United States Department of the Interio

FISH AND WILDLIFE SERVICE
Oregon Fish and Wildlife Office
2600 SE 98th Avenue, Suite 100
Portland, Oregon 97266
Phone: (503) 231-6179 FAX: (503) 231-6195

Reply To: 01EOFW00-2017-F-0316
File Name: Cover memo PCGF BO Final.docx
TS Number: 17-418
TAILS: 01EOFW00-2017-F-0316

MAY 2 2017

Stephen P. Freese
Acting Assistant Regional Administrator
Sustainable Fisheries
National Marine Fisheries Service
7600 Sand Point Way NE, Building 1
Seattle, Washington 98115-0070

Subject: Reinitiation of Formal Consultation on the Continued Operation of the Pacific Coast Groundfish Fishery (FWS reference: 01EOFW00-2017-F-0316)

Dear Dr. Freese

This letter and enclosed Biological Opinion (opinion) responds to your request for formal consultation with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.), as amended (Act). Your request for formal consultation was received in our office on December 13, 2016, and we immediately initiated formal consultation.

The enclosed opinion addresses the effects of the proposed action along the coasts of Washington, Oregon, and California within Federal waters and their effects on the federally endangered short-tailed albatross (*Phoebastria albatrus*) and California least tern (*Sterna antillarum browni*); and the Federally threatened marbled murrelet (*Brachyramphus marmoratus*), southern sea otter (*Enhydra lutris nereis*), and bull trout (*Salvelinus confluentus*) and their designated critical habitat. As described in the opinion, we have concluded that implementation of the activities as described within the biological assessment would not jeopardize the continued existence of short-tailed albatross. We also concurred with your determination that the proposed action is not likely to adversely affect the marbled murrelet, California least tern, southern sea otter, bull trout, nor bull trout critical habitat.

If you have any questions regarding this opinion, please contact Laura Todd at (541) 867-4558, x 237. Thank you for your commitment to conserving short-tailed albatrosses and other marine resources.

Sincerely

Paul Henson

Paul Henson, PhD
State Supervisor

cc (electronic copy):
USFWS-R1 (Dan Brown, Nanette Seto)
USFWS-R8 (Ellen McBride)
USFWS-WFWO (Erik Rickerson, Emily Teachout)
USFWS-PIFWO (Mary Abrams, Dawn Bruns)
USFWS-R7 (Leah Kenney, Kathy Kuletz)
USFWS-LE (Sheila O'Connor)
NOAA-NMFS (Kevin Duffy, Miako Ushio)

Biological Opinion
Regarding the Effects of the Continued Operation of the Pacific Coast Groundfish Fishery as Governed by the Pacific Coast Groundfish Fishery Management Plan and Implementing Regulations at 50 CFR Part 660 by the
National Marine Fisheries Service
on
California Least Tern (*Sterna antillarum browni*),
Southern Sea Otter (*Enhydra lutris nereis*),
Bull trout (*Salvelinus confluentus*),
Marbled Murrelet (*Brachyramphus marmoratus*), and
Short-tailed Albatross (*Phoebastria albatrus*)
(FWS Reference Number 01EOFW00-2017-F-0316)

Prepared by the Oregon Fish and Wildlife Office
U.S. Fish and Wildlife Service
Portland, Oregon

Paul Henson

Paul Henson, Ph.D., State Supervisor

5/2/17

Date

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion (opinion) based on our review of the effects of the Continued Operation of the Pacific Coast Groundfish Fishery (PCGF) as Governed by the Pacific Coast Groundfish Fishery Management Plan (FMP) and implementing regulations at 50 CFR Part 660 by the National Marine Fisheries Service (NMFS) along the coasts of Washington, Oregon, and California within Federal waters and their effects on the federally endangered short-tailed albatross (*Phoebastria albatrus*) and California least tern (*Sterna antillarum browni*); and the Federally threatened marbled murrelet (*Brachyramphus marmoratus*), southern sea otter (*Enhydra lutris nereis*), and bull trout (*Salvelinus confluentus*) and their designated critical habitat. This document was prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). NMFS's January 17, 2012, request for formal consultation was received by the USFWS on January 17, 2012.

The USFWS concurred with NMFS that the proposed action is not likely to adversely affect California least tern (*Sterna antillarum browni*), marbled murrelet (*Brachyramphus marmoratus*), bull trout (*Salvelinus confluentus*) and Southern sea otters (*Enhydra lutris nereis*). A brief rationale for each concurrence is presented in APPENDIX A. These species will not be considered further in the consultation.

This opinion is based on the following major sources of information: The January 22, 2016, Biological Assessment of Continued Operation of the Pacific Coast Groundfish Fisheries (BA) (NMFS 2016); the Recovery Plan for the Threatened Short-tailed Albatross (USFWS 2008, entire); Short-tailed Albatross (*Phoebastria albatrus*) 5-Year Review (USFWS 2009 and USFWS 2014, entire); Marine Mammal, Seabird, and Sea Turtle Summary of Observed Interactions, 2002-2014 (Jannot et al. 2016); the FMP and implementing regulations at 50 CFR Part 660; our files; and informal consultation between NMFS and USFWS staff.

CONSULTATION HISTORY

In 2008, representatives of the USFWS Regional Office in Portland, Oregon, met at the NMFS facilities in Seattle with NMFS managers and council to discuss an amendment to the subject FMP. NMFS made a commitment to pursue a plan level consultation at that time.

On April 11, 2011, a short-tailed albatross was killed by a Pacific Coast Groundfish Fishery vessel's longline fishing gear. Specifically it was killed by a fixed demersal long-line vessel from the limited entry sablefish fishery approximately 65 kilometers off the Oregon coast.

On Friday, July 15th, 2011, the USFWS Regional Office in Portland, Oregon, received a telephone voicemail from NMFS' Sustainable Fisheries Program reporting the April 11, 2011, take (mortality) of short-tailed albatross via fixed demersal long-line sablefish fishing vessel off Astoria, Oregon.

On July 27, 2011, the USFWS received via email from NMFS' Sustainable Fisheries Program a copy of the observer report that recorded the taking of a short-tailed albatross off the Oregon coast by a vessel operating under the authority of the FMP. On August 4, 2011, the Fishing Vessel Owners' Associated advocated to the Pacific Fishery Management Council for regulatory changes implementing the use of streamer lines (Alverson 2011, entire).

On August 25, 2011, the USFWS provided NMFS comments on the draft BA.

On August 31, 2011, the USFWS received a request from NMFS for formal consultation, under the Act, on effects of the Groundfish FMP on the endangered short-tailed albatross.

On September 26, 2011, the USFWS sent an email to NMFS acknowledging the consultation request from NMFS. The USFWS informed NMFS at the time that the consultation package was not complete and we requested an updated consultation package at that time.

On October 12, 2011, the USFWS sent an email to NMFS that contained our full review of the August 31, 2011, consultation package.

On January 17, 2012, a final BA was submitted by NMFS to USFWS.

On March 29, 2012, the USFWS sent a letter requesting additional information. Additional information was obtained through informal communications, including emails.

On July 30, 2012, formal consultation was officially initiated by this office, upon concurrence with NMFS that all available information had been obtained.

On November 21, 2012, USFWS transmitted the final biological opinion to NMFS, and consultation was completed.

On May 19-21, 2015, the ESA Workgroup met in Seattle, Washington, as required by term and condition in the biological opinion, and reviewed the estimated take calculated for short-tailed albatross and other species under NMFS jurisdiction. NMFS risk assessment methodology for short-tailed albatross was used to estimate take, and determined that take of short-tailed albatross was exceeded in most years, even under the most conservative estimates (Good et al. 2017). USFWS recommended reinitiating consultation, and the ESA workgroup reviewed the available information and supported this recommendation.

On June 12, 2015, NMFS presented this information to the Pacific Fisheries Management Council. The Council made the following decisions and recommendations for short-tailed albatross based on NMFS' presentation (Pacific Fisheries Management Council 2015):

- Requested that NMFS reinitiate ESA section 7 consultation for short-tailed albatross to incorporate new information on population status and fishery takes
- Tasked the Scientific and Statistical Committee (SSC) with review of methods to estimate rare event bycatch in the absence of 100 percent observer coverage.
- Began the process to implement a logbook requirement for all commercial groundfish fisheries, especially for those fisheries with low observer coverage rates.

On August 18, 2015, NMFS and USFWS initiated informal consultation via phone conversation related to the proposed reinitiation of consultation on the Pacific Coast Groundfish Fisheries.

On August 15, 2016, NMFS and USFWS met in Seattle to review procedures and considerations for draft biological assessment and take estimates.

On October 6, 2016, NMFS provided a draft biological assessment on the proposed action.

On October 13, 2016, USFWS provided comments on the draft biological assessment.

On December 13, 2016, NMFS provided a final biological assessment requested formal consultation on short-tailed albatross and informal consultation on marbled murrelet, California

least tern, southern sea otter, bull trout, and bull trout critical habitat for the Pacific Coast Groundfish Fisheries.

BIOLOGICAL OPINION

1. DESCRIPTION OF THE PROPOSED ACTION

1.1 Pacific Coast Groundfish Fisheries

The description of the proposed action is excerpted and summarized from the Biological Assessment (NMFS 2016) and the 2012 Risk Assessment (NMFS 2012). As derived from these sources and others, where indicated, the Pacific Coast Groundfish Fisheries consist of the following fisheries sectors, associated gear, and timing of activities associated with the proposed action.

1.1.1. Overview

The proposed action consists of the continued operation of the PCGF as governed by FMP (Pacific Fisheries Management Council 2016) and implementing regulations at 50 CFR Part 660. The groundfish fishery is diverse and includes over 90 different fish species in the FMP that are caught by multiple commercial and recreational fisheries using many different gear types along the entire coast. The species managed by the FMP include 64 species of rockfish (including five overfished species - bocaccio, cowcod, darkblotched rockfish, Pacific Ocean perch, and yelloweye rockfish), 12 species of flatfish, six species of roundfish, and three species of sharks, and skates.

NMFS manages the fishery in partnership with the Pacific Fishery Management Council, and the states of California, Oregon, and Washington. The management framework for the fishery, which is described in the FMP, includes a variety of fixed elements and management measures that may be adjusted through a biennial harvest specifications process and in-season management activities. The management measures are intended to constrain the total fishing mortality to stay within Annual Catch Limits (ACLs) set for individual species or species complexes. Additionally, they are designed to achieve other goals and objectives that pertain to socioeconomics and equitable utilization of the resource. The current fishery management strategy is focused on rebuilding the five overfished species in the fishery. In general, because of the level of co-occurrence of species in the fishery, this means that fishing for most healthy species is limited by measures designed to rebuild the overfished species.

