USFWS FINAL ENVIRONMENTAL ASSESSMENT

Issuance of an MBTA Permit to the National Marine Fisheries Service Authorizing Take of Seabirds in the Hawaii-based Shallow-set Longline Fishery

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Appendix 1: Permit Application and Appendices from the National Marine Fisheries Service Pacific Islands Regional Office

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Special Purpose Permit for National Marine Fisheries Service
Hawaii Shallow-set Longline Pelagic Fishery
(Migratory Bird Treaty Act, 50 CFR 21.27)

Note: All MBTA and ESA permits and required reports, relevant to the proposed activities, must be valid and up-to-date.

Please provide the following information below. Your application must include the following specific information (relevant to the activity) in addition to the general information in the permit application.

A. Identify MBTA species likely to be taken by the proposed activity:

A.1. Identify the activity sought to be authorized and how the activity will affect each MBTA species.

The activity is the operation of the Hawaii-based shallow-set pelagic longline fishery (shallow-set fishery) managed under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act. Regulations governing the fishery are found at 50 CFR 665 and 50 CFR 600.

The following seabirds may be seen where the shallow-set fishery operates:

Black-footed Albatross	(*Phoebastria nigripes*)
Laysan Albatross	(*Phoebastria immutabilis*)
Short-tailed Albatross	(*Phoebastria albatrus*)
Brown Booby	(*Sula leucogaster*)
Masked Booby	(*Sula dactylatra*)
Red-footed Booby	(*Sula sula*)
Great Frigatebird	(*Fregata minor*)
Northern Fulmar	(*Fulmarus glacialis*)
Glaucous Gull	(*Larus hyperboreus*)
Black-legged Kittiwake	(*Rissa tridactyla*)
Black Noddy	(*Anous minutus*)
Brown Noddy	(*Anous stolidus pileatus*)
Blue-gray Noddy	(*Procelsterna cerulean*)
Bulwer's Petrel	(*Bulweria bulwerii*)
Bonin Petrel	(*Pterodroma hypoleuca*)
Hawaiian Petrel	(*Pterodroma sandwichensis*)
Band-rumped Storm Petrel	(*Oceanodroma castro*)
Christmas Shearwater	(*Puffinus nativitatis*)
Newell's Shearwater	(*Puffinus auricularis newelli*)
Sooty Shearwater	(*Puffinus griseus*)
Short-tailed Shearwater	(*Puffinus tenuirostris*)
Wedge-tailed Shearwater	(*Puffinus pacificus*)
Pomarine Skua,	(*Stercorarius pomarinus*)
Arctic Skua	(*Stercorarius parasiticus*)

Gray-backed Tern	(*Sterna lunata*)
Sooty Tern	(*Sterna fuscata*)
Thayer's Gull	(*Larus thayeri*)
White Tern	(*Gygis alba*)
Red-tailed Tropicbird	(*Phaethon rubricauda*)
White-tailed Tropicbird	(*Phaethon lepturus dorotheae*)

Black-footed albatross, Northern Fulmar, Laysan albatross, and sooty shearwater are the only species that have been observed to be incidentally hooked or entangled during shallow-set longline fishing operations, and as a result are injured or killed. These birds are attracted to the fishing vessels scavenging for fish bait while the longline gear is being deployed or retrieved. There is also potential[1] that seabirds may inadvertently fly into the longline vessels ("ship strikes"), resulting in injury or death.

An average of 27 vessels per year participate in the shallow-set fishery to target broadbill swordfish (*Xiphias gladius*), a management unit species in the Pelagic FEP. Table 1 describes the fishing gear and methods employed in the fishery. Figure 1 shows the typical gear configuration and Figures 2 through 9 shows the spatial distribution of fishing effort from 2004-2010.

[1] There has been no observed seabird ship strikes in the shallow-set fishery, although storm petrel have landed on board fishing vessels.

Table 1. Characteristics of the Hawaii-based shallow-set longline fishery.

Length of mainline	18 – 60 nautical miles
Set depth	~ 25-75 meters
Hook type	18/0 offset circle hook with a 10° offset
Approx. no. hooks per set	700 - 1000
No. hooks between floats	~ 4
Bait	Fusiform fish (mackerel)
Luminescent light sticks used?	Yes, attached to branchlines
Longline deployment("set")	Night, longline is typically "soaked" for several hours overnight
Longline retrieval ("haul")	Dawn

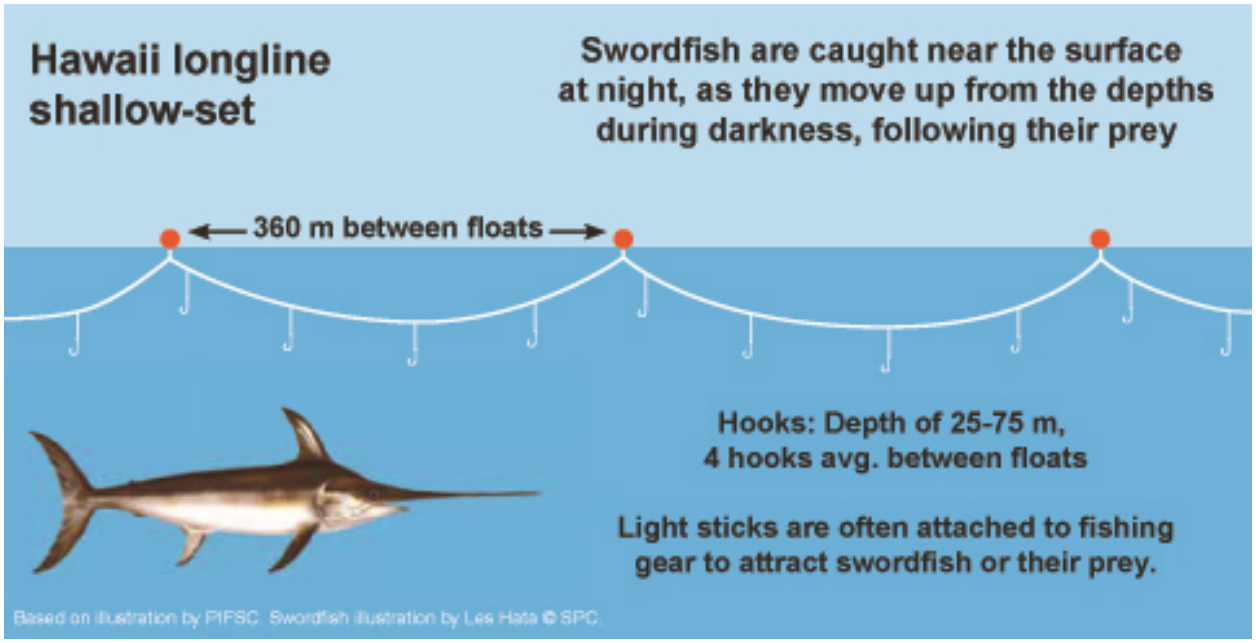


Figure 1. Generalized depiction of longline gear targeting swordfish.

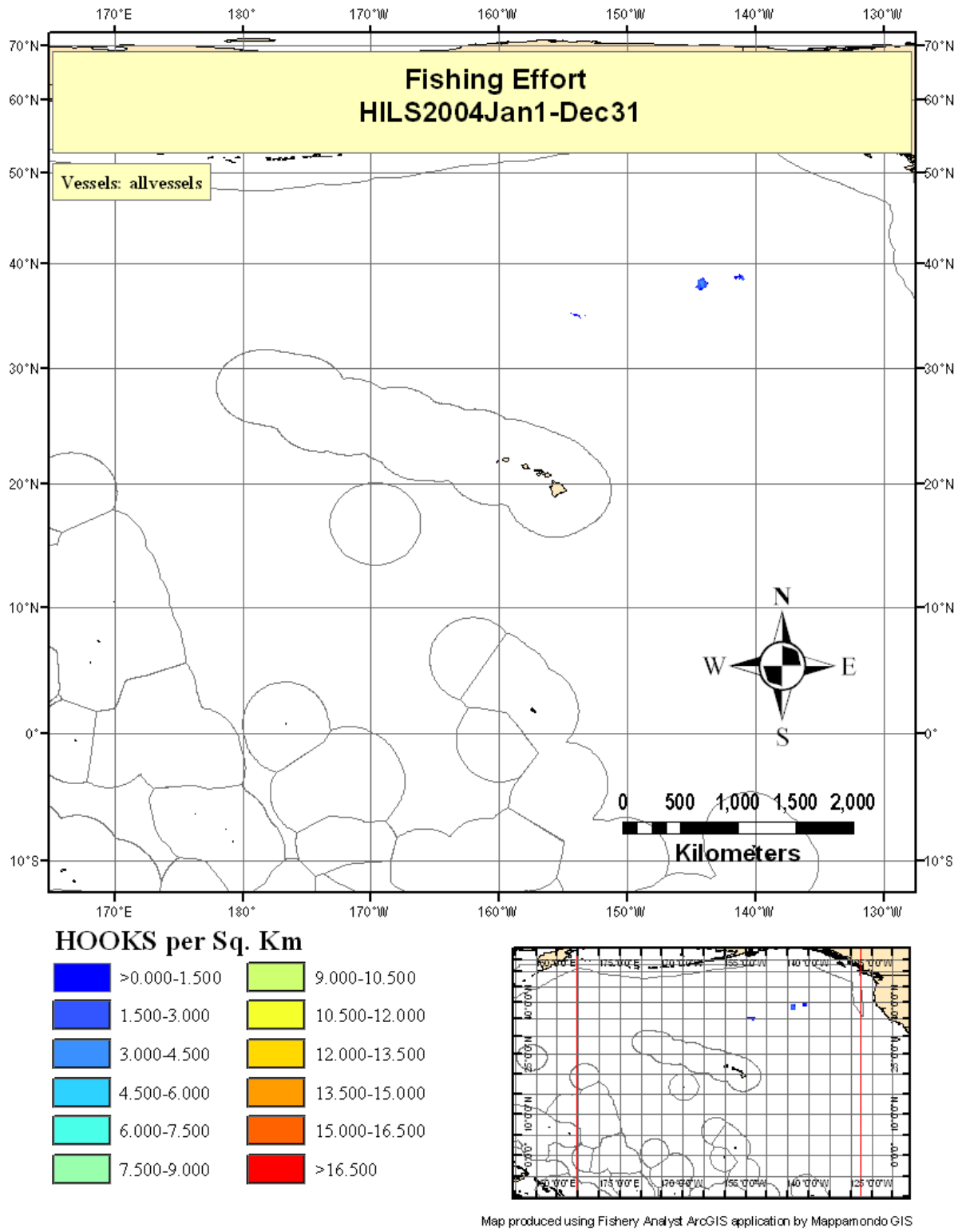


Figure 2. Spatial distribution of longline shallow-set fishing effort for the full period of 2004. (PIFSC unpub.)

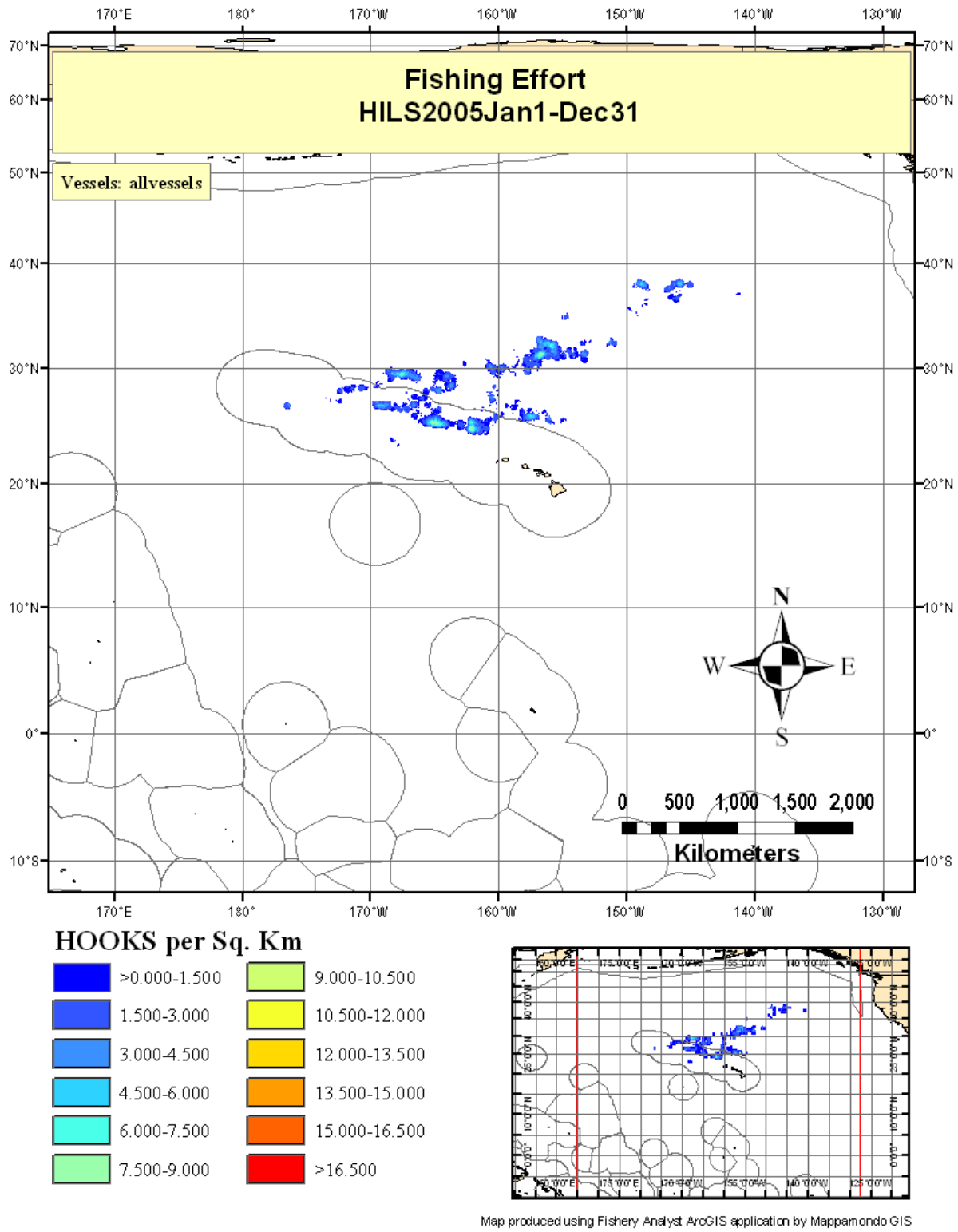


Figure 3. Spatial distribution of longline shallow-set fishing effort for the full period of 2005. (PIFSC unpub.)

