2014 ANNUAL REPORT

Seabird Interactions and Mitigation Efforts in Hawaii Longline Fisheries

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Cover image: Masked boobies. Trig Island, NWHI, Hawaii.

Nesting sooty terns. Tern Island, NWHI, Hawaii.

Contents

1. Introduction 1
   1.1 Background 1
   1.2 Seabird Mitigation Measures for the Hawaii Longline Fisheries 1
   1.3 Protected Species Workshops 3
2. Interactions 7
   2.1 Species 7
   2.2 Location of Interactions 8
   2.3 Number of Interactions 9
3. Sightings of ESA-Listed Seabirds 15
4. Management 15
5. Summary 16

Acknowledgements 16

References 16

Tables

Table 1. Seabird bycatch mitigation requirements for the Hawaii longline fleet 2

Table 2. Number of observed Hawaii longline vessels that side- and stern-set in 2014 2

Table 3. Hawaii deep- and shallow-set fisheries effort and observer coverage, 2013 and 2014. 4

Table 4. Summary of collected seabirds from the Hawaii longline fisheries, 2014 7

Table 5. Numbers of observed seabird catch levels, fishing effort, and nominal interaction rates in the Hawaii longline fisheries, 2004-2014. 10

Table 6. Estimated number of total seabird interactions in the Hawaii deep-set longline fishery, 2014. 11

Table 7. Capture and release details by species for seabird interactions in the Hawaii longline fisheries, 2014. 11

Table 8. Seabirds observed with bands from interactions with the shallow-set and deep-set Hawaii longline fisheries, 2014. 13

Table 9. Comparison of observed interactions in Hawaii longline fisheries, 2013 and 2014 16

Figures

Figure 1. Spatial distribution of fishing effort by the Hawaii longline deep-set fishery, 2014 5

Figure 2. Spatial distribution of fishing effort by the Hawaii longline shallow-set fishery, 2014 6

Figure 3. Locations of seabird interactions observed in Hawaii longline deep-set fishery, 2014 8

Figure 4. Locations of seabird interactions observed in Hawaii longline shallow-set fishery, 2014 9

Figure 5. Short-tailed albatross sightings and fishing effort in the Hawaii shallow-set fishery, 2014 15

1. Introduction

Among many management objectives, the National Marine Fisheries Service (NMFS) Pacific Islands Regional Office (PIRO) attempts to reduce, as practicable, interactions between Hawaii pelagic longline fishing operations and seabirds. NMFS monitors the fisheries to determine the effectiveness of management measures to reduce interactions and the severity of interactions that do occur. NMFS documents interactions and mitigation efforts aboard vessels at sea, and reports annually on fishing effort, seabird interactions, and mitigation research.[1] This report includes non-confidential data that have not undergone final review and verification. You may view this report, and similar reports from previous years, **www.fpir.noaa.gov**.

1.1 Background

NMFS and the Western Pacific Fishery Management Council (WPFMC) manage two Hawaii pelagic longline fisheries under the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (FEP) and implementing regulations. The deep-set fishery targets primarily bigeye tuna at depths to 400 m, and operates over broad areas mainly to the north-northeast and southwest of the main Hawaiian Islands. The shallow-set fishery targets swordfish at depths to 100 m, and typically operates over a large area north of the Hawaiian Islands. The FEP contains a detailed description of the Hawaii longline fisheries (WPFMC 2009). Since 1994, the Hawaii longline fleet has been limited to 164 permits. Activity levels in any given year since 2004 range from 11 to 35 vessels active in the shallow-set fishery, and 122 to 139 vessels active in the deep-set fishery. Nearly all vessels in the shallow-set fishery also participate in the deep-set fishery during the year.

Seabirds that feed around the Hawaiian Islands in areas where the longline fisheries operate include Laysan albatross, black-footed albatross, shearwaters, fulmars, boobies, and the endangered short-tailed albatross. During the deployment (setting) and retrieval (hauling) of longline fishing gear, hooks, and line may occasionally hook or entangle seabirds that attempt to take bait or catch. Seabirds are more likely to drown when the interaction occurs during setting because the weight of the gear may pull the seabird underwater. Although some interactions are inevitable, fishermen take steps to avoid and minimize interactions so that seabird populations remain healthy, and fishermen can pursue their livelihood. By using safe handling and release techniques, fishermen help many seabirds survive their injuries.

Effective management of the fisheries has greatly minimized interactions with seabirds, particularly with Laysan and black-footed albatrosses. In 2000, NMFS estimated that 2,433 seabird interactions occurred in the Hawaii longline fisheries. In 2004, NMFS implemented safe seabird handling and mitigation measures; these measures have significantly reduced interactions and, in 2014, NMFS estimated 123 total interactions with seabirds (see Table 5 under Section 2.3). Credit for this successful reduction in interactions is mostly due to the fishermen, who understand and routinely implement the seabird mitigation requirements, which include training in seabird identification, seabird deterrent fishing gear and techniques, and special handling and release of incidentally-caught seabirds.

1.2 Seabird Mitigation Measures for the Hawaii Longline Fisheries

Most of the regulations for the Hawaii longline fisheries are identified in Title 50 of the Code of Federal Regulations **Part 600**, and **Part 665** (50 CFR Parts 600 and 665). NMFS also provides a regulation summary and compliance guides to Hawaii longline fishermen. Regulations specific to the mitigation of seabird interactions and safe handling techniques are in 50 CFR 665.815. The ways that fishermen implement required seabird mitigation measures depend on how and where fishermen conduct fishing operations. Side-setting is one option within a suite of effective measures available to fishermen to reduce seabird interactions. Table 1 summarizes the seabird management measures.

Hawaii longline vessel side-setting with bird curtain.

[1] This annual report is required in the Terms and Conditions of the 2012 Biological Opinion of the U.S. Fish and Wildlife Service for the operation of Hawaii-based Pelagic Longline Fisheries (USFWS 2012).

Table 1. Seabird bycatch mitigation requirements for the Hawaii longline fleet.

1. How do you set your gear →	STERN-SETTING		SIDE-SETTING	
2. Do you shallow-set or deep-set, and where are you →	Shallow-Set Anywhere	Deep-Set North of 23° N	Shallow-Set Anywhere	Deep-Set North of 23° N
3. What you need to do ↓				
Deploy mainline from port or starboard side at least 1 m forward of stern corner			Yes	Yes
If line shooter is used, mount it at least 1 m forward from stern corner			Yes	Yes
Use a specified bird curtain aft of the setting station during the set			Yes	Yes
Deploy gear so that hooks do not resurface			Yes	Yes
Attach 45 g or heavier weights within 1 m of hook of each hook		Yes	Yes	Yes
Use a line shooter to set the mainline		Yes		
Keep two 1-pound containers of blue-dye on boat	Yes	Yes		
Use completely thawed and blue-dyed bait	Yes	Yes		
Keep fish parts and spent bait with all hooks removed for strategic offal discard	Yes	Yes		
Cut all swordfish heads in half, and use heads and livers for strategic offal discard	Yes	Yes		
Night Set - begin set 1 hour after local sunset and finish 1 hour before next sunrise and keep lighting to a minimum	Yes			

The following sections describe each of the main gear and operation requirements. These measures are also described in the *Biological Opinion of the USFWS for the operation of the Hawaii-based pelagic longline fisheries, shallow-set and deep-set, Hawaii* (USFWS 2012).