Regulations for the groundfish fishery are recommended by the Pacific Fishery Management Council and, if approved, are implemented by NMFS. Active management of the fishery began in the early 1980s with the establishment of optimum yields for several managed species and vessel-trip limits. The objective of trip limits has been to slow the pace of landings to maintain year-round fishing, processing, and marketing opportunities. Since the 1980s, regulations have evolved to further separate individual groundfish species for management purposes, and this led to the current use of cumulative two-month trip limits for most species. Cumulative trip limits are a specified weight of fish that can be landed during a particular time period. Under the FMP, the groundfish fishery is defined as consisting of four management components:

- Limited Entry (LE) – The LE component includes all commercial fishers who hold a Federal LE permit. The total number of LE permits available is capped, and permitted

vessels are allotted a larger portion of the total allowable catch for commercially desirable species than non-permitted vessels. Since 2011, commercial trawl fisheries have been managed under a catch-shares program using Individual Fishing Quotas (IFQ).

- Open Access (OA) – The OA component includes commercial fishers who are not Federally permitted. However, state agencies (California Department of Fish and Game and Oregon Department of Fish and Wildlife) have instituted permit programs for certain OA fisheries.
- Recreational – This component includes recreational anglers who target or catch groundfish species.
- Tribal – This component includes native tribal commercial fishers in Washington State that have treaty rights to fish groundfish.

These four components can then be further subdivided into sectors based on gear type, target species, and various regulatory factors. Commercial LE and OA sectors have traditionally caught the largest quantities of groundfish and are observed by Federal at-sea observer programs. The following provides a list of other sectors comprising the groundfish fishery, which are further described in the Biological Assessment (NMFS 2016):

- At-Sea Whiting (i.e., Hake) – Since the implementation of the trawl rationalization program (2011), the at-sea whiting sector has consisted of 9-10 catcher-processor vessels and 3- 6 motherships, along with 14 – 19 associated catcher vessels. These vessels begin fishing in mid-May of each year and continue until the Pacific whiting quota is reached or until bycatch caps are met.
    - Catcher-processor vessels targeting Pacific whiting and other groundfish species using mid-water trawl gear and processing their catch at sea.
    - Catcher vessels targeting Pacific whiting using mid-water trawl gear and delivering to at-sea mothership processors (referred to as the mothership sector, and, when combined with bullet 1, compose the 'at-sea whiting sector.').
- Catcher vessels targeting Pacific whiting using mid-water trawl gear and delivering to processing plants on land (sometimes referred to as the shoreside whiting sector, these vessels participate in the IFQ sector).
- Vessels using bottom trawl gear to target groundfish species other than Pacific whiting, with their catch landed onshore (referred to as non-whiting trawl sector; these vessels participate in the IFQ sector).
- Vessels using longline or pots (referred to as fixed gear) to target groundfish and possessing a Federal LE permit with this gear endorsement (referred to as the LE fixed gear sector).
- Vessels using legal groundfish gear other than trawl (principally longline and pot gear) to target groundfish but not possessing a Federal LE permit (referred to as the "directed OA sector").
- Vessels using a variety of gear type that catch groundfish incidentally, usually defined by catch composition rather than regulatory status (referred to as the "incidental OA sector).

A variety of other fisheries considered in the groundfish management process, are not included as part of this consultation since they are not authorized, funded, or carried out by NMFS, as follows:

- Non-groundfish trawl fisheries—pink shrimp, spot prawn, ridgeback prawn, and California halibut— that incidentally catch groundfish.
- Tribal fisheries managed by Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) in their usual and accustomed grounds and stations, under treaties with the Federal government.

The detailed description of how these various fisheries and fishing sectors are applied along the U.S. west coast are further described in detail in the biological assessment and its supporting documentation (NOAA 2016, 2012), and are hereby incorporated by reference.

Pacific Whiting

Pacific whiting (also known as hake) form dense, semi-pelagic schools so that vessels targeting the species generally encounter only small amounts of bycatch. However, rockfish and salmon can be caught incidentally, either because they co-occur with Pacific whiting or because vessels mistakenly set the gear on the wrong species. The at-sea whiting sectors are managed through a season and quota structure. The primary season opens mid-May each year (and occasionally a few weeks earlier off of central California). The third whiting sector, shore-based, is managed with individual fishing quota (IFQ). Pacific whiting is allocated among the three whiting sectors after a portion is set aside for expected catch in Tribal fisheries. The season for each sector then runs until its allocation is used up. Beginning with the 2009–2010 management period, sector-specific bycatch limits were put in place for canary rockfish, darkblotched rockfish, and widow rockfish.

The Pacific whiting fisheries encompass the first three sectors described above; however, beginning in 2011, the shoreside whiting sector is combined with the non-whiting trawl sector and managed with Individual Fishing Quotas (IFQ). The mothership sector is managed through a co-op structure with catcher vessels within a co-op delivering to a specified mothership. The catcher-processor sector operates as a voluntary co-op. Prior to 2011, most vessels in the shoreside fishery operated under Exempted Fishing Permits (EFP, see below), where participants dumped unsorted catch directly into refrigerated tanks, rather than sorting the catch on deck.

Commercial Limited Entry Bottom Trawl

The LE groundfish bottom trawl fishery off the west coast of the United States operates from the Canadian border to Morro Bay, California. Groundfish bottom trawl vessels range in size from 35 to 95 feet, with an average length of 65 feet. Vessels fish throughout the year in a wide range of depths and deliver catch to shoreside processors. Bottom trawlers often target species assemblages, which can result in diverse catch. A single groundfish bottom trawl tow often includes 15 to 20 species. Fleet size was reduced considerably under the IFQ Program implemented in 2011 (see below).

Commercial Limited Entry and Open Access Bottom Trawl – Targeting California Halibut

Vessels that participate in the California halibut trawl fishery can belong to either the LE or OA sector of the Federal groundfish trawl fishery. Some vessels with a Federal LE groundfish trawl permit also have a state California Halibut Bottom Trawl Vessel Permit, and these vessels primarily operate in Federal waters out of the ports of Monterey and San Francisco. Federal LE groundfish-permitted vessels targeting California halibut are subject to Federal groundfish

regulations, depth-based conservation area closures, and trip limits for groundfish, and they must participate in a vessel monitoring system for enforcement purposes.

The California halibut trawl fishery generally operates out of U.S. ports from San Francisco to Los Angeles. Commercial bottom trawling is prohibited in California State waters, with the exception of the California Halibut Trawl Grounds (CHTG). The fishing season within the CHTG covers two calendar years. Regulations for vessels operating in the CHTG include minimum mesh sizes of 7.5 inches in length to reduce bycatch, a three-month closed season during California halibut spawning (March 15–June 15), a 500 pound possession limit on the incidental take of fish other than California halibut, a 22-inch minimum size limit for retained California halibut, and mandated Federal observer coverage. A comprehensive review of the California halibut bottom trawl fishery in the CHTG was published by the California Department of Fish and Game (CDFG 2008). In Federal waters, trawling for California halibut can occur year-round, but a state permit is required (as of 2006) to land more than 150 pounds of California halibut per trip.

Vessels range in size from 29 to 71 feet, with an average length of 46 feet. Fishing generally occurs in less than 30 fathoms of water, and fishers deliver their catch to shore-based processors.

Commercial Fixed Gear Sectors

There are four major sectors in the fixed gear groundfish fishery: the LE sablefish-endorsed sector, the LE non-sablefish-endorsed sector, the Federal OA sector, and the state-permitted nearshore fisheries. LE fixed gear permits are either sablefish-endorsed or non-sablefish-endorsed. In addition, all LE fixed gear permits have gear endorsements (longline, pot/trap, or both. The OA fixed gear sector is not subject to a limited access privilege program, or issued Federal permits. Therefore, the total number of participants varies widely from year to year. OA vessels can use any type of hook-and-line or pot/trap gear, including longline, fishing pole, and vertical longline.

Limited Entry Sablefish -Endorsed Fixed Gear Primary Tier

Vessels participating in the LE sablefish-endorsed sector range in size from 33 to 95 feet and operate north of 36° N latitude. Fishing generally occurs in depths greater than 80 fathoms. Nearly all of the vessels participating in this sector deliver their iced catch to shoreside processors. Catch in the LE sablefish-endorsed fishery is composed mostly of sablefish, with bycatch primarily composed of spiny dogfish shark, Pacific halibut, rockfish species, and skates.

LE sablefish-endorsed primary season fishing currently takes place over a seven-month period from April 1 to October 31. The seven-month season was first implemented in 2002. Permit holders land their limits at any time during the seven-month season. Once the primary season opens, all sablefish landed by a sablefish-endorsed permit is counted toward attainment of its limit. Vessels that have LE sablefish-endorsed permits can fish in the LE non-sablefish-endorsed fishery under trip limits once their quota of primary season sablefish has been caught or when the primary season is closed, from November 1 through March 31.

Limited Entry Non-Sablefish-Endorsed Fixed Gear

The LE non-sablefish-endorsed fixed gear sector occurs coastwide but operates primarily out of southern California ports. The fishery operates year-round, but the majority of fishing activity

occurs during the summer months when weather conditions improve. Vessels in the LE non-sablefish-endorsed sector range in size from 17 to 60 feet, with an average length of 34 feet. Vessels catch a variety of groundfish species, including thornyheads, sablefish, rockfish, and flatfish. The fleet typically operates in depths greater than 80 fathoms. Nearly all of the vessels participating in this fishery deliver their iced catch to fresh fish markets. LE non-sablefish-endorsed fixed gear permits are subject to weekly and monthly trip limits for sablefish, thornyheads, and other groundfish species.

Open Access Fixed Gear

As the OA sector of the fixed gear groundfish fishery does not require Federal permits (state requirements for commercial fishing licenses notwithstanding), characterizing the participants can be difficult. Vessels range in size from 10 to 97 feet, with an average length of 33 feet. Vessels catch a variety of groundfish species, including sablefish, spiny dogfish, and skates. Vessels operate out of all three coastal states and generally fish in waters shoreward of 30 fathoms or seaward of 100 fathoms. OA fixed gear vessels are subject to daily and weekly trip limits for sablefish, spiny dogfish shark, and other groundfish species. Flatfish species—including dover sole, arrowtooth flounder, petrale sole, English sole, starry flounder, and all other flatfish—are managed as a single group for the OA fishery.