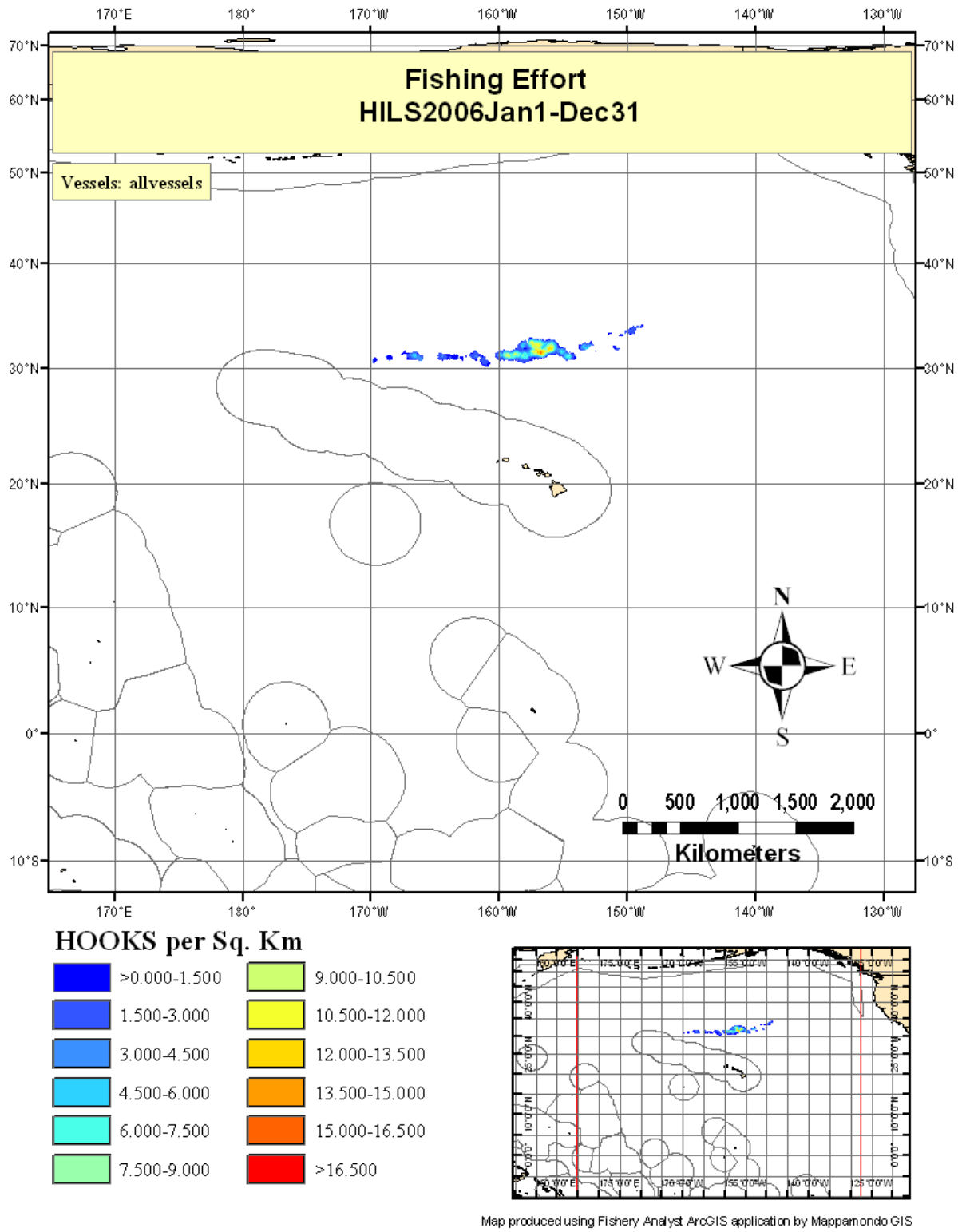


Figure 4. Spatial distribution of longline shallow-set fishing effort for the full period of 2006. (PIFSC unpub.)

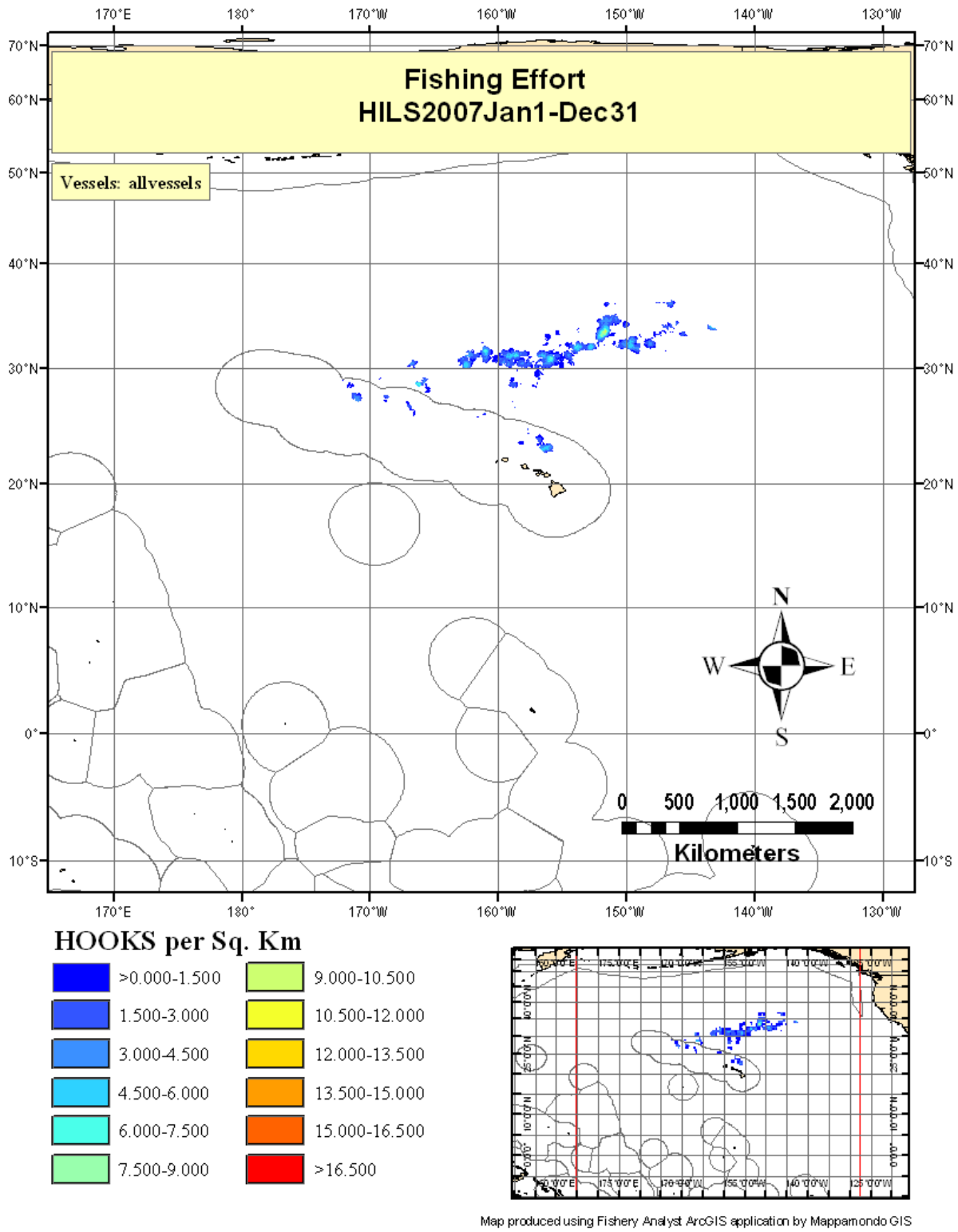


Figure 5. Spatial distribution of longline shallow-set fishing effort for the full period of 2007. (PIFSC unpub.)

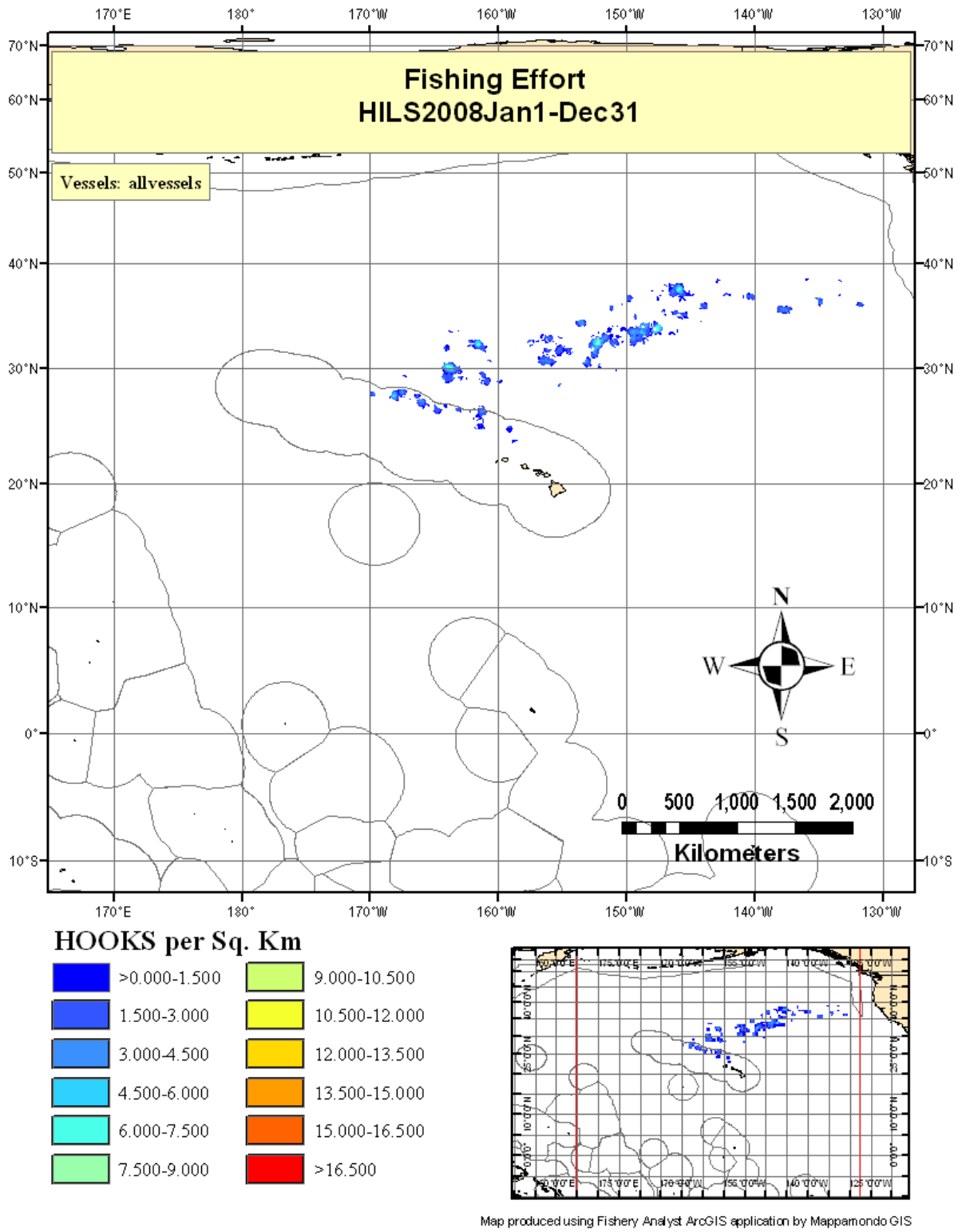


Figure 6. Spatial distribution of longline shallow-set fishing effort for the full period of 2008. (PIFSC unpub.)

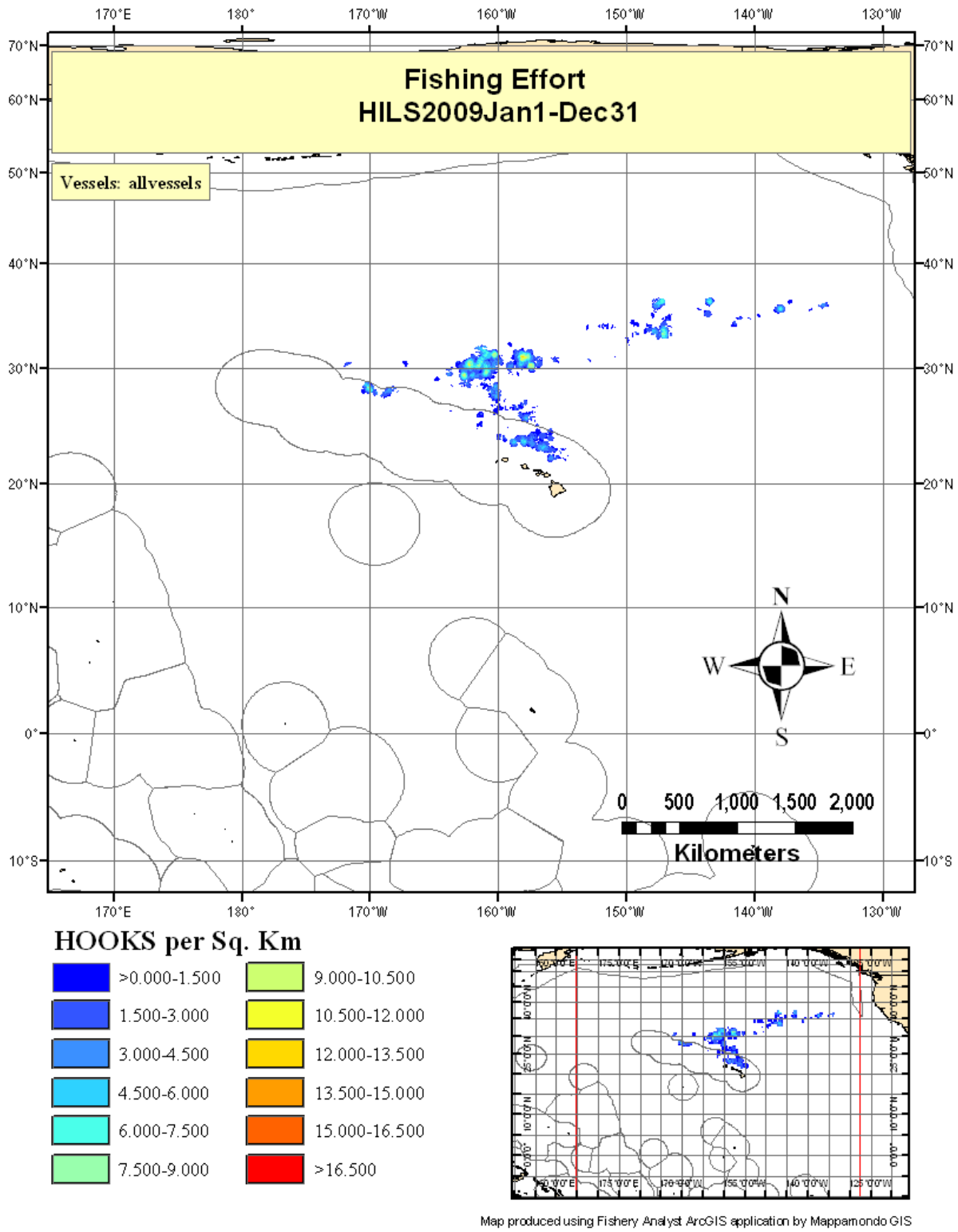


Figure 7. Spatial distribution of longline shallow-set fishing effort for the full period of 2009. (PIFSC unpub.)

