoebastria albatrus*) was completed in 2000 and addressed the take of short-tailed albatross. In 2002, the BO was reinitiated as a result of the court-ordered suspension of the swordfish or shallow set fishery for the protection of sea turtles. In 2002, a BO was completed to address the effect of the deep set fishery on short-tailed albatross. The incidental take statement in the 2002 BO for the Hawaii-based longline fisheries expired on December 31, 2006. The consultation was reinitiated in 2004 for the shallow set fishery and short-tailed albatross when the fishery was re-opened after addressing concerns related to interactions with sea turtles. We finalized an informal consultation for the modifications of the shallow set fishery due to the implementation of Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (Amendment 18) in 2008. The USFWS concurred with NMFS determination that the proposed change to the shallow set fishery may affect, but was not likely to adversely affect the short-tailed albatross during a one-year period beginning January 1, 2009, and ending December 31, 2009. This BO consolidates and updates the previously separate opinions covering the Hawaii-based shallow set and deep set longline fisheries to enable effective administration, monitoring, and implementation of the ESA requirements to protect short-tailed albatross.

**Consultation History**

July 12, 2011: National Oceanic and Atmospheric Administration-NMFS Regional Administrator, Michael Tosatto, transmitted a biological assessment to the Pacific Islands Fish and Wildlife Office (PIFWO) Field Supervisor Loyal Mehrhoff.

August 12, 2011: PIFWO provided comments and recommendations for additional information to be included in the biological assessment.

August 31, 2011: PIFWO staff, Region 1 USFWS staff and NMFS Pacific Islands Regional Office (PIRO) staff met to discuss coordination and time line for section 7 consultation and Migratory Bird Treaty Act Permit application.

September 7, 2011: PIFWO sent a letter to PIRO (Service file 2011-F-0436) indicating all necessary information was received on August 31, 2011, and that formal consultation was initiated on this date.

September 19, 2011: Hawaii Longline Association submitted a letter to PIFWO at PIRO's request, designating Stoel Rives LLP as representatives for the Hawaii Longline Association as applicants for the purpose of the section 7 consultation.

November 18, 2011: PIFWO transmitted a draft project description for PIRO and Hawaii Longline Associations review and approval.
December 1, 2011: Conference call with PIFWO, PIRO and Hawaii Longline Association to coordinate time lines for transmittal and review of a draft BO.

December 7, 2011: PIRO transmitted comments consolidated with those received from the Hawaii Longline Association on the project description to PIFWO for incorporation into the draft BO.

December 16, 2011: PIFWO transmitted draft BO to PIRO and Hawaii Longline Association (Service file 2011-F-0436) and requested comments by January 3, 2012.

January 3, 2012: The PIFWO received PIRO and Hawaii Longline Association's consolidated comments on the draft BO.

## BIOLOGICAL OPINION

## I. Description of the Proposed Action

### Project Description

The Hawaii-based pelagic longline fisheries are currently managed under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region developed by the Western Pacific Fishery Management Council (WPFMC) and approved by the Secretary of Commerce. Since 1994, the fisheries have been limited to a maximum of 164 vessels (59 FR 26979), with about 120-130 active vessels (deep and shallow set) fishing in any given year since then. Between 2000 and 2004, management regulations were implemented to monitor and reduce fishery interactions with seabirds, sea turtles, and marine mammals, and to optimize the harvest of the targeted resources.

Pelagic longline fishing deploys ("sets") a mainline, usually consisting of a single monofilament line with a breaking ("test") strength of up to 680 kilograms (kg) [1,500 pounds (lb)], as the fishing vessel moves across the water. The mainline is suspended horizontally below the surface by floats with monofilament branch lines attached with quick release snaps at regular intervals that terminate with single baited hooks (Figure 1). Longlines then drift ("soak") for several hours before being retrieved ("hauled"). The complete cycle of gear deployment and retrieval usually spans less than 24 hours. Mainlines are stored on large reels and range in length from 1 to 60 nautical miles (nm). Float lines consist of multi-stranded rope line with a quick release snap on one end and a float on the other.

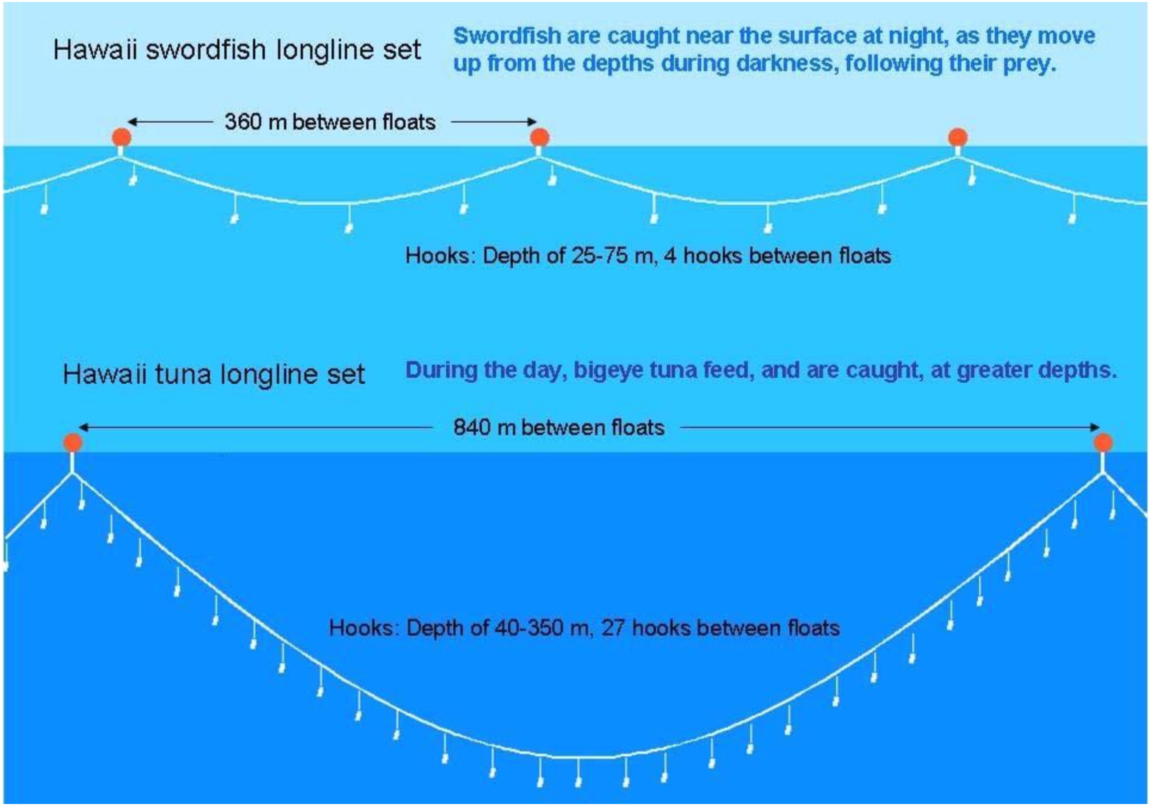


**Figure 1**. Generalized depiction of shallow set (swordfish) and deep set (tuna) gear configuration.

In 2004, NMFS defined deep and shallow set fishing activities. They are now managed as two distinct fisheries under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region. The deep set fishery generally targets bigeye tuna, and occasionally catches yellowfin tuna (*Thunnus albacares*). The shallow set fishery targets swordfish. Because of the varying habitat and foraging preferences among these species, the two fisheries employ differing techniques in their gear designs and fishing operations. Table 1 and Figure 1 summarize the differences in gear deployed in the two fisheries.

**Table 1**. Characteristics of the shallow set (swordfish) and deep set (tuna) fisheries.

| **Characteristics** | **Swordfish-targeting** | **Tuna-targeting** |
|---|---|---|
| Set depth | Shallow (~ 25-75 m) | Deep (~ 40-350 m) |
| Hook type | 18/0 offset circle hook (up to 10° offset) | 3.6-3.8 mm tuna hooks, 14/0-16/0 circle hooks |
| Bait | Fusiform fish (mackerel) | Saury, sardines |
| Light sticks | Yes | No, not permitted |
| Set deployment/retrieval | Night/Morning | Morning/Night |
| Number of hooks between floats | ~ 4 | ~ 27 |
| Approx. no. hooks per set | 850 | 2,300 |
| Observer Coverage | 100% | 20% (annual average of trips) |

Weighted branch lines are required in the deep set fishery when fishing north of 23° N latitude. Also, if the vessel sets its gear from the stern when fishing north of 23° N, thawed blue-dyed bait must be used and the mainline must be set with a line shooter to decrease the potential for seabird interactions. The line shooter will deploy the mainline slack, so it sinks as quickly as possible. A deep set must have all float lines on the vessel at least 20 meters (m) in length, 15 or more branch lines between any two floats, no light sticks may be used (or on the vessel), and a maximum of 10 swordfish may be retained or landed by the vessel. If any one of these criteria is not met, the vessel is considered to be shallow setting.

In the shallow set fishery, float lines are usually between 5-15 m in length. Branch lines typically consist of 10-20 m long, 227 kg (500 lb) test monofilament line with a quick release clip on one end, a 45-80 g swivel weight, and a hook. Regulations for the shallow set fishery require 18/0 or larger offset circle hooks and mackerel-type bait be used to reduce the number and severity of sea turtle interactions.

*Avoidance and Minimization - Seabird Regulations*

The first pelagic longline seabird mitigation regulations were implemented in 2002 as conditions of the 2000 BO. Rules promulgated through this regulatory amendment required all Hawaii longline limited access vessels operating north of 23° N latitude, to either use a line setting machine with weighted branch lines [45 grams (g) minimum] or use basket-style gear, as well as requiring the use of blue-dyed bait and strategic offal discards during setting and hauling longlines. The amendment also required fishermen to employ specific seabird handling techniques and required owners and operators to attend an annual protected species workshop conducted by NMFS (67 FR 34408).

Vessel operators have the option of either side setting (as defined under the regulations) or using an alternate suite of mitigation methods when stern setting. A variety of seabird deterrence methods for longline fisheries have been tested and found to reduce interaction rates and mortality of seabirds (Brothers 1996; Brothers *et al.* 1999; Gilman *et al.* 2003, 2005, and 2007a; McNamara *et al.* 1999). When employed effectively and consistently, seabird interaction avoidance measures have the potential to nearly eliminate seabird interactions. Table 2 depicts seabird avoidance and minimization measures in the Hawaii-based pelagic longline fisheries (NMFS 2010).

**Table 2.** Summary of current seabird regulations for the Hawaii longline fisheries, effective as of January 18, 2006.

| **Measure** | **Side Setting** | | | **Stern Setting** | | |
|---|---|---|---|---|---|---|
| | Shallow Set | Deep Set >23° N | Deep Set <23° N | Shallow Set | Deep Set >23° N | Deep Set <23° N |
| Weights (minimum 45 g) attached within 1 m of the hook | X | X | | | X | |
| Set from port or starboard side | X | X | | | | |
| Setting station at least 1 m forward of stern corner | X | X | | | | |
| Line shooter at least 1 m forward of stern corner (if used) | X | X | | | | |
| Deploy gear so that hooks do not resurface | X | X | | | | |
| Use bird curtain | X | X | | | | |
| Use thawed & blue-dyed bait | | | | X | X | |
| Maintain at least 2 - one lb containers of blue dye on board the vessel at all times | | | | X | X | |
| Use line shooter | | | | | X | |
| Employ strategic offal discards | | | | X | X | |
| Begin set 1 hr after local sunset & complete before dawn | | | | X | | |
| Follow all seabird handling procedures | X | X | X | X | X | X |

*Side Setting*

Side setting involves deploying the gear from the side of the vessel, as compared to the conventional approach of setting from the stern. Crew set baited hooks forward and close to the side of the vessel's hull where seabirds are unable or unwilling to pursue them. With proper branch line weighting, by the time the vessel stern passes the location where baited hooks have been set, the baited hooks will have sunk to a depth where a North Pacific albatross species cannot reach them (Gilman and Brothers, 2005, 2006, 2007a; Gilman *et al.* 2007b). Additionally, deploying a bird curtain inhibits the ability of seabirds to land along the side of the vessel where baits are accessible.

Side setting requirements are as follows for deep setting north of 23° N latitude or shallow setting anywhere north of the Equator:

- Deploy the mainline as far forward on the vessel as practicable, including mounting line shooters (if used) at least 1 m forward from the stern corner of the vessel;
- Set the mainline and branch lines from the port or starboard side of the vessel;
- Attach weights (45 g minimum) to branch line within 1 m of the hook;
- When seabirds are present, the longline gear must be deployed so that baited hooks remain submerged and do not rise to the sea surface; and
- A bird curtain must be deployed aft of where the gear is being set that consists of the following three components:
    - A pole that is fixed to the side of the vessel aft of the line shooter and is at least 3 m long;
    - At least three main streamers that are attached at regular intervals to the upper 2 m of the pole and each of which has a minimum diameter of 20 millimeters (mm); and
    - Branch streamers attached to each main streamer at the end opposite from the pole, each of which is long enough to drag on the sea surface in the absence of wind, and each of which has a minimum diameter of 10 mm.

If all of the above conditions are not met by a vessel, it is not considered to be side setting by NMFS.

*Strategic Offal Discards*

Strategically discarding offal is a technique developed by fishermen to distract albatrosses attempting to steal baits from hooks before the branch lines can be retrieved. Fishermen throw swordfish heads and livers over the side of the vessel to distract albatrosses away from the baited hooks. NMFS observers in the mid-1990s noted that strategically discarding offal seemed to reduce incidental hookings and entanglements of albatrosses. When deep setting north of 23° N. latitude or shallow setting north of the Equator and seabirds are present around the vessel, owners and operators of vessels that stern set are required to use strategic offal discards as a seabird bycatch mitigation measure.

Strategically discarding offal to reduce seabird interactions requires vessel operators to:

- Retain sufficient quantities of spent bait or fish offal with hooks removed for use as strategic offal discards during fishing operations;
- Prepare any swordfish caught by removing the bill, and cutting them length-wise between the eyes;
- Retain swordfish heads and livers for use as offal; and
- Discharge spent bait or fish parts on the opposite side of the vessel during gear deployment and retrieval, if seabirds are present.

*Thawed and Blue-dyed Bait*

Dyeing bait to a specific blue color is a means to reduce the visibility of baits by reducing their contrast with the sea surface. The bait is thawed to increase sink rates and to allow a more effective penetration of the blue dye.

Almost all bait used in the Hawaii longline fisheries consists of fusiform fish: mackerel (saba), sardines, and saury (sanma). Using squid for bait is prohibited in the shallow set fishery to reduce sea turtle interactions. While squid may still be used in the deep set fishery, the cost is currently high, and possibly prohibitive.