Recreational Fisheries

Recreational fisheries are primarily managed by the states, so catch and effort data are often grouped by state and sub-state region. A distinction is also made between charter vessels (commercial passenger fishing vessels, or CPFVs) and private recreational vessels (individuals fishing from their own or rented boats). As would be expected, participation is higher during warmer months. The number of marine angler trips peaks in the July-August period, but the seasonal concentration is more pronounced in northern areas.

Timing

Groundfish are commercially harvested year-round with changes in effort related to management and markets. Seasonality of the groundfish fisheries varies by sector and is shown in Table 3. As described above, the seasonality of Pacific whiting fisheries is driven by regulations which open the season around May 1 each year (and occasionally a few weeks earlier off of central California). The season for each Pacific whiting sector then runs until its allocation is used up.

Table 1. Seasonality of non-whiting commercial groundfish landings over 2005–2009 timeframe, average in metric tons per two-month seasons by sector (excerpted from PFMC 2011, p. F-14).

Sector	Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
Shoreside Non-whiting Trawl	3,637.56	3,672.64	3,918.75	3,988.75	3,788.83	2,659.96
Limited Entry Fixed Gear	101.90	261.88	678.20	759.48	718.41	119.06
Open Access Fixed Gear	101.82	142.69	266.89	280.65	289.08	187.65
Incidentally Caught	25.58	23.40	37.23	48.43	37.08	10.70
Tribal Shoreside Non-whiting Groundfish	68.71	427.75	362.38	304.72	299.57	172.77

Recreational effort tends to peak during warmer months, particularly in Oregon and Washington where weather is more variable.

1.1.2. Characterization of the Pacific Coast Groundfish fleet

Following completion of the 2012 biological opinion on the PCGF (USFWS 2012), Melvin (2016) characterized the current longline fleet. Based on publicly available vessel data (NOAA 2017), he estimated that approximately 80 vessels participated in the LE sector in 2016, and 347 – 544 vessels participated in the OA Fishery between 2013 and 2015. The review determined that the longline fleet numbers around 500 vessels, and the majority of the fleet is considered "small" vessels, less than 55 feet in length (Table 2). In addition to the longline fleet, approximately 171 vessels were solely equipped with trawl gear associated with the groundfish fishery.

Table 2. Distribution of vessels sizes in the U.S. Pacific Coast Groundfish Fisheries longline fleet (Melvin 2016, NOAA 2017).

Vessel size	**Percentage of fleet in permitted sablefish longline fishery**	
	Limited Entry	**Open Access**
≥55 feet	30 percent	3.7 - 7.2 percent
<55 feet	60 percent	92.7 - 96.3 percent

Another characteristic of the U.S. Pacific Coast longline fleet is that many vessels incorporate floats into their longline gear. Based on surveys of longline captains, Melvin (2016) reported that 59 percent of the 28 responders indicated that they use floated longlines. Although the survey sample was small, investigators believed the percentage to be representative of the fleet between Washington and Ft. Bragg, California (Melvin 2016).

1.1.3. Monitoring

The fishery is extensively monitored as described in the Biological Assessment and supporting documents (NOAA 2016, 2012). Of particular note are the Federal observer programs that monitor catch and discard at sea. The At-Sea Hake Observer Program (ASHOP) places fishery observers on all vessels that process Pacific whiting at-sea, and the West Coast Groundfish Observer Program (WCGOP) places fishery observers on the shore-based whiting and non-whiting groundfish sectors, as well as catcher vessels delivering to motherships in the at-sea Pacific whiting sector.

Monitoring by the ASHOP

All at-sea Pacific whiting vessels (catcher-processors and motherships) over 125 feet are required to carry two observers, while vessels less than 125 feet carry only one. Catcher vessels delivering to at-sea motherships require 100 percent observer coverage or electronic monitoring systems. The electronic monitoring systems focus on the retention of fish catch and potential discard of catch, and would be unlikely to discover sea bird bycatch, unless the bird makes it into the codend and is therefore delivered to the mothership for catch accounting.

The observer program in this fleet gives high priority to documenting any take of seabirds. Observers on these vessels are not explicitly required to watch the set, however they monitor for seabird takes and interactions with the fishing gear and vessel. When observers are on deck during fishing operations, they monitor for seabird interactions with the fishing gear. Any interactions are recorded, including the species and associated data. Any carcasses found are collected and frozen for further study and species identification confirmation. In addition, when observers are sampling for species composition of the haul, they include any birds that end up in

the haul as part of the catch. Sightings of seabird species of interest are also recorded by the observer.

A special research project to determine the extent of seabird interactions with trawl cables began in 2016. This project is a collaborative research project with the fishing industry and is outside of the monitoring which observers are already doing. The goal of the proposed research project is to:

- Systematically quantify the magnitude of seabird cable strikes, and
- Develop methods to improve fleet-wide estimates of seabird mortality in the fishery.

The data collected will be used to develop model-based estimates of cable-strike mortality to provide unbiased estimates of seabird mortality in the fishery.

Monitoring by the WCGOP

Non-whiting groundfish sectors, occurring year round, are observed by the WCGOP, which was established in May 2001 by NMFS in accordance with the FMP (50 CFR Part 660) (50 FR 20609). This regulation requires all vessels that catch groundfish in the US EEZ from 3-200 miles offshore to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state rulemaking has extended NMFS's ability to require that vessels which only fish in the 0-3 mile state territorial zone also carry observers. The implementation of trawl rationalization (Catch Shares, IFQ) in 2011 significantly increased coverage of the LE trawl fleet due to a 100 percent observer coverage requirement. Catch Share quota can be fished by both trawl and fixed gear vessels. WCGOP observers are stationed along the U.S. west coast from Bellingham, Washington to San Diego, California.

Generally speaking, WCGOP observers are not required to monitor the setting of trawl or fixed gear. Instead, their efforts are focused on monitoring the retrieval of gear and the sampling of any associated catch, particularly bycatch. Observers are however required to document the sighting of short-tailed albatrosses and other ESA listed seabird species, regardless of when they are seen and when observations are permitted relative to other priorities. This information is collected on a Marine Mammal/Seabird/Sea Turtle Interaction and Sighting Form and entered into the WCGOP observer database, along with any other witnessed interactions, including those resulting in takes. Observers are required to identify seabirds to species, when possible. Photos, drawings, and notes taken by the observer may be used by staff to determine identification, when necessary.

In general, the WCGOP discourages observers from handling and caring for injured seabirds, with the exception of short-tailed albatrosses. Observers are required to provide care for these birds under 50 CFR 660.21, until they can be handed over to a representative of USFWS. Incapacitated or dead short-tailed albatross are to be photographed and retained, along with any associated tags/bands, and handed over to USFWS as soon as possible after disembarkation.

Over the past several years, the WCGOP has worked closely with Ed Melvin of the Washington Sea Grant Program to develop methods for characterizing the Pacific Coast longline fleet and attempt to determine the potential effectiveness of traditional seabird avoidance measures, particularly streamer lines. A "Hook and Line Characterization Form" was developed for this purpose and is currently being completed on all longline vessels (NMFS 2016, NWFSC 2016).

1.1.4. Seabird Avoidance and Mitigation Measures

NMFS has been working with fishermen and Washington Sea Grant to reduce the potential for seabirds to be taken by the fishery. The actual take and the estimates of short-tailed albatross bycatch presented in Section 3.8.1 are based on years prior to consistent seabird bycatch mitigation measures, which have been shown to drastically reduce seabird bycatch in Alaskan groundfish fisheries (Melvin 2000). Streamer lines flying in the air above where gear, particularly baited gear, is being deployed provides a visual stimulus to inhibit seabirds from ingesting baited hooks and drowning. While some longline vessels in the groundfish fishery used streamer lines and other seabird avoidance gear voluntarily, organized efforts promoting the use of streamer lines did not begin until 2009, and recently regulations went in place to require the use of streamer lines on vessels 55 feet and over.

- Pre-2009 – Some voluntary use of streamer lines and other seabird avoidance gear;
- 2009 - Washington Sea Grant initiated a NMFS-supported streamer line distribution pilot program with tribal fisheries; WCGOP observers began documenting the use and characteristics of seabird avoidance gear on fixed gear vessels;
- 2009 - 2011 – Washington Sea Grant extend free streamer line program to major longline ports in Oregon and Washington (WA Sea Grant 2011, see Attachment 3);
- 2013-2016 – distribution of free streamer lines, and research to refine the design of streamer lines specifically for groundfish fisheries; and
- December 2015 – the use of streamer lines on vessels over 55 feet long became mandatory (NMFS 2015a, 50 CFR 660.61), and tribal vessels use streamer lines voluntarily. Vessels shorter than 55 feet may voluntarily participate in seabird bycatch measures.
- December 2015 – Regulations (NMFS 2015a, 50 CFR 660.61) were promulgated that require fishers and observers in the West Coast Observer Program to report all hooked short-tailed albatrosses and to use appropriate handling procedures for dead or hooked live short-tailed albatrosses.

Public education and outreach efforts were implemented to further the use of streamers and promote seabird bycatch reductions. Fishermen have responded well to this outreach by using the streamer lines, and increased usage is anticipated as outreach efforts continue and more lines are made available

Research for use of streamer lines for smaller boats is ongoing. While it is not yet known with precision how seabird mortality rates are affected, streamer lines have been shown to significantly reduce mortality in the Alaskan groundfish fisheries with similar results expected for the Pacific Coast groundfish fisheries. The WCGOP observers document seabird mortalities, and this information should be available for future analyses of effectiveness of the 2015 mandatory streamer line rule on bycatch of short-tailed and black footed albatross (Jannot et al. 2011).

1.2 Action Area

The action area is defined in the implementing regulations for section 7 at 50 CFR 402 as, "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

The fishery occurs in off the Pacific Coast with the fishery management area formally defined by regulation at 50 CFR 660.11, subpart C as (Figure 1):

> *The Exclusive Economic Zone off the coasts of Washington, Oregon, and California between 3 and 200 nm offshore, and bounded on the north by the Provisional International Boundary between the U.S. and Canada, and bounded on the south by the International Boundary between the U.S. and Mexico. The inner boundary of the fishery management area is a line coterminous with the seaward boundaries of the States of Washington, Oregon, and California (the "3–mile limit"). The outer boundary of the fishery management area is a line drawn in such a manner that each point on it is 200 nm from the baseline from which the territorial sea is measured, or is a provisional or permanent international boundary between the U.S. and Canada or Mexico. All groundfish possessed between 0– 200 nm offshore or landed in Washington, Oregon, or California are presumed to have been taken and retained from the EEZ, unless otherwise demonstrated by the person in possession of those fish.*

Although the consulted-on action of the continued operations of the PCGF regulated by NMFS occurs only between 3 and 200 nautical miles off the coast, fishing vessels will be transiting through the coastal waters to reach the EEZ and therefore coastal waters are included in the action area. Groundfish Fishery in state waters are regulated by state regulations and although the state works in collaboration with the PFMC, state Fishery Groundfish Fishery is not interrelated to, nor interdependent with the proposed action. As the states' groundfish fisheries do not depend on the Federal groundfish fishery for their justification, the two fisheries are not interrelated. Also, the state-managed groundfish fisheries do have independent utility apart from the action under consultation, and thus is not interdependent with the Federal action. Therefore, the effects of state-managed groundfish fisheries, which occur in state waters, are not analyzed as part of the proposed action. Potential effects of state-managed fisheries are, however, considered in the analysis of cumulative effects. As the use of interrelated and interdependent is often confusing, as in this case, guidance that we follow from our Endangered Species Consultation Handbook, 1998 has been provided.