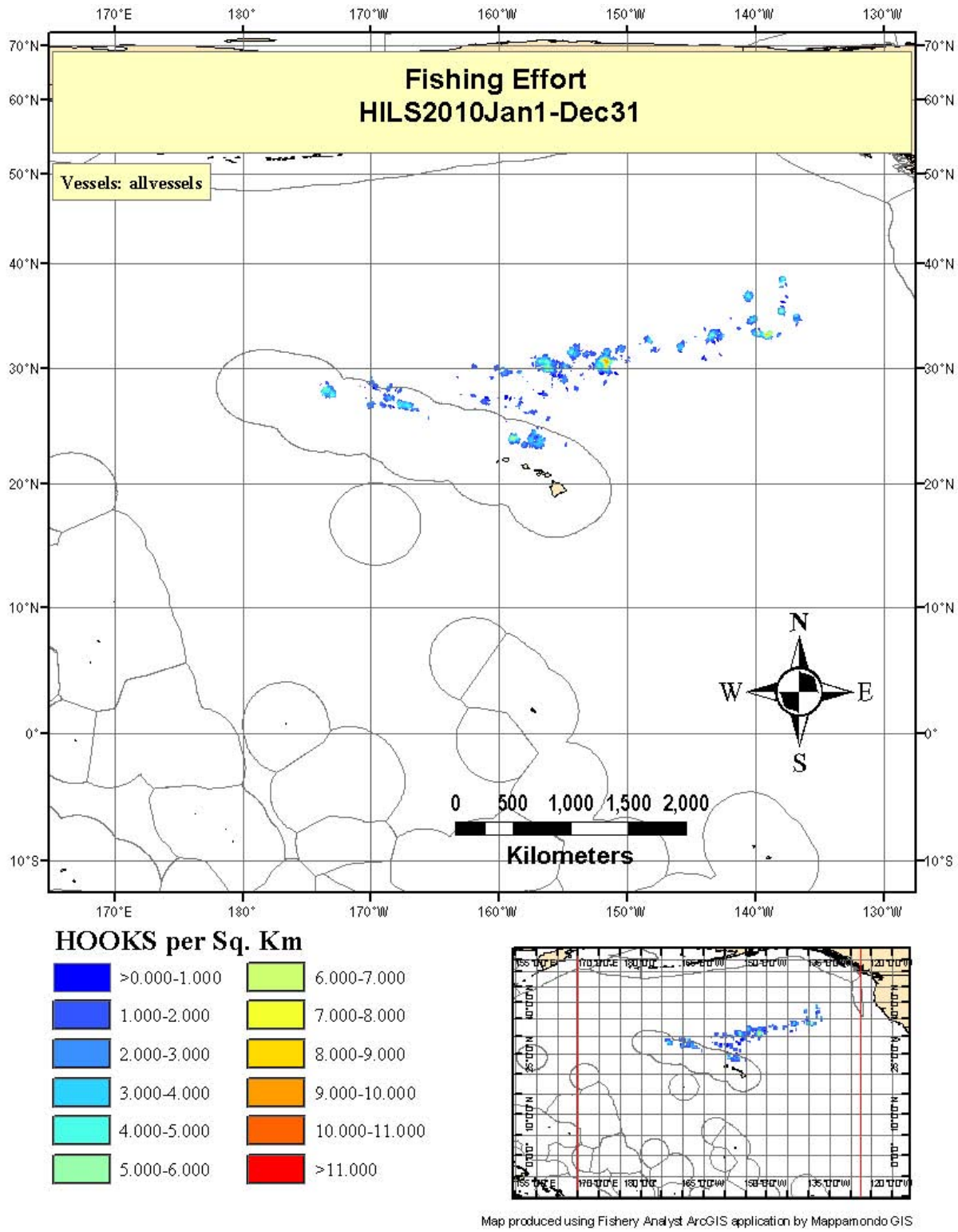


Figure 8. Spatial distribution of longline shallow-set fishing effort for the full period of 2010. (PIFSC unpub.)

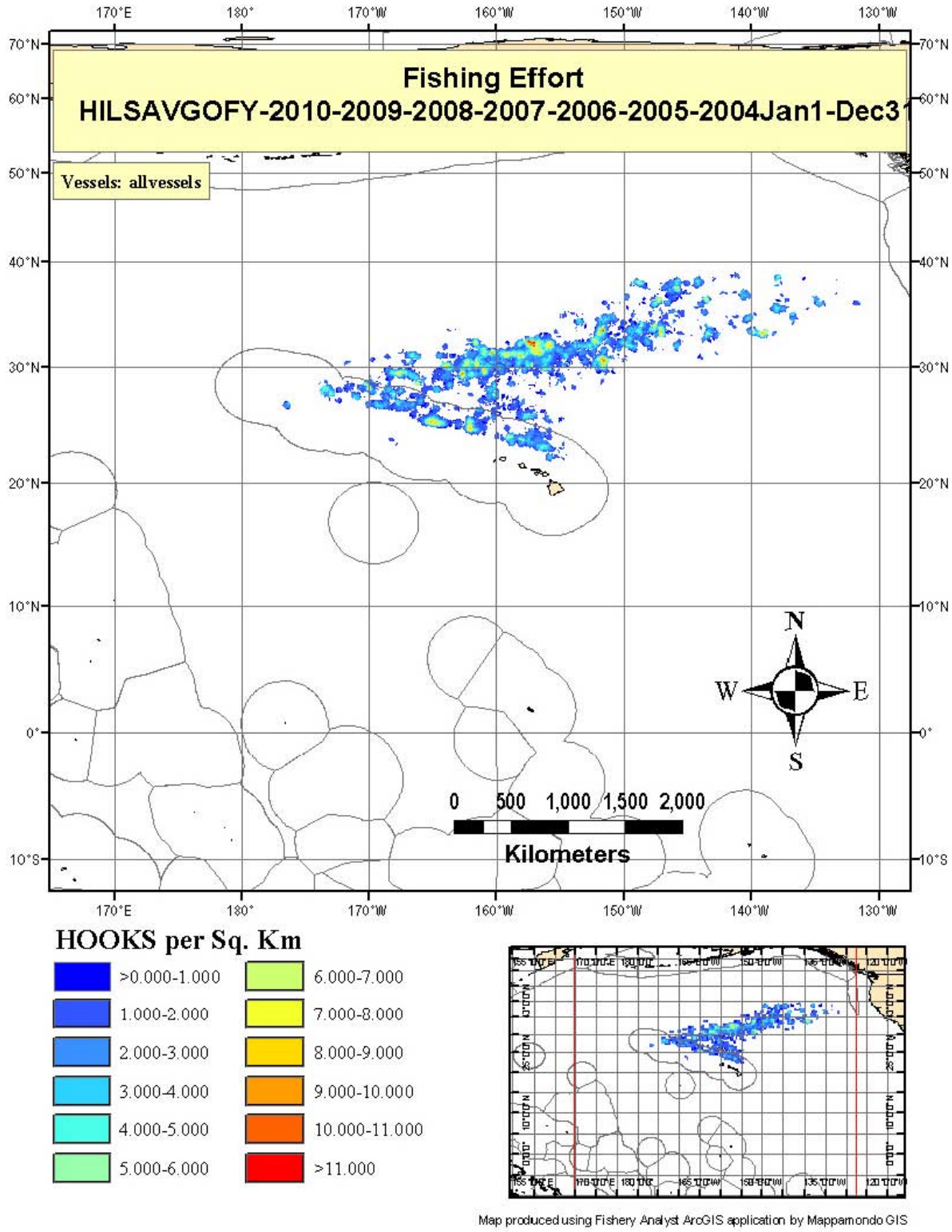


Figure 9. Spatial distribution of longline shallow-set fishing effort for the full period of 2004-2010. (PIFSC unpub.)

Fishermen are required to comply with mandatory seabird deterrent and injury mitigation measures. Table 2 summarizes the seabird regulations (50 CFR 665.815). Between August 2005 and February 2007, a technical assistance program provided Hawaii longline vessel operators with equipment and instructions for side-setting and by February 2007, eight vessels that target swordfish exclusively or part of the year were converted to side-setting (Brothers and Gillman 2006). However, according to National Marine Fisheries Service (NMFS) observer data, from 2004 to 2010 only three vessels used side setting in the shallow-set fishery (one vessel in 2005, two vessels in 2009 and two vessels in 2010). Currently, most of the fleet uses the stern-setting measures in Table 2. A recent unpublished case study by the Pacific Islands Fisheries Science Center (PIFSC) discussed side setting activity in the Hawaii longline fishery. The study found that some captains and owners had success when they converted from stern- to side-setting while others had safety concerns, operational issues, and did not see a change in seabird interactions so they switched back to stern-setting. A compliance guide for fishermen to implement these requirements can be found at: www.fpir.noaa.gov/SFD/SFD_regs_2.html.

Table 2. Summary of current seabird regulations for the shallow-set fishery. Note: Vessels can select to employ either suite of measures (stern- or side-set).

Seabird Mitigation Measure	Stern-Setting	Side-Setting
Begin set at least 1 hr after local sunset & complete no later than 1 hr before sunrise*	X	
Use thawed & blue-dyed bait	X	
Maintain at least two (2) - one lb containers of blue dye on board the vessel at all times	X	
Discard offal opposite side of the vessel from where the longline gear is being set or hauled (when birds are present); retain sufficient quantities of offal; remove all hooks from offal	X	
When using basket-style longline gear north of 23° N. lat., ensure that the main longline is deployed slack to maximize its sink rate	X	
Branchlines must have weights that are a minimum 45 g (1.6 oz) within 1 m (3.3 ft) of the hook		X
Set from port or starboard side		X
Place setting station at least 1 m (3.3 ft) forward from the stern of the vessel		X
Place line shooter at least 1 m (3.3 ft) forward from the stern of the vessel (if used)		X
Deploy gear so that hooks do not resurface		X
Use bird curtain with required specifications		X
Follow all seabird handling procedures	X	X

* Setting of longline gear should be conducted under minimum deck lighting and in conformance with navigation rules and best safety practices.

The average seabird interaction (hooking or entanglement) rates shown in Table 3 would likely not change under current seabird deterrent and mitigation measures governing the fishery. Since 2004, the shallow-set fishery is required to have 100% onboard observer coverage; therefore, any significant increase in interaction rates would be detected and be addressed by the Western Pacific Fishery

Management Council (WPFMC) and NMFS. From 2004 through the end of 2010, 359 seabird interactions were observed in the fishery: 265 Laysan albatrosses, 92 black-footed albatrosses, 1 northern fulmar, and 1 sooty shearwater (Table 3).

Table 3. Summary of seabird interactions and nominal rates in the Hawaii longline shallow-set swordfish fishery, 2004-2010. Data source is NMFS observer program with 100% coverage. Data are based on the date for the beginning of the haul and are not fleet-wide extrapolations.

Year	No. of active vessels	No. of sets	Total effort (no. of hooks)	No. Laysan albatross	No. black-footed albatross	No. Sooty shear-waters	No. other bird species	Total no. of birds	Estimated Total seabirds plus drop-offs (employing 31% drop-off rate)	Laysan albatross interaction rate (no. birds per 1000 hooks)	Black-footed albatross interaction rate (no. birds per 1000 hooks)	Nominal seabird interaction rate (no. birds per 1000 hooks)
2004	7	11	115,718	1	0	0	0	1	1	0.009	0.000	0.009
2005	33	109	1,358,247	62	7	0	0	69	90	0.046	0.005	0.051
*2006	35	57	676,716	8	3	0	0	11	14	0.012	0.004	0.016
2007	28	88	1,353,761	40	8	0	0	48	63	0.030	0.006	0.035
2008	27	93	1,460,042	33	6	0	0	39	51	0.023	0.004	0.027
2009	28	112	1,694,550	81	30	1	0	112	147	0.048	0.018	0.066
2010	28	108	1,832,471	40	38	0	1	79	103	0.022	0.021	0.043
Total	**NA**	**NA**	**8,491,505**	**265**	**92**	**1**	**1**	**359**	**470**	**0.031**	**0.011**	**0.042**
Ave.	**27**	**83**	**1,213,072**	**38**	**13**	**0.14**	**0.14**	**51**	**67**	**0.039**	**0.006**	**0.050**

* Fishery closed early because turtle take limit was reached.

Shallow-setting occurs at night and hauls occur during the daytime. While some birds retrieved alive in shallow-sets may have been caught during the set and survived the soak, likely most of these records of live seabird captures represent bird captures occurring during the haul. Occasionally observers are able to observe and record bird captures occurring during gear hauling, but observers are not always able to determine when a caught bird was captured. For example, in 2008, observer data identify one black-footed albatross and eight Laysan albatross being captured during gear hauling in shallow-sets out of a total of 39 observed bird interactions. Hence, in 2008, based on direct observations, a minimum of 21% of total observed bird interactions in shallow-sets were confirmed as having been hooked or entangled during gear hauling. This represents a minimum estimate of bird interactions during gear hauling.

Hooked or entangled seabirds may drop off the gear between the set and gear retrieval, and there is a growing body of evidence that counts of bird interactions during gear retrieval underestimates total bird interactions (Brothers, 1991; Gales et al., 1998; Gilman et al., 2003, 2005, 2007; Watkins et al., 2008). An estimated 27% of seabirds caught during setting by Japanese longline tuna vessels operating off of Tasmania, Australia, were not hauled aboard (Brothers 1991). Gales et al. (1998) observed crew from a Japanese longline southern bluefin tuna fishery and found that they discarded half (51%) of hooked seabirds by flicking or cutting them off branch lines while alongside the vessel; observers often fail to notice or record such birds. Gilman et al. (2003) estimated that in the Hawaii longline tuna fishery 34% of seabirds caught during setting were not hauled aboard. In a subsequent study in the Hawaii longline tuna and swordfish fisheries, Gilman et al. (2007) estimated that 28% of seabirds observed caught during setting were not hauled aboard. In the two Hawaii studies, crew did not attempt to dislodge or discard caught seabirds during hauling, and no birds were caught during gear hauling (Gilman et al. 2003, 2007). In these studies, birds that had been observed hooked during gear setting but were not present upon gear retrieval can be inferred to have freed themselves from the hooks, or fallen from hooks due to scavenging, current, or other mechanical action during the line soak and haul (Gilman et al. 2005).

In a 2004 Biological Opinion, the USFWS used a 31% correction factor for estimating drop-offs and total seabird interactions (USFWS 2004). Based on the drop-off rates used in that biological opinion and the rates estimated by Gillman et al. (2003 and 2007), a reasonable and conservative drop-off rate of 31% was used to estimate total seabird interactions in Table 3. This is a conservative estimate that assumes all observed seabird interactions occurred while setting the gear, and that none were caught while hauling the gear. The estimated annual interaction rates in Table 3 are for blackfooted and Laysan albatross and all seabirds.

Figure 10 through 16 show locations of all seabird interactions in the Hawaii longline shallow-set fleet by individual year and aggregated for 2004-2010.

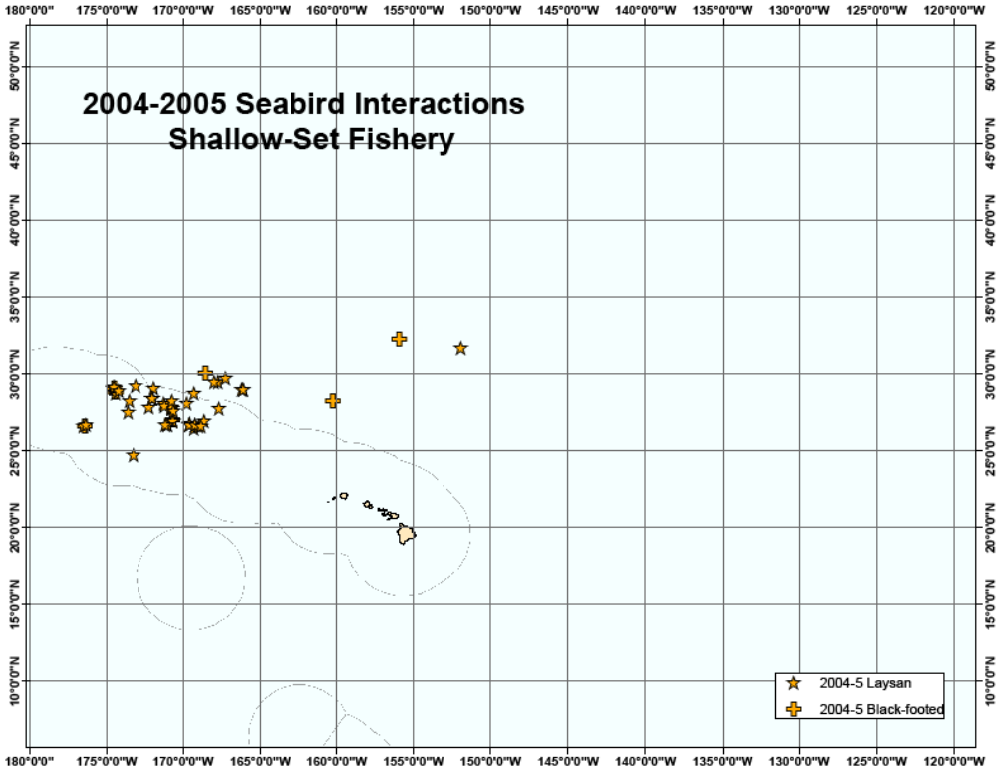


Figure 10. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2004-2005. (NMFS unpub.)