Side-Setting

Side-setting involves deploying the gear from the side of the vessel, compared to the conventional method of setting from the stern. In side-setting, 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 required 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 seabirds, such as albatrosses, cannot reach them (Gilman and Brothers 2006; Gilman et al. 2005, 2007a, 2007b). Additionally, deploying a required bird curtain aft of where crew is deploying the gear inhibits the ability of seabirds to land along the side of the vessel where baits are accessible.

Table 2 summarizes the number of Hawaii pelagic longline deep- and shallow-set vessels observed to set from the stern and from the side in 2014, with some vessels operating in both deep- and shallow-set fisheries. In 2014, the majority of vessels in both fisheries chose to stern-set.

Table 2. Number of observed Hawaii longline vessels that side- and stern-set in 2014.

Fishery	Deck setting position	Vessels
Deep-set	Stern-setting	97
Deep-set	Side-setting	32
Shallow-set	Stern-setting	19
Shallow-set	Side-setting	2

Source: NMFS PIRO Observer Program, unpublished data, 12/21/2015.

Weighted Branch Lines

Weights placed close to the hook on branch lines quickly sink baited hooks before foraging seabirds can take the baits and possibly become hooked or entangled in longline gear. When required, Hawaii longline fishermen must attach a weight of at least 45 g within 1 m of the hook to sink the branch line quickly. Fishermen commonly use weights from 45 to 80 g. Nearly all fishermen in the deep- and shallow-set fisheries use weighted branch lines.

Thawed and Blue-dyed Bait

Dyeing bait to a specific blue color is a means to reduce visibility by reducing contrast with the sea surface. Fishermen thaw the bait 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). NMFS prohibits the use of squid bait in the shallow-set fishery to reduce sea turtle interactions. While fishermen may still use squid in the deep-set fishery, it costs more than some fish bait and, thus, less preferred.

Strategic Offal Discards

Fishermen developed the technique of strategically discarding offal to distract albatrosses from attempting to steal baits from hooks before the branch lines can be retrieved. Fishermen discard swordfish heads and livers on the opposite the side of the vessel from fishing operations to distract albatrosses away from the baited hooks. NMFS observers in the mid-1990s noted that strategically discarding offal reduced incidental hooking or entanglement of albatrosses, and it is now a requirement. When seabirds are present around the vessel, fishermen that are deep-setting north of 23° N., or shallow-setting anywhere, are required to use strategic offal discards as a seabird bycatch mitigation measure when setting from the stern.

Night Setting

Night-setting as a seabird mitigation measure requires shallow-set fishermen, when stern-setting, to start deploying gear no earlier than one hour after local sunset and complete the set no later than the following sunrise. The measure also requires using the minimum lighting necessary to conform to navigation rules and best safety practices. The requirement to night-set is based on the premise that seabirds cannot see baited hooks in the dark and, thus, do not attack them. Night-setting has been a very effective seabird mitigation measure, reducing seabird interactions as much as 98% (McNamara et al. 1999, Boggs 2003).

1.3 Protected Species Workshops

In addition to gear and operational requirements to reduce or deter seabird interactions, owners and operators of pelagic longline vessels must complete a protected species workshop each year (50 CFR 665.814). The workshop includes training in the identification, safe handling, and release techniques for sea turtles, marine mammals, and seabirds. The workshop also reviews regulatory and compliance requirements. In a classroom setting, fishermen learn from oral presentations, hands-on demonstrations, videos, and printed reference materials. NMFS also offers the workshops on line. A valid workshop certificate is necessary for owners to obtain and annually renew Federal longline fishing permits. Longline vessel operators must also have on board the vessel a valid protected species workshop certificate issued by NMFS to the operator of the vessel.

In 2014, NMFS PIRO provided protected species workshop training for 255 Hawaii-based longline vessel owners and captains, and other interested individuals. Another 84 vessel owners, captains, and crewmembers completed protected species workshop training in American Samoa with assistance from the PIRO Observer Program.

Protected Species Workshop, Pier 38, Honolulu.

1.4 Fishing Effort and Observer Coverage

From 2013 to 2014, fishing effort in the deep-set fishery decreased, and effort in the shallow-set fishery increased (Table 3). In 2014, NMFS placed observers on 20.8% of deep-set fishing trips and 100% of shallow-set fishing trips. NMFS provides summary reports from mandatory logbook data reported by longline captains.

Effort data for 2014 are summarized in this section by haul date. Please note that other summaries throughout this report (and elsewhere) may vary slightly depending upon the data source, including revisions. For example, data obtained from seabird interactions on observed trips can be reported by date of trip departure or arrival, set date, or haul date in a given year. Likewise, a quarterly report might vary from an annual report if, for example, double-counting occurred and was corrected after evaluating data collection methods. NMFS typically bases observer coverage levels on the trip departure date, while protected species interactions reported in the observer program's quarterly, semiannual, and annual reports are typically based on vessel arrival date.

Table 3. Hawaii deep- and shallow-set fisheries effort and observer coverage, 2013 and 2014.

Source: NMFS PIRO Observer Program, unpublished data, 10/21/2015, and NMFS (2015a).

2014

	Deep-set fishery	Shallow-set fishery
Number of vessels	139	20
Trip	1,350	81
Sets	17,777	1,334
Hooks	45,646,747	1,466,866
Observer coverage	20.8%	100%

2013

	Deep-set fishery	Shallow-set fishery
Number of vessels	133	15
Trip	1,383	58
Sets	18,772	962
Hooks	46,919,110	1,074,909
Observer coverage	20.4%	100%

Masked booby pair returning from sea. Trig Island, NWHI, Hawaii.

Figures 1 and 2 illustrate the spatial distribution of fishing effort in 2014 by the Hawaii deep- and shallow-set longline fisheries, respectively.