The Act's implementing regulations [50 CFR § 402.02] refer to the action under consultation as the "larger action," which has proven to be confusing when applied to cases of modification to an existing project. Instead of keeping the inquiry on whether other activities (this case state groundfish fishery) are interrelated to or interdependent with the modification (Federal PCGF), people sometimes unintentionally and inappropriately shift the focus to an inquiry on whether the modification itself (consulting on the Federal PCGF) is interrelated to or interdependent with the "larger" action or project (collaborative effort in the management of the groundfish fishery).

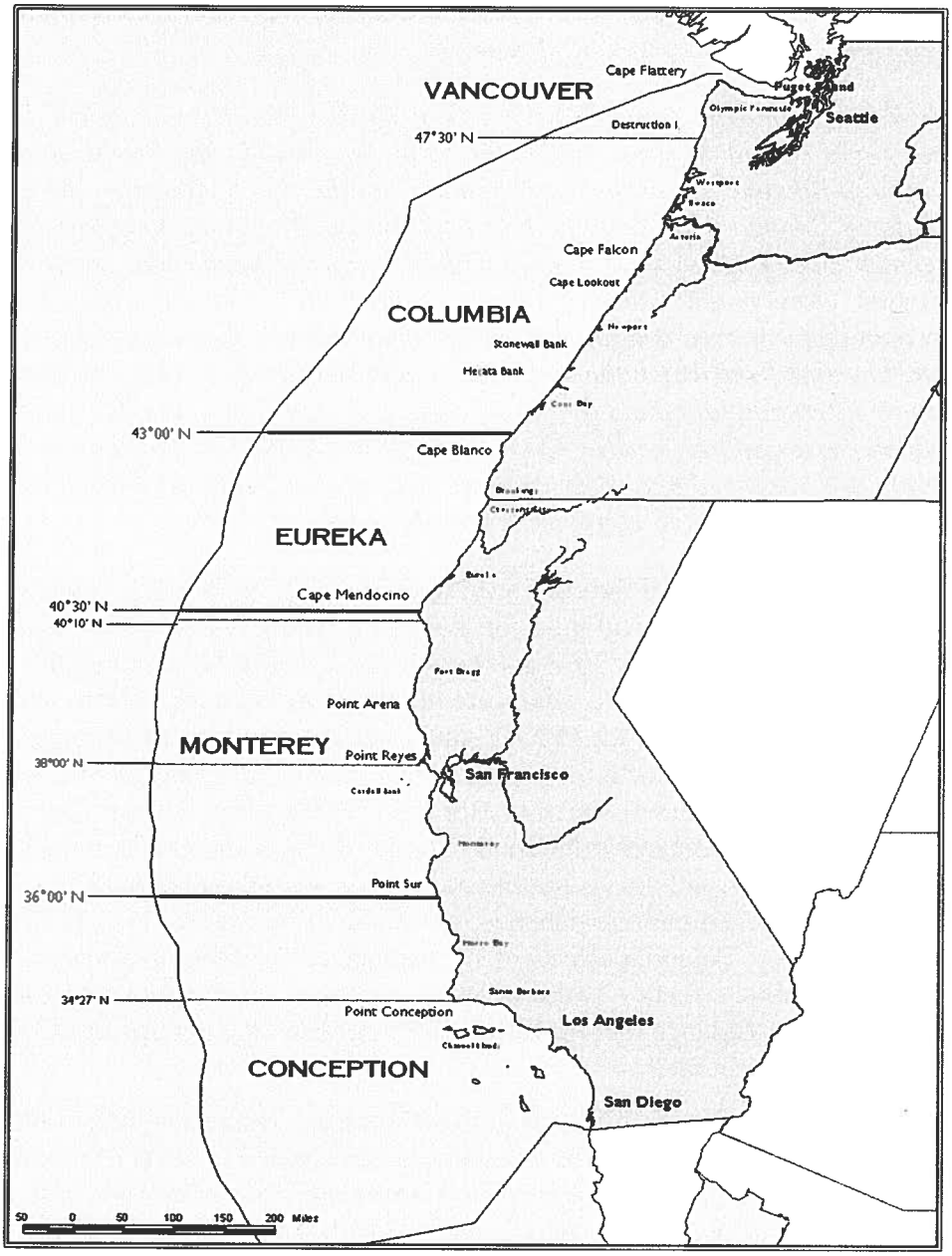

Figure 1. General map of the proposed action area; solid line west of the coast depicts the limit of the U.S. Exclusive Economic Zone (Pacific Fisheries Management Council 2016).

Our Endangered Species Consultation Handbook (USFWS and USDC NMFS 1998, page 4-26) further goes on to say "As a practical matter, the analysis of whether other activities are interrelated to, or interdependent with, the proposed action under consultation should be conducted by applying a "but for" test. The biologist should ask whether another activity in question would occur "but for" the proposed action under consultation. If the answer is "no," that the activity in question would not occur but for the proposed action, then the activity is interrelated or interdependent and should be analyzed with the effects of the action. If the answer is "yes," that the activity in question would occur regardless of the proposed action under consultation, then the activity is not interdependent or interrelated and would not be analyzed

with the effects of the action under consultation." Because the state-managed groundfish fishery would occur regardless of the Federal PCGF, the state-managed groundfish fishery is not interrelated to, or interdependent with, the proposed action.

2. FRAMEWORK FOR JEOPARDY ANALYSIS

In accordance with policy and regulation, the jeopardy analysis in this Biological Opinion relies on four components: (1) the Status of the Species, which evaluates the short-tailed albatross's range-wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which evaluates the condition of the short-tailed albatross in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the short-tailed albatross; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the short-tailed albatross; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the short-tailed albatross.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the short-tailed albatross's current status, taking into account cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the range-wide survival and recovery needs of the short-tailed albatross.

3. STATUS OF THE SHORT-TAILED ALBATROSS

3.1 Taxonomy and Species Description

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

3.2 Listing Status

The short-tailed albatross was Federally listed as endangered throughout its range, including the United States, on July 31, 2000 (65 FR 46643). At the time of listing, designation of critical habitat was determined to be not prudent (65 FR 46651). The Short-tailed Albatross Recovery Plan was finalized in 2008 (USFWS 2008).

3.3 Historic and Current Distribution

Historically, the short-tailed albatross was probably the most abundant albatross in the North Pacific, with 14 known breeding colonies in the northwestern Pacific and potentially in the North Atlantic (Olson and Hearty 2003; USFWS 2008). However, from the late 1800's, millions were hunted for feathers, oil, and fertilizer (USFWS 2008), and by 1949, no birds were observed

breeding and the species was thought to be extinct. The species began to recover during the 1950s, and currently occurs throughout the North Pacific Ocean.

Today, breeding colonies exist primarily on two small islands in the North Pacific Ocean (Figure 2). Torishima, a Japanese island that is an active volcano, is estimated to contain 80 - 85 percent of the existing breeding population. The remaining population is believed to nest in the Senkaku Islands (USFWS 2008). The Senkaku Islands breeding population estimate is an unverified projection from growth of this breeding colony since 2002, the last time the site was visited. The Senkaku Islands are in disputed ownership between China, Japan, and Taiwan, and are politically difficult to access. Therefore, no nest searches have occurred since 2002. The estimates of the Senkaku population data are extrapolated from the 2002 data under the assumption that factors affecting population growth have remained similar to those observed on Torishima.

In 2008, 10 chicks were translocated to a former colony site on Mukojima, a non-volcanic island south of Torishima, in the hope of re-establishing a colony on this island. All chicks in this group survived to fledging. From 2009 through 2012, an additional 15 chicks per year have been moved to Mukojima and reared to fledging. All but one of the 70 chicks fledged successfully. The relocation effort may be attracting additional breeding adults to this island; an egg was laid by a pair in 2012 and again in 2013. In 2016, an eight-year-old translocated male and a wild female, thought to be from the Senkaku Islands, successfully fledged the first chick on Mukojima, and the another chick successfully hatched in 2017.

As of 2016, there were also two breeding sites in addition to Mukojima with in the Ogasawara (Bonin) Islands: one on Nakodojima approximately 5 km south of Mukojima and one on