*Weighted Branch Lines*

Weights placed close to the hook on branch lines are intended to quickly sink baited hooks, before foraging seabirds can take the baits and then become hooked or entangled in longline gear. Hawaii longline vessels use a range of weight sizes from 45 to 80 g within 1 m of the hook to quickly sink their branch lines to desired target depths. The current minimum weight requirement is 45 g weights when line weighing is required.

*Night Setting*

The use of night setting as a seabird mitigation measure requires that shallow set fishermen that stern set to deploy their gear no earlier than one hour after local sunset and they must complete the set no later than the following sunrise, using only the minimum number of lights necessary to conform to navigation rules and best safety practices. The requirement to night setting is based on the premise that seabirds cannot see baited hooks in the dark and, thus, do not attack them. The effectiveness of this measure may potentially be affected by moon phase and cloud cover, vessel lighting, and the use of light sticks to illuminate baits making them more conspicuous. Night setting has been identified as an effective seabird mitigation measure, reducing seabird interactions by 73% (McNamara *et al.* 1999) and even by as much as 98% (Boggs 2003).

The Hawaii-based longline vessels operate over a wide geographical area. NMFS observers aid fishermen to determine when it is legal for them to begin gear deployment in relation to local sunset. NMFS observers are trained to use Global Positioning System monitors to determine the exact time of sunset for a vessel's position. This has proven to be very helpful, especially on cloudy evenings.

*Action Area - Fishing Grounds*

The action area encompasses all areas where the fisheries are conducted, including areas transited by vessels to and from fishing grounds. The fisheries operate longline gear between the surface down to 350 m in depth (see Figure 1). The deep set fishery traditionally operates between 140° W and 180°W longitude and from 0° to 35°N latitude with the majority of fishing historically taking place near, or south of, the Hawaiian Archipelago (Figure 2). The shallow set fishery typically operates between 140°W and 180°W longitude and 20°N and 40°N latitude, with the majority of longline fishing effort concentrated between 25° N and 35° N latitude (Figure 3).

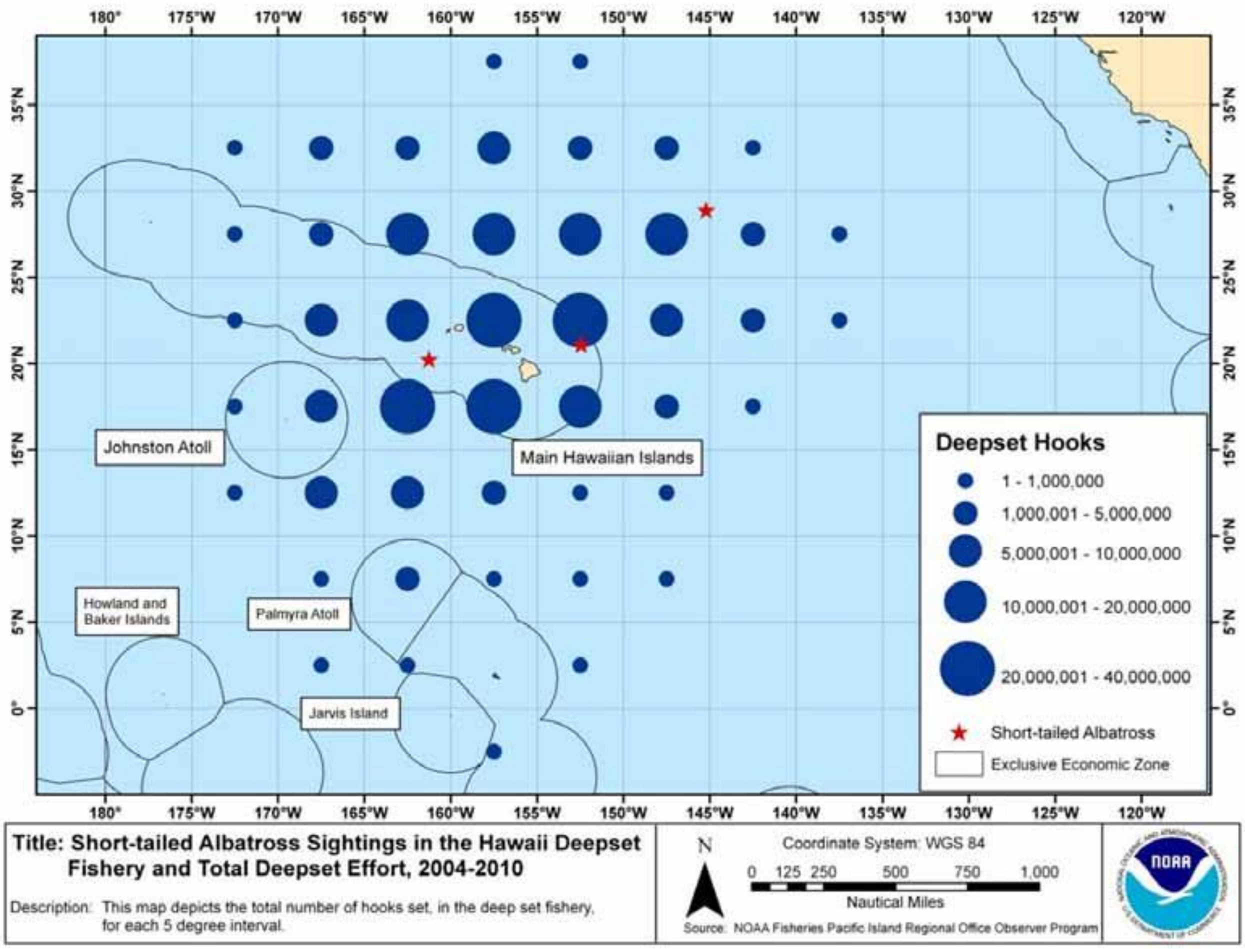


**Figure 2**. Deep set fishery: short-tailed albatross sightings and total fishing effort, 2004-2010.

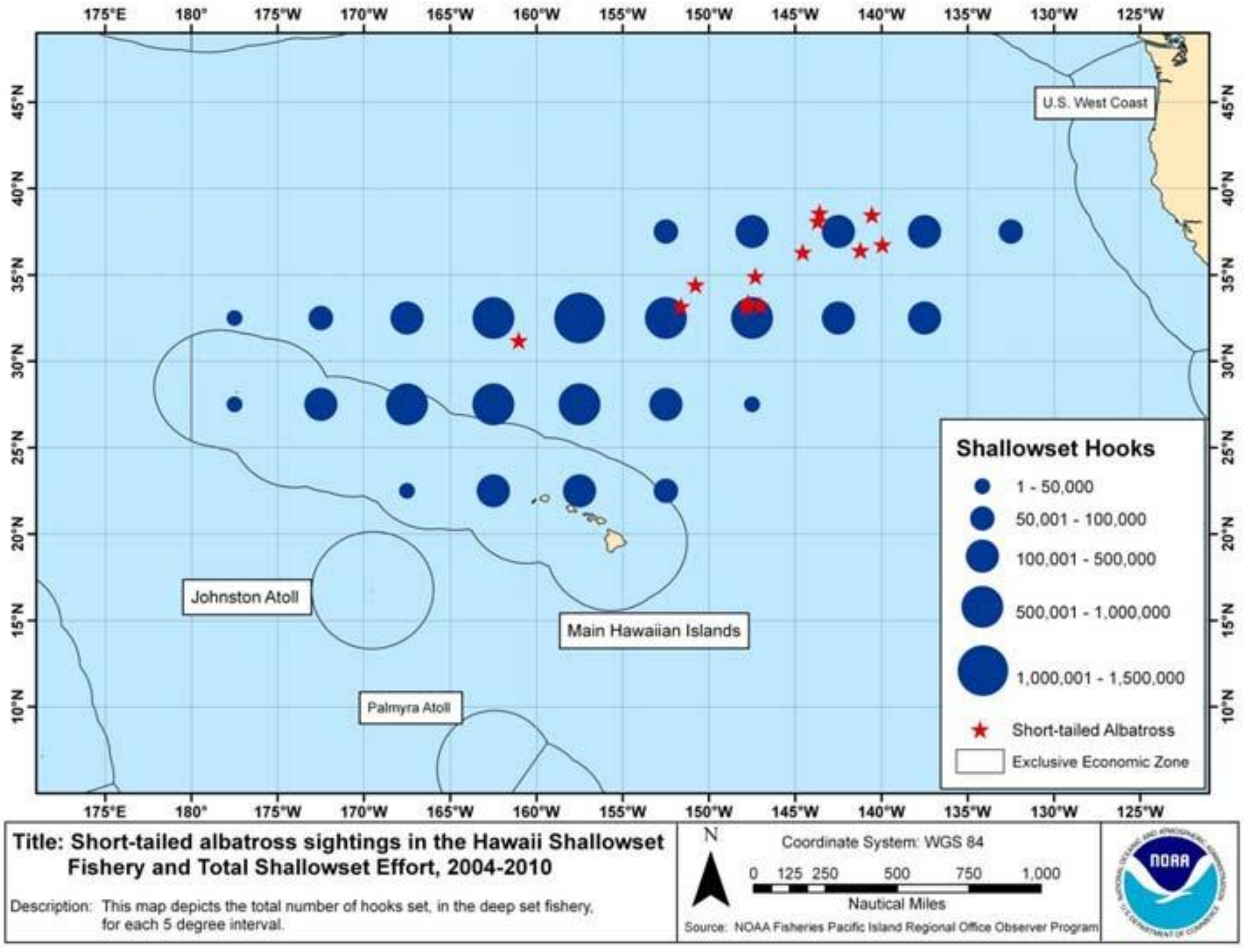


**Figure 3.** Shallow set fishery: short-tailed albatross sightings and total fishing effort, 2004-2010.

*Current Effort*

Fishing effort for the combined fisheries has increased from approximately 22 million hooks in 2001 to 39 million hooks in 2010. Annual combined number of vessel trips was stable from 2004 to 2010; however, there was a decrease (491 thousand in shallow set and 2.5 million in deep set) in the total number of hooks in 2010 relative to the previous two years. The shallow set fishery represents an annual average of approximately 7% of the total fishery effort based on number of sets. Since 2004, the deep set fishery has deployed 91 to 99% of the total sets and 95 to 99% of the total hooks in the two fisheries (Tables 3 through 5). Note the year assigned to individual trips was based on the date of return to port of the vessel from a trip and some trips straddled calendar years.

**Table 3**. Hawaii-based pelagic longline fisheries effort, deep and shallow set 2004–2010.

| Year | No. trips | No. sets | No. hooks (deep and shallow-set) | Percent of sets shallow-set | Percent of sets deep-set |
|---|---|---|---|---|---|
| 2004 | 1,393 | 16,029 | 32,019,715 | 1 | 99 |
| 2005 | 1,552 | 18,195 | 35,048,705 | 9 | 91 |
| 2006 | 1,445 | 17,302 | 35,303,789 | 5 | 95 |
| 2007 | 1,515 | 19,385 | 40,211,326 | 8 | 92 |
| 2008 | 1,474 | 19,482 | 41,580,233 | 8 | 92 |
| 2009 | 1,365 | 18,572 | 39,492,259 | 9 | 91 |
| 2010 | 1,313 | 17,903 | 39,001,014 | 10 | 90 |
| Average | 1,437 | 18,124 | 37,522,434 | 7 | 93 |

**Table 4**. Hawaii-based pelagic longline deep set fishery effort, 2004–2010.

| Year | Active vessels | No. trips | Number of sets | Number of Hooks |
|---|---|---|---|---|
| 2004 | 125 | 1,382 | 15,894 | 31,906,397 |
| 2005 | 124 | 1,443 | 16,550 | 33,663,248 |
| 2006 | 127 | 1,388 | 16,452 | 34,598,343 |
| 2007 | 129 | 1,427 | 17,815 | 38,839,377 |
| 2008 | 127 | 1,381 | 17,885 | 40,083,935 |
| 2009 | 127 | 1,253 | 16,810 | 37,770,913 |
| 2010 | 122 | 1,205 | 16,070 | 37,197,582 |
| Average | 126 | 1,354 | 16,782 | 36,294,256 |

**Table 5**. Hawaii-based pelagic longline shallow set fishery effort, 2004–2010.

| Year | Active vessels | Number of trips | Number of sets | Number of Hooks |
|---|---|---|---|---|
| 2004 | 7 | 11 | 135 | 113,318 |
| 2005 | 33 | 109 | 1,645 | 1,385,457 |
| 2006 | 35 | 57 | 850 | 705,446 |
| 2007 | 28 | 88 | 1,570 | 1,371,949 |
| 2008 | 27 | 93 | 1,597 | 1,496,298 |
| 2009 | 28 | 112 | 1,762 | 1,721,346 |
| 2010 | 28 | 108 | 1,833 | 1,803,432 |
| Average | 27 | 83 | 1,342 | 1,228,178 |

Temporal distributions of fishing effort for the deep set and shallow set fisheries are different. Effort in the deep set fishery is evenly distributed throughout the year (Figure 4). In contrast, shallow set effort is concentrated during the first two quarters of the year, a reflection of the seasonal distribution of swordfish (Figure 5).