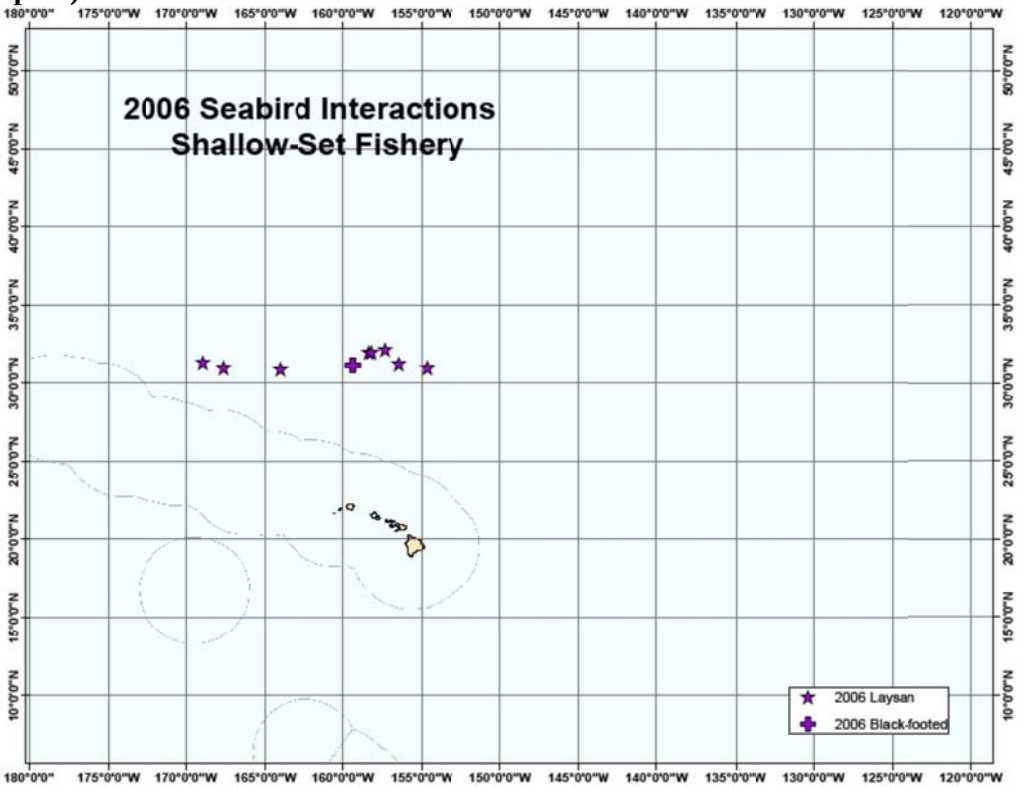


Figure 11. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2006. (NMFS unpub.)

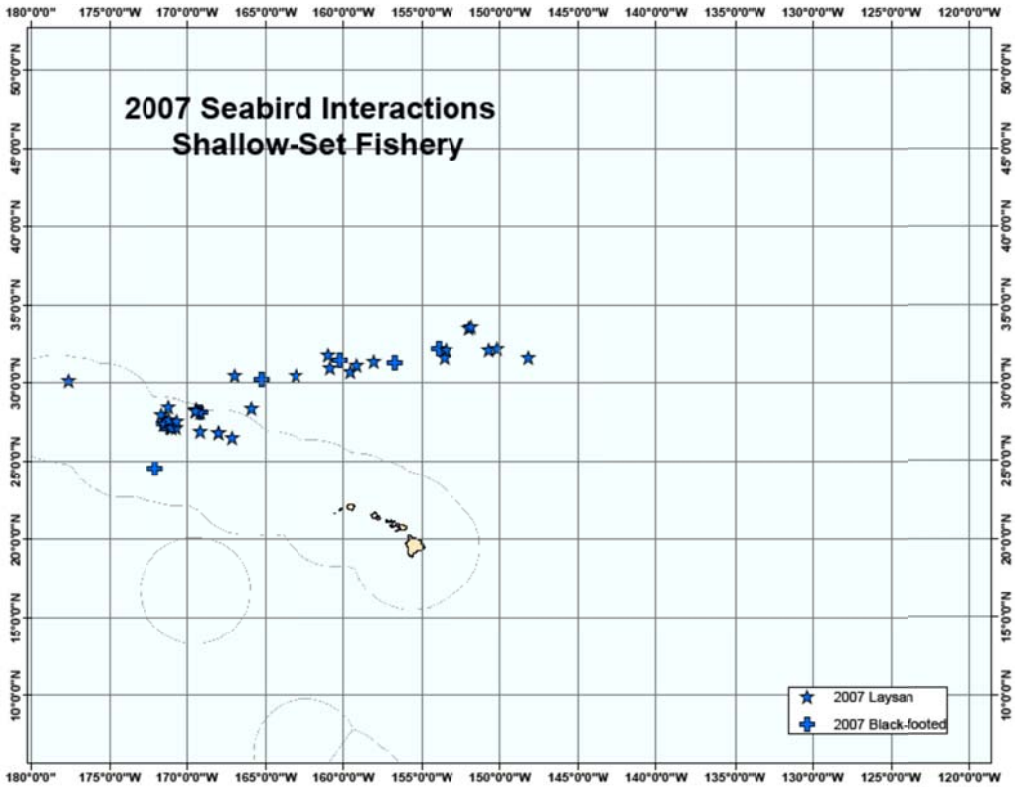


Figure 12. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2007. (NMFS unpub.)

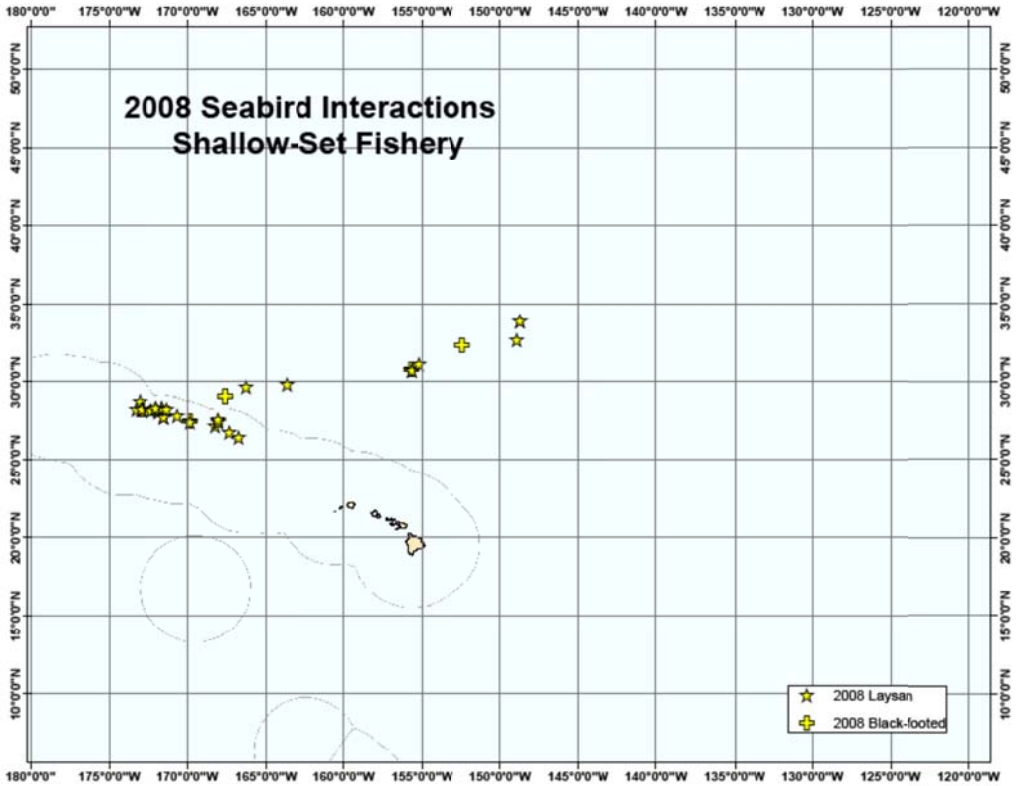


Figure 13. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2008. (NMFS unpub.)

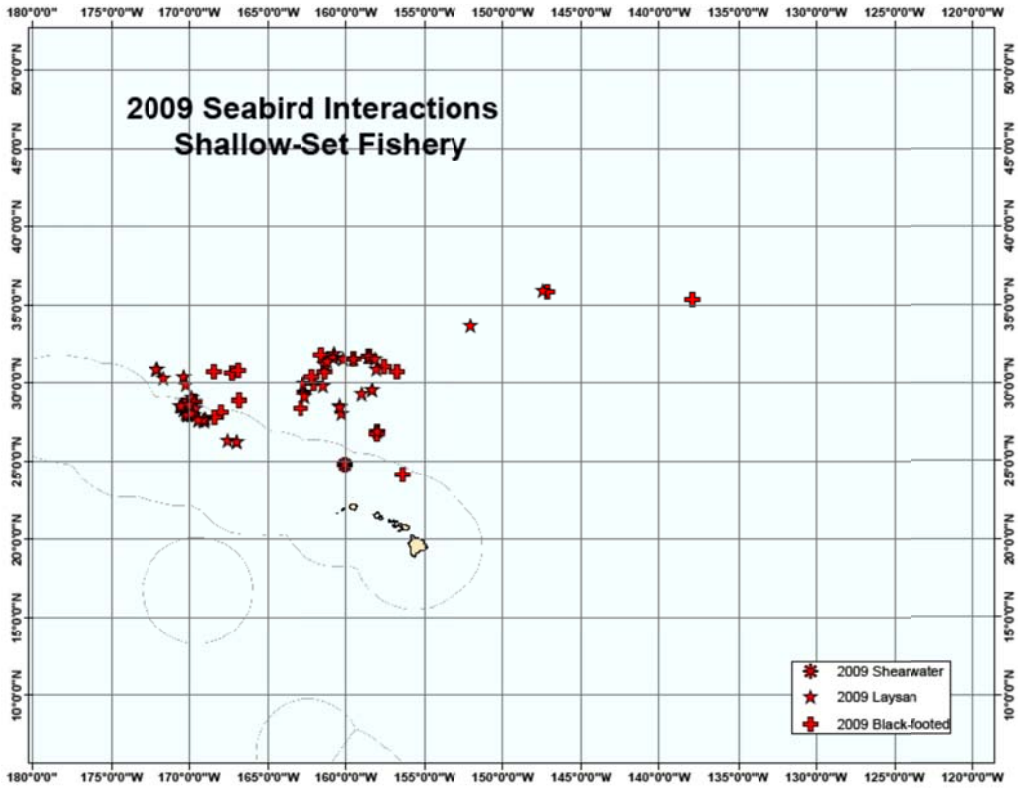


Figure 14. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2009. (NMFS unpub.)

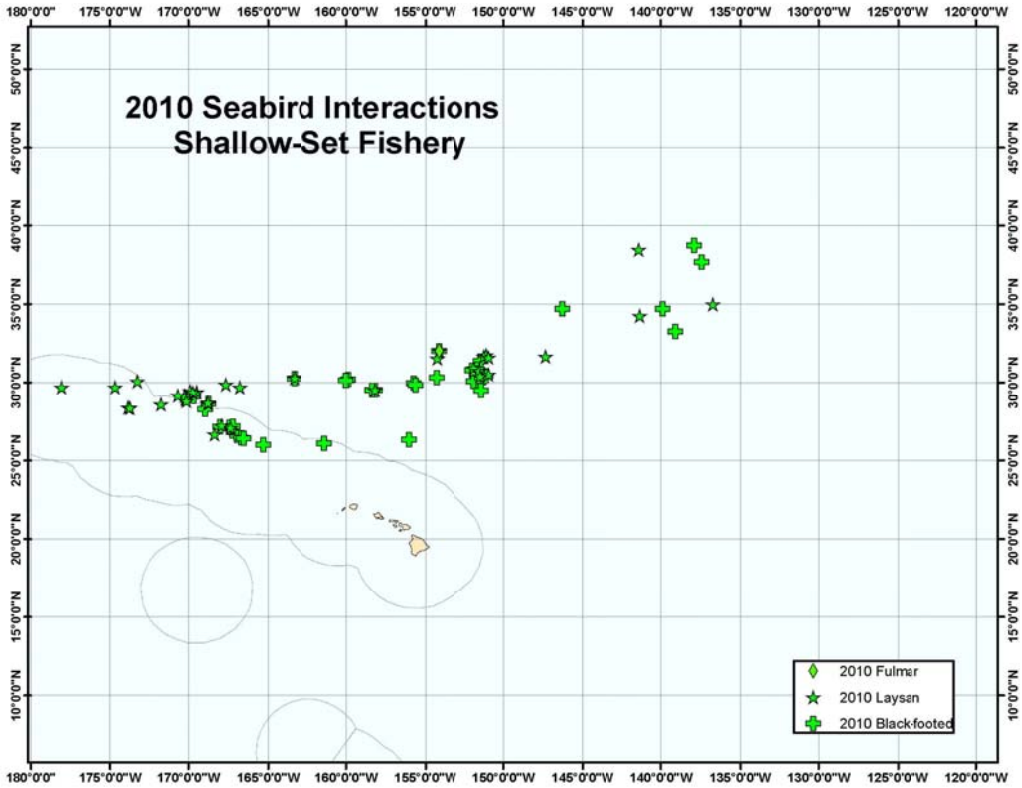


Figure 15. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2010. (NMFS unpub.)

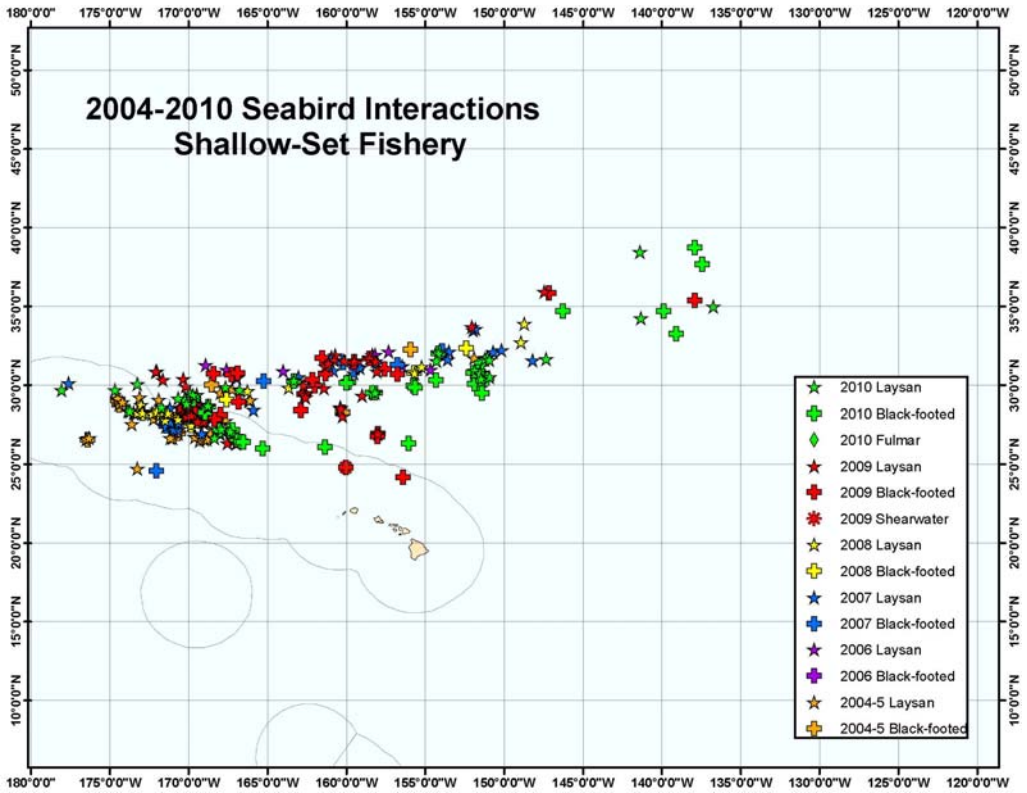


Figure 16. Locations of seabird interactions in the shallow-set Hawaii longline fleet 2004-2010. (NMFS unpub.)

A.2. Identify the MBTA species and number of individuals of each species that may be injured or killed as a result of this activity, to the most specific taxonomic level, and common names) as well as the species' status (e.g., Birds of Conservation Concern, USFWS Focal Species, Colonial Waterbird Conservation Status, etc.).