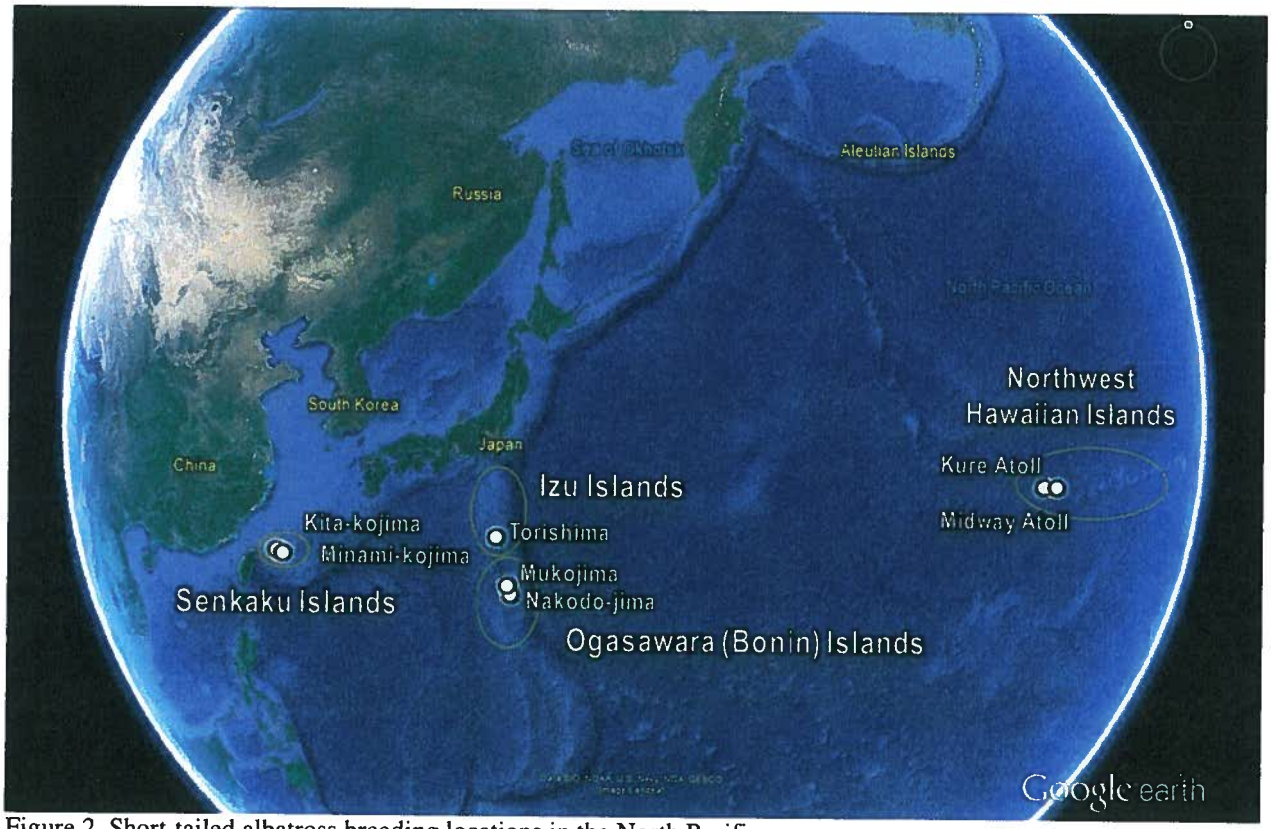

Figure 2. Short-tailed albatross breeding locations in the North Pacific.

Yomejima approximately 20 km south of Mukojima (Degcuhi et al. 2016). A chick was fledged from Nakodojima in 2014, and the Yomejima chick was observed in 2016. Since the translocation, three pairs have produced four chicks in the Ogasawara Islands (Deguchi et al. 2016, Deguchi, pers. comm. 2017).

In the Northwestern Hawaiian Islands, one pair was breeding at the Midway Atoll (having fledged a chick in 2011, 2012, and 2014) and another suspected female-female pair has been attempting to breed at Kure Atoll since 2010. The hatching in 2011 marked the first confirmed hatching of a short-tailed albatross outside of the islands surrounding Japan in recorded history. Prior to that, observations of infertile short-tailed albatross eggs and reports from the 1930's suggested that short-tailed albatross may have nested on Midway Atoll in the past.

3.4 Life History

The short-tailed albatross is a colonial, annual breeding species; each breeding cycle lasts about eight months. Birds may breed at five years of age, but first year of breeding is more commonly at six. Birds arrive on Torishima in October, but as many as 25 percent of breeding age adults may not return to the colony in a given year, instead they spend the year at sea, often in Alaskan waters. A single egg is laid in late October to late November, and is not replaced if destroyed. Bi-parental incubation lasts 64 to 65 days. Hatching occurs from late December through January (Hasegawa and DeGange 1982). Chicks begin to fledge in late May through June.

Nest sites may be flat or sloped, with sparse or full vegetation. Nests consist of a concave scoop about 2 feet in diameter on the ground, lined with sand and vegetation. Tickell (1975) described the nests as scoops in volcanic ash lined and sometimes built up with grass.

Parents alternate foraging trips that may last two to three weeks while taking turns incubating the egg. When one bird is foraging, the other stays on the nest without eating or drinking. The first few days after hatching, the chick is fed on stomach oil, which is rich in calories and Vitamin A. This oil also provides a source of water once metabolized. Soon after hatching, the chicks are fed more solid food, such as squid and flying fish eggs. During the first few weeks after hatching, one adult broods the chick and the other forages at sea. Later, when the chick can thermoregulate, both parents leave the chick, while they forage simultaneously.

By late May or early June, the chicks are almost fully grown, and the adults begin abandoning the colony site (Hasegawa and DeGange 1982). The chicks fledge soon after the adults leave the colony (Austin 1949). By mid-July, the breeding colony is empty. Non-breeders and failed breeders disperse earlier from the breeding colony, during late winter through spring (Hasegawa and DeGange 1982).

Short-tailed albatross are monogamous and highly philopatric to nesting areas (they return to the same breeding site year after year). Chicks hatched at Torishima return there to breed. However, young birds may occasionally disperse from their natal colonies to attempt to breed elsewhere, as evidenced by the appearance of adult birds on Midway Atoll that were banded as chicks on Torishima (Richardson 1994). In summer (non-breeding season), short-tailed albatross disperse widely throughout the temperate and subarctic North Pacific Ocean (Sanger 1972; Suryan et al. 2007b).

3.5 Habitat Description

3.5.5. Distribution

Juveniles and younger sub-adult birds (up to two years old) have a wider range than adults and can be found in the Sea of Okhotsk, a broader region of the Bering Sea, and the Pacific Coast of North America (O'Connor et al. 2013; Figure 3). Sub-adult birds also travel greater daily distances (mean = 119 mi/day in first year of flight, 112 mi/day in second year of flight; O'Connor et al. 2013) than adults (83 mi/day; Suryan et al. 2007). Post-fledging juvenile birds ranged widely throughout the North Pacific rim, and some individuals also spent time in the oceanic waters between Hawaii and Alaska (Deguchi et al. 2014). Although the highest concentrations of short-tailed albatross are found in the Aleutian Islands and Bering Sea (primarily outer shelf) regions of Alaska, subadults appear to be distributed along the Pacific Coast of the U.S. more than has been previously reported (Guy et al. 2013).

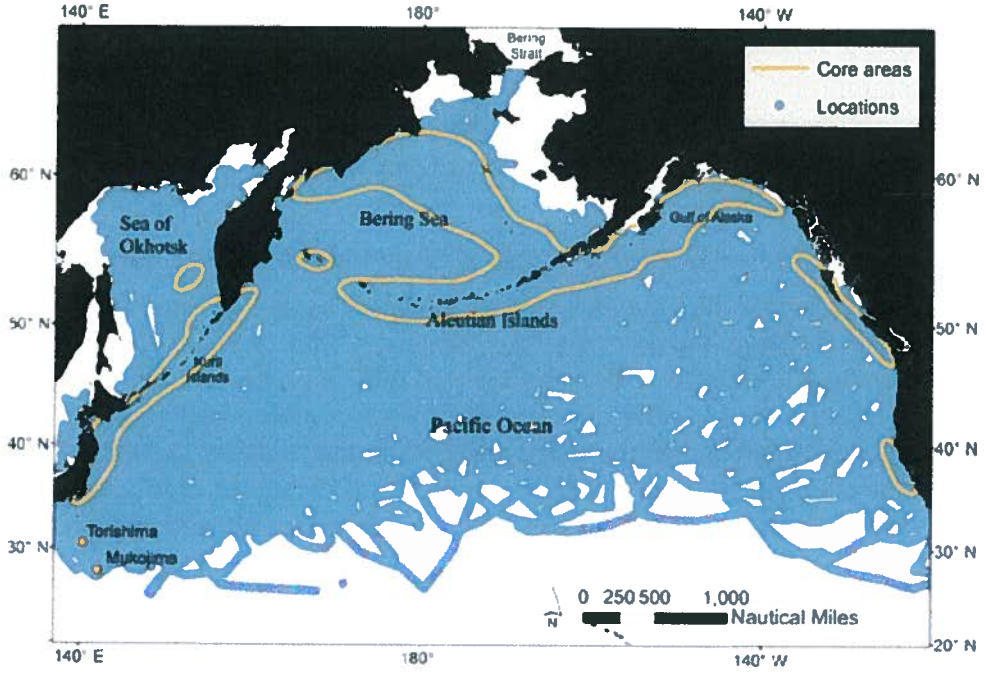

Figure 3. Core habitat (50 percent kernel) and point locations showing extent of travel for immature short-tailed albatross (from O'Connor 2013).

3.5.6. Foraging Ecology and Diet

The diet of short-tailed albatross is not well-known, but observations of food brought to nestlings and of regurgitated material (Austin 1949), as well as at-sea observations during feeding indicate that the diet includes squid, shrimp, fish (including bonitos [Sarda sp.], flying fishes [Exocoetidae] and sardines [Clupeidae]), flying fish eggs, and other crustaceans (Hasegawa and DeGange 1982; Tickell 1975). This species has also been reported to scavenge discarded marine mammals and blubber from whaling vessels, and they readily scavenge fisheries offal (Hasegawa

and DeGange 1982). Short-tailed albatross forage diurnally and possibly nocturnally (Hasegawa and DeGange 1982), either singly or in groups (occasionally in the 100's) predominantly taking prey by surface-seizing (Piatt et al. 2006).

In an analysis of historic and current distribution of North Pacific albatrosses, Kuletz et al. (2014) speculated that the increase in albatrosses (including short-tailed albatross) and changes in their distribution over the last decade were due to possible increases in squid biomass in the Bering Sea/Aleutian Islands region. Overall the much higher abundance of albatrosses in the Aleutians compared to the Bering Sea mirrored the relative density of squid, which is estimated to be approximately seven times higher in the Aleutians (Ormseth 2012).

3.5.7. Dispersing and Foraging Habitat

While the short-tailed albatross range encompasses the North Pacific from approximately latitude 15°N to the Bering Sea, the short-tailed albatross appear to prefer waters shallower than 1,000 m that are associated with continental shelves (Figure).

Short-tailed albatross forage on squid, small fish (including bonitos [*Sarda* sp.], flying fishes [Exocoetidae] and sardines [Clupeidae]), flying fish eggs, and crustaceans [subphylum Crustacea].

3.5.8. Breeding Habitat

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

3.6 Threats

3.6.1. Natural Events

Habitat destruction from volcanic eruption continues to pose a significant threat to short-tailed albatross at the primary breeding colony on Torishima (USFWS 2014). The main colony site, Tsubamezaki, is on a sparsely vegetated steep slope of loose volcanic soil that is subject to severe erosion, particularly during monsoon rains. A landslide at Tsubamezaki buried up to 10 chicks in February 2010 (Yamashina Institute for Ornithology, unpublished data). Future eruptions or landslides could result in a significant loss to the primary nesting area and the population as a whole.