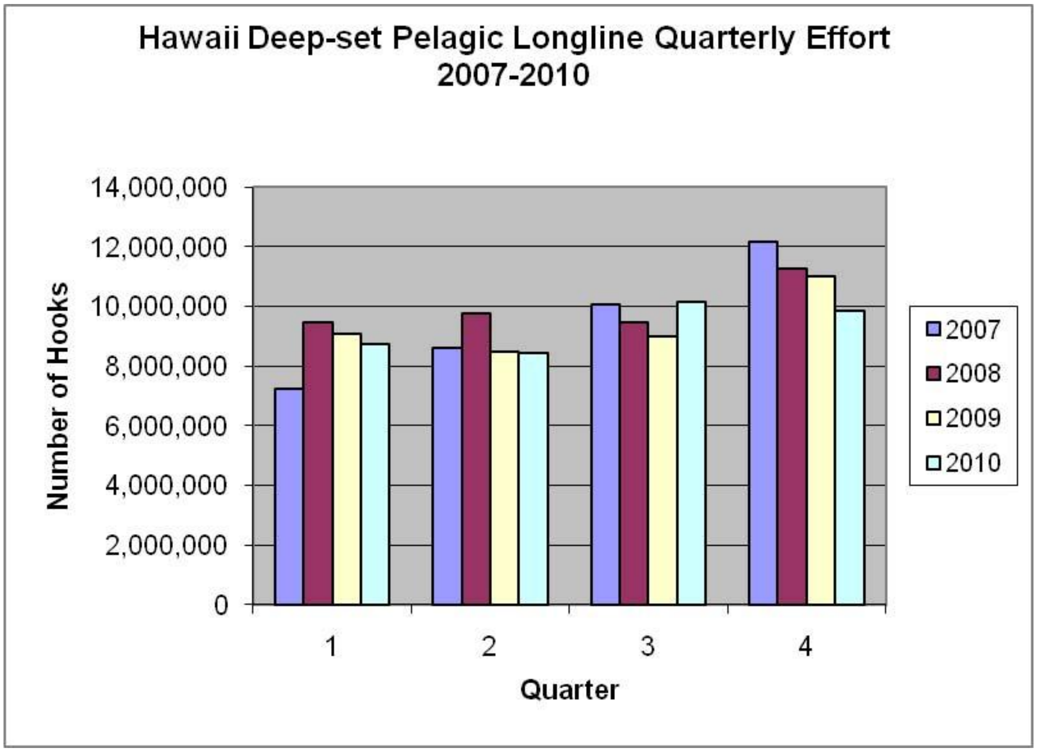


**Figure 4**. Hawaii deep set longline fishing effort by quarter, 2007-2010.

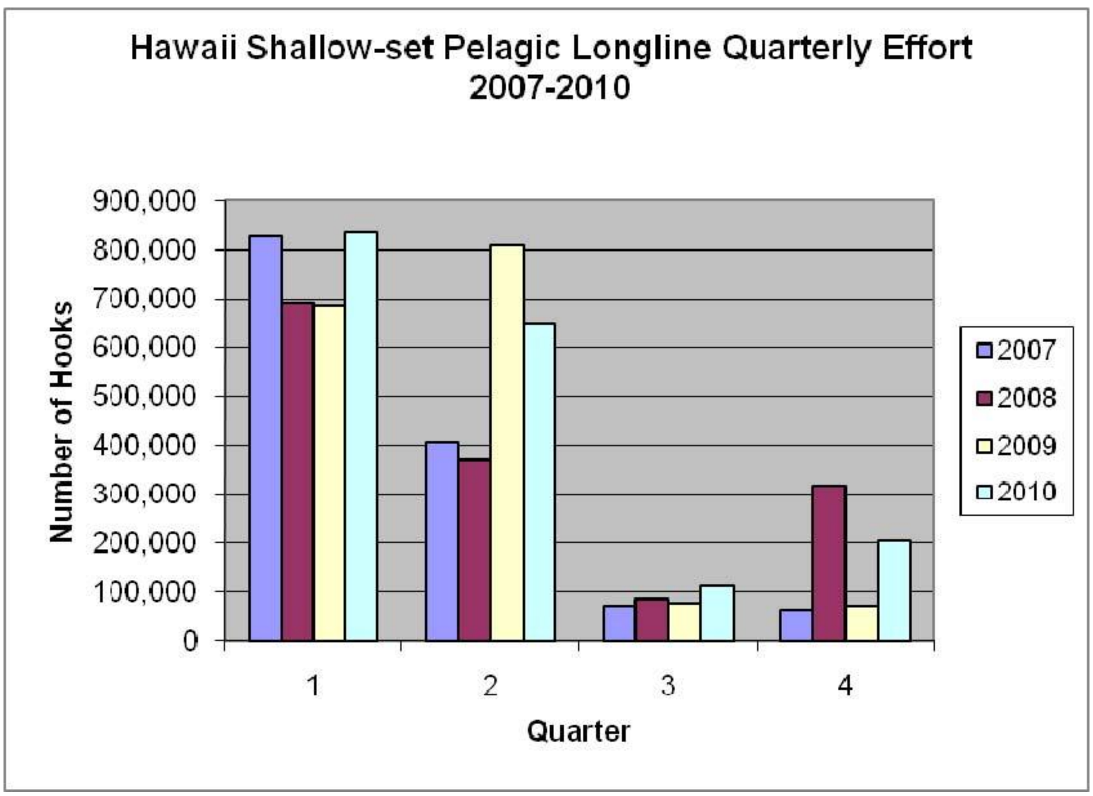


**Figure 5**. Hawaii shallow set longline fishing effort by quarter, 2007-2010.

*Bigeye tuna catch limits*

In December 2009, NMFS issued regulations under authority of the Western and Central Pacific Fisheries Convention (WCPFC) Implementation Act to establish catch limits for bigeye tuna in the United States pelagic longline fisheries in the western and central Pacific Ocean (WCPO) for each of the years 2009, 2010, and 2011, to allow the United States to comply with a conservation and management measures per the WCPFC Implementation Act. Once the limit of 3,763 metric tons (mt) is reached in any of those years, retaining, transshipping, or landing bigeye tuna caught in the WCPO is prohibited for the remainder of the year. The limit does not apply to the longline fisheries of American Samoa, Guam, the Northern Mariana Islands, or to Hawaii limited access permit holders that also have American Samoa limited access permits or to Hawaii vessels that are on declared shallow set trips. When the limit is reached in a given year, affected fishermen, i.e., mainly Hawaii limited access permit holders that deep set for bigeye, would be expected to either cease fishing for the remainder of the calendar year in the WCPFC Convention Area, shift from deep setting in the WCPO to shallow setting, or deep set fish in the eastern Pacific Ocean (EPO) (east of 150° West) (see Figure 3). Fishermen could also continue to deep set fish in the WCPFC Area provided they do not retain any bigeye tuna. Furthermore, because the distance to swordfish grounds is generally further from port relative to tuna grounds, targeting swordfish may only be feasible for larger vessels participating in the tuna-targeting fishery.

On November 18, 2011, the President signed into law the Consolidated and Further Continuing Appropriations Act, 2012. Section 113 of that Act authorizes United States Participating Territories of the Commission, i.e., American Samoa, Guam, and the Northern Mariana Islands to assign catch limits established by the Commission through arrangements with U. S. vessels with permits issued under the Fishery Management (now "Ecosystem") Plan for Pelagic Fisheries of the Western Pacific Region. Under CMM 2008-01, Participating Territories are generally subject to an annual catch limit of 2,000 mt of bigeye tuna. Under Section 113, the Secretary of Commerce is to attribute to Participating Territories those catches made by vessels operating under arrangements that meet the requirements of that section for the purposes of annual reporting to the Commission. The Commission has not assigned bigeye tuna catch limits for years beyond 2011, but is expected to in early 2012. As of the implementation date of the Act (November 18, 2011), the Hawaii Longline Association, which represents United States longline vessels that fish in the western and central Pacific, had entered into an arrangement with the Territory of American Samoa. Accordingly, one could reasonably expect that the fishery will not reach the 2012 catch limit for United States fisheries.

The bigeye tuna catch limit has been in place for three years (2009, 2010, and 2011) and the deep set fishery for bigeye tuna closed on December 29, 2009, and reopened January 1, 2010. In 2010, the fishery for bigeye tuna closed on November 22 and reopened January 1, 2011.

*Amendment 18*

During 2004-2009, the shallow set fishery operated under a set certificate program that limited the annual number of sets to 2,120. Under the program the fishery did not utilize all of the available certificates and the highest percent of certificates used was in 2009 (83.6 %) (Table 6). Thus, the program never limited effort in the fishery. However, the fishery is subject to the number of sea turtle interactions that may occur in the fishery. In 2006, the fishery for swordfish was closed because the annual interaction limit for loggerhead sea turtles (*Caretta caretta*) was reached. In 2010, NMFS implemented Amendment 18, which was intended to allow for the attainment of optimum yield in the swordfish fishery, while continuing protecting listed species. Amendment 18 removed the shallow-set effort limit, eliminated the set certificate program, and established a new annual interaction limit (WPFMC 2010) (74 FR 65460; January 10, 2010) for 46 loggerhead[1] sea turtles. However, the previous limit for leatherback sea turtles (*Dermochelys coriacea*) was not changed and remains at 16 turtles.

**Table 6**. Number of set certificates issued and used in the shallow set fishery 2004-2010.

| **Year** | **Issued** | **Used** | **Percent Used** |
|---|---|---|---|
| 2004 | 2040 | 140 | 6.9 |
| 2005 | 2074 | 1639 | 79.0 |
| 2006 | 2040 | 850 * | 41.7 |
| 2007 | 2072 | 1569 | 75.7 |
| 2008 | 2072 | 1604 | 77.4 |
| 2009 | 2100 | 1755 | 83.6 |
| 2010 | 1988 | 82 ** | 4.1 |

* Fishery closed early because of loggerhead turtle interaction limit was reached.
** Certificate requirement ended January 11, 2010.

Analysis in Amendment 18 estimated that the fishery effort would gradually increase to 5,500 sets per year. This number is the approximate annual maximum number of sets made in any one year from 1994 to 1999. Since implementation of Amendment 18 on January 10, 2010, the shallow set fishery effort increased from 1.72 million hooks in 2009 to 1.8 million hooks in 2010 (increased approximately 82,000 hooks) and increased from 1,762 sets to a 1,833 sets (see Table 5). Typically, shallow set effort is highest in the first quarter of each year (see Figure 5). The average rate of increase in the number of sets per year since 2007 is 5%, so it is unlikely that shallow set effort will increase to 5,500 sets within the next five years.

In addition to these seabird deterrent and mitigation regulations, other management measures found in 50 CFR 665 currently governing the fishery include, but are not limited to; 1) Federal catch and effort logbooks; 2) longline fishing prohibited areas; 3) vessel monitoring system; 4) limited access permits; 5) vessel length restriction; 6) annual protected species workshops for vessel owners and captains on shipboard marine mammal, sea turtle, and seabird mitigation equipment and handling techniques; 7) fishing trip declaration (shallow setting or deep setting); and 8) vessel and gear identification requirements.

[1] On December 16, 2009, plaintiffs Turtle Island Restoration Network, Center for Biological Diversity, and Kahea-the Hawaiian Environmental Alliance, filed a complaint in the United States District Court for the District of Hawaii, seeking declaratory and injunctive relief for alleged violations of the ESA, Marine Mammal Protection Act, Migratory Bird Treaty Act, and the Administrative Procedure Act. As part of a negotiated settlement approved by the Court, NMFS agreed to reinstate the annual incidental take for loggerhead sea turtles as set forth in the 2004 Regulations; namely 17 loggerheads. NMFS also agreed not to increase allowable incidental take of leatherback and loggerhead sea turtles by the Hawaii-based shallow set longline fishery above the limits set forth in the 2004 Regulations prior to the completion of a new biological opinion based on the best available science currently available. The new biological opinion is expected to be completed in January 2012.

## II. Status of the Species

### Short-tailed Albatross

*Taxonomy and Species Description*

The short-tailed albatross is a large pelagic bird with long, narrow wings adapted for soaring just above the water surface. It is the largest species within the North Pacific albatross genus Phoebastria, which includes the Laysan albatross, the black-footed albatross, and the waved albatross (*Phoebastria irrorata*). The short-tailed albatross has a body length of 33-37 inches (84-94 cm) and a wingspan of 84-90 inches (213-229 cm). Adults have a white head and body and golden cast to crown and nape. The tail is white with a black terminal bar. A disproportionately large pink bill distinguishes it from other North Pacific albatrosses and its hooked tip becomes progressively bluer with age. Juveniles of the species are blackish-brown with flesh-colored legs, progressively whitening with age. Short-tailed albatross are also the only North Pacific albatross that develops an entirely white back at maturity (USFWS 2008).

*Listing Status*

The short-tailed albatross was federally listed as endangered throughout its range, including the United States, on July 31, 2000 (65 FR 147:46643-46654). Prior to that, it had been listed as endangered throughout its range except within the United States and its territorial waters. At the time of listing, designation of critical habitat was determined to be not prudent (65 FR 147:46651-46653).

*Historic and Current Distribution*

Historically, the short-tailed albatross was probably the most abundant albatross in the North Pacific, with 14 breeding colonies in the northwestern Pacific. However, from the late 1800's, millions were hunted for feathers, oil, and fertilizer (USFWS 2004, USFWS 2008), and by 1949, no birds were observed breeding and the species was thought to be extinct. The species began to recover during the 1950s, and currently the population is growing exponentially at about 7.3% annually (Naughton *et al.* 2007) due to habitat management and protection, fishing gear mitigation measures to reduce interactions, and bird-handling techniques to increase survival.

Today, two small colonies exist in the western Pacific on small Japanese islands (USFWS 2004). The largest colony, at Tsubamezaki on Torishima Island, is estimated to contain 80-85% of the existing breeding population. The most recent population assessment of for 2009-2010 breeding season was 3,181 and for the 2010-2011 breeding season it is 3,441. The estimates are derived from a deterministic population model by Dr. Paul Sievert (short-tailed albatross Recovery Team member). In 2008, 10 chicks were translocated to a former colony site on Mukojima, a non-volcanic island, south of Torishima in the hope re-establishing a colony on this island. All chicks in this group survived to fledging. In 2009, an additional 10 chicks were translocated to Mukojima. A smaller breeding colony exists off Taiwan in the Senkaku Islands and in 2002 was estimated to be 260 birds by Dr. Hasegawa (NMFS 2002).

While the short-tailed albatross range encompasses the North Pacific from approximately 15°N to the Bering Sea, they appear to prefer waters shallower than 1,000 m that are associated with continental shelves (Balogh and Morgan 2008). Breeding short-tailed albatross do not appear to travel great distances while nesting. In the case of the Torishima population, most breeding birds tend to forage around Torishima and north to the Japanese mainland. In addition, satellite tracks of birds from the main breeding colony on Torishima suggest that the majority of short-tailed albatross forage in Alaskan waters (Figure 6). The majority of non-breeding short-tailed albatross tend to aggregate along the continental shelves of North America.

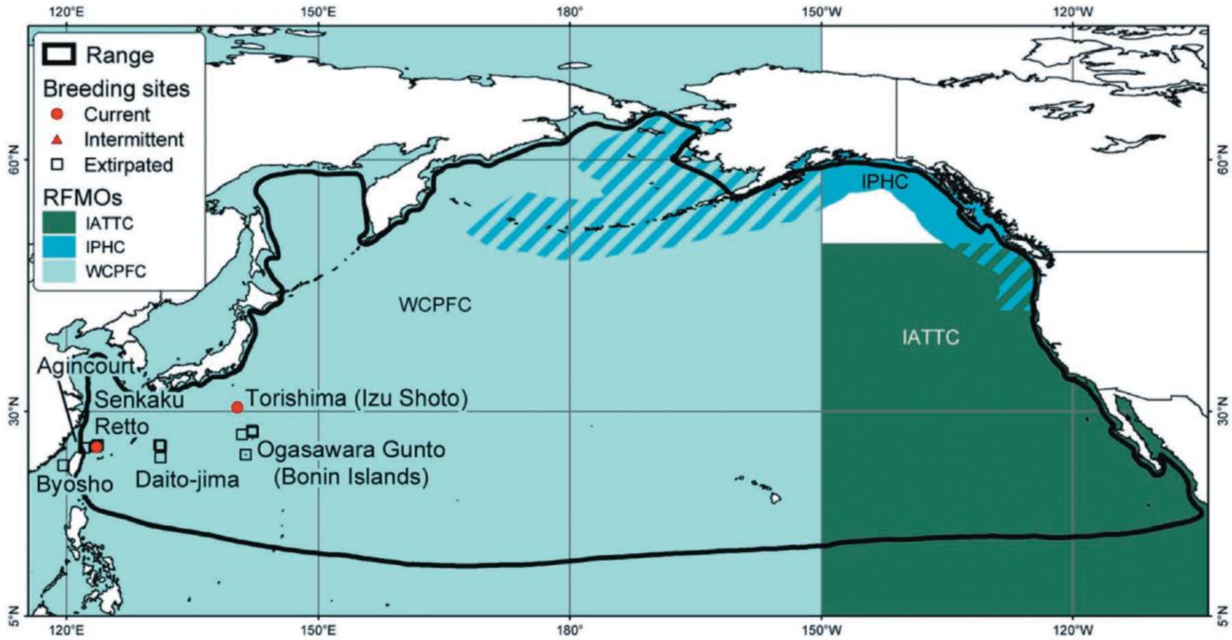


**Figure 6**. Former and current breeding range and at-sea range of short-tailed albatross. This species range overlaps with at least three Regional Fishery Management Organizations.