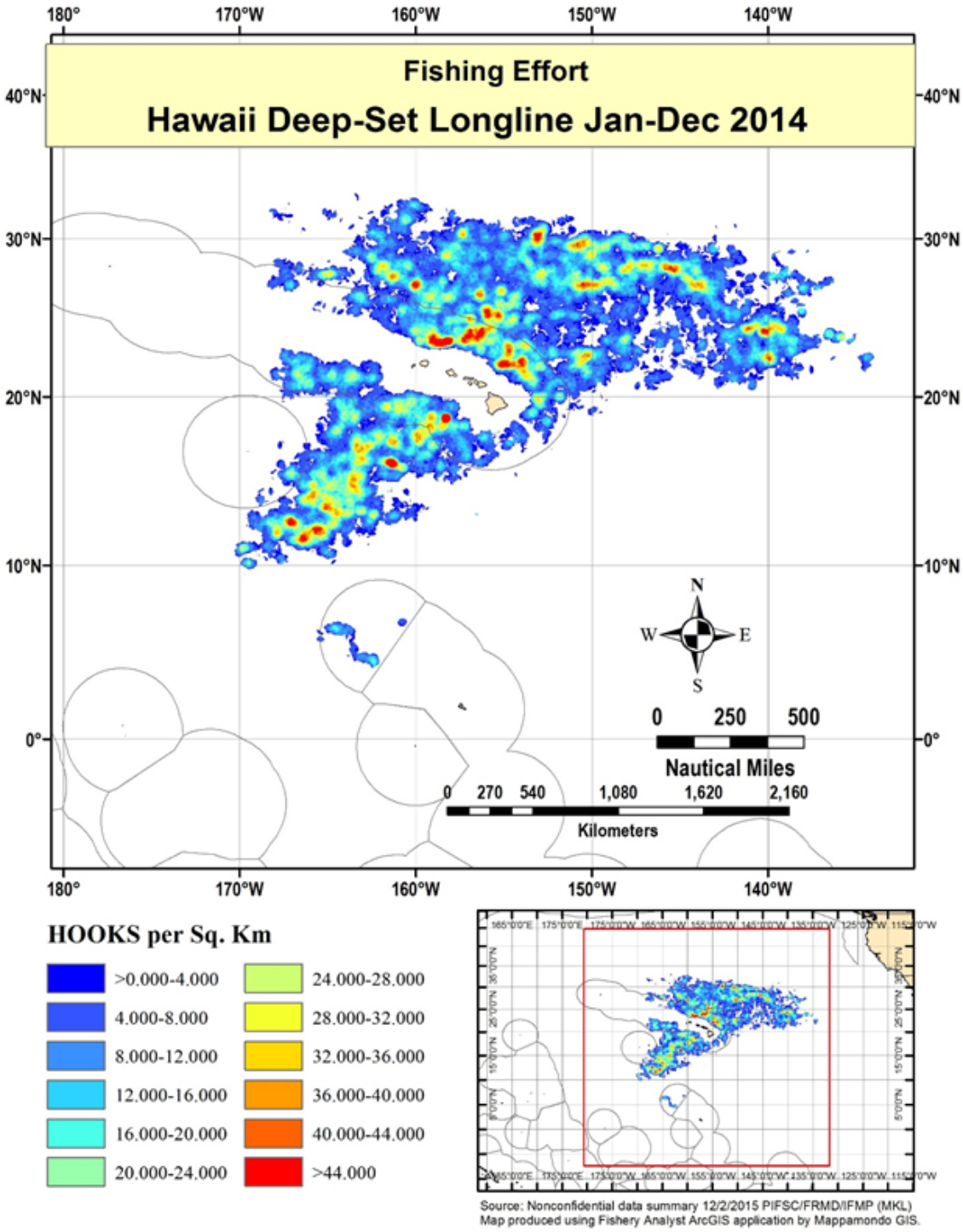


Figure 1. Spatial distribution of fishing effort by the Hawaii longline deep-set fishery, 2014.

Source: NMFS PIFSC logbook, unpublished data, received 12/2/2015.

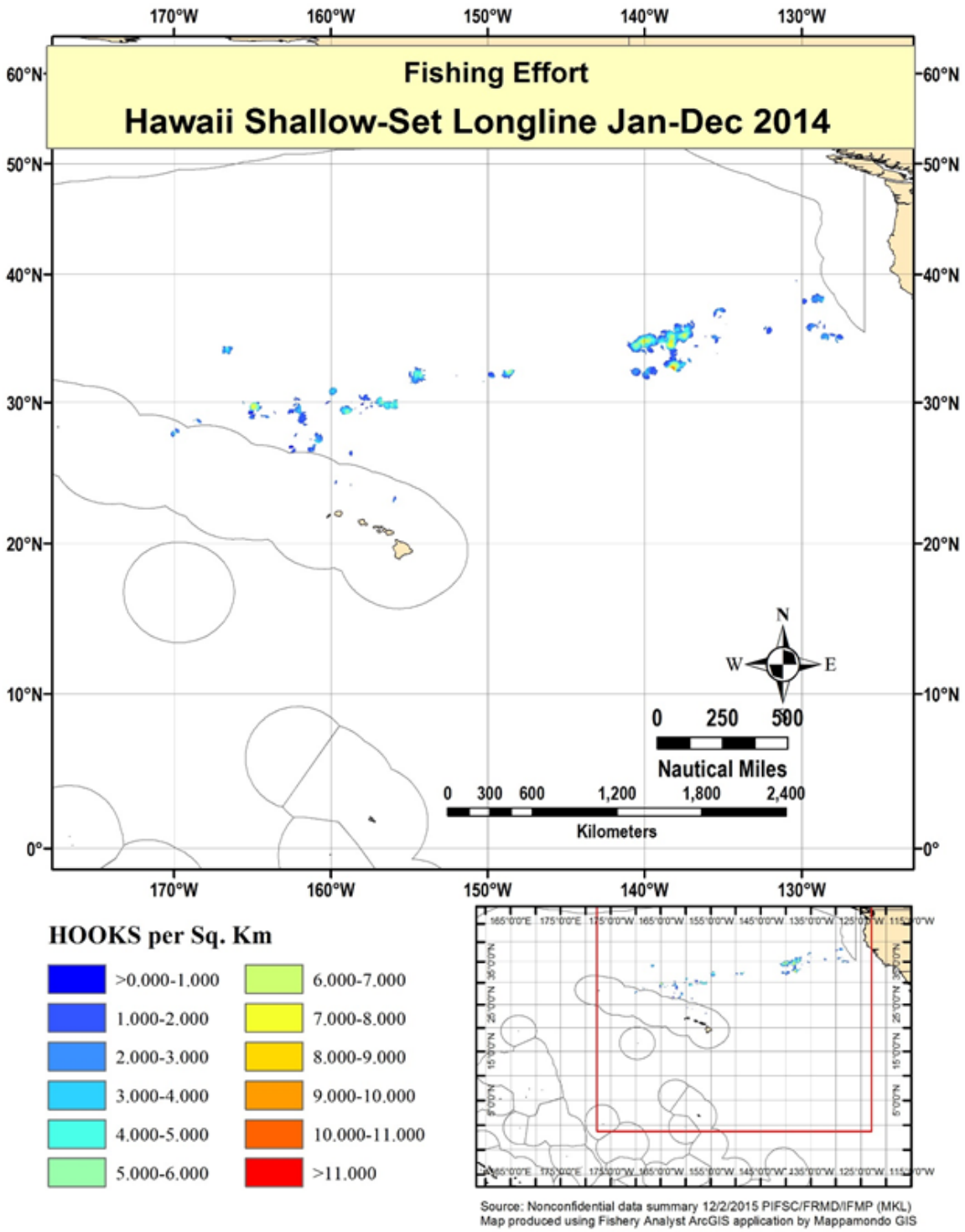


Figure 2. Spatial distribution of fishing effort by the Hawaii longline shallow-set fishery, 2014.