3.6.2. Commercial Fishing

Albatross, like many seabirds, attack baited hooks of both pelagic and demersal longlines after the hooks are deployed; if they get hooked or snagged, they are likely to be injured or pulled underwater with the rest of the gear and drowned (USFWS 2008). Interactions with trawls may occur when seabirds fly behind vessels or float in offal plumes that trail behind vessels. Individuals can strike the trawl cables (warp cables) or the sonar cable (third wire) attached to

the net or become entangled on the outside of nets towed at or near the surface; the former in particular are unlikely to be detected as they do not show up on the vessels' deck to be sampled (USFWS 2008).

Commercial Fishing by Non-U.S. Fishing Fleets

Japan - Japan developed a National Plan of Action for seabird conservation and management (Fisheries Agency of Japan 2004, 2009). In areas where short-tailed albatrosses occur (north of 23° N latitude), vessels must employ two of the following measures, one of which must be from the first four listed, and streamer lines are obligatory within 20 mi of Torishima in October through May: side setting with a bird curtain and weighted branch lines, night setting with minimum deck lighting, streamer (tori) lines, weighted branch lines, blue-dyed bait, deep setting line shooter, and/or management of offal discharge. Japan has also implemented an observer program on their longline and purse seine fisheries to observe bycatch of non-target species, including seabirds (Uosaki et al. 2013, 2014). The only observed seabirds incidentally caught north of the 23°N latitude were a black-footed albatross in 2012 and an unidentified petrel in 2013 (Uosaki et al. 2013, 2014). However, only a small percentage of deployed hooks are observed.

Japanese fishermen pioneered the use of streamer (tori) lines to deter seabirds, and researchers have continued to assess their use. Researchers have continued to examine methods to improve the effectiveness of streamer lines. Yokota et al. (2011) and Sato et al. (2012) assessed types and lengths of streamers for their effectiveness and found that lighter lines with shorter streamers are as effective as those with long streamers, although the shorter lines are thought to be safer and less likely to tangle. Sato et al. (2013) further examined the use of paired versus single streamer lines and determined that paired lines were more effective than single lines in reducing bait attacks and seabird mortality. The continuing research by Japan has been an important contribution to minimizing longline fisheries bycatch of short-tailed albatrosses.

Russia - Russian longline cod fisheries implemented experimental use of streamers in 2004 - 2008 (Artukhin et al. 2013). The frequency of reported seabird attacks was 5 - 9 times lower on boats with paired streamers, and total catch of fish was 4 - 12% higher. The study recommended wide application of streamer line in the Far Eastern Seas of Russia. Although consistent funding has been a problem, the World Wildlife Fund has continued to work with Russian partners to educate the Russian commercial fishing communities about the benefits of using streamer lines and promote their use to reduce seabird bycatch and improve fishing success (World Wildlife Fund 2014). Four short-tailed albatross have been reported taken in Russian fisheries; two in the western Bering Sea (1998 and 2003), one in the Sea of Okhotsk (2002) and one in the Kuril Islands (2006; Table 3).

Canada - Off Canada's west coast, deployment of seabird avoidance gear has been mandatory for all hook and line groundfish fisheries since 2002 - 2005. Most bycatch monitoring in these fisheries is done by on-board Electronic Monitoring Systems. Following each fishing trip, approximately 10 percent of the imagery is audited. Although there have been no reported takes of short-tailed albatross bycatch in the groundfish fisheries, in a recent examination of imagery collected between 2006 and 2012, 79 albatrosses were detected; a third of which were identified only as "albatross species." Based on the proportions of sets audited, an estimated 120 albatrosses were predicted to have been caught each year (range 0 - 269). Given the high proportion of albatrosses that are not identified to species and the fact that more than a third of

all birds detected during the audits were listed as "unidentified bird," Canadian officials estimate that one or two short-tailed albatrosses are killed each year in Canadian west coast groundfish longline fisheries (COSEWIC 2014).

Table 3. Known short-tailed albatross mortalities associated with North Pacific and Pacific Coast fishing activities since 1983.

Date	Fishery	Observer	In sample*	Bird age	Location	Source
7/15/1983	Net	No	n/a	4 months	Bering Sea	USFWS 2014
10/1/1987	Halibut	No	n/a	6 months	Gulf of Alaska	USFWS 2014
8/28/1995	IFQ sablefish	Yes	No	1 year	Aleutian Islands	USFWS 2014
10/8/1995	IFQ sablefish	Yes	No	3 years	Bering Sea	USFWS 2014
9/27/1996	Hook-and-line CP targeting Pacific cod	Yes	Yes	5 years	Bering Sea	USFWS 2014
4/23/1998	Russian salmon drift net	n/a	n/a	< 1 year	Bering Sea, Russia	USFWS 2014
9/21/1998	Hook-and-line CP targeting Pacific cod	Yes	Yes	8 years	Bering Sea	USFWS 2014
9/28/1998	Hook-and-line CP targeting Pacific cod	Yes	Yes	Sub-adult	Bering Sea	USFWS 2014
7/11/2002	Russian **	n/a	n/a	3 months	Sea of Okhotsk, Russia	USFWS 2014
8/29/2003	Russian demersal hook- and-line	n/a	n/a	3 years	Bering Sea, Russia	USFWS 2014
8/31/2006	Russian **	n/a	n/a	1 year	Kuril Islands, Russia	USFWS 2014
8/27/2010	Hook-and-line CP targeting Pacific cod	Yes	Yes	7 years	Bering Sea/ Aleutian Islands	USFWS 2014
9/14/2010	Hook-and-line CP targeting Pacific cod	Yes	Yes	3 years	Bering Sea/ Aleutian Islands	USFWS 2014
4/11/2011	Sablefish demersal hook- and-line	Yes	Yes	1 year	Pacific Ocean, Oregon	USFWS 2014
10/25/2011	Hook-and-line CP targeting Pacific cod	Yes	Yes	1 year	Bering Sea	USFWS 2014
5/24/2013	Hook-and-line seabird bycatch research	No	n/a	1 year	Pacific Ocean, Japan	USFWS 2014
9/7/2014	Hook-and-line CP targeting Pacific cod	Yes	No	5 years	Bering Sea	NMFS 2014a
9/7/2014	Hook-and-line CP targeting Pacific cod	Yes	Yes	Sub-adult	Bering Sea	NMFS 2014b
12/16/14	Hook-and-line CP targeting Pacific cod	Yes	Yes	< 1 year	Bering Sea	NMFS 2015b

Driftnet Fishing in the North Pacific

United Nations General Assembly Resolutions 44/225, 45/197, and 46/215 (United Nations 1989, 1990, 1991) called for a global driftnet moratorium on the high seas by June 30, 1992, and the resolution has been re-adopted biennially. The NMFS and the State Department worked to implement the moratorium for the U.S. According to NMFS (2013), high seas driftnet fishing continues to occur in the North Pacific Ocean. The fishing effort targets species of squid and occurs toward the end of the fishing season. Both of these factors increase the threat to short-tailed albatrosses. While the numbers of sightings and apprehensions of vessels driftnetting in the North Pacific high seas appear to be decreasing, non-compliance with the moratorium continues to pose a risk of mortality to short-tailed albatrosses entangled in nets.

Commercial Fishing by U.S. Fishing Fleets

Alaska – Demersal longline fisheries off Alaska (Bering Sea/Aleutian Islands area and Gulf of Alaska) are a known threat to short-tailed albatross, with almost all known takes occurring in these fisheries (Table 3); none has been reported in groundfish trawl or pot fisheries. No known takes of short-tailed albatross have been reported in domestic pelagic longline fisheries in the North Pacific. Two separate analyses for the demersal groundfish longline fisheries estimate that, on average, one short-tailed albatross is taken in the Bering Sea hook-and-line fishery each year (Stehn et al. 2001). Mitigation measures have reduced bycatch in these fisheries since those analyses.

Hawaii – U.S.-based pelagic longline swordfish and tuna fisheries in the vicinity of the Hawaiian Islands have the potential to affect short-tailed albatross, although there have been no reported takes as of yet. The rate of incidental takes of seabirds in general and albatross in particular has declined markedly in Hawaiian pelagic longline fisheries since bycatch reduction regulations were instituted (Gilman et al. 2005, USFWS 2008, NMFS 2011).

California, Oregon, Washington – Since 2002, one known take of short-tailed albatross has been reported for the Pacific Coast groundfish fisheries. In April 2011, a single short-tailed albatross juvenile was reported caught by longline gear in the LE sablefish fishery approximately 65 kilometers off the Oregon coast (WCGOP, unpubl. data). There have been a variety of other interactions have been reported by the WCGOP and the At-Sea Hake Observer Program (Table 5). These sightings, which had been increasing in recent years, possibly from the increasing global population, increased observer coverage since 2011, or increased attention to short-tailed albatross by observers. However, the sightings dropped off considerably in 2014 and 2015 (Table 5), likely due to competing priorities observers that prevent observers from conducting and recording seabird observations.

Controlled and large-scale field studies have demonstrated that properly deployed paired streamer lines are effective at reducing seabird attacks on the gear by 85-100 percent (Figure 4) (Melvin et al. 2001). Single streamer lines are slightly less effective than paired lines, reducing seabird bycatch by 96 percent and 71 percent for the sablefish and Pacific cod fisheries in the respectively (Melvin et al. 2001). The effectiveness of streamer lines is documented in the bycatch data, which shows continued reduction in bycatch rate since fishermen began using the lines in Alaska in 1999 (NMFS 2015c).

While streamer lines have greatly reduced bycatch, the observed has only been a reduction of 78 percent in Alaska, not the potential 88 to 100 percent (Dietrich and Fitzgerald 2010). A small

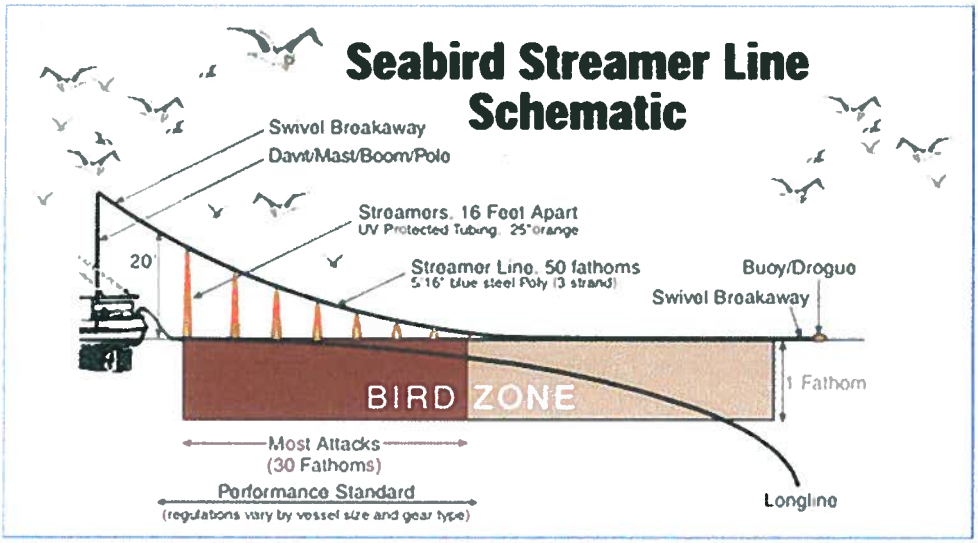

Figure 4. Streamer line and longline sink profile (Gladics et al. 2017).

number of vessels are responsible for a majority of seabird bycatch (Dietrich and Fitzgerald 2010). However, this reporting is based on total number of birds caught, not a standardized catch rate. Seabird bycatch rate is an important metric when evaluating bycatch of short-tailed albatross. A vessel may catch 10 birds on 250,000 hooks, resulting in a bycatch rate of 0.04 birds per 1,000 hooks, another vessel may catch 10 birds on 500,000 hooks resulting in a rate of 0.02 birds per 1,000 hooks. When only the total bycatch is reported it is difficult to extrapolate which vessel has the highest impact on seabirds (Dietrich and Fitzgerald 2010).