*Life History*

The short-tailed albatross is a colonial, annual breeding species; each breeding cycle lasts about 8 months. Birds may breed at 5 years of age, but first year of breeding is more commonly at 6 (Hasegawa 2009). Birds arrive on Torishima in October, but as many as 25% of breeding age adults may not return to the colony in a given year (Hasegawa 2009). A single egg is laid in late October to late November, and is not replaced if destroyed (Austin 1949). Bi-parental incubation lasts 64 to 65 days. Hatching occurs from late December through January (Hasegawa and DeGange 1982). During the brood-rearing period, most foraging bouts are along the eastern coastal waters of Honshu Island, Japan (Suryan *et al.* 2008). Chicks begin to fledge in late May into June (Austin 1949). There is little information on timing of breeding on Minami-kojima.

Nest sites may be flat or sloped, with sparse or full vegetation (Aronoff 1960, Sherburne 1993, DeGange 1981). Nests consist of a divot on the ground lined with sand and vegetation. Tickell (1975) describes the nest as a grass or moss-lined concave scoop about 2 ft. (0.61 m) in diameter. Parents alternate foraging trips that may last 2-3 weeks while taking turns at incubating. When one bird is foraging, the other stays on the nest without eating or drinking. Yamashina Institute staff observed 24 days to be the longest period between nest exchanges of a single observed pair (Fumio Sato, Yamashina Institute, pers. comm. 2001).

Eggs hatch in late December and January. For the first few days after hatching the chick is fed on stomach oil, heavy oil, very rich in calories and Vitamin A. This oil also provides a source of water once metabolized, which is important when chicks may be left for several days in high temperatures on dry islands. Soon after hatching, the chicks are fed more solid food, such as squid and flying fish eggs. During the first few weeks after hatching, one adult broods the chick and the other forages at sea. Later, when the chick can regulate its body temperature, both parents leave their chick, while they forage simultaneously. When chicks are left alone without a parent, they are at the post-guard stage.

Parents forage primarily off the east coast of Honshu Island, Japan, almost entirely north of Torishima and south of Ishinomaki, Japan (Figure 7) (Suryan *et al.* 2008), where the warm Kuroshio current from the south collides with the cold Oyashio current from the north (Suryan *et al.* 2008, Balogh 2008).

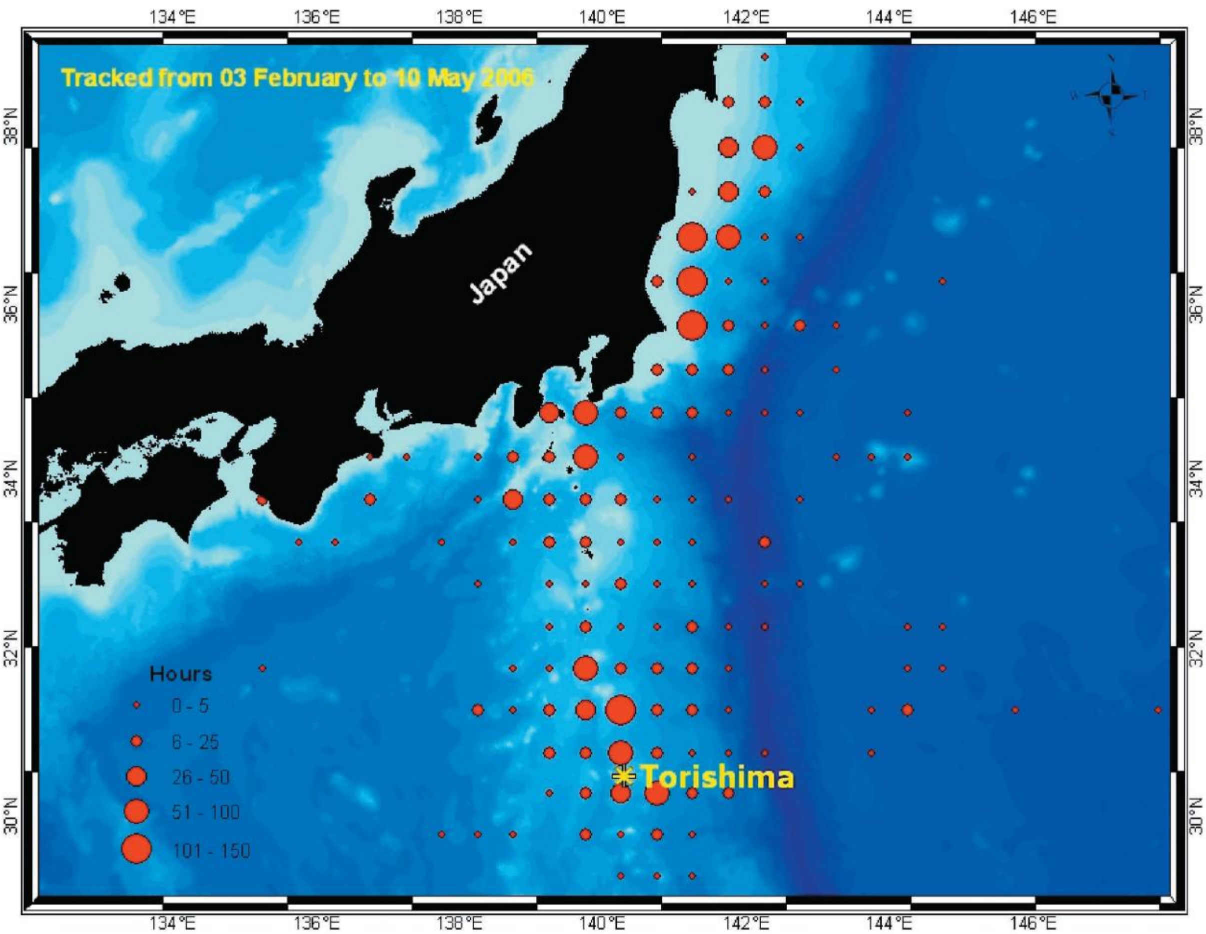


**Figure 7.** Use of marine habitat by short-tailed albatross breeding adults during the chick-rearing period. (Data were generated from satellite telemetry data, and the hours spent by tagged short-tailed albatross in each 0.5 degree block were summed).

By late May or early June, the chicks are almost fully grown, and the adults begin abandoning the colony site (Hasegawa and DeGange 1982, Suryan *et al.* 2008). The chicks fledge soon after the adults leave the colony. By mid-July, the breeding colony is empty (Austin 1949). Nonbreeders and failed breeders disperse earlier from the breeding colony, during late winter through spring (Hasegawa and DeGange 1982). There is no detailed information on timing of breeding on Minami-kojima.

Short-tailed albatross are monogamous and highly philopatric to nesting areas (they return to the same breeding site year after year). Chicks hatched at Torishima return there to breed. However, young birds may occasionally disperse from their natal colonies to attempt to breed elsewhere, as evidenced by the appearance of adult birds on Midway Atoll that were banded as chicks on Torishima (H. Hasegawa pers. comm. 1997; Richardson 1994).

In summer (the nonbreeding season), short-tailed albatross disperse widely throughout the temperate and subarctic North Pacific Ocean (Sanger 1972; Suryan *et al.* 2007b).

*Habitat Description*

Short-tailed albatross nest on isolated, windswept, offshore islands, with restricted human access. On Torishima, most birds nest on a steep site containing loose volcanic ash (Tsubamezaki), however, a new colony on a vegetated gentle slope (Hatsunezaki) is growing rapidly. Nesting at the eroding Tsubamezaki site may be an artifact of where commercial harvest did not occur, due to difficulty of access for humans. Torishima, where vegetated, is dominated by a clump-forming grass, *Miscanthus sinensis* var. *condensatus*. The grass helps to stabilize the soil, provide protection from weather, and acts as a beneficial visual barrier between nesting pairs that minimizes antagonistic interactions. In addition, it allows for safe, open takeoffs and landings (Hasegawa 1977).

*Threats*

Natural Events

Torishima, the main short-tailed albatross breeding colony, is an active volcano. There were minor and major eruptions throughout the 20th century, and as recently as 2002. It is estimated that a catastrophic eruption during the breeding season could kill up to 54% of the short-tailed albatross population. In addition to outright deaths, volcanic eruptions have the potential to reduce breeding habitat by destroying vegetation (USFWS 2008).

Intense storms accompanied by high winds and heavy rains have reduced breeding habitat on Torishima in the past. Additionally, years with intense storm activity correspond to years with lower breeding success.

Ocean regime shifts, e.g., El Niño Southern Oscillation, are common environmental phenomena arising from large-scale changes in atmospheric pressure affecting wind and oceanographic conditions that ultimately affect ocean productivity. The effects of these changes can be positive or negative depending on species and should be recognized as an important variable in population dynamics (USFWS 2008).

Commercial Fishing

Many domestic and international commercial fisheries can potentially affect short-tailed albatross (Table 7). These fisheries include demersal (bottom), pelagic longline fisheries, and trawl fisheries. Short-tailed albatross have also been taken incidentally in the Russian driftnet fishery (USFWS 2008). Besides the United States of America, other countries operating fisheries with the potential to interact with short-tailed albatross include Japan, Taiwan, China, Korea, Russia, and perhaps others. Information from foreign fisheries is incomplete and some fisheries like the Japanese salmon driftnet fishery operating in Russian territory are documented taking high numbers (186,000 per year) of seabirds with the majority being shearwaters and murres (Artukhin 1999).

**Table 7.** Short-tailed albatross and various fisheries interactions throughout the range of the species 1983-2011.

| **Date** | **Fishery** | **Observer program** | **In sample*** | **Bird age** | **Location** | **Source** |
|---|---|---|---|---|---|---|
| 7/1983 | Net | n/a | n/a | Hatch-year | North of St. Matthew Island, Bering Sea | USFWS (2008) |
| 10/1/1987 | Halibut | n/a | n/a | Hatch-year | Gulf of Alaska | USFWS (2008) |
| 08/28/1995 | IFQ sablefish fishery | Yes | No | 1-year old | Western Gulf of Alaska, south of the Krenitzin Islands | USFWS (2008) |
| 10/8/1995 | IFQ sablefish fishery | Yes | No | 3-year old | Bering Sea, Alaska | USFWS (2008) |
| 9/27/1996 | Hook-and-line fishery | Yes | Yes | 5-year old | Bering Sea, Alaska | USFWS (2008) |
| 4/23/1998 | Russian salmon drift net fishery | n/a | n/a | Hatch-year | Bering Sea, 140km east of Cape Oljtorskij, Russia | USFWS (2008) |
| 9/21/1998 | Cod hook-and-line fishery | Yes | Yes | 8-year old | Bering Sea, Alaska | USFWS (2008) |
| 9/28/1998 | Cod hook-and-line fishery | Yes | Yes | Sub-adult | Bering Sea, Alaska | USFWS (2008) |
| 4/24/2002 | Russian fishing net entanglement | n/a | n/a | Hatch-year | Sea of Okhotsk, 120km south from Magadan, Russia | USFWS (2008) |
| 8/29/2003 | Russian longline Fishery | n/a | n/a | 3-year old | Bering Sea | USFWS (2008) |

**Table 7.** Continued.

| **Date** | **Fishery** | **Observer program** | **In sample*** | **Bird age** | **Location** | **Source** |
|---|---|---|---|---|---|---|
| 8/31/2006 | Russian fishing net entanglement | n/a | n/a | 0 to 1-year old | 120km Southeast offshore Simusil Island, Kuril Islands, Kamchatka O.,Russia | USFWS (2008) |
| 8/27/2010 | Cod freezer demersal longline fishery | Yes | Yes | 7-year old | Bering Sea/Aleutian Islands | NOAA (2010) |
| 9/14/2010 | Cod freezer demersal longline fishery | Yes | Yes | 3-year old | Bering Sea/Aleutian Islands | NOAA (2010) |
| 4/7/2011 | Sablefish demersal longline fishery | Yes | Yes | 1-year old | Pacific Ocean/Oregon coast | West Coast Groundfish Observer Program |

* In sample refers to detection of mortality within a fisheries observer sample period.

Invasive Species

Black rats (*Rattus rattus*) were introduced to Torishima at some point during human occupation. The effect of these rats on short-tailed albatross is unknown, but rats are known to feed on chicks and eggs of other seabird species (Atkinson 1985), and there have been numerous efforts of rat eradication to protect seabird colonies (Taylor *et al.* 2000; USFWS 2003a).

Disease and Parasites

Diseases and parasites are not currently adversely affecting short-tailed albatross. No diseases have been documented in short-tailed albatross. Tick parasites have been documented infesting short-tailed albatross on Torishima, although, not recently (USFWS 2008).

Predation

Sharks have been observed to prey upon fledgling short-tailed albatross as they depart their natal colony (Harrison 1979). Shark predation is also documented among other albatross species (USFWS 2008).

Oil Pollution

There is potential for oil spills to occur in the action area which could affect short-tailed albatross. Petroleum and petroleum products released into the environment are documented as having several deleterious effects on seabirds in general. These effects include disruption in thermoregulation through fouled feathers, toxicity through ingestion (e.g., while preening fouled feathers), contamination of food resources, reduction of prey availability through toxic effects to prey species, and embryo toxic effects. Oil contamination may be a serious consideration, because the disputed Senkaku Islands have potentially exploitable oil resources and are the site of the smaller of the two remaining short-tailed albatross colonies. Oil spills in any of the short-tailed albatross range may have serious impacts. The transfer of small amounts (1 microliter) of oil from adults to eggs may be enough to kill an egg.