As explained in the previous section, black-footed albatross, Northern Fulmar, Laysan albatross, and sooty shearwater are the MBTA species likely to be injured or killed in the shallow-set fishery. None of these four species are listed under the Endangered Species Act.

USFWS informally uses the term "Species of Concern" to refer to species that may require conservation actions. Species of concern receive no legal protection and may or may not be proposed for listing as threatened or endangered and are not defined in the ESA. USFWS lists the black-footed and Laysan albatrosses as Birds of Conservation Concern (USFWS 2005). The black-footed albatross is categorized as Endangered by the IUCN Red List, and Highly Imperiled/High Concern in the USFWS North American Waterbird Conservation Plan (USFWS 2005). The Laysan albatross is categorized as Vulnerable on the IUCN Red List, and Highly Imperiled/High Concern in the USFWS North American Waterbird Conservation Plan (IUCN 2011; USFWS 2005). The Northern Fulmar and sooty shearwater are categorized as Moderate Concern in the in the USFWS North American Waterbird Conservation Plan (USFWS 2005). The Northern Fulmar status is listed as Least Concern and the sooty shearwater is listed as Near Threatened by the IUCN Red List (IUCN 2011).

Table 3 presents annual levels, rates of interaction, and estimated interaction totals (including drop-offs) observed in the fishery since seabird deterrent and mitigation requirements were implemented. It is anticipated that average levels and rates of seabird interactions will continue in the future. As discussed in the previous section, seabird interaction totals and rates may be 31% higher than observed totals due to

drop-offs. The inclusion of drop-off estimates is considered conservative because the proportion of seabirds that free themselves and survived the gear interaction are unknown.

An incidental take of one short-tailed albatross is anticipated per year for the shallow-set fishery, as described in the 2004 Biological Opinion (USFWS 2004). There have been no recorded or observed gear interactions between any short-tailed albatross and any Hawaii-based longline vessels. However, NMFS observers have documented short-tailed albatross foraging on spent bait and offal around longline vessels (NMFS unpub.). Black-footed albatrosses are used as surrogate species to assess the effects of fishery interactions and the efficacy of mitigation measures on the short-tailed albatross population due to their relatedness, similar habitats, and likely similar foraging strategies.

In January 2011, a short-tailed albatross pair successfully hatched an egg on Midway Atoll, Northwestern Hawaiian Islands. This is the first time an egg has been hatched outside the two main breeding sites in Japan. The juvenile bird was tagged and has left the nest.

A.3. Quantify any anticipated effects to the birds and the habitat(s) of each species.
The anticipated effects on the populations of the four species from interactions with this fishery are discussed in detail in sections A.1. and D.1. The relative degree of importance of fishing mortality is not well understood, as information on mortality levels from the wide range of anthropogenic and natural threats, including fisheries interactions, is generally lacking. Pelagic longline fishing gear does not affect seabird habitat.

A.4. Provide a description of the abundance, distribution, and seasonal distribution (when applicable) of the affected MBTA species likely to be affected by activities.

Black-footed albatross
NMFS (2010) and Rivera (2006) provide profiles for this species. Breeding distribution is almost entirely restricted to the Hawaiian Islands with the exception of small colonies off Japan (USFWS 2005). In Hawaii, colonies occur in the Northwestern Hawaiian Islands and Kaula and Lehua in the main Hawaiian Islands. They have also recently recolonized Wake. During the breeding season, adults range mostly to the north and east of the Hawaii colonies. Adults brooding chicks forage closer to the colonies, within 100s of kilometers. After brooding, birds transit to continental shelf areas of North America while feeding chicks. Non-breeding individuals distribute throughout the North Pacific between 20^{o} and 58^{o} N (USFWS 2005).

Direct counts of populations cannot be made because not all birds (e.g., juveniles and some adults) return to the breeding colonies every year. Instead, the numbers of breeding pairs, or numbers of active nests, are used to assess the health of albatross populations. Environmental factors such as foraging success may influence how many albatrosses return to a colony to breed. Therefore, foraging success should not be considered to assess short-term changes in population. However, this measurement can be used to assess long-term trends in populations. Fig. 17 illustrate trends in black-footed albatross breeding pair numbers at Midway Atoll, Laysan Island, and French Frigate Shoals from 1998-2009.

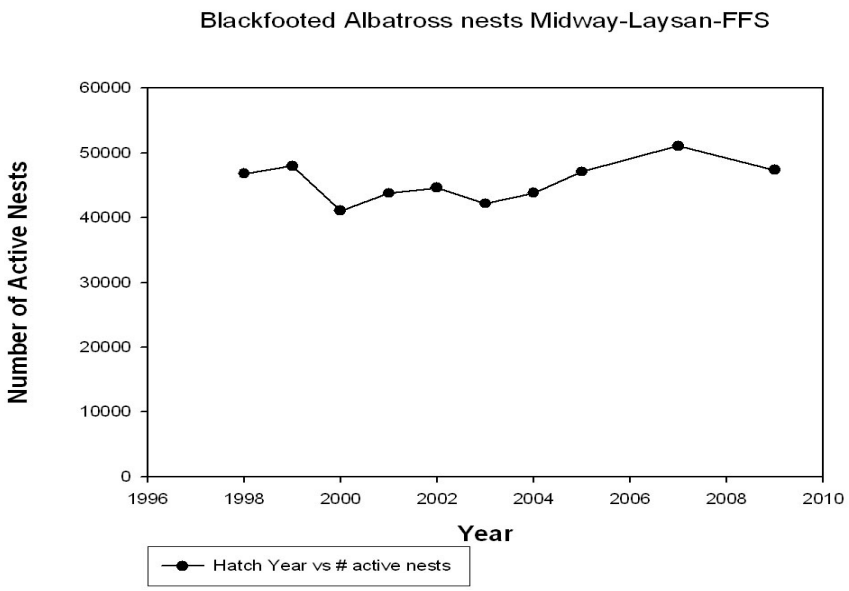


Figure 17. Number of black-footed albatross breeding pairs in three areas in the Northwestern Hawaiian Islands, 1998-2009 (NMFS, 2010).

Laysan albatross (*Phoebastria immutabilis*)
NMFS (2010), Rivera (2006), and USFWS (2005) provide profiles for this species. The breeding range is centered in the Hawaiian Islands with smaller colonies on the Bonin Islands of Japan and islands off western Mexico. Over 99% of the world's Laysan albatrosses breed in the Northwestern Hawaiian Islands. They also nest on Kauai, Lehua, and Oahu in the main Hawaiian Islands. They have recolonized Wake and Johnston and one pair successfully bred in Wake in 2001. Breeding adults forage primarily to the north and northwest of Hawaii to the Gulf of Alaska and Aleutian Islands. During nonbreeding periods, adults disperse widely throughout the North Pacific.

Because variables, such as population structure, mortality, and individual breeding frequency are not fully understood, a total world population estimate cannot be determined for this species. Instead, an estimate of total numbers of nesting pairs has been used to monitor Laysan populations. The worldwide breeding population was estimated at 590,000 pairs in 2005 (NMFS 2010). . Other breeding sites are in Japan and Mexico. Figure 18 illustrate trends in breeding pair numbers at Midway Atoll, Laysan Island, and French Frigate Shoals from 1992-2009.

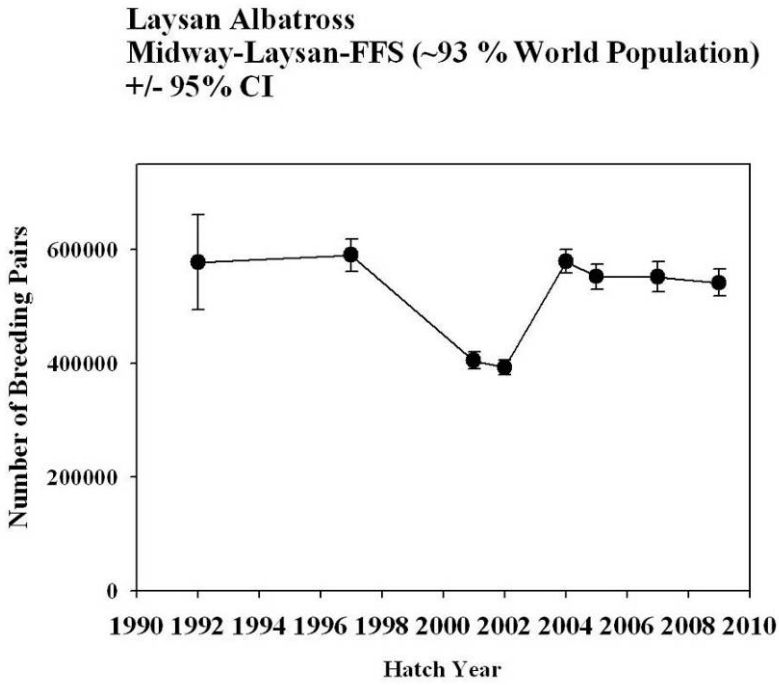


Figure 18. Number of Laysan albatross breeding pairs at three islands in the Northwestern Hawaiian Islands (NMFS 2010).

Northern Fulmar

The following information is from the *Alaska Seabird Information Series:* (http://alaska.fws.gov/mbsp/mbm/seabirds/pdf/nofu.pdf)

The Northern Fulmar spends most of its life at sea and comes to land only to breed. They are abundant in Alaska, but rarely seen because they breed in a few remote breeding locations. Breeding in North America occurs in Alaska, British Columbia, and in arctic and eastern Canada. Half of the colony sites identified are in Alaska. Ninety-nine percent of the Alaskan population breeds at only four sites: the Semidi Islands in the Gulf of Alaska, Chagulak Island in the Aleutian Islands, the Pribilof Islands, and on St. Matthew and Hall islands in the Bering Sea. Reproduction of Northern fulmars is slow. Generally, they do not breed until they are 8-10 years old and breeding can continue over a period of 40 years or more. Alaskan populations are common in winter to the northern limits of open water in the Bering Sea. They are also scattered over the North Pacific, but are common only north of 35-40° N.

The estimated worldwide population (including estimates for pre-breeders at sea) is 10-12 million individuals. The North American breeding population is estimated at 2.1 million individuals. About 70%, or 1.4 million, of those birds are found in Alaska at 38 colonies. In Alaska, at least four small colonies established since about 1970 are thought to be growing. Fulmars plunge dive and surfaces dips while feeding on fish, squid, and crustaceans, and are known to feed extensively on fish waste. There is no immediate threat to the conservation status of Northern Fulmars; however, high local densities of breeding populations may make the species vulnerable to catastrophic changes in food supplies, other environmental conditions, and several human activities.

Sooty shearwater

The most abundant seabird off of the California coast, this species is a southern hemisphere breeder that

migrates to the north Pacific during the austral winter (USFWS 2005). It nests only in Australia, New Zealand, and southern South America. New Zealand has by far the most birds, with five million pairs in 80 breeding colonies—approximately half the world's population. Colonies on the Snares Islands south of New Zealand alone contain 2,750,000 pairs. Their annual migration entails traveling north from their southern Australia and New Zealand breeding colonies via Polynesia at the end of the nesting season in March to May, to their foraging grounds in Japan, Alaska, and California by September, and then returning to their breeding colonies by November.

A.5. Describe the anticipated impact of the activity upon each species' status.
The continued operation of the shallow-set fishery is not likely to alter the conservation status of affected seabird populations or species.

B. Identify location of the proposed activity:

B.1. Provide the specific location of the proposed activity. Include a formal legal description and any other identifying designation (e.g., oceanographic region) that will most accurately describe the location of the proposed activity.
The shallow-set fishery typically operates between 140°W and 180°W longitude and 20°N and 40°N latitude with the majority of fishing effort concentrated north to northeast of the Hawaiian Islands between 25° N and 35° N latitude. The fishery typically concentrates its effort outside U.S. territorial waters around the subtropical and south subtropical frontal zones. Figures 2 through 9 present the spatial distribution of fishing effort by the fishery from 2004-2010. Longline fishing is prohibited within 25 – 75 nm of the main Hawaiian Islands depending on the time of year and location around the islands, and in the waters of the Papahanaumokuakea Marine National Monument (i.e., 50 nm from the center geographical positions of each of the Northwestern Hawaiian Islands). In general, shallow-set vessels operate out of Hawaii ports, with the vast majority based in Honolulu, and some in Hilo. Infrequently, shallow-set trips originate from ports outside of Hawaii, such as Long Beach or San Francisco, California, and then land their catches in Hawaii or California.

C. Describe the proposed activity, including a statement justifying the permit request. Include the following:

C.1. Describe in detail the purpose(s) and objective(s) of the activity.

C.1.i. Include project design, methodologies, and equipment.
The proposed activity is the continued operation of the shallow-set fishery under current regulations in 50 CFR 665 and 50 CFR 600. The fishery uses longline gear to target swordfish at night. Pelagic longline fishing deploys ("sets") a mainline, usually consisting of a single monofilament line with a breaking strength ("test") of up to 680 kg (1,500 pounds (lb). The mainline is suspended horizontally below the surface by floats, with branch lines attached at regular intervals that terminate with baited hooks (Fig. 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 a one 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. 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 28-80 g swivel weight, and a hook. An average of four branchlines are deployed between floats and, frequently, lightsticks are attached to every third branchline to attract fish. Regulations for the shallow-set fishery require 18/0 or larger offset circle hooks and mackerel-type bait be used to reduce sea turtle interactions. Shallow-set gear is usually deployed by allowing the mainline to spool off the mainline reel as the vessel is underway. This causes the line to be

set relatively shallow in the water column, usually less than 100 m, where swordfish tend to congregate at night (Fig. 1). Shallow-set vessels set their lines where swordfish are feeding on squid, the primary prey of swordfish (Seki et al. 2002) and albatross (Harrison et al. 1983). Hence, albatross and longline vessels targeting swordfish are often present at the same time in the same area of biological productivity.

C.1.ii. Provide the dates, duration, and expected effort (e.g., number of sets, number of hooks/set, etc.) for each geographical region, where the activity will occur.
The fishery operates year-round; however, 72 to 90% of the total hooks are deployed between January and June (Fig. 19). This effort distribution is a reflection of the seasonal distribution of the swordfish.

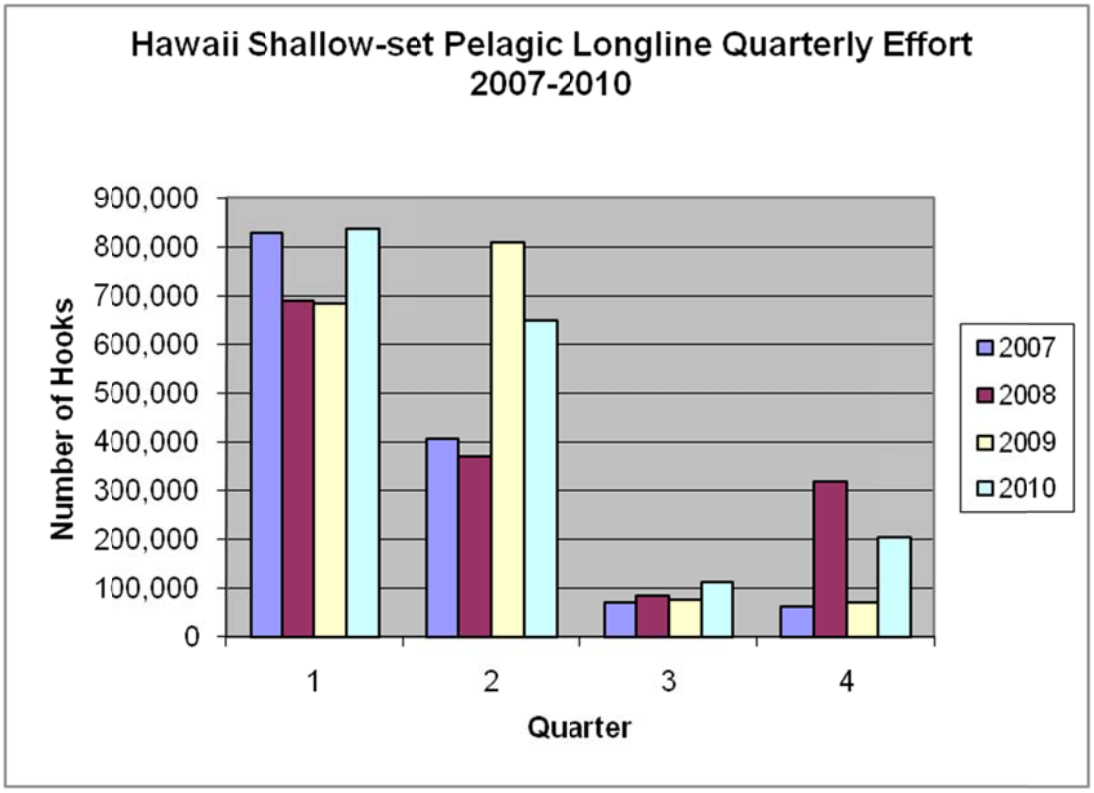


Figure 19. Hawaii shallow-set longline fishing effort by quarter, 2007-2010. (PIFSC logbook summary reports)
Note: Quarterly effort for the swordfish fishery prior to 2007 is not displayed due to confidentiality restrictions.