Source: NMFS PIFSC logbook, unpublished data, received 12/2/2015.

2. Interactions

2.1 Species

NMFS observers have recorded the following species being hooked or entangled in the longline fisheries since 1994, when NMFS began deploying observers: Laysan albatross (*Phoebastria immutabilis*), black-footed albatross (*P. nigripes*), sooty shearwater (*Puffinus griseus*), unidentified shearwaters, brown booby (*Sula leucogaster*), red-footed booby (*S. sula*), and Northern fulmar (*Fulmarus glacialis*). These species are not protected under the Endangered Species Act (ESA).

The Laysan albatross population estimate is about 591,000 breeding pairs. The low coral islands of the Northwestern Hawaiian Islands (NWHI) have the world's largest colonies, and together support more than 99% of the global breeding population (ACAP 2012a). The global breeding population of black-footed albatross estimate is 61,300 pairs, with more than 95% breeding in the NWHI (ACAP 2012b). Northern fulmars are located throughout the North Atlantic and North Pacific. The estimated worldwide population is 15 to 30 million individuals (Birdlife 2016a). The red-footed booby winters on tropical islands in most oceans, and its total population estimate is more than 1 million birds (Birdlife 2016b). The brown booby is found throughout the pan-tropical oceans, with a population estimate of 200,000 adults (Birdlife 2016c). The total world population of sooty shearwaters estimate is more than 20 million adults. These birds nest in Australia, New Zealand, and southern South America (Birdlife 2016d). Both Hawaii longline fisheries have a low level of interactions with these species, and based on the population estimates, the fisheries have very little effect on their populations.

Some seabirds, especially shearwaters, are difficult to identify. Table 4 provides a summary of seabird specimens that NMFS observers collected for identification and biological study after capture in the Hawaii longline fisheries in 2014. Most seabird specimens are frozen and shipped to the California Department of Fish and Game, Office of Spill Prevention and Response, Marine Wildlife Veterinary Care and Research Center, in Santa Cruz, California.

Table 4. Summary of collected seabirds from the Hawaii longline fisheries, 2014.

Species	Number retained
Black-footed albatross	40
Laysan albatross	10
Sooty shearwater	1

Note: Not all dead seabirds are collected as specimens. Source: NMFS PIRO Observer Program, unpublished data, 12/29/15.

Laysan and black-footed albatrosses behind Hawaii longline vessel.

2.2 Location of Interactions

Figures 3 and 4 show the spatial distribution of observed seabird interactions in deep- and shallow-set fisheries, respectively, based on observations of seabirds in 2014. Most of the interactions occur north of 25° N., where seabirds are typically more abundant.

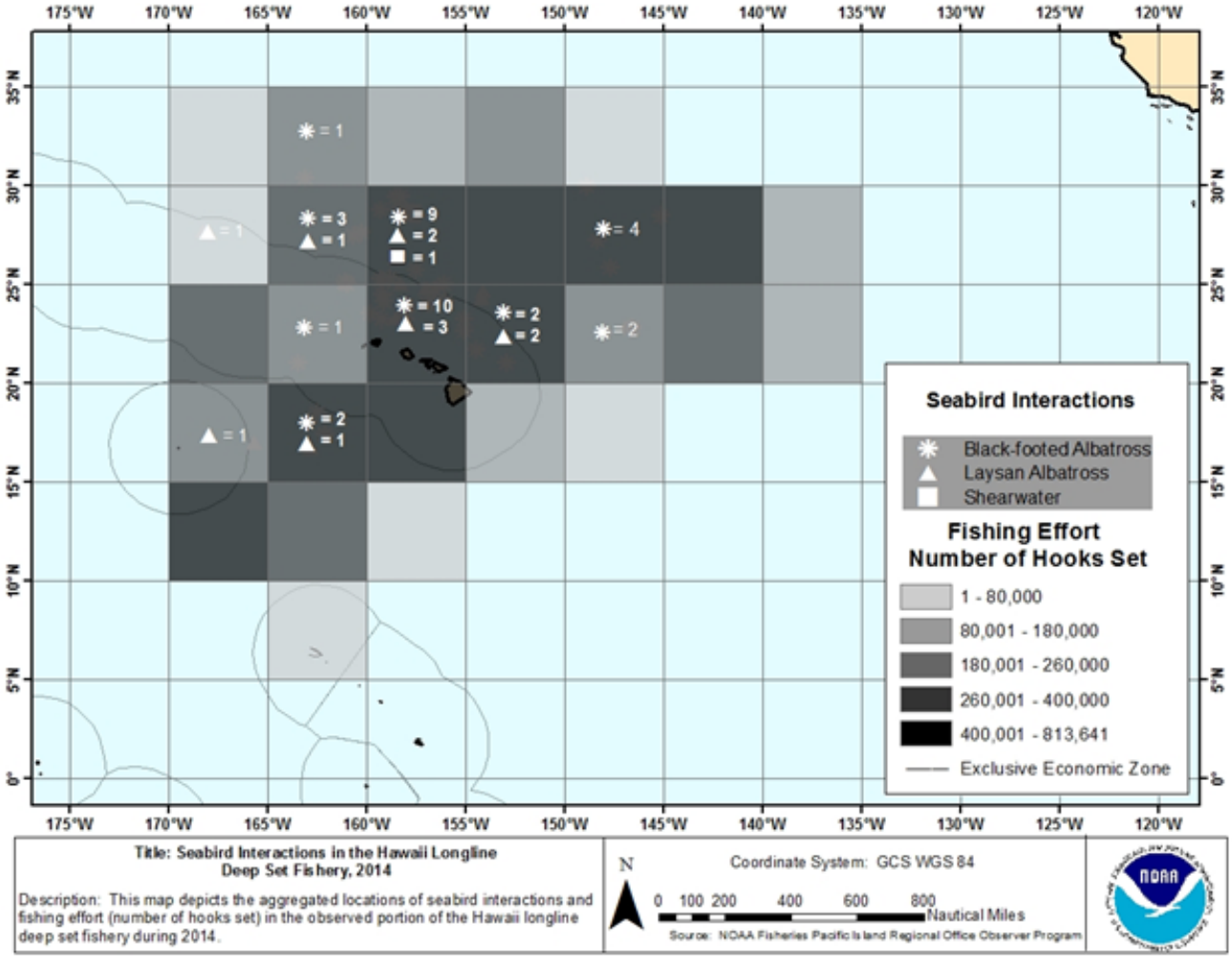


Figure 3. Locations of seabird interactions observed in Hawaii longline deep-set fishery, 2014.