Short-tailed albatross generally attack the lines as they leave the boat, once the lines have been baited. Weighting of the long lines causes the lines to sink quicker, minimizing the time that the birds have access to the lines and bait when the gear is set. Weighted lines in coordination with streamer lines provide the most effective means to reduce seabird and short-tailed albatross bycatch (Dietrich et al. 2008). Weighted lines work best with the auto-bait systems found on larger CVs, but the additional weight makes them impractical for smaller vessels (Dietrich et al. 2008).

The use of integrated weight longlines, used simultaneously with paired streamers, reduces seabird mortality almost completely (Dietrich et al. 2008). Tools and techniques continue to improve; Melvin et al. (2011) compared a third wire snatch block, warp boom, and paired streamer lines on two trawlers in the eastern Bering Sea. They determined that bird strikes could be diminished by deploying streamer lines at least a meter above the third-wire block and by minimizing the aerial extent of the third wire.

3.6.3. Invasive Species

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

3.6.4. Disease and Parasites

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

3.6.5. Predation

Shark predation is documented among other albatross species, but has not been observed for short-tailed albatross (USFWS 2008). This predation would likely include sharks preying upon fledgling short-tailed albatross as they depart their natal colony.

3.6.6. Oil Pollution

There is potential for oil spills to occur in the action area which could affect short-tailed albatross. Oil contamination can adversely affect short-tailed albatross either through acute toxicity from being directly oiled or as a result of chronic or sublethal exposure to low levels of oil. Petroleum exposure may: (1) compromise seabirds thermoregulations through fouling of feathers, (2) cause direct toxicity through ingestions (during preening), (3) contaminate the birds food resources, (4) reduce prey availability from toxic effects on prey species, and (5) cause embryo toxic effects (USFWS 2008 and 2009).

3.6.7. Plastic Pollution

Plastics have been found in most, if not all, species of albatross. Both black-footed and Laysan albatross are well known to ingest plastics in the course of foraging. Lavers and Bond (in review) have recently examined the role of plastic as a vector for trace metals in Laysan albatrosses. Lavers et al. (2014) studied sub-lethal effects of plastic ingestion in flesh-footed shearwaters (*Puffinus carneipes*) and found birds with high levels of ingested plastic exhibited reduced body condition and increased contaminant load ($p < 0.05$) (Lavers et al. 2014). Tanaka et al. (2013) analyzed polybrominated dephenyl ethers in the abdominal adipose of short-tailed shearwaters (*Puffinus tenuirostris*). Some of the birds were found to contain higher-brominated constituents, which were not present in their pelagic fish prey. These same birds were found to contain plastics in their stomach. Plastic ingestion is therefore not only a direct dietary risk but may contribute to chronic accumulation of contaminants that adhere to and are absorbed by plastics in albatross.

3.6.8. Contaminants

Radiation

Approximately 80 percent of the radiation released from the Fukushima Daiichi Nuclear Plant, which was damaged by a March 11, 2011, earthquake and tsunami, was believed to have entered the Pacific Ocean (Tanabe and Subramanian 2011; Steinhauser et al. 2013, 2014). The area east of the plant is a primary feeding area for nesting short-tailed albatrosses. Although recent analysis has shown no detectable levels of radiation in short-tailed albatross, the impact of these continuing releases on short-tailed albatrosses or their food resources is unknown.

Organochlorines, pesticides and metals

Albatross and other birds may be exposed to organochlorine contaminants such as polychlorinated biphenyls (PCBs) and pesticides, and to toxic metals (e.g., mercury, lead) via atmospheric and oceanic transport. Vo et al. (2011) examined mercury and methylmercury in tissues of black-footed albatross. They compared the levels of mercury and methylmercury in museum specimens (n = 25) from a 120-year collection period (1880 - 2002). They found no temporal trend in mercury concentrations, but measured significantly higher concentrations of methylmercury through time. Finkelstein et al. (2007) found mercury concentrations in black-footed albatross were associated with decreased immune response. Similar effects would be expected for short-tailed albatross.

High concentrations of lead at Midway Atoll are a concern. Taylor et al. (2000) described neurological impacts of lead-based paints on Laysan albatross chicks. Since then, the USFWS has initiated removal and remediation of lead-based paint and contaminated soils on Sand Island (NW Demolition and Environmental 2015). Although only one pair has successfully nested on Midway at Eastern Island, this remediation will reduce exposure to any offspring or future nesting birds on Sand Island. The degree to which any of these or other toxins impact short-tailed albatross remains uncertain, and further research is needed to examine the prevalence of these contaminants in short-tailed albatrosses and their impact on the population.

3.6.9. Global Climate and Ecological Change

Climate change impacts to short-tailed albatrosses could include changes to nesting habitat or changes to prey abundance or distribution. Fortunately, the nesting habitats on Torishima, the Ogasawara Islands, and the Senkaku Islands are high enough above sea level (above 70 ft) to avoid inundation by projected sea level rise. Models for the Northwestern Hawaiian Islands indicate nesting habitat used by short-tailed albatrosses on low-lying Midway and Kure Atolls is likely to be lost by the end of the century due to sea level rise and increased storm frequency and intensity (Storlazzi et al. 2013).

Sea-ice retreat in the Arctic may potentially open new foraging habitat or provide a new migration corridor between the Pacific and Atlantic Oceans. A juvenile short-tailed albatross was recently sighted in the Arctic (Chukchi Sea) and evidence from other species (e.g., northern gannet [*Morus bassanus*], ancient murrelet [*Synthliboramphus antiquus*]) indicates some bird species might use ice free portions of the Arctic as a migration or population dispersion route (Gall et al. 2013). The alteration of ice, prey, and seabird distribution is expected to continue, but how these changes will affect short-tailed albatrosses is unknown.

3.6.10. Nesting Habitat Destruction

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

3.7 Recovery Plan Delisting Criteria

The short-tailed albatross may be delisted under the following conditions:

- The total breeding population of short-tailed albatross reaches a minimum of 1000 pairs; (population totaling 4,000 or more birds); AND
- The 3-year running average growth rate of the population as a whole is ≥6 percent for ≥7 years; AND
- At least 250 breeding pairs exist on 2 island groups other than Torishima, each exhibiting ≥6 percent growth for ≥7 years; AND
- A minimum of 75 pairs occur on a site or sites other than Torishima and the Senkaku Islands.

3.8 Recovery Actions

The Recovery Plan for Short-tailed Albatross (USFWS 2008, pages 41-51) recommends the following Recovery Actions:

- Support ongoing population monitoring and habitat management on Torishima
- Monitor the Senkaku population
- Conduct telemetry studies to determine at-sea habitat use
- Establish one or more nesting colonies on non-volcanic islands
- Continue research on fisheries operations and mitigation measures
- Conduct other research that will facilitate recovery
- Conduct other management-related activities
- Conduct outreach and international negotiations as appropriate
- Develop models and protocols as needed

Specific to Recovery Action Five, the NMFS and USFWS are working with the commercial fishing industry to minimize injury and mortality of the short-tailed albatross in U.S. waters. The NMFS's 2011 revised seabird bycatch regulations require Alaska longline vessels over 26-55 feet to deploy single streamer lines while setting gear and vessels greater than 55 feet to deploy paired streamer lines (50 CFR 679.24(e)) (NMFS 2004, 2009). In 2008, efforts were undertaken to begin establishment of a nesting colony on a non-volcanic island (Recovery Action 4) and former breeding site, Mukojima. Seventy chicks from Torishima were translocated to Mukojima and hand-reared until fledging. Fledging success was 98 percent over the four years. Hand-reared birds are now making their way back to Mukojima, and four chicks have been produced from pairs with at least one translocated parent (Emura et al. 2015; Yamashina Institute for Ornithology, pers. comm. 2017). However, deterministic population models do not project the population to reach 50 breeding pairs until 2046, and 75 breeding pairs in 2052 (USFWS 2014).

3.9 Population

The short-tailed albatross species was believed to be extinct in the 1940s, but with protections, the population has since increased to 3,441 birds (Table 4). The population is increasing at an average annual rate of 7.5 percent (USFWS 2014) to 8.5 percent (Sievert, pers. comm., 2017) annually.

Table 4. Short-tailed alabatross population estimates on Torishima and Senkakus Islands, Japan (Sievert 2010).

Breeding Season	Breeding Status	Torishima	Senkakus	Total
2009 – 2010	Breeders	1194	262	2940
	Non-breeders	1177	307	
2010-2011	Breeders	1284	290	3181
	Non-breeders	1265	342	
2011 – 2012	Breeders	1380	322	3441
	Non-breeders	1360	379	
2012 – 2013	Breeders	1484	397	3808
	Non-breeders	1461	466	
2013 – 2014	Breeders	1714	440	4362
	Non-breeders	1690	518	
2014 – 2015	Breeders	1981	488	4996
	Non-breeders	1952	575	

4. ENVIRONMENTAL BASELINE

The environmental baseline is defined as "the past and present impacts of all Federal, state or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation in process [50 CFR 402.02]."

4.1 Status in the Action Area

The action area is within the range of the short-tailed albatross. Short-tailed albatross are using the action are to forage and disperse. No breeding habitat is located within the action area. Within the action area the short-tailed albatross recovery plan documents usage primarily along the continental shelf margin from northern Washington to northern California (USFWS 2008, page 13).