Plastic Pollution

The presence of plastics in the North Pacific is a serious threat to albatrosses. All three species of North Pacific albatross have been documented to consume plastics. Plastics are probably eaten when they are mistaken for food, or have flying fish eggs adhering to them. Plastics likely reduce chick survival when they are fed to chicks prior to their ability to regurgitate. This can clog the digestive tracts, leading to the eventual starvation of chicks. Another possible consequence of plastics ingestion is the transfer of toxic compounds to short-tailed albatross. USFWS (2008) cites a study in which polychlorinated biphenyl concentrations in short-tailed albatross tissues were positively correlated to the amount of ingested plastics. Five to 20 million tons of marine debris generated from the 2011 Japan tsunami increases risk of plastic exposure to short-tailed albatross throughout the range. The debris is predicted to pass near or wash ashore in the Northwestern Hawaiian Islands as early as the winter of 2012, based on reported sightings of debris by the Russian ship STS Pallada. The debris could approach the West Coast of the United States in 2013, and circle back to the main Hawaiian Islands in 2014 to 2016.

Contaminants

Albatrosses at Torishima, including short-tailed albatross, have higher concentrations of pollutants than albatrosses in other parts of the North Pacific. Possible consequences of this contamination are shell thinning (from pesticides), disruption of physical and embryonic development, and reproductive inhibition (from organochlorines and heavy metals) (USFWS 2008). Debris from 2011 Japan tsunami could increases risk of contaminant exposure to short-tailed albatross throughout the range.

Climate Change

USFWS (2008) cites two major studies documenting climate change. The authors suggest that climatic change in the Arctic would shift the range of short-tailed albatross prey items northward increasing energetic costs to foraging birds. Additionally, USFWS suggests climate change would likely cause shifts in vegetation on the main breeding colony at Torishima.

Habitat Destruction

Non-native plants, such as shrubs, can limit or destroy suitable nesting habitat on breeding islands. Although there is currently no known invasive plant problem on Torishima, accidental introduction remains a threat as long as humans work on the island. Catastrophic events listed under Natural Events above, can change habitat at breeding colonies. These events can result in permanent loss of habitat.

*Recovery Strategy and Ongoing Conservation Measures*

The Recovery Plan for Short-tailed Albatross describes key recommendations for immediate action, which are: (1) formation of new breeding colonies at safe locations on Torishima and in the Bonin Islands; (2) stabilization of existing breeding habitat on Torishima Island; and (3) reduction of seabird bycatch in all North Pacific fisheries that may take this species.

In 2008, the USFWS in collaboration with the Japanese Ministry of the Environment, Yamashina Institute of Ornithology, and Oregon State University, embarked on an historic attempt to translocate short-tailed albatross chicks to Mukojima for the purpose of starting a new breeding colony. Mukojima is a newly designated United Nations Educational, Scientific and Cultural Organization World Heritage Site that is non-volcanic and is not in politically disputed territory. Since 2008, 55 six-week-old short-tailed albatross chicks have been moved from their natal nest on Torishima and hand-reared on the “safe” island of Mukojima. The goal is for 70 chicks to fledge from Mukojima by 2012 (USFWS 2009).

So far, 100% of the hand-reared chicks successfully fledged from Mukojima, and because of the species delayed breeding age, they have not yet returned to Mukojima to breed. Initial signs are hopeful that the fledglings recognized Mukojima as their future nesting site because recently three year old subadults returned to Mukojima and were observed practicing their mating dance, a ritual that is a prelude to breeding. The establishment of a third, “safe” breeding colony is required for recovering this endangered bird.

The government of Japan provides legal protection to the short-tailed albatross as a Special National Monument and a Special Bird of Protection. The main nesting island, Torishima, is protected as a National Monument. Japan has improved the nesting habitat on Torishima by planting grass at the colony site to stabilize soils and provide cover. Efforts to establishing a second nesting area on Torishima Island continue. The second nesting island, Minami-Kojima, is currently claimed by both Japan and China. This dispute in ownership prevents scientists from studying and managing the birds that nest there (USFWS 2009).

The USFWS in Alaska is working with the commercial fishing industry to minimize take of this endangered seabird. To that end, USFWS in Alaska is supplying free paired tori line (streamer line) kits to any commercial longline vessel owner/operator who requests one. In addition, USFWS is conducting a 50% cost-share program to reimburse owners of longline vessels that are 100 ft or more in length for half of the costs associated with installation of davits (heavy-duty tori line-deployment booms). Fishermen are strongly encouraged to develop new, innovative techniques to avoid catching birds (USFWS 2009).

## III. 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 during the consultation process. 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. The environmental baseline describes the species’ health at a specified point in time, and it does not include the effects of the action under review in this consultation. The action area of a project (Figure 8) is defined by regulation as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02).

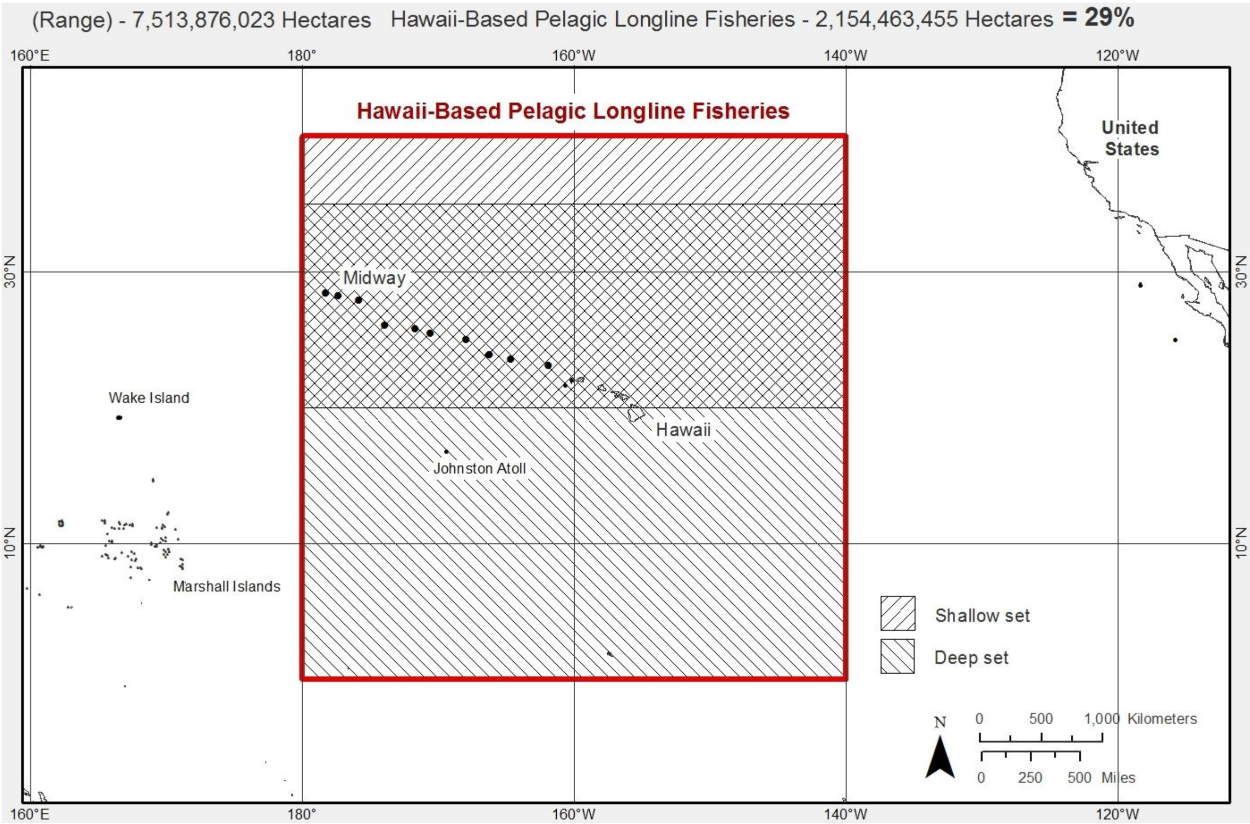


**Figure 8.** Combined area of shallow set and deep set fisheries within the short-tailed albatross range.

Short-tailed albatross have been observed in the Northwestern Hawaiian Islands, with at least 50 sightings of about 17 different birds since 1938 (USFWS 2004). In recent history, one bird consistently returns to Midway Atoll and occasionally displays mating behavior with transient short-tailed albatross. In 2010, one breeding pair at Midway Atoll National Wildlife Refuge successfully hatched and fledged a chick. No successful breeding attempts have been observed in other locations within the United States (USFWS 2009).

Since 2000, NMFS observers aboard vessels have noted the presence of short-tailed albatross in the vicinity of the fishing grounds north of Hawaii, as well as a single observation off of the Island of Hawaii (see Figures 2 and 3). Sixteen sightings have been noted over these 11 years (Table 8). Observer sightings include one in 2000, two in 2004, three in 2007, 2008, and 2009, and four in 2010 (NMFS unpub). Two of the sightings in the deep set fishery occurred below 23° N latitude where seabird avoidance measures are required. In 2010, three of the four sightings occurred on the same trip on three different days indicating it may have been the same bird. All sightings were non-breeding juveniles (NMFS 2008a) and occurred during the winter (November – February), when the breeding population remains in the vicinity of Torishima. Initial tracking data suggested that during their post-breeding migration, female short-tailed albatross may have a prolonged exposure to fisheries in Japanese and Russian waters compared to males and that juvenile birds have greater exposure to fisheries in shelf waters (in the Bering Sea and elsewhere) and off the west coasts of Canada and the United States (Figure 9).

**Table 8.** Short-tailed albatross sightings by fishery, year, month, day, and location, 2000-2011.

| Date of sighting | Latitude | Longitude | Fishery (Deep or Shallow) |
|---|---|---|---|
| 1/23/2000 8:37 | 33.15 | 147.83 | Shallow |
| 11/18/2004 10:15 | 38.1 | 143.69 | Shallow |
| 12/23/2004 6:55 | 36.31 | 144.56 | Shallow |
| 1/4/2007 4:33 | 33.18 | 151.61 | Shallow |
| 1/14/2007 10:32 | 34.43 | 150.78 | Shallow |
| 11/21/2007 1:02 | 21.12 | 152.44 | Deep |
| 1/22/2008 14:12 | 34.92 | 147.31 | Shallow |
| 12/1/2008 12:00 | 38.59 | 143.58 | Shallow |
| 12/12/2008 11:35 | 36.74 | 139.95 | Shallow |
| 2/10/2009 8:54 | 33.39 | 147.72 | Shallow |
| 2/19/2009 10:00 | 31.2 | 161.02 | Shallow |
| 2/11/2009 13:40 | 33.23 | 147.03 | Shallow |
| 11/6/2010 8:31 | 38.47 | 140.55 | Shallow |
| 12/3/2010 10:26 | 36.42 | 141.21 | Shallow |
| 1/17/2011 7:18 | 20.25 | 161.25 | Deep |
| 5/21/2011 2:20 | 28.9 | 145.21 | Deep |

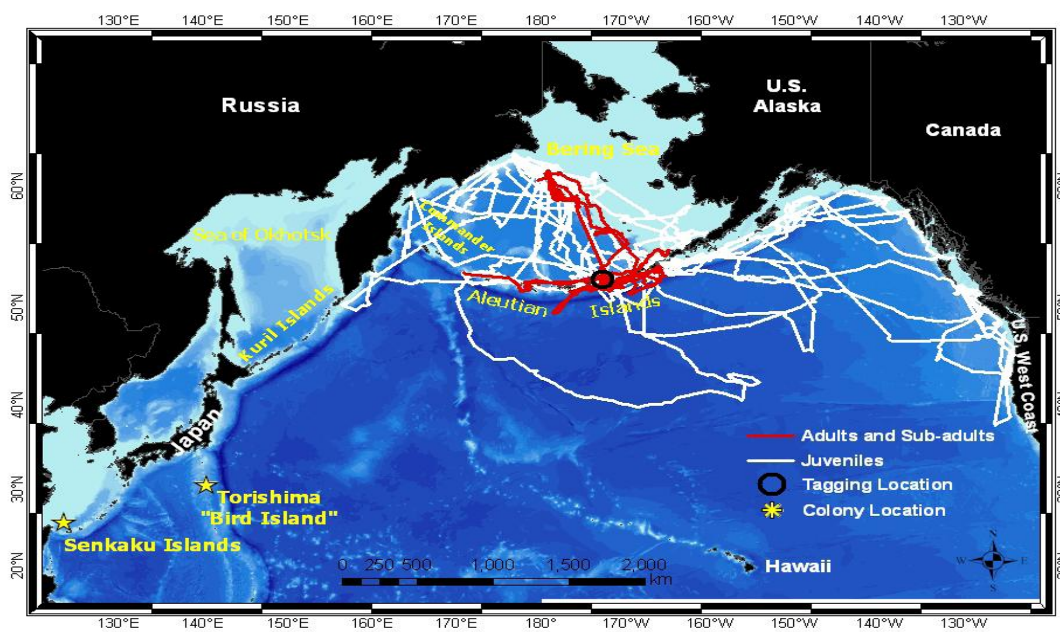


**Figure 9.** Satellite track lines for adults and sub-adults vs. juveniles captured at sea in Alaska near Seguam Pass. (Note the wide ranging track lines for juveniles vs. adults.)

Between 2004 and 2010, most shallow set fishing activity took place in the first half of the year (January – June). It is not certain whether short-tailed albatross are absent in the action area during summer months, or whether the lack of sightings reflects temporal patterns in fishing, and, thus, observer effort. Temporal distributions of short-tailed albatross could also be explained by environmental conditions such as favorable winds during the winter months that make it possible for birds to forage in these distant areas (Suryan *et al.* 2008). Because primarily juvenile short-tailed albatross have been observed by observers in the action area, it may be that these are young birds in the process of learning to locate the best foraging grounds. However, with successful nesting occurring at Midway Island NWR an increased potential for foraging breeding adults to interact with fisheries exists.

## IV. Effects of the Action

Commercial longline activities pose a threat to the short-tailed albatross throughout the species range. The expected adverse effect of the proposed action is injury and/or mortality. Short-tailed albatross attempting to feed on bait may be hooked, pulled underwater as the mainline is set, and drowned. Birds may also sustain injuries from baited hooks during the process of hauling back the mainline, which may also result in mortality. To date, there are no documented cases of short-tailed albatross taken in the Hawaii-based pelagic longline fishery. Because short-tailed albatross occurrences are likely to be relatively rare due to their low population numbers, the black-footed albatross are used as a proxy species in this analysis. Our knowledge of the foraging behavior of black-footed albatross, and existing data collected in various studies of seabird deterrents suggest these species behave similarly with respect to longline fishing, and an effective deterrent for one species is likely to be effective for all species. The use of specific data on the behaviors and interactions of black-footed albatross, then, is a practical and sound method for assessing and monitoring the risk of take and the use of measures to minimize take of short-tailed albatross. There are thousands recorded observed interactions between black-footed albatross and Hawaii-based pelagic longline vessels since the onset of the observer program in 1994. These interactions have decreased after seabird regulations were implemented. The black-footed albatross observed rate of interaction per 1,000 hooks in 2010 is 0.021 birds for the shallow set fishery and 0.002 birds for the deep set fishery (Table 9). All interactions are hooking and entanglements, and include birds that are injured but alive, and dead birds. No black-footed albatross have been observed colliding with vessels.