Note: NMFS deployed observers on 20.8% of deep-set trips in 2014. Source: NMFS PIRO Observer Program, unpublished data, 12/21/2015.

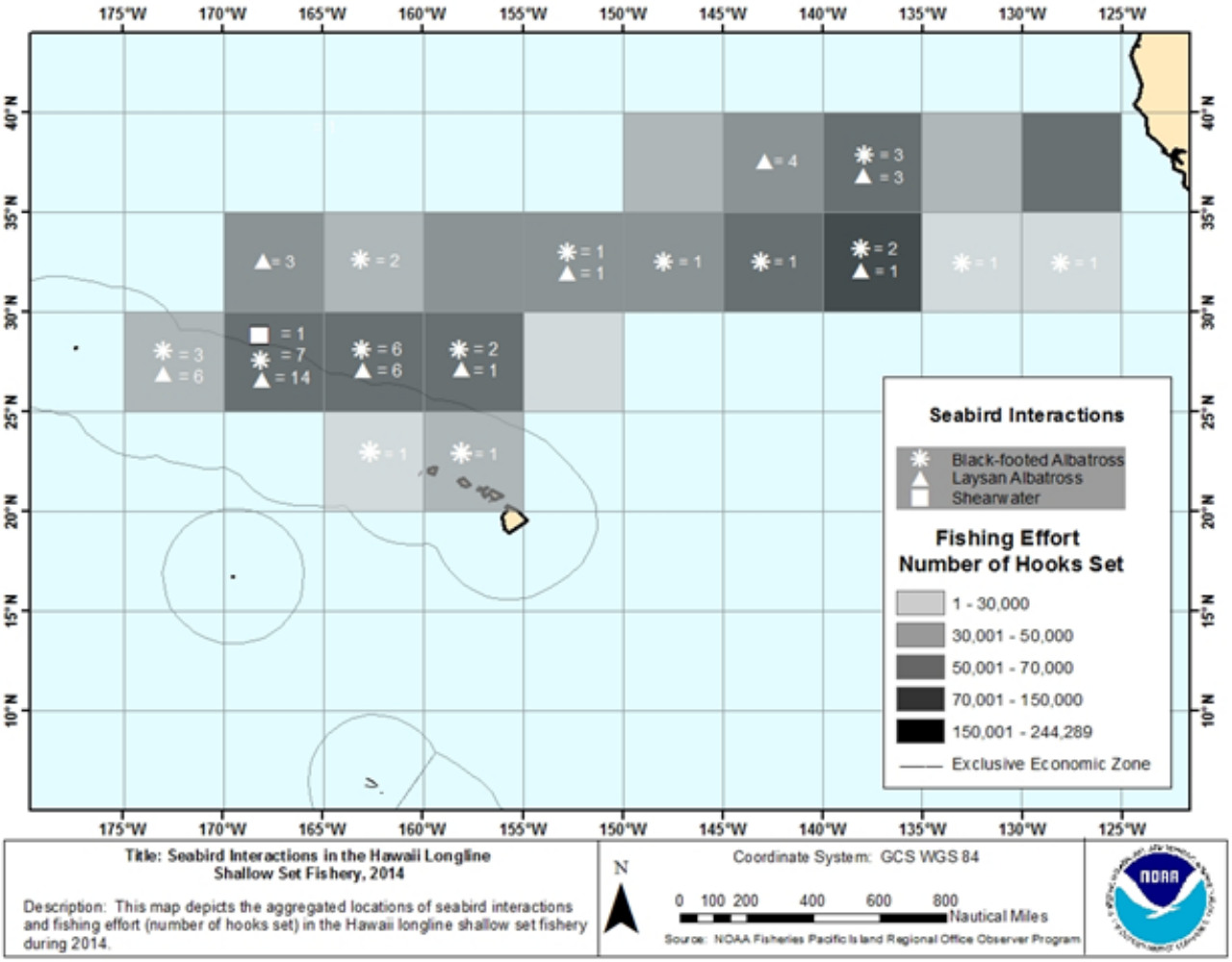


Figure 4. Locations of seabird interactions observed in Hawaii longline shallow-set fishery, 2014.

Note: NMFS deployed observers on every shallow-set trip in 2014. Source: NMFS PIRO Observer Program, unpublished data, 12/21/2015.

2.3 Number of Interactions

Table 5 summarizes the number of observed seabird interactions, including the condition of seabirds upon release, and fishing effort in both longline fisheries from 2004 to 2014. During this period, there was 100% observer coverage of shallow-set fishery; therefore, the number of interactions shown in Table 5 represents the fishery-wide totals.

Almost all interactions in the deep-set fishery occur when gear is being set during the day while seabirds are actively feeding. Seabirds may be hooked or entangled and then drown while the gear sinks. Fishermen typically haul deep-set gear at night, and the hooked or entangled seabirds caught while setting are retrieved dead. Because most seabirds are inactive at night, very few interactions occur during gear hauling in the deep-set fishery. In 2014, observers recorded the deep-set fishery to interact with 12 Laysan albatrosses, 38 black-footed albatrosses, and one sooty shearwater (Table 5). Nearly all of the seabirds observed to interact with the deep-set fishery were dead (88%) when retrieved. Table 6 contains the total estimated number of interactions with Laysan albatross, black-footed albatross, and shearwaters based on observer records for the deep-set fishery in 2014.

Table 5. Numbers of observed seabird catch levels, fishing effort, and nominal interaction rates in the Hawaii longline fisheries, 2004-2014.