Table 3 summarizes the annual effort by the fishery from 2004 to 2010. We anticipate that the future fishing effort by this fishery (at least during the 3-year period of a MBTA permit) will be similar to the five-year mean of about 1.2 million hooks per year (Table 3) with about 27 vessels actively fishing each year to the north and northeast of the Hawaiian Islands (Fig. 2 through 9). Annual closures can occur due to exceeding sea turtle caps; this occurred in 2006 (Table 3).

C.1.iii. Identify any monitoring, studies, or other anticipated results from the project that will improve our knowledge of the species and/or the effects of the activity on the affected species.
NMFS will continue to deploy 100% onboard observer coverage in the fishery. Thus, all interactions between the shallow-set fishery and seabird species will be recorded. Should the fishery take a short-tailed albatross, USFWS issued NMFS Pacific Islands Regional Office (PIRO) a Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Permit (No. 10US022729/9, valid through November 3, 2011) for the introduction of tissue samples and whole carcasses of short-

tailed albatrosses. For any other seabirds taken or collected, USFWS issued NMFS PIRO Special Purpose Salvage Permit (No. MB052060-0, valid through March 31, 2014) to salvage migratory birds during fisheries observer programs. These permits allow onboard observers to retain all dead albatrosses and non-albatross species so that qualified and experienced staff can identify the salvaged seabirds. Since 2008, all seabirds collected by the Observer Program have been sent to the wildlife veterinary laboratory at the University of California Santa Cruz for storage and species identification. The laboratory is also conducting a diet study for plastics and a seabird bycatch study.

C.1.iii.a. Include planned analysis and disposition of data upon completion of activity.
Not applicable – the application is for the continued operation of the fishery with no specified completion date or new dedicated data collection program. NMFS will continue to produce annual seabird reports, the most recent being NMFS (2010). All information collected by PIRO Observer Program, including species identification of salvaged specimens is available to the USFWS.

Pending budget constraints, PIRO plans to evaluate the observer program dataset to estimate the proportion of seabirds that are caught during gear retrieval, and assess the significance of various fishing gear design factors on the ability of seabirds to survive the gear soak.

C.1.iii.b. Qualifications or training of observers collecting data.
Observers are trained to collect and report accurate information on seabird interactions, including fishing effort, the number and species of seabirds that interacted with during fishing operations as determined during observations of hauls, and employment of seabird bycatch mitigation methods. Recently, observers have begun to report seabird ship strikes and dead seabirds on board the vessels. Training also includes the proper handling and record-keeping of specimens for identification and necropsy by seabird experts.

C.1.iv. Describe the compelling justification for permitting this activity.
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 Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act (MBTA), and the Administrative Procedure Act (APA), as a result of NMFS promulgation of a final rule on December 10, 2009 that implemented the regulatory provisions of Amendment 18 (Turtle Island Restoration Network, et al., v. DOC; 76 FR13297). If an MBTA permit is issued it would be the first that governs the operations of a U.S. Fishery. The shallow-set fishery contributes in a minor way to total seabird interactions compared to other U.S. and International fisheries and not to endangered seabirds. In 2009, NMFS and USFWS conducted an informal consultation on Amendment 18. USFWS concurred that the proposed change to the shallow-set fishery may affect, but is not likely to adversely affect the STAL during a one-year period beginning January 1, 2009, and ending December 31, 2009 (NMFS 2008a and 2008b). NMFS anticipates that any ESA-listed seabird taken in the course of commercial fishing operations consistent with an incidental take statement would also comply with the MBTA permit.

The continued operation of the shallow-set fishery provides a net benefit to the Nation. According to Amendment 18 it was estimated that the shallow-set fishery would generate $60.7 million in direct and indirect business sales, $27 million in personal and corporate income, 837 jobs, and 44.5 million in state and local taxes (WPFMC 2009). The shallow-set fishery also serves as a benchmark internationally for employing effective seabird mitigation techniques and serves as an example of responsible conservation practices by a fishery. Closure of this fishery would likely result in replaced effort by foreign longline fleets to supply swordfish demand, where use of bycatch mitigation methods would not likely follow international best practices, and observer coverage rates tend to be inadequate in providing reliable information on the use of bycatch mitigation methods or seabird interaction rates and levels.

D. Describe in detail the anticipated negative impacts, including injury or death of individuals (for each species), as a result of this activity.

D.1. For each species, quantify the rate (e.g., injured or killed/1000 hooks) and the maximum number of individuals that would be injured or killed.
Annual and mean interaction rates (hooking or entanglement) for all seabirds are displayed in Table 3. These rates would likely not change under current seabird deterrent and mitigation measures governing the fishery. We anticipate that annual interactions per year in future years of operation of the shallow-set fishery would be similar to Table 3. These estimates are cautious overestimates. We used the annual observed seabird interaction rates for each year, 2004-2010, and assumed all caught birds were hooked or entangled during setting activity such that an additional 31% of the total observed number of birds would have been captured and fell from the gear prior to gear retrieval. Based on 2009 observations, about 78% of caught birds in this fishery would be released alive but injured, and 22% would be dead upon being brought to the vessel. Information is not available on the post-release survival rate of seabirds released from the fishery.

D.2. Quantify any anticipated effects to the birds and the habitat(s) of each species. Provide the number, age, and sex of each species, to the extent known.
This information is provided in sections A.1. D.1., and D.3 . Information is not available to provide estimates of age and sex classes that could be caught.

D.3. Quantify the anticipated impact of the activity upon each species population.
Arata et al. (2009) review the existing literature, including models of effects of anthropogenic mortality sources on the populations of Laysan and black-footed albatrosses. Matrix modeling indicated that the Laysan albatross population, summed across all three monitored breeding colonies, is increasing at 6.7 percent a year, and that an estimated level of bycatch mortality of 2,500 birds per year is below the Potential Biological Removal (PBR). However, PBR refers to all sources of non-natural mortality, and this should be considered in applying PBR-based mortality caps in individual fisheries, including the shallow-set fishery. Matrix modeling also indicated that the black-footed albatross population, summed across all three colonies is increasing slightly, with a population growth rate of 0.3 percent per year, and that an estimated level of bycatch mortality of 5,228 birds per year is also below PBR (Arata et al., 2009).

For the Laysan albatross, based on regression analysis of breeding pair count data, Arata et al. (2009) concluded that the population has been increasing over the past 83 years, but has been stable during the more recent 13 years. Based on population viability analyses (PVA) for the Laysan albatross colony at Laysan Island there was no significant trend in growth rate (the population has been stable) from 1992-2005 (Arata et al., 2009), a very short time series for a long-lived species. PVA for the Laysan colony at French Frigate Shoals also found no significant trend in growth rate (Arata et al., 2009). Both Laysan colonies at Laysan Island and French Frigate Shoals are hypothesized to be close to carrying capacity.

For the black-footed albatross, regression analysis of breeding pair count data (time series is from 1923-2005, but with counts only from 11 individual years across this period), Arata et al. (2009) concluded that over the full 83-year period, the population increased, over 48 years from 1957-2005 the population was stable, and over the most recent 13 years the population was also stable. Based on PVA for the Midway Atoll and the French Frigate Shoals colonies, the populations were stable (Arata et al., 2009). As with the Laysan albatross, Arata et al. (2009) concluded that their 2005 estimate of total fishery bycatch mortality level is within the mortality level that can be sustained by the black-footed albatross without causing a decrease in population abundance.

Cousins and Cooper (2000), Lewison and Crowder (2003), Niel and Lebreton (2005) have conducted population modeling of the black-footed albatross, generally consistently concluding that mortality levels

from interactions with international pelagic and demersal Pacific longline fisheries is a concern. The more current PBR estimate for the black-footed albatross by Arata et al. (2009) of 11,980 birds per year is similar to that of Niel and Lebreton (2005) of 8,850 and Cousins and Cooper (2000) of 10,000.

Because the shallow-set fishery represents an extremely small component of total longline fishing effort that overlaps with the distributions of the affected populations, and because this fishery employs best practice seabird bycatch mitigation methods (Gilman et al., 2005; Gilman 2011) and maintains 100% observer coverage, it is very likely that this fishery causes a relatively very small component of total international fishing mortality and small proportion of total non-natural mortality.

E. Describe what will be done to minimize the negative effects on each MBTA species.

E.1. Include the equipment, methodologies and/or performance standards to be used.
Table 2 presents the current domestic seabird deterrent and mitigation measures that are required for continued operation of the fishery. With 100% observer coverage, observer program data can be used to assess compliance with these measures as well as efficacy (Gilman et al. 2008). There are currently no quantifiable performance standards included as a part of the NMFS seabird regulations (e.g., output controls such as threshold seabird catch rate or annual quota, no specified baited hook sink rate). However, given the significant decline in seabird catch rate and level since the pre-regulations period, and ability to assess efficacy via analyses of observer program data, this is not currently deemed a problematic governance deficit.

Short-tailed albatross and non-short-tailed albatross handling techniques must be used by owners and operators when birds are hooked or entangled to minimize injury and release birds with minimal harm (50 CFR 665.815). This regulatory requirement will continue.

E.2. Identify and provide copies of any research relevant to these activities and their effectiveness in minimizing injury and take.

Boggs, C.H., 2001. Deterring albatrosses from contacting baits during swordfish longline sets. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, AK-SG-01-01, 2001. pp. 79–94.

Boggs, C.H. 2003. Annual Report on the Hawaii Longline Fishing Experiments to Reduce Sea Turtle Bycatch under ESA Section 10 Permit 1303. U.S. National Marine Fisheries Service Honolulu Laboratory, Honolulu. 42 pp.

Brothers, N.P., Cooper, J., Lokkeborg, S. 1999. The incidental catch of seabirds by longline fisheries: Worldwide review and technical guidelines for mitigation. FAO Fisheries Circular No. 937. Rome: Food and Agriculture Organization of the United Nations.

FAO. 1999. International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Rome: Food and Agriculture Organization of the United Nations.

Gilman, E., Boggs, C., and Brothers, N. 2003. Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery. Ocean and Coastal Management 46: 985-1010.

Gilman, E., Brothers, N., and Kobayashi, D. 2005. Principles and approaches to abate seabird bycatch in longline fisheries. Fish and Fisheries 6: 35-49.

Gilman, E., Brothers, N., and Kobayashi, D. 2007a. Comparison of three seabird bycatch avoidance methods in Hawaii-based pelagic longline fisheries. Fisheries Science 73: 208-210.

Gilman, E., Moth-Poulsen, T., and Bianchi, G. 2007b. *Review of Measures Taken by Inter-Governmental Organizations to Address Problematic Sea Turtle and Seabird Interactions in Marine Capture Fisheries*. Fisheries Circular No. 1025, ISSN 0429-0329. Food and Agriculture Organization of the United Nations, Rome. (http://www.fao.org/docrep/010/a1426e/a1426e00.htm)

Gilman, E., Kobayashi, D., Chaloupka, M. 2008. Reducing seabird bycatch in the Hawaii longline tuna

fishery. Endangered Species Research 5: 309–323 ISSN 1613-4796.
Gilman, E. 2008. Alternative Branch Line Weight Designs to Improve Crew Safety and Reduce Bycatch of Sensitive Species Groups in Pelagic Longline Fisheries. International Union for the Conservation of Nature and U.S. National Marine Fisheries Service, Pacific Islands Regional Office, Gland, Switzerland and Honolulu, U.S.A. http://cmsdata.iucn.org/downloads/safelead_trial_report.pdf
Lokkeborg, S. 2001. Reducing Seabird Bycatch in Longline Fisheries by Means of Bird-Scaring Lines and Underwater Setting. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, AK-SG-01-01, 2001. pp. 33–41.
McNamara, B., Torre, L., Kaaialii, G. 1999. Hawaii Longline Seabird Mortality Mitigation Project. U.S. Western Pacific Regional Fishery Management Council, Honolulu.
Robertson, G. 2001. Effect of Line Sink Rate on Albatross Mortality in the Patagonia Toothfish Longline Fishery. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, AK-SG-01-01, 2001. pp. 43–60.
Robertson, G., Candy, S., and Wienecke, B. 2010. Effect of line shooter and mainline tension on the sink rates of pelagic longline and implications for seabird interactions. Aquatic Conservation: Marine and Freshwater Ecosystems 10.1002/aqc.1100.

E.3. If applicable, explain how research and monitoring associated with this project will contribute to knowledge of the species and/or measures to minimize take of MBTA species associated with this activity.

As conducted by Gilman et al. (2008), analyses of longline observer program data provide a mechanism to assess the efficacy of seabird bycatch mitigation methods, where findings guide the amendment of domestic and international management measures. NMFS seabird annual reports (NMFS 2010) provide information on seabird interactions in the fishery, including changes in level and distribution of effort: http://www.fpir.noaa.gov/SFD/SFD_seabirds.html.

E.4. Explain how you will coordinate your efforts with past and ongoing research, monitoring, and activities related to reducing such incidental taking and evaluating its effects.

NMFS PIRO continues to support research, including analyses of the observer program data, so that continual improvements in the efficacy of seabird bycatch mitigation measures are made. NMFS PIRO will continue to prepare seabird annual reports.

NMFS observer program quarterly and annual reports that contain seabird interaction information can be found at: http://www.fpir.noaa.gov/OBS/obs_hi_ll_rprts.html. The interaction totals in these reports may differ slightly on an annual basis from those reported here. Summary statistics in the permit application are based on the date of the beginning of the haul whereas summary statistics for the quarterly and annual observer reports are based on vessels that have return to port by the end of the month or year.

Owners and operators of western Pacific pelagic longline vessels must complete the NMFS PIRO Protected Species Workshop each year. A valid workshop certificate is necessary for owners to renew fishing permits. Each year, over 200 fishermen and vessel owners are trained in Hawaii. NMFS PIRO Sustainable Fisheries staff conduct the workshops and fishermen learn from verbal presentations, hands-on demonstrations, videos, and printed reference materials. The workshop training includes protected species identification, handling and release techniques, and an overview of regulatory requirements (http://www.fpir.noaa.gov/SFD/SFD_psw_index.html). Seabird handling instructions can be found at 50 CFR 665.815 and in the Protected Species Workshop placards: http://www.fpir.noaa.gov/SFD/SFD_psw_1.html (See Appendix A).

NMFS PIRO will continue to apply for MBTA and CITES permits to enable the salvage of all seabirds killed in the fishery to confirm identification to the species level.

E.5. Include planned disposition of specimens upon completion of project. If so, list the educational/research institute where birds will be deposited. Is there a plan to rescue and transport injured birds to rehabilitation facilities upon arrival back to port? If so, list the licensed wildlife rehabilitator where birds will be taken.

NMFS PIRO has obtained MBTA and CITES permits to enable the salvage of all seabirds killed in the fishery to confirm identification to the species level. Since 2008, all seabirds collected by the observer program have been sent to the wildlife veterinary laboratory at the University of California Santa Cruz for storage and species identification. The laboratory is also conducting a diet study for plastics and a seabird bycatch study.