**Table 9.** Summary of observed seabird catch levels and nominal rates in the Hawaii longline shallow and deep set fishery, 1994-2010.

| Year | No. Black-footed albatross interactions | Total observed effort (no. of hooks) | Black-footed albatross rate (no. birds per 1000 hooks) |
|---|---|---|---|
| **Shallow set** | | | |
| 1994 | 126 | 275,730 | 0.457 |
| 1995 | 104 | 251,911 | 0.413 |
| 1996 | 56 | 305,681 | 0.183 |
| 1997 | 105 | 252,155 | 0.416 |
| 1998 | 45 | 251,577 | 0.179 |
| 1999 | 47 | 159,590 | 0.295 |
| 2000 | 146 | 344,663 | 0.424 |
| 1/1 – 6/12/01 | 32 | 126,038 | 0.254 |
| 6/12/ - 12/31/01 | 0 | 12,935 | 0 |
| 2002 | 2 | 22,627 | 0.088 |
| 2003 | 0 | 17,965 | 0 |
| 2004 | 0 | 115,718 | 0 |
| 2005 | 7 | 1,358,247 | 0.005 |
| 2006 | 3 | 676,716 | 0.004 |
| 2007 | 8 | 1,353,761 | 0.006 |
| 2008 | 6 | 1,460,042 | 0.004 |
| 2009 | 30 | 1,694,550 | 0.018 |
| 2010 | 38 | 1,832,471 | 0.021 |
| **Deep set** | | | |
| 1995 | 1 | 365,665 | 0.003 |
| 1996 | 3 | 442,278 | 0.007 |
| 1997 | 2 | 324,068 | 0.006 |
| 1998 | 1 | 515,064 | 0.002 |
| 1999 | 4 | 525,817 | 0.008 |
| 2000 | 10 | 1,973,389 | 0.005 |
| 1/1 – 6/12/01 | 48 | 2,061,837 | 0.023 |
| 6/12/ - 12/31/01 | 0 | 2,920,015 | 0 |
| 2002 | 16 | 6,697,636 | 0.002 |
| 2003 | 24 | 6,540,606 | 0.004 |
| 2004 | 1 | 7,868,613 | 0 |
| 2005 | 11 | 9,328,681 | 0.001 |
| 2006 | 17 | 7,437,498 | 0.002 |
| 2007 | 18 | 7,728,502 | 0.002 |
| 2008 | 30 | 8,747,496 | 0.003 |
| 2009 | 23 | 7,872,668 | 0.003 |
| 2010 | 17 | 8,161,800 | 0.002 |

The model used in the 2000 BO and the 2002 revised BO to estimate take of short-tailed albatrosses by the commercial long line fishery is presented below and updated to reflect the fishery operation as described in the proposed action and other new information (reduced interaction rate after implementation of deterrents, revised short-tailed albatross range, increased population of short-tailed and black-footed albatross). Because take of short-tailed albatrosses has not yet been observed and reported in the Hawaii-based fisheries, the model hypothesizes an annual short-tailed albatross take based on the average 2004 -2010 annual rate of black-footed albatross interactions (Table 10 and 11). There is a growing body of evidence that counts of interactions with birds during gear retrieval underestimates total bird interactions (Brothers 1991; Gales et al. 1998; Gilman et al. 2003, 2007). Gilman et al. (2003) found that, in the deep-set fishery, 34% of seabirds caught during setting were not hauled aboard. In a subsequent study of the deep and shallow set fisheries, Gilman et al. (2007a) found that 28% of seabirds observed caught during setting were not hauled aboard. In the two Hawaii studies, the crew did not attempt to dislodge or discard caught seabirds during hauling, and no birds were caught during gear hauling (Gilman et al. 2003, 2007a). In these studies, birds that had been observed hooked during gear setting but were not present upon gear retrieval can be inferred to have fallen from hooks due to scavenging, currents, or other mechanical action during the line soak and haul (Gilman et al. 2005). The average of the fall-off rates (34 and 28 %) is 31% and this percentage rate was used in the model. The model further assumes the Hawaii-based fisheries affects only the fraction of the short-tailed albatross population that is present within the range of the shallow set and deep set fisheries. The model used the following variables:

Shallow set (SS) fishery:
The average of the estimated annual injuries and mortalities of black-footed albatrosses in shallow set is 13.1 for 2004-2010 (see Table 10).

Where:
M = ((average of the estimated annual injuries and mortalities of black-footed albatrosses in shallow set) + (average of the estimated annual injuries and mortalities of black-footed albatrosses in shallow-set *0.31))/ (black-footed albatross population estimate of 245,234)

M= ((13.1) + (13.1)*0.31))/ 245,234)

Therefore, M = 0.00007 per year.

Deep set (DS) fishery:
The average of the estimated annual injuries and mortalities of black-footed albatrosses for the deep-set fishery of 76.9 is calculated using the average of the Annual Total Point Estimates, 2004-2010 (see Table 11).

Where:
M = ((average of the estimated annual injuries and mortalities of black-footed albatross in deep set) + (average of the estimated annual injuries and mortalities of black-footed albatrosses in deep-set *0.31))/ (black-footed albatross population estimate of 245,234)

M = ((76.9) + (76.9)*(0.31))/ 245,234

Therefore, M = 0.00041

USFWS scaled the exposure of the short-tailed albatross population to the geographic area where their range and the operation of the fishery overlap.

| | |
|---|---|
| At-risk area (A) = SS: 0.15<br>DS: 0.16 | Fraction of the short-tailed albatross range that overlaps with each of the Hawaii-based longline fisheries (Figures 10 and 11). |
| Population (N) = 3,181 | The most recent population assessment of for 2009-2010 breeding season was 3,181 and for the 2010-2011 breeding season it is 3,441. The estimates are derived from a deterministic population model by Dr. Paul Sievert (short-tailed albatross Recovery Team member). The 2009-2010 population numbers is used for calculations to correspond to data for black-footed albatross. |

The estimated take (T) of short-tailed albatrosses in the Hawaii-based fisheries based on historical levels of fishing effort and albatross take, scaled to the area of overlap between the species' range and the fisheries, and updated with the current short-tailed albatross population estimate is calculated as:

T=MxAxN, or T = 0.034 short-tailed albatrosses per year or less than one (0.17) over five-years for the shallow set longline fishery. Calculated for the deep set fishery T = 0.21 short-tailed albatross per year or more than one (1.07) albatross over five-years.

**Table 10**. NMFS observer program annual report of black-footed albatross interactions 2004-2010 for Hawaii shallow set fishery.

| Year | No. released dead | No. released live | Percent of trips with seabird interactions | No. observed sets |
|---|---|---|---|---|
| 2004 | 0 | 0 | 16.7% | 88 |
| 2005 | 4 | 3 | 17.3% | 1,604 |
| 2006 | 3 | 0 | 11.7% | 939 |
| 2007 | 2 | 6 | 24.1% | 1,496 |
| 2008 | 4 | 2 | 14.6% | 1,487 |
| 2009 | 7 | 22 | 27.2% | 1,833 |
| 2010 | 11 | 28 | 28.3% | 1,879 |
| Average | 4.4 | 8.7 | 20.0% | 1,332 |

**Table 11**. Fleet-wide estimates of the number of black-footed albatross incidental interactions and corresponding 95% confidence intervals (C.I.) for the Hawaii deep set longline fishery 2004-2010.

| Year | Quarter 1 Point Estimate & [C.I.] | Quarter 2 Point Estimate & [C.I.] | Quarter 3 Point Estimate & [C.I.] | Quarter 4 Point Estimate & [C.I.] | Annual Total Point estimate | Interaction rate based on annual point estimate |
|---|---|---|---|---|---|---|
| 2004 | 16 [4,36] | 0 [0,12] | 0 [0,13] | 0 [0,12] | 16 | 0.001 |
| 2005 | 68 [25,115] | 11 [2,37] | 0 [0,10] | 3 [1,18] | 82 | 0.002 |
| 2006 | 28 [5,112] | 21 [8,39] | 8 [2,26] | 13 [2,34] | 70 | 0.002 |
| 2007 | 33 [4,98] | 25 [5,62] | 7 [1,30] | 12 [4,28] | 77 | 0.002 |
| 2008 | 26 [8,57] | 92 [52,132] | 0 [0,12] | 0 [0,22] | 118 | 0.003 |
| 2009 | 19 [5,50] | 12 [2,36] | 72 [39,105] | 7 [1,26] | 110 | 0.003 |
| 2010 | Not calculated | Not calculated | Not calculated | Not calculated | 65 | 0.002 |

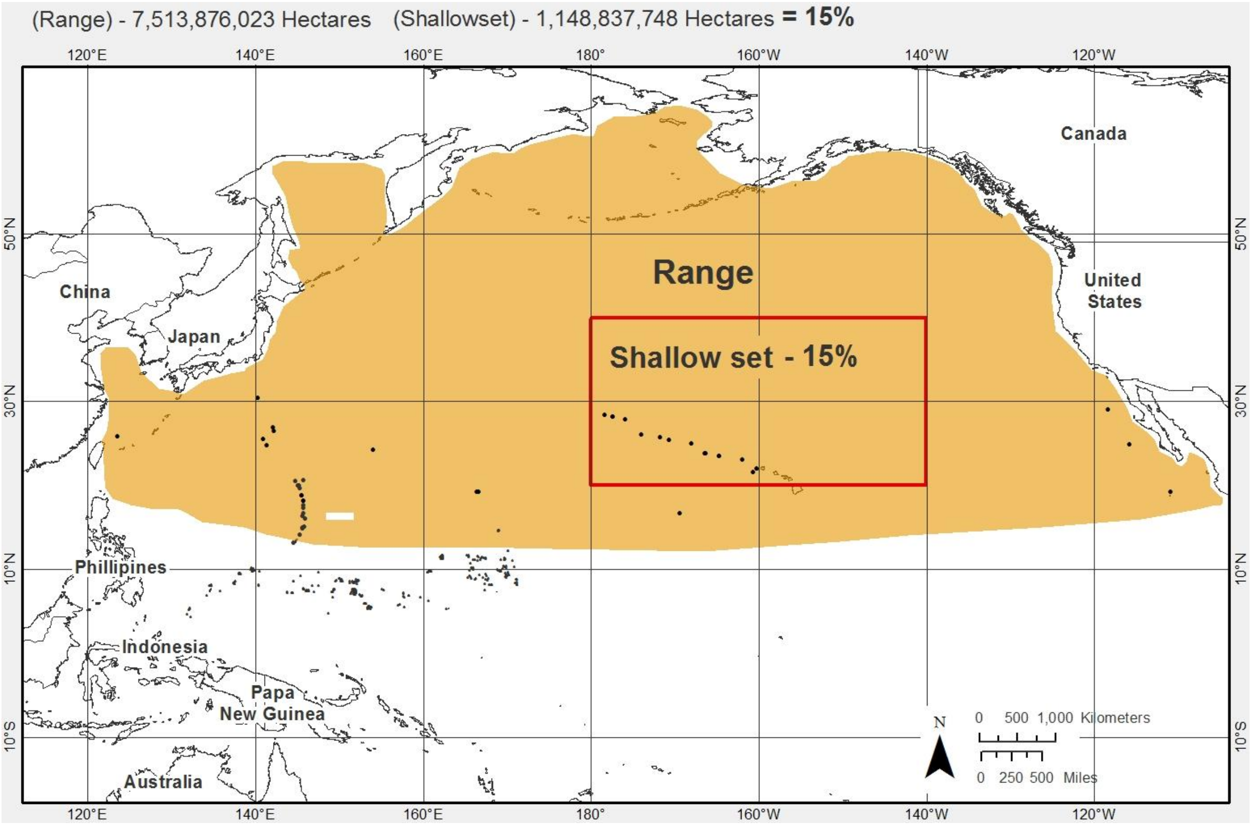

**Figure 10.** Fraction of the short-tailed albatross range that overlaps with the Hawaii-based shallow set longline fishery.

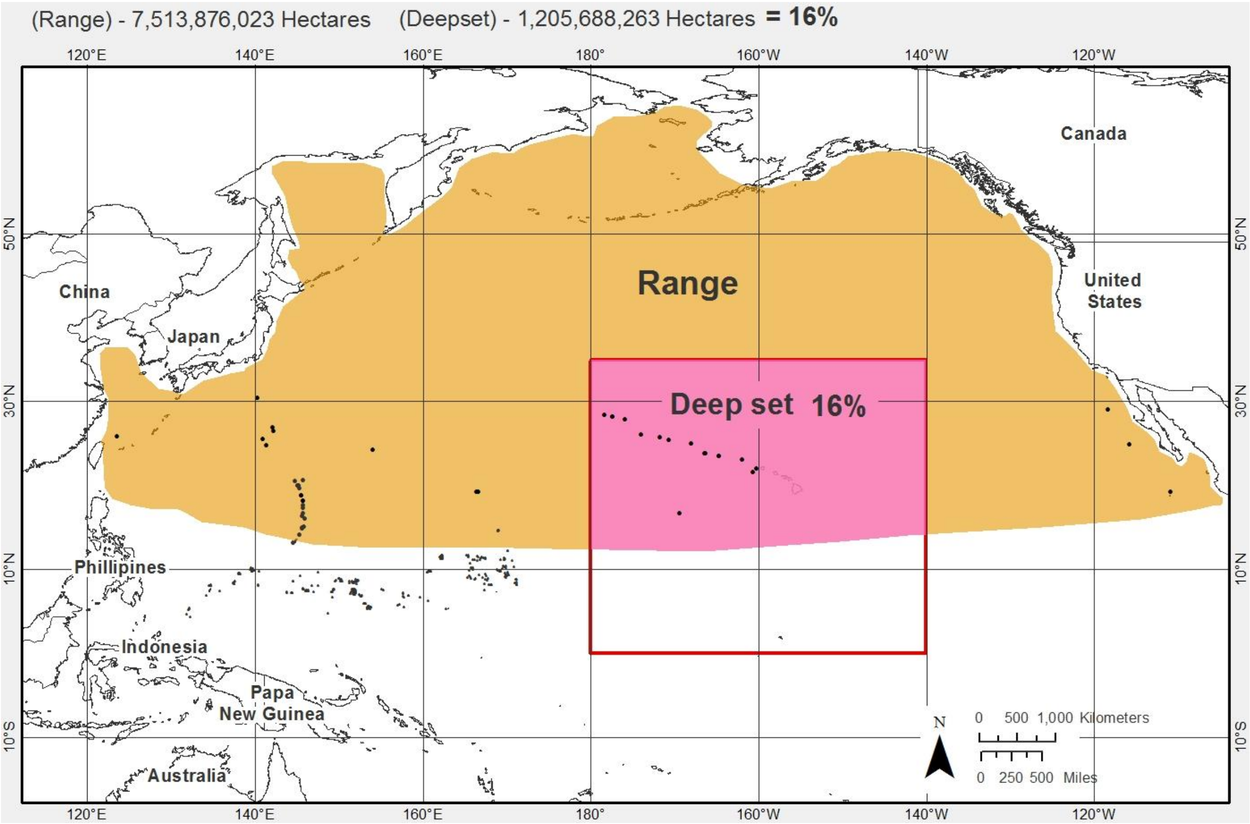


**Figure 11.** Fraction of the short-tailed albatross range that overlaps with the Hawaii-based deep set longline fishery.