Year	Laysan albatross	Black-footed albatross	Sooty shearwater	Other or unidentified bird species caught	Total birds observed caught	Birds released injured and alive	Birds released dead	Total observed effort (hooks)	Seabird interaction rate (birds per 1,000 hooks observed)
Deep-set Fishery									
2004	2	5		2	9		9	7,900,681	0.001
2005	6	11		1*	18		18	9,360,671	0.002
2006	1	17	5		23		23	7,540,286	0.003
2007	7	18			25		25	7,620,083	0.003
2008	14	30	14	2**	60	4	56	8,775,951	0.007
2009	18	23	4		45		45	7,877,861	0.006
2010	39	17	1		57	1	56	8,184,127	0.007
2011	32	13	3		48	2	46	8,260,092	0.006
2012	31	36	7		74	5	67	8,768,728	0.008
2013	48	49	8		105	5	100	9,278,133	0.011
2014	12	38	1		51	6	45	9,608,244	0.005
Shallow-set Fishery									
2004	1				1	1		76,750	0.013
2005	62	7			69	47	22	1,328,806	0.052
2006	8	3			11	5	6	745,125	0.015
2007	40	8			48	40	8	1,292,036	0.037
2008	33	6			39	24	15	1,350,127	0.029
2009	81	30	1		112	88	24	1,767,128	0.063
2010	40	38		1***	79	61	18	1,828,529	0.043
2011	49	19			68	53	15	1,611,395	0.042
2012	62	37			99	77	21	1,418,843	0.070
2013	45	28	2		75	48	27	1,000,084	0.075
2014	39	32	1		72	56	16	1,509,727	0.048

Note: Observer Program data (unpublished, 12/29/2015) are based on the date and time of the beginning of the haul, with the exception of the total observed effort (hooks), which is based on departure date from the Observer Program annual reports (NMFS 2015b and NMFS 2015c). Interaction rates are calculated and rounded to the nearest thousandths (third decimal) place.

**brown booby; **red-footed booby and unidentified seabird; ***Northern fulmar*

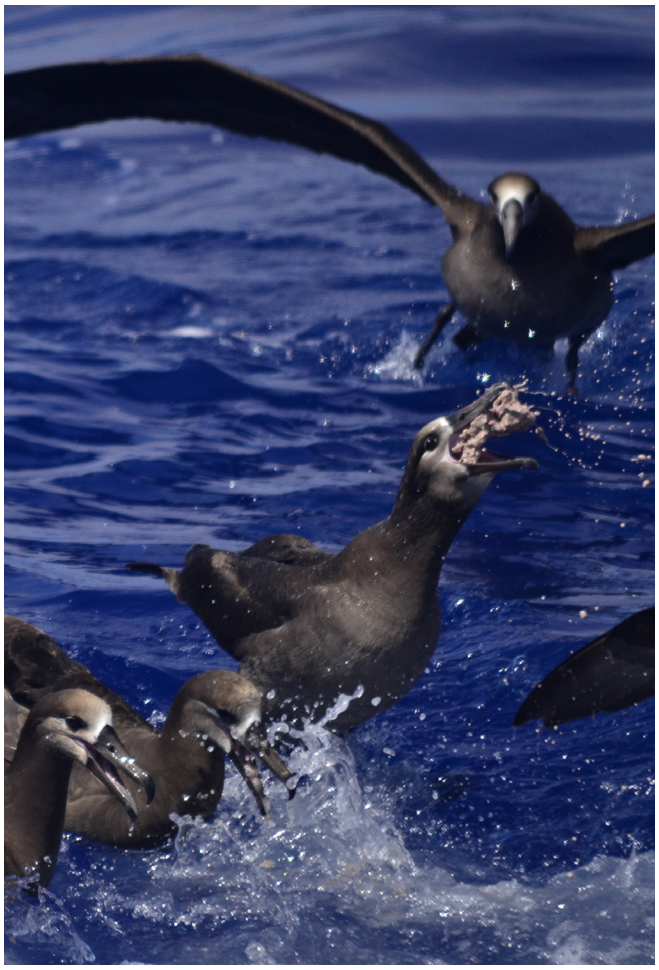
Table 6. Estimated number of total seabird interactions in the Hawaii deep-set longline fishery, 2014.

Species	Total annual estimate	95% confidence interval
Black-footed albatross	177	105-254
Laysan albatross	73	36-113
Shearwater	7	1-21

Note: Table lists point estimates of the total number of incidental interactions by species, and corresponding 95% confidence intervals, in the Hawaii deep-set longline fishery from observed interactions during 2014. The estimate for shearwaters represents an estimate for the number of incidental interactions by the group of species considered shearwaters. Source: McCracken 2015.

The shallow-set fishery typically sets at night and hauls the gear during the day; therefore, most of the interactions occur when fishermen retrieve the gear and birds are actively feeding. In 2014, the shallow-set fishery interacted with 39 Laysan albatrosses, 32 black-footed albatrosses, and one sooty shearwater (Table 5). Fishermen retrieved approximately 78% of seabirds alive.

Seabirds can be hooked, entangled, or both. Table 7 provides a summary of capture and release conditions in 2014. Regulations require fishermen to remove as much gear as safely possible from any seabirds captured before they are released, so seabirds rarely have gear attached to them when released.



Black-footed albatrosses feeding on discarded offal.

Table 7. Capture and release details by species for seabird interactions in the Hawaii longline fisheries, 2014.

	MANNER OF CAPTURE				GEAR ATTACHED UPON RELEASE[1]			
Number for each species/ group	Hooked only	Entangled only	Both hooked and entangled	Not known or not recorded	Line only	Hook only	Hook and line	No gear attached
Laysan albatross	36	6	5	4	0	0	0	39
Black-footed albatross	54	5	10	1	0	0	0	21
Sooty Shearwater	2	0	0	0	0	0	0	1

[1] Released seabirds are those that were released alive. Source: NMFS PIRO Observer Program, unpublished data, 12/29/2015.

Analysis of Seabird Interactions in the Hawaii Shallow-set Fishery

Effective management in the Hawaii longline shallow-set fishery has greatly reduced seabird bycatch, primarily through mitigation measures required during longline gear setting (gear deployment). Since effective implementation of these measures in 2001, approximately 75% of the remaining seabird interactions occur during gear hauling.

In a review of observer data from 2004 to 2012, Gilman et al. (2014) found higher density of albatrosses attending vessels during hauling, which may have been one of the factors that resulted in the observed increasing temporal trend in the seabird standardized haul catch rate. As most shallow-set fishermen choose the option to stern set at night, they haul their gear primarily during the day when seabirds are foraging actively. Seabirds retrieved alive were caught during hauling, and Laysan albatrosses accounted for 73% of total live caught seabirds. The majority (77%) of live bird captures occurred as single events (single live bird capture during an individual haul).

Tended branch lines[2] represented 81% of the seabird haul captures, while 15% of the haul captures were on untended branch lines. During hauling, baited hooks are more likely to remain below the reach of scavenging albatrosses on shorter leaders (weighted swivels located closer to the hook), although this can also pose safety concerns to crew if the branch line breaks during hauling. In addition to reduced leader length, increased swivel weight was effective in reducing seabird captures on tended as well as untended lines (Gilman et al. 2014).

Highest standardized catch rates occur from January to March, which corresponds with brooding and chick rearing for mature Laysan and black-footed albatrosses. At this stage, the albatrosses forage in areas that overlap spatially with the longline swordfish (shallow-set) fishery. The lowest live seabird catch rates occurred during the non-breeding season in August and September, when albatross foraging areas spatially overlap less with the fishery (Gilman et al. 2014).