Information regarding seabird disposition can be found at 50 CFR 665.815 and in the Protected Species Workshop placards: http://www.fpir.noaa.gov/SFD/SFD_psw_1.html (See Appendix A).

Information regarding seabird biological data collected by the NMFS observer program can be found at: http://www.fpir.noaa.gov/Library/PUBDOCs/observer_manual_forms/obs_hawaii/obs_hi_sb_jul_2011.pdf (See Appendix B).

References

Arata, J.A., Sievert, P.R., and Naughton, M.B., 2009. Status assessment of Laysan and black-footed albatrosses, North Pacific Ocean, 1923–2005: U.S. Geological Survey Scientific Investigations Report 2009-5131, 80 p.

Boggs, C.H., 2001. Deterring albatrosses from contacting baits during swordfish longline sets. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, pp. 79–94.

Boggs, C.H. 2003. Annual Report on the Hawaii Longline Fishing Experiments to Reduce Sea Turtle Bycatch under ESA Section 10 Permit 1303. U.S. National Marine Fisheries Service Honolulu Laboratory, Honolulu. 42 pp.

Brothers, N. 1991. Albatross mortality and associated bait loss in the Japanese longline fishery in the Southern Ocean. Biological Conservation 55: 255-268.

Brothers, N.P., Cooper, J., Lokkeborg, S. 1999. The incidental catch of seabirds by longline fisheries: Worldwide review and technical guidelines for mitigation. FAO Fisheries Circular No. 937. Rome: Food and Agriculture Organization of the United Nations.

Brothers, N. and Gilman, E. 2006.Technical assistance for Hawaii-based pelagic longline vessels to modify deck design and fishing practices to side set: Executive summary report prepared for the National Marine Fisheries Service Pacific Islands Regional Office, September 2006dd.

Cousins, K. and Cooper, J. (eds) 2000. The Population Biology of the Black-Footed Albatross in Relation to Mortality Caused by Longline Fishing. Black-footed Albatross Population Biology Workshop, Honolulu, Hawaii, 8– 10 October 1998. US Western Pacific Regional Fishery Management Council, Honolulu, HI.

FAO. 1999. International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries. Rome: Food and Agriculture Organization of the United Nations.

Gales, R., Brothers, N., and Reid, T. 1998. Seabird mortality in the Japanese tuna longline fishery around Australia, 1988-1995. Biological Conservation 86:37-56.

Gilman, E. 2008. Alternative branch line weights for pelagic longlines. International Union for the Conservation of Nature and U.S. National Marine Fisheries Service, Pacific Islands Regional Office, Gland, Switzerland and Honolulu, U.S.A. http://cmsdata.iucn.org/downloads/safelead_trial_report.pdf

Gilman, E. 2011. Bycatch governance and best practice mitigation technology in global tuna fisheries. *Marine Policy*. doi:10.1016/j.marpol.2011.01.021.

Gilman, E., Boggs, C., and Brothers, N. 2003. Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery. Ocean and Coastal Management 46: 985-1010.

Gilman, E., Brothers, N., and Kobayashi, D. 2005. Principles and approaches to abate seabird bycatch in longline fisheries. Fish and Fisheries 6: 35-49.

Gilman, E., Brothers, N., and Kobayashi, D. 2007a. Comparison of three seabird bycatch avoidance methods in Hawaii-based pelagic longline fisheries. Fisheries Science 73: 208-210.

Gilman, E., Moth-Poulsen, T., and Bianchi, G. 2007b. *Review of Measures Taken by Inter-Governmental Organizations to Address Problematic Sea Turtle and Seabird Interactions in Marine Capture Fisheries*. Fisheries Circular No. 1025, ISSN 0429-0329. Food and Agriculture Organization of the United Nations, Rome. (http://www.fao.org/docrep/010/a1426e/a1426e00.htm)

Gilman, E., Kobayashi, D., and Chaloupka, M. 2008a. Reducing seabird bycatch in the Hawaii longline tuna fishery. Endangered Species Research 5(2-3):309-323.

Harrison, C.S., Hida, T.S., and Seki, M.P. 1983. Hawaiian seabird feeding ecology. Wildl. Monog. 85: 1-71.

IUCN 2011. *Fulmarus glacialis* (Northern Fulmar) In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 06 August 2011.

IUCN 2011. *Phoebastria immutabilis*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 06 August 2011.

IUCN 2011. *Phoebastria nigripes*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 06 August 2011.

Lewison, R. and Crowder, L. 2003. Estimating fishery bycatch and effects on a vulnerable seabird population. Ecological Applications 13, 743–753.

IUCN 2011. *Puffinus griseus*. In: IUCN 2011. IUCN Red List of Threatened Species. Version 2011.1. <www.iucnredlist.org>. Downloaded on 06 August 2011.

Lewison, R.L., Nel, D.C., Taylor F., Croxall J.P., and Rivera K.S. 2005. Thinking big – taking a large-scale approach to seabird bycatch. Mar Ornithol 33, 1–5.

Lokkeborg, S. 2001. Reducing Seabird Bycatch in Longline Fisheries by Means of Bird-Scaring Lines and Underwater Setting. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, AK-SG-01-01, 2001. pp. 33–41.

McNamara, B., Torre, L., Kaaialii, G. 1999. Hawaii Longline Seabird Mortality Mitigation Project. U.S. Western Pacific Regional Fishery Management Council, Honolulu.

Niel, C. and Lebreton, J. 2005. Using demographic invariants to detect overharvested bird populations from incomplete data. Conservation Biology.

NMFS. 2008b. Biological Opinion on Proposed Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific. Honolulu, HI. 91 p.

NMFS. 2008c. Letter from Patrick Leonard, Field Supervisor, USFWS to William Robinson, Regional Administrator, NMFS. Dated September 24, 2008.

NMFS. 2010. Annual Report on Seabird Interactions and Mitigation Efforts in the Hawaii Longline Fisheries for 2009. U.S. National Marine Fisheries Service, Pacific Islands Regional Office, Honolulu.

Rivera, K. 2006. Seabirds and Fisheries in the IATTC Area. IATTC Working Group to Review Stock Assessment 7th Meeting. Document SAR-7-05c. Inter-American Tropical Tuna Commission, La Jolla, USA.

Robertson, G. 2001. Effect of Line Sink Rate on Albatross Mortality in the Patagonia Toothfish Longline Fishery. In: Melvin, E., Parrish, J.K. (Eds), Seabird Bycatch: Trends, Roadblocks and Solutions. University of Alaska Sea Grant, Fairbanks, Alaska, AK-SG-01-01, 2001. pp. 43–60.

Robertson, G., Candy, S., and Wienecke, B. 2010. Effect of line shooter and mainline tension on the sink rates of pelagic longline and implications for seabird interactions. Aquatic Conservation: Marine and Freshwater Ecosystems 10.1002/aqc.1100.

Seki, M.P., Polovina J.J., Kobayashi D.R., Bidigare R.R., and Mitchum, G.T. 2002. An oceanographic characterization of swordfish (Xiphias gladius) longline fishing grounds in the springtime subtropical North Pacific. Fisheries Oceanography 11(5): 251-266.

Turtle Island Restoration Network, et al., v. Department of Commerce, et al., and Hawaii Longline

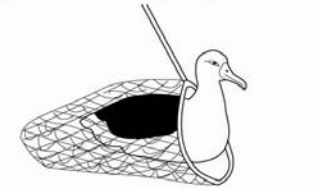
Association, Civil No. 09–00598 DAE (D. HI)).
USFWS. 2004. BiOp on the Effects of the Reopened Shallow-Set Sector of the Hawaii Longline Fishery on the STAL (*Phoebastria albatrus*), October 2004. FWS 1-2-1999-F-02.2. U.S. Fish and Wildlife Service, Honolulu, HI. 129 p.
USFWS. 2005. Regional Seabird Conservation Plan, Pacific Region. U.S. Fish and Wildlife Service, Migratory Birds and Habitat Programs, Pacific Region, Portland, Oregon, USA.
Watkins, B., Petersen, S., and Ryan, P. 2008. Interactions between seabirds and deep-water hake trawl gear: an assessment of impacts in South African waters. Animal Conservation 11: 247-254.
Western Pacific Fishery Management Council. 2009. Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. Including a Final Supplemental Environmental Impact Statement, Regulatory Impact Review, and Initial Regulatory Flexibility Act Analysis. Management Modifications for the Hawaii-based Shallow-set Longline Swordfish Fishery that Would Remove Effort Limits, Eliminate the Set Certificate Program, and Implement New Sea Turtle Interaction Caps. 333 pp + 7 appendices.

Appendix A [to NMFS permit application]
Protected Species Workshop Seabird Handling Instructions

Seabird Handling Guidelines

PLEASE NOTE: If bird is a short-tailed albatross, follow special guidelines for handling short-tailed albatross. For all other seabirds, see below.

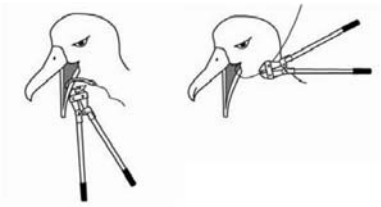
1. Stop vessel to reduce tension on the line and bring bird aboard using a dip net.



2. Working with another person, hold the back of the bird's head and isolate the hooked or entangled area while the other person takes the bird from the net. Fold the bird's wings to their natural resting position against the body.

3. Wrap the bird's wings and feet with a clean towel or blanket. Do not wrap the bird's body too tightly or block the nostrils, as these will prevent the bird from breathing.

4. Cut and remove all fishing line from bird. If bird is lightly hooked in the bill, leg, or wing, and the barbed end of the hook is visible, use bolt cutters to cut the barb and then back the hook out. If bird has been deeply hooked, cut the line as close as possible to hook and leave hook in place.



Never attempt to remove a hook from anywhere on a bird by pulling on line.

5. Allow bird to dry for 1/2 hour to 4 hours in a safe, enclosed place. Refer to **Release Guidelines.**

6. Record any leg band numbers observed on the bird in logbook.

Wear gloves, long sleeves and protective eyewear when handling seabirds. They have sharp beaks and give painful bites.

Release Guidelines

A bird is ready for release when its feathers are dry.

Albatross NOT ready to be released

Albatross ready to be released

If bird is ready for release:
Stop the vessel. Gently place bird onto the surface of the water. Do not throw bird in air or motor away if bird is not clear of vessel.

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

Appendix A Continued

Short-Tailed Albatross Handling Guidelines

Short-tailed albatross are an endangered species and have special handling requirements.

If you catch a short-tailed albatross:

Immediately try to contact National Marine Fisheries Service, U.S. Coast Guard, or U.S. Fish and Wildlife Service. They will contact an expert to give you advice in the handling and release of short-tailed albatross.

National Marine Fisheries Service (NMFS)
(808) 944-2200

U.S. Coast Guard (USCG)
08240.0 KHz (Daytime ITU Channel 816)
12242.0 KHz (Daytime ITU Channel 1205)
04134.0 KHz (Nightime ITU Channel 424)
06200.0 KHz (Nightime ITU Channel 601)

U.S. Fish and Wildlife Service at French Frigate Shoals (USFWS)
Contact frequency: 10.0054

If a short-tailed albatross is hooked or entangled:

1. Stop vessel to reduce tension on the line and bring bird aboard using a dip net.
2. Wrap the bird's wings and feet with a clean towel to protect its feathers from oils or damage.
3. Remove any entangled lines from the bird and determine if the bird is dead or alive.

   If dead, notifiy NMFS. Label the bird, put it in a plastic bag and store in freezer. Give bird to NMFS when you return to port.

   If alive, place bird in a safe, enclosed place and immediately contact NMFS, USCG and USFWS.

   If unable to make contact for 24-48 hours, determine if the bird is lightly, moderately, or deeply hooked. See description.
4. If bird is deeply hooked, keep bird in a safe, enclosed place until further instructed. Do NOT release the bird.
5. If bird is lightly or moderately hooked, remove hook by cutting the barb and backing hook out.
6. Allow bird to dry for 1/2 hour to 4 hours in a safe, enclosed place. Refer to **Release Guidelines.**
7. Record information in the short-tailed albatross recovery data form.

Short-tailed albatross fly across the entire North Pacific. Around Hawaii, only young short-tailed albatross (shown above) have been seen. The number of birds is increasing, but fewer than 3,000 birds remain in the wild.

Is the bird lightly, moderately, or deeply hooked?

Lightly Hooked: Hook is clearly visible on bill, leg or wing.

Moderately Hooked: Hooked in the mouth or throat with hook visible.

Deeply Hooked: Hook has been swallowed and is located inside the bird's body below the neck.

Release Guidelines

The bird is ready for release if it meets ALL of the following criteria:

- Stands on both feet with toes pointed forward
- Holds its head erect and responds to sound and motion
- Breathes without making noise
- Flaps and retracts wings to normal folding position
- Feathers are dry

If any of these conditions are not met, the bird cannot be released.

If bird is ready for release:
Stop the vessel. Gently place bird onto the surface of the water. Do not throw bird in air or motor away if bird is not clear of vessel.

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

Appendix A Continued

Seabird Identification

Laysan Albatross *(Phoebastria immutabilis)*

Feathers:
- White head, neck, and belly
- Dark brown upper wings and back
- Brown and white under wings
- Dark area around each eye

Legs/Feet Color: Pink to gray

Bill Color: Yellow-pink with gray tip

Black-footed Albatross *(Phoebastria nigripes)*

Feathers:
- Dark brown head, body, and wings
- Small white patch behind the eyes
- White ring around base of bill
- Adults - small white patch at base of tail

Legs/Feet Color: Black-brown

Bill Color: Black-brown

Short-tailed Albatross *(Phoebastria albatrus)*

ENDANGERED SPECIES

JUVENILE

Feathers: Dark brown head, body, and wings

Legs/Feet Color: Brown-gray

Bill Color: Bright pink with a thin black line around base

SUB ADULT

Feathers:
- White neck, belly, and back
- Dark brown cap and back of neck
- Black and white wings

Legs/Feet Color: Pink to gray

Bill Color: Bright pink with a thin black line around base

ADULT

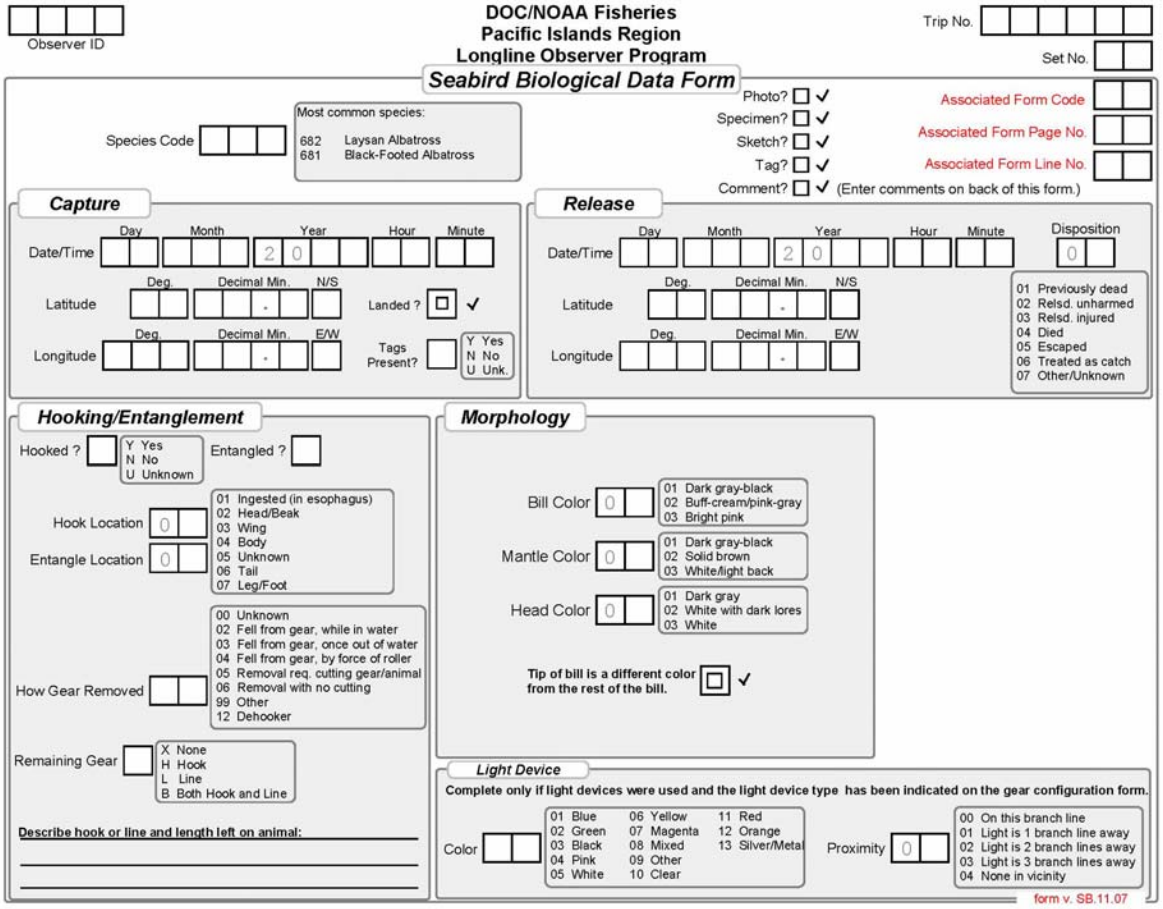
Feathers:
- Golden-yellow head and neck
- White back, base of tail, and belly
- Black and white wings

Legs/Feet Color: Pink to gray

Bill Color: Bright pink with a thin black line around base

Questions? Call Pacific Islands Regional Office, Sustainable Fisheries Division at (808) 944-2200

Appendix B [to NMFS permit application]
NMFS Observer Program Seabird Biological Data Form



Appendix B Continued

Observer ID

DOC/NOAA Fisheries
Pacific Islands Region
Longline Observer Program

Trip No.