**Review of Gear Technology Research in the Hawaii-Based Pelagic Longline Fisheries**

Several effective seabird avoidance methods have been identified. These include measures to: (1) avoid peak periods of seabird foraging via night setting; (2) reduce seabirds' detection of baited hooks through dyeing bait blue, (3) shielding deck lights, (4) employing underwater setting devices, (5) retaining offal and other discards, and (6) using artificial bait; (7) limit bird access to baited hooks through underwater setting devices, (8) side setting, (9) increased weighting near hooks, (10) thawed bait, (11) bait casting machine, (12) avoiding setting terminal tackle and mainlines into propeller turbulence; (13) deterring birds from taking baited hooks through the use of bird scaring 'tori' lines, (14) towed buoys and other objects, (15) water cannons, and (16) acoustic deterrents (Brothers *et al.* 1999, FAO 1999; Gilman *et al.* 2003, 2005, 2007a, 2008; Robertson *et al.* 2010). Table 12 provides a review of research on gear technology approaches (involving changes in fishing gear and fishing methods) to reduce seabird interactions in the Hawaii-based pelagic longline fisheries. For example, side setting in combination with weights, increased line weighting from 45 g to 60 g, and thawed and blue-dyed bait in combination with 45 g weights, were inferred to each have reduced seabird interaction rates by greater than 67% in the deep set fishery, based on a comparison of observations of commercial fishing operations before versus after regulations were in effect, employing a model that accounted for temporal and spatial effects of fishing effort on seabird interaction rates (Gilman *et al.* 2005, 2007a, 2008). Similarly, experiments have found the single-factor effect of employing blue-dyed fish bait reduced seabird interactions by 63-95%, side setting eliminated seabird interactions, an underwater setting chute reduced seabird interactions by 38-100%, and night setting reduced seabird interactions by 97-98% (McNamara *et al.* 1999; Boggs 2003; Gilman *et al.* 2003, 2007a).

**Table 12.** Findings from gear technology seabird interaction research in the Hawaii pelagic longline fisheries.

| Study | Treatment | Contact rate | Contact reduction | Capture rate | Capture reduction |
|---|---|---|---|---|---|
| McNamara *et al.* (1999) Hawaii longline swordfish gear | Control[a] | 32.8 (265.7)b | | 2.23 (18.0) | |
| | Blue-dyed bait | 7.6 (61.6) | 77% | 0.12 (17.5) | 95% |
| | Towed buoy | 16.1 (130.4) | 51% | 0.26 (6.8) | 88% |
| | Offal discards | 15.7 (124.7) | 53% | 0.32 (2.3) | 86% |
| | Streamer line | 15.7 (127.2) | 52% | | 79% |
| | Night setting | | | (0.60) | 97% |
| Boggs (2001) Hawaii longline swordfish gear | Control[a] | 7.60 (313.5)b,d | | | |
| | Blue-dyed bait | 0.43 (20.5)d | 94% | | |
| | Streamer line | 1.82 (93.4)d | 76% | | |
| | Additional 60g weight at bait | 0.61 (25.0)d | 92% | | |
| Gilman *et al.* (2003) Hawaii longline tuna gear | Control[a] | 0.61 (75.93) | | 0.06 (4.24) | |
| | Underwater setting chute 9 m | 0.03 (1.85) | 95% | 0.00 (0.00) | 100% |
| Boggs (2003) Hawaii longline swordfish gear | Control | 0.78 (27.1) | | 0.058 (2.0) | |
| | Night setting | 0.053 (4,8) | 93% | 0.0013 (0.11) | 98% |
| | Night setting & blue-dyed bait | 0.01 (0.98) | 99% | 0.00 (0.00) | 100% |
| Gilman *et al.* (2007a), Hawaii longline swordfish gear | Underwater setting chute 9 m | 0.30 (5.0) | | 0.03 (0.6) | |
| | Blue-dyed bait | 2.37 (64.9) | | 0.08 (1.8) | |
| | Side-setting | 0.08 (1.9) | | 0.01 (0.2) | |

| **Table 12.** Continued. | | | | | |
|---|---|---|---|---|---|
| **Study** | **Treatment** | **Contact rate** | **Contact reduction** | **Study** | **Treatment** |
| Gilman *et al.* (2007), Hawaii longline tuna gear | Underwater setting chute 9 m | 0.28 (10.3) | 82% | 0.05 (1.7) | 38% |
| | Underwater setting chute 6.5 m | 0.20 (5.6) | 87% | 0.01 (0.5) | 88% |
| | Blue-dyed bait | 0.61 (23.8) | 60% | 0.03 (1.2) | 63% |
| | Side-setting | 0.01 (0.1) | 99% | 0.00 (0.0) | 100% |

Note: Updated from Gilman *et al.* (2005). Interaction rates are expressed normalized for seabird abundance (expressed as contacts or captures per 1,000 hooks per bird) and without normalizing for bird abundance (expressed in parentheses as contacts or captures per 1,000 hooks). Percent reductions are based on the normalized rates unless noted otherwise.

a. Control treatments in McNamara *et al.* (1999), Boggs (2001), Gilman *et al.* (2003a), and Boggs (2003) entailed conventional fishing operations with no seabird avoidance methods.

b. The different contact rates observed by Boggs (2001) and McNamara *et al.* (1999) may be explained by the use of different definitions of what constituted a seabird contact. McNamara *et al.* (1999) counted the total number of times a seabird came into contact with gear near the hook, even if the same bird contacted the gear multiple times, while Boggs (2001) defined a contact where only one contact per bait was recorded as a contact regardless of whether a single bird contacted a bait multiple times.

c. This rate is not normalized for albatross abundance. McNamara *et al.* (1999) could not estimate seabird abundance during night setting. McNamara *et al.*'s (1999) control capture rate when not normalized for albatross abundance was 18.0 captures per 1000 hooks. Night setting reduced this control capture rate by 97%.

d. Contact rates are averages of rates reported by Boggs (2001) for Laysan and BFALs.

e. Percent reductions use the control treatment contact and capture rates of Gilman *et al.* (2003)

*Side setting*

In the 2000 BO and the 2002 revised BO side setting was anticipated to significantly aid in reduction of seabird interactions with the fisheries. It has not been implemented at the scale originally anticipated. Side setting continues to be an optional seabird deterrent measure. The NMFS observer program reports that, from 2004 through 2011, three shallow set vessels used side setting during any given year (Table 13), and approximately 23% of deep set vessels employed side setting in any given year (Table 14). Gilman *et al.* (2008) analyzed observer program data for the deep set fishery to assess the performance of seabird mitigation measures. Based on a Poisson GAM model fit to two categories of sets made during the post-regulations period of those made from the side vs. the stern of the vessel, conditioned on the factors of time of starting setting, season, location at the start of sets, branch line weighting, and whether or not bait was thawed and dyed blue, there was no significant difference in seabird interaction rates between side vs. stern setting at the 95% confidence level ($P = 0.14$), but there was a significant difference at the 85% level ($P<0.15$) (Gilman *et al.* 2008). Side setting resulted in seabird interaction rate 21% (95% CI: -8 - 42) lower than stern setting (Gilman *et al.* 2008). Side setting was never implemented to a scale that its effectiveness could be determined in respect to short-tailed albatross interactions.

**Table 13.** Shallow set vessels and side setting, 2004-2011.

| Year | Shallow set vessels | Number side setting |
|---|---|---|
| 2004 | 8 | 0 |
| 2005 | 35 | 1 |
| 2006 | 38 | 0 |
| 2007 | 31 | 0 |
| 2008 | 27 | 0 |
| 2009 | 31 | 0 |
| 2010 | 36 | 2 |
| 2011 | 18 | 0 |

**Table 14.** Deep set vessels and side setting, 2004-2011.

| Year | Deep set vessels | Number side setting |
|---|---|---|
| 2004 | 113 | 11 |
| 2005 | 138 | 25 |
| 2006 | 142 | 27 |
| 2007 | 136 | 34 |
| 2008 | 132 | 40 |
| 2009 | 126 | 33 |
| 2010 | 116 | 30 |
| 2011 | 79 | 25 |

*Discharge of Offal and Bait*

There have been mixed evaluations of the effectiveness of strategic offal discharge (Cherel *et al.* 1996; Brothers 1996; McNamara *et al.* 1999). The results of research on the short-term effectiveness of strategic offal discharge in a pelagic longline fishery showed reduced seabird interactions with longline gear after offal is thrown overboard (see Table 12) (McNamara *et al.* 1999), and results of a study of the short-term effectiveness of strategic offal discharge in a demersal longline fishery observed reduced seabird interactions (Cherel *et al.* 1996). In the long term, strategic offal discharge may reinforce the association that birds make with specific longline vessels being a source of food. While discharging offal and fish bycatch during setting can distract birds from baited hooks (Cherel *et al.* 1996; McNamara *et al.* 1999), this practice is believed to have the disadvantage of attracting birds to the vessel, thereby increasing bird abundance, searching intensity and interactions (Brothers *et al.* 1999). For instance, results from Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) studies in demersal longline fisheries have shown that vessels consistently discharging offal attract larger numbers of birds to their vessels (CCAMLR 2002), likely resulting in increased seabird interaction rates. Brothers (1996) hypothesized that seabirds learn to recognize specific vessels by smell that provide a source of food, implying that vessels that consistently discharge offal and fish bycatch will have higher seabird abundance and interactions than vessels that do not discharge offal and fish waste. The Hawaii seabird regulations allow selection of strategic offal discards as a potential seabird mitigation measure. There is inconsistency in international measures related to managing discards from longline vessels. Internationally, the Indian Ocean

Tuna Commission (IOTC) and CCAMLR prohibit the discharge of offal and spent fish during setting and discourage this practice during hauling, while the WCPFC employs a measure similar to the Hawaii regulations. Short-tailed albatross occurrences are likely to be relatively rare due to their low population numbers, the Laysan and black-footed albatross have not been monitored to evaluate if offal is habituating birds to the boats in these fisheries. The presumption is if birds are attracted away from the gear, thereby avoiding an interaction, it would be a benefit.

Gilman *et al.* (2008) analyzed observer program data for the deep set fishery to assess the performance of seabird mitigation measures. A Poisson generalized additive regression modeling approach evaluated the change in seabird interaction rates from the pre- to post-regulations period and to evaluate the efficacy of alternative combinations of seabird mitigation methods employed during the post-regulations period. Informative covariates of temporal and geo-referenced spatial effects of fishing effort and sampling variation commonly found with count data were included in the model to provide a better inference of the effect of the employment of required changes in fishing gear and methods. There was a significant reduction (67% with 95% CI: 62-72) in the seabird interaction rates following the introduction of regulations for the deep set fishery. The pre- and post-regulations nominal seabird interaction rates were 0.080 (95% CI: 0.066-0.097) and 0.021 (95% CI: 0.018-0.025) seabirds per 1,000 hooks, respectively, a significant 74% reduction in the pre-regulations period seabird interaction rate. Post-regulations, sets employing four different combinations of seabird avoidance methods all resulted in significant reductions to the pre-regulation seabird interaction rate: (1) side setting with 45 g weights located within 1 m of the hook resulted in a seabird interaction rate 40 % (95% CI: 28 – 58) lower than the pre-regulations seabird interaction rate; (2) no seabirds were caught in sets employing the combination of side setting with 60 g weights located within 1 m of the hook (100% reduction); (3) stern setting with 45 g weights located within 1 m of the hook resulted in a seabird interaction rate 60% (95% CI: 44 – 82) lower; and (4) stern-setting with 60 g weights located within 1 m of the hook 41% (95% CI: 27 – 62) lower than the pre-regulations seabird interaction rate.

For this study on the deep set fishery, there was no significant difference in seabird interaction rates between the three categories of sets where birds were caught (Gilman *et al.* 2008). Using heavier branch line weights and treated bait (thawed and dyed blue) both significantly reduced seabird interaction rates. There was a significant difference in seabird interaction rates between sets made during the post-regulations period with 45 g weights located within 1 m of the hook versus sets with 60 g weights within 1 m of the hook, when employing a Poisson GAM model fit to sets employing 45 g versus 60 g weights, conditioned on the factors of time of starting setting, season, location of the start of sets, side versus stern setting, and whether or not bait was thawed and dyed blue ($P < 0.01$). Sets with 60 g weights resulted in a seabird interaction rate 63% (95% CI: 45-88) lower than sets with 45 g weights (Gilman *et al.* 2008).

Because short-tailed albatross occurrences are relatively rare due to their low population numbers seabird measures in these fisheries cannot be evaluated for this species. However, black-footed and Laysan albatross and existing data collected in various studies of seabird deterrents suggest these species behave similarly with respect to longline fishing, and an effective deterrent for one species is likely to be effective for all albatross species. Seabird deterrents have, based on this data, demonstrated a reduction in interactions with the fishery.

Similar modeling has not been conducted for the shallow set fishery, due to inadequate sample sizes for all but one combination of seabird mitigation measures employed by the shallow set fishery.

In evaluating the effects of the continued operation of the longline fishery for the 2000 BO, USFWS developed a Population Viability Analysis (PVA) to estimate the mortality of short-tailed albatross necessary to cause extinction of the species. The USFWS also considered the impact of lost future productivity of a bird to the species. We present those analyses again here. In recognition of the many limitations of PVAs and uncertainties inherent in the outputs of such models (see Reed *et al.* 1998), we present this model only for illustration, not for prediction or prescription.