Future recommended research include reducing bird access to hooks as crew coil branch lines, including faster branch line coiling and shielding the area where hooks become accessible (Gilman et al. 2014). Additional research plans for the shallow-set fishery include a commercial demonstration of methods that could reduce haul interactions in the shallow-set fishery.

Recovered Seabird Bands

State and Federal agencies and other groups attach identification bands to the legs of birds to study bird movement, survival, and other characteristics. Table 8 provides a summary of observed seabirds with leg bands from Hawaii longline fisheries interactions in 2014.

Mating dance of the Laysan albatross.

[2] When a branch line is detached from the mainline it becomes a "tended" line while fishermen are actively pulling in the line. Any such detached line that is attached to the vessel and left trailing in the water until fishermen pull it in is an "untended" line.

Table 8. Seabirds observed with bands from interactions with the shallow-set and deep-set Hawaii longline fisheries, 2014.

Species	Disposition	Date banded	Band(s) recovery date	Location banded	Age at banding (yr)	Age at recovery (yr)
Black-footed Albatross	Dead	6/5/1998	1/15/2013	French Frigate Shoals (Tern Island)	<1	15
Black-footed Albatross	Dead	6/7/2000	1/18/2013	French Frigate Shoals (Tern Island)	<1	13
Black-footed Albatross	Dead	6/5/2008	1/18/2013	French Frigate Shoals (Tern Island)	<1	5
Black-footed Albatross	Dead	6/2/2003	2/16/2013	French Frigate Shoals (Tern Island)	<1	10
Laysan Albatross	Injured	4/7/2005	2/27/2013	Kauai (Kilauea Point)	>/=1	>/=8
Laysan Albatross	Injured	6/1/1995	3/18/2013	French Frigate Shoals (Tern Island)	<1	18
Laysan Albatross	Dead	6/1/2005	3/3/2013	French Frigate Shoals (Tern Island)	<1	8
Black-footed Albatross	Dead	6/9/2006	3/7/2013	French Frigate Shoals (Tern Island)	<1	7
Laysan Albatross	Dead	6/5/1998	3/2/2013	French Frigate Shoals (Tern Island)	<1	15
Black-footed Albatross	Dead	12/30/1997	3/7/2013	French Frigate Shoals (Tern Island)	>/=3	>/=19
Laysan Albatross	Dead	1/21/2004	3/9/2013	French Frigate Shoals (Tern Island)	>/=3	>/=12
Laysan Albatross	Injured	5/27/1994	3/29/2013	French Frigate Shoals (Tern Island)	<1	19
Laysan Albatross	Dead	2/22/2004	5/1/2013	Kauai (Kilauea Point)	>/=1	>/=10
Black-footed Albatross	Injured	1/17/2007	5/4/2013	Laysan Island	>/=1	>/=7
Black-footed Albatross	Injured	5/20/2008	4/20/2013	French Frigate Shoals (Tern Island)	<1	5
Laysan Albatross	Dead	6/18/2001	5/1/2013	French Frigate Shoals (Tern Island)	<1	12
Laysan Albatross	Dead	5/27/1994	5/2/2013	French Frigate Shoals (Tern Island)	<1	19
Laysan Albatross	Injured	12/16/2009	5/8/2013	French Frigate Shoals (Tern Island)	>/=3	>/=14
Laysan Albatross	Injured	5/17/1993	5/9/2013	French Frigate Shoals (Tern Island)	<1	10
Black-footed Albatross	Dead	6/1/1995	5/7/2013	French Frigate Shoals (Tern Island)	<1	18
Laysan Albatross	Dead	6/5/1996	5/10/2013	French Frigate Shoals (Tern Island)	<1	17
Black-footed Albatross	Dead	1/2/2007	5/23/2013	Laysan Island	<1	6
Laysan Albatross	Dead	6/12/2002	5/31/2013	Laysan Island	<1	11
Black-footed Albatross	Injured	12/6/2006	5/24/2013	Laysan Island	>/=1	>/=8
Black-footed Albatross	Dead	12/1/2006	5/25/2013	Laysan Island	>/=1	>/=8
Black-footed Albatross	Dead	6/7/2000	5/26/2013	French Frigate Shoals (Tern Island)	<1	13
Black-footed Albatross	Dead	6/8/2001	5/29/2013	French Frigate Shoals (Tern Island)	<1	12
Laysan Albatross	Dead	12/27/2001	5/26/2013	French Frigate Shoals (Tern Island)	>/=3	>/=15
Laysan Albatross	Dead	6/5/1996	5/26/2013	French Frigate Shoals (Tern Island)	<1	17
Laysan Albatross	Dead	6/10/2002	5/31/2013	French Frigate Shoals (Tern Island)	<1	11
Laysan Albatross	Dead	11/30/2000	6/3/2013	French Frigate Shoals (Tern Island)	>/=3	16
Laysan Albatross	Dead	6/24/2004	6/15/2013	French Frigate Shoals (Tern Island)	<1	9
Black-footed Albatross	Dead	6/18/2012	6/26/2013	Kure Atoll (Green Island)	<1	1
Laysan Albatross	Dead	4/29/2007	3/5/2014	Oahu (Kaena Point)	>/=1	>/=8
Laysan Albatross	Injured	12/1/1991	3/7/2014	French Frigate Shoals (Tern Island)	>/=3	>26
Laysan Albatross	Injured	12/5/2003	3/7/2014	French Frigate Shoals (Tern Island)	>3	>14

continued on next page

Species	Disposition	Date banded	Band(s) recovery date	Location banded	Age at banding (yr)	Age at recovery (yr)
Black-footed Albatross	Injured	6/15/2004	3/15/2014	French Frigate Shoals (Tern Island)	<1	10
Black-footed Albatross	Dead	5/28/2009	3/15/2014	French Frigate Shoals (Tern Island)	<1	5
Black-footed Albatross	Injured	5/26/1994	4/14/2014	French Frigate Shoals (Tern Island)	<1	20
Black-footed Albatross	Dead	5/29/1997	5/8/2014	French Frigate Shoals (Tern Island)	<1	17
Laysan Albatross	Dead	12/30/2009	6/18/2014	French Frigate Shoals (Tern Island)	>/=1	>/=6
Black-footed Albatross	Dead	6/8/2005	11/28/2014	French Frigate Shoals (Tern Island)	<1	9
Black-footed Albatross	Dead	6/4/2003	12/1/2014	French Frigate Shoals (Tern Island)	<1	11
Black-footed Albatross	Dead	6/7/2006	12/6/2014	French Frigate Shoals (Tern Island)	<1	9
Black-footed Albatross	Dead	4/9/2008	12/25/2014	Lehua Island, HI	<1	6
Black-footed Albatross	Injured	Unknown	12/27/2014	Unknown	Unknown	Unknown

Source: USGS, USFWS, and NMFS, unpublished data, received 12/17/2015.