Set No.

Seabird Biological Data Form Comments

Comments:

Injuries Description:

Identifying Characteristics:

form v. SB.11.07.Back

Appendix 2: Samples of Reports on the Shallow-set Fishery from the National Marine Fisheries Service Pacific Islands Regional Observer Program

PACIFIC ISLANDS REGIONAL OBSERVER PROGRAM
SHALLOW SET
SEMIANNUAL STATUS REPORT
January 1, 2011 – June 30, 2011

Pacific Islands Regional Office
National Marine Fisheries Service
July 27, 2011

The Hawaii-based pelagic longline fishery targeting swordfish and tunas has been monitored under a mandatory observer program since February 1994. In 2004, the Hawaii swordfish fishery was reopened with restrictions on allowable gear used in the fishery. This report is used to ensure prompt dissemination of Hawaii Swordfish Observer Data and may be revised after final data editing has been completed. The following table summarizes the percent observer coverage for vessel departures, vessels arriving with observers, and protected species interactions for vessels arriving with observers during the first and second quarters of 2011.

Vessel Departures - 1st & 2nd Quarters (January 1, 2011 - June 30, 2011)	
Departures	55
Departures with observers	55
Observer coverage 2nd quarter	**100.0%**
Vessels Arriving with Observers - 1st & 2nd Quarters	
Departures with observers in 1st & 2nd quarters	55
Observers departing in 4th quarter arriving 1st quarter	12
Observers departing in 2nd quarter arriving 3rd quarter	0
Total vessels arriving with observers - 1st & 2nd quarters	67
Protected Species Interactions - 1st & 2nd Quarters	
Vessels arriving with observers - 1st & 2nd quarters	67
Trips with turtle interactions	22
Trips without turtle interactions	45
Trips with marine mammal interactions	10
Trips without marine mammal interactions	57
Trips with seabird interactions	16
Trips without seabird interactions	51
Total Sea Turtle Interactions	**28**
Released injured	
Loggerhead	14
Leatherback	10
Green	4
Total Marine Mammal Interactions	**11**
Released injured	
Risso's Dolphin	4
Bottlenose Dolphin	2
False Killer Whale	1
Blainville's Beaked Whale	1
Unidentified Beaked Whale	1
Unidentified Cetacean	2
Total Seabird Interactions	**61**
Released dead	
Laysan Albatross	8
Black-footed Albatross	4
Released injured	
Black-footed Albatross	11
Laysan Albatross	38
Total Sets	**1,331**
Total Hooks Retrieved	**1,355,252**
Turtles per 1,000 Hooks	**0.021**
Seabirds per 1,000 Hooks	**0.045**
Marine Mammals per 1,000 Hooks	**0.008**

Note: The percent of observer coverage is based on vessel departures.
Protected species interactions are based on vessel arrivals. For the purpose of this report, an animal that becomes hooked or entangled is an interaction.

PACIFIC ISLANDS REGIONAL OBSERVER PROGRAM
SHALLOW SET
ANNUAL STATUS REPORT
January 1, 2010 – December 31, 2010

Pacific Islands Regional Office
National Marine Fisheries Service
February 9, 2011

The Hawaii-based pelagic longline fishery targeting swordfish and tunas has been monitored under a mandatory observer program since February 1994. In 2004, the Hawaii swordfish fishery was reopened with restrictions on allowable gear used in the fishery. This report is used to ensure prompt dissemination of Hawaii Swordfish Observer Data and may be revised after final data editing has been completed. The following table summarizes percent observer coverage for vessel departures, vessels arriving with observers, and protected species interactions for vessels arriving with observers during 2010.

Vessel Departures - 2010 (January 1, 2010 - December 31, 2010)	
Departures	104
Departures with observers	104
Observer coverage 2010	**100.0%**
Vessels Arriving with Observers - 2010	
Departures with observers in 2010	104
Observers departing in 2009 arriving in 2010	14
Observers departing in 2010 arriving in 2011	12
Total vessels arriving with observers - 2010	106
Protected Species Interactions - 2010	
Vessels arriving with observers - 2010	106
Trips with turtle interactions	11
Trips without turtle interactions	95
Trips with marine mammal interactions	10
Trips without marine mammal interactions	96
Trips with seabird interactions	30
Trips without seabird interactions	76
Total Sea Turtle Interactions	**12**
Released injured	
Leatherback	7
Loggerhead	5
Total Marine Mammal Interactions	**12**
Released dead	
Risso's Dolphin	1
Striped Dolphin	1
Released injured	
Bottlenose Dolphin	2
Risso's Dolphin	6
Striped Dolphin	1
Unidentified Dolphin	1
Total Seabird Interactions	**80**
Released dead	
Black-footed Albatross	11
Laysan Albatross	7
Released injured	
Black-footed Albatross	28
Laysan Albatross	33
Northern Fulmar	1
Total Sets	**1,879**
Total Hooks Retrieved	**1,828,529**
Turtles per 1,000 Hooks	**0.007**
Seabirds per 1,000 Hooks	**0.044**
Marine Mammals per 1,000 Hooks	**0.007**

Note: The percent of observer coverage is based on vessel departures.
Protected species interactions are based on vessel arrivals. For the purpose of this report, an animal that becomes hooked or entangled is an interaction.

Appendix 3: Comparison of Fishing Effort (Number of Hooks) with Seabird Take Rates

An analysis of data supplied by NMFS suggests that the rate of take per 1,000 hooks is correlated with the number of hooks set per year. That is, between 2005 and 2011, the numbers of albatrosses (both species combined) taken per 1,000 hooks deployed rises with the total number of hooks set; the pattern matches an exponential (R^2 = 0.85; Fig. 1) better than a linear relationship (R^2 = 0.68). The biological explanation for this apparent relationship is not clear and merits further research. However, the pattern indicates that the rate of take of seabirds is not constant. Predictions of take in the future might account for a rate that varies with fishing effort.

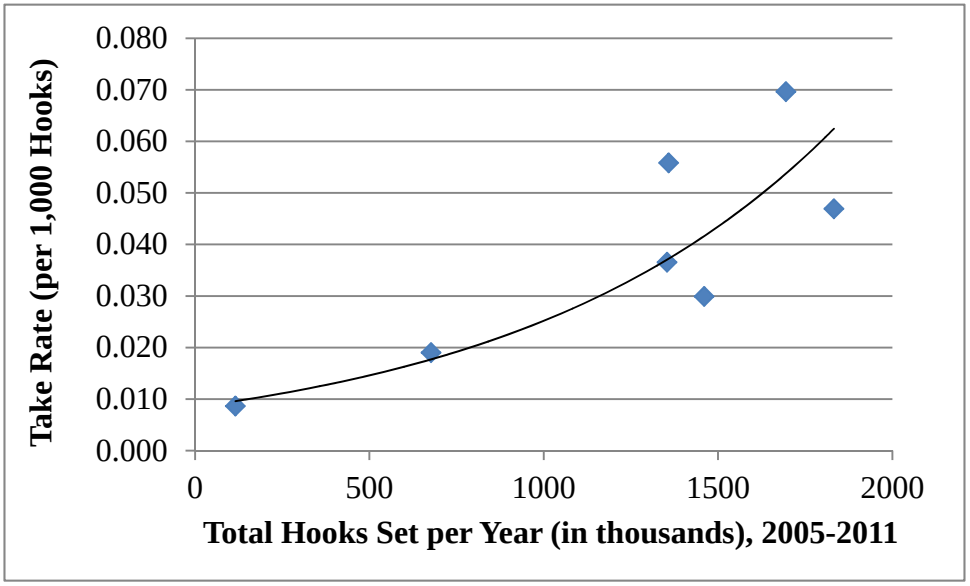


Figure 1. Relationship between rate of take of seabirds per 1,000 hooks and total hooks set per year. Exponential growth curve: y=0.085e1E-0.06x; R^2 = 0.85.

Appendix 4: Calculation of Take of Laysan and Black-footed Albatrosses for MBTA Permit (see Final Environmental Assessment (FEA), pages 32-35)

In FEA Table 4.4 (reproduced below), we estimated the potential total fishing effort in the Hawaii-based shallow-set longline fishery and estimated the concomitant maximum take of Laysan and Black-footed Albatrosses during the putative permit term 2012-2014. We estimated total effort (total number of hooks/year between 2012 and 2014) based on the average observed increase each year between 2007 and 2010. We chose these years as model years for projecting an annual rate of increase in fishing effort because these four consecutive years were complete years uninterrupted by fishery closures and so are the best representation in the 2004-2011 dataset of interannual change in effort. We then estimated the maximum incidental take of these two albatross species in 2012-2014 by applying the highest observed rate of take/1,000 hooks for each species since the fishery reopened in 2004 (see discussion in FEA, p. 32) to the estimated total fishing effort. These rates per 1,000 hooks are based on estimates of take that already include the drop-off rate of 31 percent added to the total number of birds reported as "released dead" (see FEA Table 4.3).

FEA Table 4.4 Projected take of Laysan and Black-footed Albatrosses through 2014 and proportion of 2011 breeding population

Year	Projected Total Number of Hooks Set	Maximum Take/Year**		Proportion of 2011 Breeding Population	
		LAAL	BFAL	LAAL	BFAL
2012	2,257,788	115	52	0.01%	0.04%
2013	2,506,144	128	58	0.01%	0.04%
2014	2,781,820	142	64	0.01%	0.05%

We base our authorization of take of these two albatross species (FEA Table 4.5; reproduced below) on a calculation of the 95 percent confidence interval around the mean rate of take per 1,000 hooks in 2005 and 2007-2011 (Tables A and B). We chose these as model years because all were complete or near-complete fishing years and thus the data from these years is sufficient to calculate a meaningful rate of take.

FEA Table 4.5. Authorized take based on adding 95% CI to mean observed rate of take, 2005 and 2007-2011.

Year	Projected Total Number of Hooks Set	Maximum Take/Year**		Proportion of 2011 Breeding Population*	
		LAAL	BFAL	LAAL	BFAL
2012	2,257,788	129	57	0.010%	0.043%
2013	2,506,144	143	64	0.011%	0.048%
2014	2,781,820	159	71	0.012%	0.053%
		430	191	0.033%	0.144%

*Based on estimated breeding populations of 656,310 pairs of LAAL and 66,621 pairs of BFAL; see FEA Table 4.2.

Table A. Observed and estimated take of Laysan and Black-footed Albatrosses and rates of take per 1,000 hooks in the Hawaii-based shallow-set longline fishery, 2005 and 2007-2011 (from FEA Table 4.3).

A. LAYSAN ALBATROSS (LAAL)

YEAR	DEAD LAAL (Observed)	TOTAL DEAD (Estimated; add 31% drop-off)	**INJURED LAAL (Observed)**	TOTAL LAAL (Estimated)	**PERCENT INJURED OF EST. TOTAL**	NO. HOOKS SET	RATE/ 1,000 HOOKS
2005	18	24	**44**	68	**0.651**	1,358,247	0.05
2007	6	8	**33**	41	**0.808**	1,353,761	0.03
2008	11	14	**22**	36	**0.604**	1,460,042	0.025
2009	17	22	**64**	86	**0.742**	1,694,550	0.051
2010	7	9	**33**	42	**0.783**	1,832,471	0.023
2011	10	13	**39**	52	**0.749**	1,611,395	0.032
TOTAL	72	94	**241**	335	**0.724**		
			MAX LAAL	86			0.051
		6-year average (2005-11, excluding 2006)		54			0.035

B. BLACK-FOOTED ALBATROSS (BFAL)

YEAR	DEAD BFAL (Observed)	TOTAL DEAD (Estimated; add 31% drop-off)	**INJURED BFAL (Observed)**	TOTAL BFAL (Estimated)	**PERCENT INJURED OF EST. TOTAL**	NO. HOOKS SET	RATE/ 1,000 HOOKS
2005	4	5	**3**	8	**0.364**	1,358,247	0.006
2007	2	3	**6**	9	**0.696**	1,353,761	0.006
2008	4	5	**2**	7	**0.276**	1,460,042	0.005
2009	7	9	**22**	31	**0.706**	1,694,550	0.018
2010	11	14	**28**	42	**0.66**	1,832,471	0.023
2011	5	7	**14**	21	**0.681**	1,611,395	0.013
TOTAL	36	47	**75**	122	**0.611**		
			MAX BFAL	42			0.023
		6-year average (2005-11, excluding 2006)		20			0.012

To obtain the amounts of take to be authorized in our permit (FEA Table 4.5, reproduced below), we added the 95 percent confidence interval to the mean observed rate (Table B), and applied the result to the amount of fishing effort (number of hooks set) projected in FEA Table 4.4 for the three years of our permit term.

Table B. Calculation of 95 percent confidence interval around mean observed rate of take per 1,000 hooks in the shallow-set fishery in 2005 and 2007-2011 (see FEA Table 4.3 for observed rates of take in these years).

Mean rate of take/1,000 hooks	Population variance, rate of take/1,000 hooks	Square root of variance	Square root*z (= 95% CI)	Mean rate + 95% CI	z
LAAL					
0.035	0.00012647	0.011	0.022	0.057	1.96
BFAL					
0.012	0.00004647	0.007	0.013	0.0254	1.96

The resulting projection of take for authorization in a permit includes a buffer of approximately 12 percent more take of Laysan Albatrosses and 10 percent more take of Black-footed Albatrosses (Table C) than our estimates of maximum take in Table 4.4. The amount of take of Laysan and Black-footed Albatrosses in FEA Table 4.5 still represents only a small fraction of the total estimated breeding population of each species, and does not approach the magnitude of take estimated to cause population-level impacts (Arata *et al.* 2009).

Table C. Size of buffer added to projected take in FEA Table 4.4 to yield authorized take in FEA Table 4.5.

	Year	**Projected No. of Hooks**	**Projected Take LAAL**	**Projected Take BFAL**
Table 4.4	2012	2,257,788	115	52
	2013	2,506,144	128	58
	2014	2,781,820	142	64
95% CI	2012		14	5
[added	2013		15	6
in Table 4.5]	2014		17	7
% change	2012		12%	10%
[FEA Table	2013		12%	10%
4.4 to 4.5]	2014		12%	10%