*Population Viability Analysis*

In an effort to better understand the impacts of fisheries take on the short-tailed albatross population, the USFWS prepared a preliminary PVA in 1999 for the 2000 BO. PVAs are predictive models used to evaluate the effect on populations of changes in a species' environment, demography, or vital rates (Lacey 1993). Such models often are used to evaluate extinction risks and management options for rare or threatened species (Meffe and Carroll 1997). Data and general information for this analysis was obtained from Hiroshi Hasegawa and from Cochrane and Starfield (1999). The PVA was done using VORTEX Version 7.2. VORTEX is produced and maintained by Robert Lacy, Department of Conservation Biology, Chicago Zoological Society, Brookfield Zoo and the most recent version of the software can be obtained at no cost at internet web page: http://www.vortex9.org/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. The Torishima colony harbors the majority of the world short-tailed albatross population, and this colony has been closely monitored for several decades; therefore, data from the Torishima colony represent our most precise knowledge of the species. For this reason, data from the much smaller Senkaku Islands colony were not included in the model. Variances and average values for juvenile and adult mortalities and for breeding rate of adults were obtained from Cochrane and Starfield (1999)

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% of all adults breed each year

Baseline Adult and Juvenile Survivorship:

1. Annual Adult Survivorship = 95.5% (4.5% mortality)-± 2.0%.
2. Annual Juvenile Survivorship = 91.0% (9% mortality)-± 4.0%; note that this is for years 1-7.
3. Year 0-1 Survivorship = 56.2% (43.8% mortality) ± 5.8%. 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 (See

Attachment G and H; 58.9% ± 7.742%); very similar to the Cochrane and Starfield (1999) estimate of 55% average for nest success rate. Survivorship of juveniles during the first 6 months of juvenile life is the same as the baseline juvenile survivorship.

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%. A volcanic eruption on or near Torishima Island during the breeding season could have catastrophic effects on breeding success for that year and may also result in the death of many of the adult birds sitting on nests at the time of the eruption. These factors should be taken into consideration when evaluating the long-term dynamics of the short-tailed albatross population.

Take in fisheries has been documented in Alaska-based fisheries, and this take is a source of juvenile and adult short-tailed albatross mortality. Of the seven observed takes in the Alaska fishery, six were juveniles and one was an adult. Fishery takes 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:

- Current mortality estimates: 9% annual juvenile mortality and 4.5% annual adult mortality;
- 11 % annual juvenile mortality and 4.83% annual adult mortality;
- 13% annual juvenile mortality and 5.17% annual adult mortality;
- 15% annual juvenile mortality and 5.5% annual adult mortality;
- 17% annual juvenile mortality and 5.83% annual adult mortality.

Although the PVA analysis indicates that the Torishima Island short-tailed albatross population is resilient, it is apparent from the analysis that impacts from fisheries-related mortality represent a significant hurdle to reestablishing a large population with multiple breeding sites, returning back to the historic condition of this species. The PVA analysis also indicates that relatively small increases in the taking of juvenile and adult birds can significantly slow population growth, and if take increases by more than 8% for annual juvenile mortality and 1.33% for annual adult mortality, then the species will most likely go extinct, given the conservative parameters used in the model.

**Table 15**. PVA results for modeled increases in adult and juvenile short-tailed albatross takes.

| Percent increase in annual juvenile mortality | Percent increase in annual adult mortality | Approximate years to double current population size |
|---|---|---|
| 2 (11 total) | 0.33 (4.83 total) | 21 |
| 4 (13 total) | 0.67 (5.17 total) | 27 |
| 6 (15 total) | 1 (5.5 total) | 50 |
| 8 (17 total) | 1.33 (5.83 total) | 130 |
| >8 | > 1.33 | N/A (extinction) |

As indicated in Table 15, there is a significant jump in the time required to double the current population size when juvenile and adult mortalities exceed 13% and 5.17%, respectively: a 4% increase in the annual juvenile mortality (total 13%) and a 0.67% increase in the annual adult mortality (total 5.17%) increases the time to double the current population by approximately 6 years, whereas a 6% increase in the annual juvenile mortality (total 15%) and a 1% increase in the annual adult mortality (total 5.5%) increases this time by approximately 23 years. An 8% increase in the annual juvenile mortality (total 17%) and a 1.33% increase in the annual adult mortality (total 5.83%) increases the time to double the current population by approximately 80 years. Consequently, annual juvenile and adult mortalities that do not exceed 13% and 5%, respectively, for the Torishima Island population, should not change the current rate of population growth in 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% increase in the annual juvenile mortality (total 11%) and a 0.33% increase in the annual adult mortality (total 4.83%) will increase the time to reach 15,000 birds by approximately 21 years; a 4% increase in the annual juvenile mortality (total 13%) and a 0.67% increase in the annual adult mortality (total 5.17%) will increase this time by approximately 50 years. Consequently, a total annual mortality of around 11% for juveniles and 4.83% 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. Establishment of additional short-tailed albatross breeding sites should be considered on Pacific islands that can be managed to protect the birds. Midway Atoll National Wildlife Refuge, Tern Islet (French Frigate Shoals) and Laysan Island - Papahanaumokuakea Marine National Monument (Papahanaumokuakea) are on secure USFWS Refuge lands are an example of potential breeding sites (with Midway NWR having a short-tailed albatross pair nesting successfully in 2010 and 2011). These United States 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 take in fisheries. These ideas, and others, are under review by our short-tailed albatross recovery team as they work to draft the recovery plan for this species.

According to information provided by Hasegawa for the PVA conducted in 1999, the worldwide population of short-tailed albatross was about 1,362 birds, roughly half juveniles and half adults. Based on the PVA and its assumptions, at that population size, an annual loss of about 82 subadults (17% mortality) and 12 adults (5.83% mortality) would lead to eventual extinction of the species. The increase of the short-tailed albatross population since 1999 likely increases the numbers needed to achieve those thresholds. Because the current total annual estimated loss of reproductive contribution due to adverse effects by United States fisheries (i.e., three short-tailed albatross

[Hawaii] over five years in Hawaii and two short-tailed albatross for Alaska groundfish fisheries and two short-tailed albatross per 2 years Pacific Halibut fisheries [Alaska] = three per year in Alaska) falls short of those levels, the Hawaii-based pelagic longline fisheries may slow population growth of the species, but is not anticipated to jeopardize the continued existence of the species.

**V. Cumulative Effects**

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

There is potential for oil spills to occur in the action area that could affect short-tailed albatrosses. USFWS refuge managers and biologists stationed within Papahanaumokuakea 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 central Pacific Ocean may be responsible for these oil-related injuries. Vessels that have sunk in the vicinity of the Hawaiian Islands National Wildlife Refuge may periodically release oil from fuel tanks (USFWS 2004).

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 affected by plastic debris (WPRFMC 1998).

Drift and trawl nets accumulate in the Northwestern Hawaiian Islands and entangle protected species such as sea turtles, the Hawaiian monk seal (*Monachus schauinslandi*) and seabirds. A multi-agency State and Federal effort is underway to remove driftnets from several locations within the Papahanaumokuakea. However, as long as fisheries continue to lose fishing gear, protected species will continue to become entangled. At this time, there is not enough information about the threats described above and their impacts on short-tailed albatross to determine the level of impact they might have on the species.

The action area encompasses ocean areas outside the range of most state and private activities. State and United States based private fishing activities, that may affect the short-tailed albatross, such as domestic tuna trolling, occur within the action area. These activities are regulated by the Federal government under the Magnuson Act, but no data exists to evaluate these fisheries.

Japan, Taiwan, Korea, and other fishing nations operate longline vessels in areas which overlap with the known range of the short-tailed albatross and may interact with this species in the action area. However, these nations do not report the rate at which seabirds are caught on longline gear. In order to estimate seabird bycatch rates, foreign vessels should report the rate at which seabirds are caught per 1,000 hooks fished. The very limited information available about seabird bycatch in foreign fishing fleets is summarized in Table 7 and Short-tailed Albatross 5-Year Review

(USFWS 2009). Without more consistent and detailed information about seabird take in foreign fisheries, the USFWS cannot estimate the adverse effects that these fisheries may have on the short-tailed albatross.

## VI. Conclusion

After reviewing the current status of the short-tailed albatross, the environmental baseline of the species in the proposed project, and the effects of the proposed action, including cumulative effects, it is the USFWS's biological opinion that the continued operation of the Hawaii-based pelagic longline fisheries will adversely affect the short-tailed albatross but will not jeopardize their survival and recovery in the wild. No critical habitat has been designated for this species; therefore, none will be affected.

## VII. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including, breeding, feeding, or sheltering. Harass is defined by the USFWS 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, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking under the ESA provided that 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 NMFS so that they become binding conditions for the exemption in section 7(o)(2) to apply. If NMFS (1) fails to assume and implement the terms and conditions or (2) 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, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NMFS must report the progress of the action and its impact on the species to the USFWS as specified in this incidental take statement and reporting requirements below [50 CFR 402.14(i)(3)].

### Amount or Extent of Take Anticipated

The USFWS anticipates the observed take of three short-tailed albatross may occur in the form of harm resulting in injury or death of individual seabirds. Take is anticipated to be incidental to, and not the purpose of, carrying out of otherwise lawful activities related to the Hawaii-based pelagic longline fisheries described in the BO.

1. The USFWS anticipates one (1) short-tailed albatross may be taken every five-years in the form of injury or death as a result interactions with fishing activity in the shallow set fishery.

2. The USFWS anticipates two (2) short-tailed albatross may be taken every five-years in the form of injury or death as a result interactions with fishing activity in the deep set fishery.

The USFWS will not refer the incidental take of any migratory bird listed under the ESA 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 specified herein.

**Effect of the Take**

The USFWS has estimated that three (3) short-tailed albatross may be taken every five-years as a result of the proposed action. This estimate is based on certain assumptions relative to the bird's behavior and distribution in the area of the Hawaiian Islands and its possible interaction with the Hawaii-based pelagic longline fisheries which is minimal. Based on the PVA conducted in 1999 and its assumptions, an annual level of death of about 81.9 sub adults (17% mortality) and 11.7 adults (5.83 % mortality) would lead to eventual extinction of the species (USFWS 2004). The short-tailed albatross population has been increasing since 1999. Therefore, the take of the three birds in the Hawaii-based pelagic longline fisheries may slow population growth of the species very slight, but it is not anticipated to jeopardize the continued existence of the species. Furthermore, the short-tailed albatross population has continued to grow despite documented and undocumented mortality in United States and foreign commercial fisheries (Sievert 2004). The USFWS therefore concludes that the level of take anticipated in the Hawaii-based pelagic longline fisheries will not jeopardize the continued existence of the short-tailed albatross, nor will the proposed action result in destruction or adverse modification of critical habitat, as critical habitat is not designated for this species.

**Reasonable and Prudent Measures**

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

1. Minimize attraction of short-tailed albatross to fishing gear used by the Hawaii-based pelagic longline fisheries.
2. Monitor the level of take and measures to minimize take.

**Terms and Conditions**

To be exempt from the prohibitions of section 9 of the ESA, NMFS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and specified reporting requirements. These terms and conditions are nondiscretionary. To implement the reasonable and prudent measure above, NMFS will monitor incidental take.

1a. NMFS Pacific Islands Regional Office Fisheries Observer Program has specific instructions for observers on how to collect information on seabird interactions and perform scan counts. The existing and future information will be analyzed to examine how fishing practices may be modified to reduce potential take of short-tailed albatross.

1b. NMFS, in consultation with USFWS, will analyze the use of untended lines, strategic offal discard, and other fishing practices that could make hooks and gear available to seabirds and possibly attract or habituate seabirds to longline vessels, especially during gear retrieval. If new analysis, qualitative assessments, and other information lead to identification of how fishing practices may be modified to reduce potential take of short-tailed albatross, NMFS will meet with USFWS to discuss how to incorporate the findings into the regulatory process.

2a. NMFS will analyze existing and future observer data, emphasize to observers the importance of seabird data collection, and provide opportunities to discuss how and when seabird interactions occur during pelagic longline fishing at NMFS Protected Species Workshops. NMFS will report the results of these activities each year in NMFS Annual Report - Seabird Interactions and Mitigation Efforts in the Hawaii Longline Fisheries, including insights that could further reduce potential take of short-tailed albatross in the fisheries, or point to research needed to achieve reduction.

2b. Annual reports, covering the Hawaii–based pelagic longline fisheries for the previous calendar year, will be submitted to the USFWS no later than September 30. NMFS will report to the USFWS on the effectiveness of seabird deterrent measures employed in the Hawaii-based longline fisheries during the previous calendar year. The report will include (for each trip and summarized over all trips) all reported observations and mortalities of Laysan, black-footed, and short-tailed albatross, including date, time, location, vessel, vessel type, vessel size, gear description, total number of hooks deployed, total number of trips, and all observer or reported comments. Annual reports will be submitted to: Field Supervisor, U.S. Fish and Wildlife Service; Pacific Islands Fish and Wildlife Office; 300 Ala Moana Boulevard; Room 3- 122, Box 50088; Honolulu, Hawaii 96850; telephone 808-792-9400, facsimile 808-792-9581.

2c. NMFS will instruct observers and crew members that any dead short-tailed albatross must be retained aboard and brought back to port. Specimens must 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 must include all of the following information: species, date of mortality, name of vessel, location (latitude and longitude) of mortality, observer or captain's name (or both), and any band numbers and colors if the specimen has any leg bands. Leg bands must remain attached to the bird. NMFS will inform observers and crew members that specimens must be surrendered as soon as possible to a NMFS or USFWS office. Specimens must remain frozen and must be shipped as soon as possible to: Field Supervisor, Ecological Services, Pacific Islands Office, U.S. Fish and Wildlife Service, Room 3-122, Honolulu, Hawaii 96850. The contact numbers for the Pacific Islands Office are: telephone 808-792-9400, facsimile 808-792-9581.

The USFWS believes that no more than three short-tailed albatross will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with USFWS the need for possible modification of the reasonable and prudent measures.

## VIII. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA 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.

The USFWS provides the following conservation recommendations to the NMFS:

1. Regulations for seabird deterrents required for Hawaii-based pelagic longline vessels operating above 23° N should be modified to require deterrents to be used when fishing throughout the range of the short-tailed albatross.

2. Observer coverage for the deep set fishery should be increased, as funds are available. Currently the shallow set fishery requires 100% coverage and accounts for 7% of the Hawaii-based pelagic longline fisheries. The deep set accounts for approximately 93% of the overall effort, yet only requires 20% observer coverage. The USFWS recommends 100% observer coverage for the deep set fishery for vessels fishing within the short-tailed albatross range.

To be kept informed of actions minimizing or avoiding adverse effects, or benefitting listed species or their habitats, the USFWS requests notification of implementation of any conservation recommendations.

**IX. Reinitiation Notice**

This concludes formal section 7 consultation on this action. As required in 50 CFR § 402.16, reinitiation of 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 in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions concerning this BO, please contact Aaron Nadig or Megan Laut of this office at 808-792-9400.

Sincerely,

Loyal Mehrhoff
Field Supervisor

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