Masked booby and green sea turtle. Trig Island, NWHI, Hawaii.

3. Sightings of ESA-Listed Seabirds

The distributions of three seabird species that are protected under the ESA overlap with the areas where the Hawaii longline fisheries operate: the endangered short-tailed albatross and Hawaiian dark-rumped petrel (*Pterodroma sandwichensis*), and the threatened Newell's shearwater (*Puffinus auricularis newelli*). There have been no observed interactions (hooking or entanglement) between the fisheries and any ESA-listed seabirds. There were no sightings of short-tailed albatross on observed deep-set trips in 2014. There were two sightings of short-tailed albatross in the shallow-set fishery in 2014. Fig. 5 shows the locations of these sightings compared to the observed fishing effort.

4. Management

Migratory Birds

In May 2015, under the Migratory Bird Treaty Act, the USFWS issued a Special Purpose Permit to NMFS for the shallow-set fishery. The permit authorizes the incidental take of a limited number of migratory birds in the shallow-set longline fishery until March 31, 2018, including short-tailed albatross, black-footed albatross, Laysan albatross, sooty shearwater, and Northern fulmar. For further information, please visit the USFWS website (**http://www.fws.gov/pacific/migratorybirds/nepa.html**).

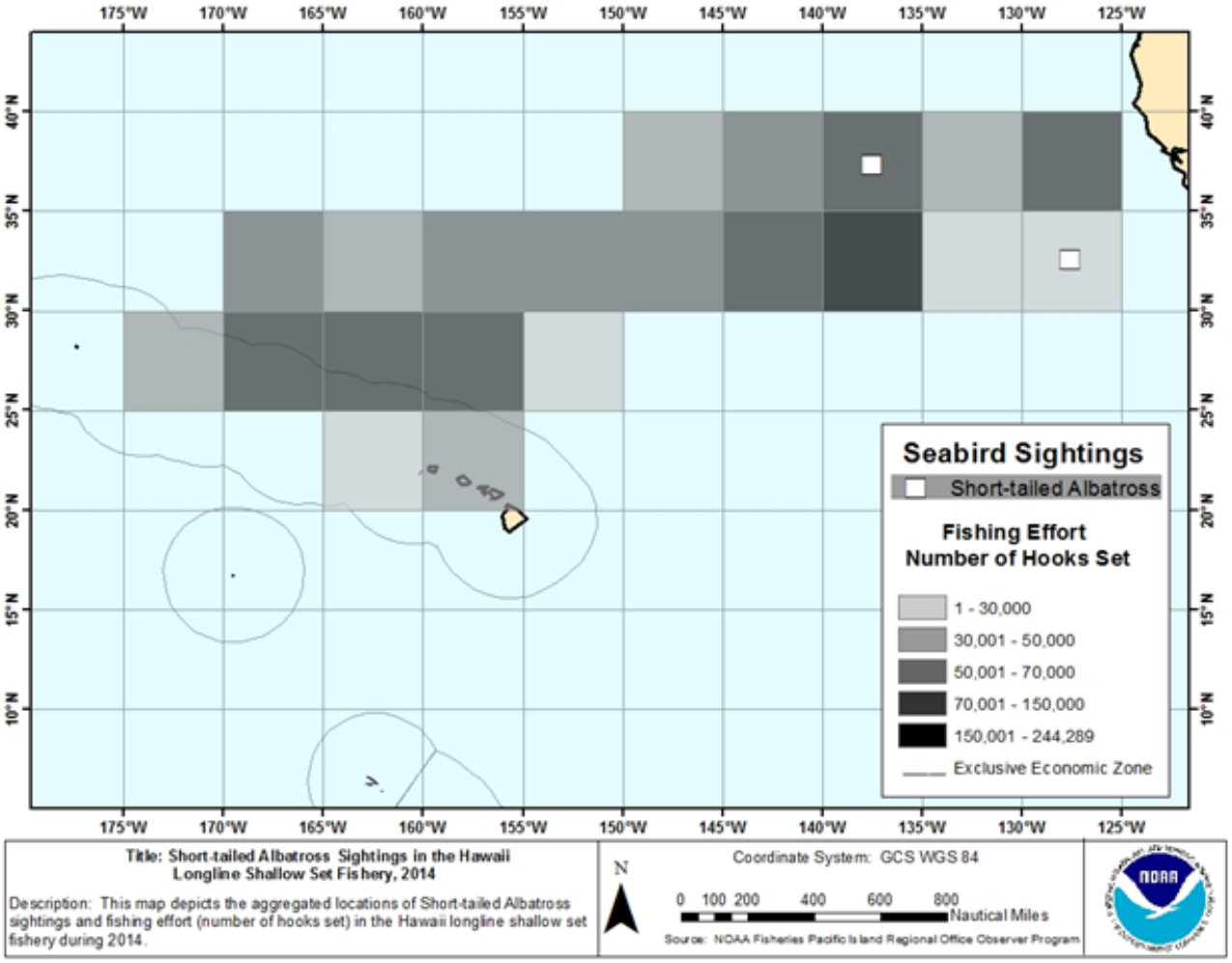


Figure 5. Short-tailed albatross sightings and fishing effort in the Hawaii shallow-set fishery, 2014.

Source: NMFS PIRO Observer Program, unpublished data, received 12/17/2015.

5. Summary

Table 9 compares the 2013 and 2014 observed interactions in the two fisheries. The observed interactions and interaction rate for the shallow-set and deep-set fisheries decreased from 2013 to 2014.

In 2013, the shallow-set fishery interacted with 75 seabirds (45 Laysan albatrosses, 28 black-footed albatrosses, and two sooty shearwaters). In 2014, the shallow-set fishery interacted with 72 seabirds (39 Laysan albatrosses, 32 black-footed albatrosses, and one sooty shearwater) (Table 5).

Table 9. Comparison of observed interactions in Hawaii longline fisheries, 2013 and 2014.

	2013	2014
Seabirds observed in deep-set	105	51
Seabirds observed in shallow-set	75	72
Deep-set interaction rate (birds per 1,000 hooks observed)	0.011	0.005
Shallow-set interaction rate (birds per 1,000 hooks observed)	0.070	0.048

Note: Since 2004, NMFS has targeted observer coverage in the deep-set fishery at 20% annually and has placed observers on every trip in the shallow-set fishery.

In 2013, observers documented the deep-set fishery to interact with 105 seabirds (48 Laysan albatrosses, 49 black-footed albatrosses, and eight sooty shearwaters). In 2014, observers documented the fishery to interact with 51 seabirds (12 Laysan albatrosses, 38 black-footed albatrosses, and one sooty shearwater).

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