Recent analyses have found that the U.S. West Coast has a higher density of subadults than previously thought (Guy et al. 2013) and that adult birds travel less far and range less widely than juveniles and sub-adults up to 2 years old (Deguchi et al. 2014). The overall range of short-tailed albatrosses includes most of the North Pacific Ocean; however core habitat, especially for immature birds, includes northern Japan and the Kuril Islands, the Bering Sea, Aleutian Islands, and the Gulf of Alaska, British Columbia down to Washington, and California (Figure 3). Despite overlap of immature albatross and fishing vessels along the Bering Sea shelf, these areas are not hotspots of recent short-tailed albatross mortalities (O'Connor 2013).

Sightings by the NMFS Observer Program have documented use down to Monterey Bay, California (Figure 5). Currently, no formal surveys for the species exist for the waters of the action area, and no estimate of density for the area is available. While the apparent increase in sightings of the species along the west coast correlates to known increases in the species' range-wide population, the increase in trained observers and bird enthusiasts available to document sightings of the species confounds any attempt to extrapolate the available sighting data into a precise estimate of population size or density within the affected area. As the population trajectory is increasing for the short-tailed albatross, we can also expect the use of the action area for sub-adult and adult foraging and dispersal to increase.

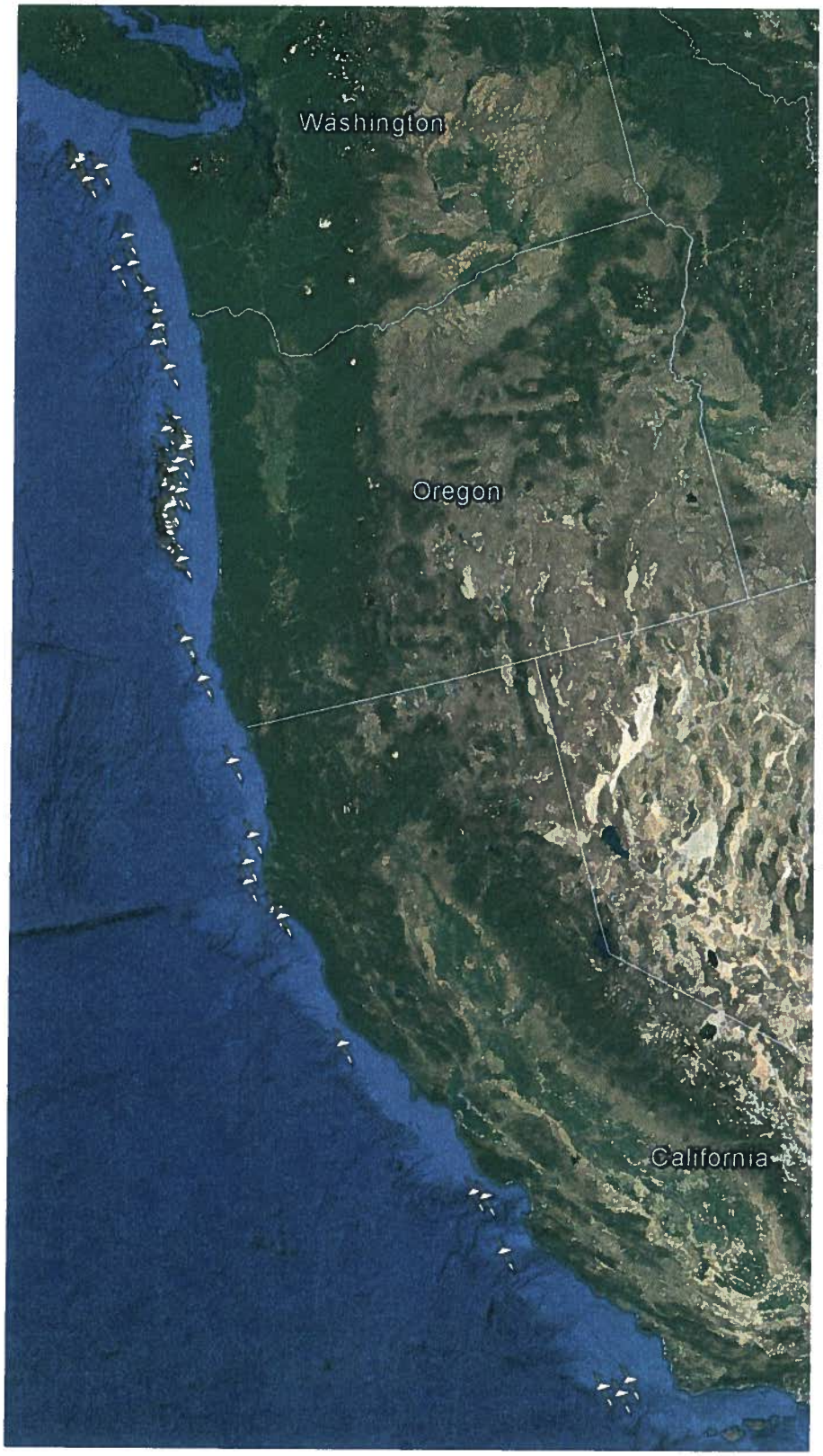

Figure 5. Geographic distribution of opportunistic sightings of short-tailed albatross by the WCGOP from 2002-2011 (NOAA 2016).

Since 2002, one short-tailed albatross mortality has been reported associated with the west coast groundfish fisheries. In April 2011, a single short-tailed albatross juvenile was reported caught by longline gear in the LE sablefish fishery approximately 65 kilometers off the Oregon coast (WCGOP, unpubl. data, NMFS 2016). Other interactions have been reported by the WCGOP and the At-Sea Hake Observer Program, although no other mortalities were reported (Table 5). These sightings have been increasing in recent years, possibly from the increasing global population, increased observer coverage since 2011, and/or increased attention to short-tailed albatross by observers.

Sightings of short-tailed albatross in the West Coast NMFS observer programs are relatively common compared to some other fisheries. For example, in Hawaiian longline fisheries, 100 percent observer coverage has yielded 16 sightings over the last 11 years between 2000 and 2011.

Considerably lower observer coverage in the West Coast NMFS Observer Program has yielded 95 short-tailed albatross sightings over same period. The higher rate of sightings along the west coast compared to Hawaii is consistent with the species' primary use of continental shelf margins when not nesting. The majority of sightings show a distribution largely along the shelf-break and off the coasts of Washington, Oregon, and northern California (Figure 5); this reinforces the tagging work that has shown short-tailed albatross hotspots (for some age classes) off Washington and northern California (O'Connor 2013).

4.2 Factors Affecting the Species' Environment Within the Action Area

Short-tailed albatross are periodically captured in the commercial hook-and-line groundfish fishery (Table 3). Birds dive after baited hooks as they are being set, get hooked, and drown while being dragged below the water's surface with the sinking line. Additionally, short-tailed albatross may strike aerial trawl cables, resulting in injury or death. The USFWS, NMFS, and the fishing industry have taken steps to monitor and reduce seabird interactions incidental to the groundfish fisheries. These measures have included: implementing an observer program to monitor catch of target species and bycatch; fishing industry participation in seabird bycatch mitigation research; examining the effects of trawl cable interactions; requiring use of seabird avoidance and minimization measures such as bird deterrence streamers (tori lines); and supplying free streamer line kits to commercial longline vessel owners. In addition, NMFS has conducted public awareness and education campaigns to improve use of streamers on smaller vessels.

Although the Recovery Plan only mentions possible prey base changes due to climate change (USFWS 2008, page 19), we are including information on fishing and prey. The PCGF does not harvest short-tailed albatross prey. Impacts to short-tailed albatross prey from other fisheries in the action area are not known. A recent global analysis of seabird response to forage fish depletion in 16 seabird species found a general pattern of breeding success being fairly stable above a threshold of prey abundance, but was impacted below that threshold (Cury et al. 2011, entire); the threshold approximated one-third of the maximum prey biomass observed in long-term studies. This study suggests that many seabird species are resilient to some level of prey depletion.

Derelict gear from fisheries is also a potential threat to short-tailed albatross (USFWS 2008, page 30), although there is no information on the extent of derelict gear in the action area, except for

Table 5. Observed short-tailed albatross interactions with Pacific Coast groundfish fisheries 2002-2013 (NMFS 2016).

Year	Sector	Gear	Percent Observer coverage	Killed by gear	Feeding on catch	Other	Sighting	Total
2002	Limited Entry Sablefish	Hook and Line	24				1	15
	Limited Entry Trawl	Bottom Trawl	15		2		12	
2003	Limited Entry Sablefish	Hook and Line	22				1	5
	Limited Entry Trawl	Bottom Trawl	14				4	
2004	Limited Entry Trawl	Bottom Trawl	24				3	3
2005	Limited Entry Sablefish	Hook and Line	38				3	6
	Limited Entry Trawl	Bottom Trawl	22				3	
2006	Limited Entry Sablefish	Hook and Line	22				3	4
	Limited Entry Trawl	Bottom Trawl	19				1	
2007	Limited Entry Sablefish	Hook and Line	28				2	3
	Limited Entry Trawl	Bottom Trawl	17				1	
2008	Limited Entry Sablefish	Hook and Line	30				1	2
	Limited Entry Sablefish	Pot	57				1	
2009	Limited Entry Sablefish	Hook and Line					1	20
	Limited Entry Trawl	Bottom Trawl	23		2		17	
2010	Limited Entry Sablefish	Hook and Line	26			1	4	17
	Limited Entry Sablefish	Pot	28				2	
	Limited Entry Trawl	Bottom Trawl	18		3		6	
	OA Fixed Gear	Pot					1	
2011	Catch Shares	Bottom Trawl	100		4		33	51
	Catch Shares	Pot	100				2	
	Catch Shares	Hook and Line	100			1		
	Limited Entry Sablefish	Hook and Line	21	1		2	1	
	Limited Entry Sablefish	Pot	37				2	
	MS Catcher Vessels	Midwater Trawl	100		1		1	
	Shoreside Hake	Midwater Trawl	100		1		2	
2012	Catch Shares	Bottom Trawl	100		3		8	23
	Catch Shares	Hook and Line	100				3	
	Catch Shares	Pot	100		2		2	
	Limited Entry Sablefish	Hook and Line	22				1	
	MS Catcher Vessels	Midwater Trawl	100				1	
	Shoreside Hake	Midwater Trawl	100		2		1	
2013	Catch Shares	Bottom Trawl	100		3		13	18
	Shoreside Hake	Midwater Trawl	100		1		1	
2014	IFQ	Bottom Trawl	100		4			5
	IFQ	Bottom Trawl	100				1	
2015	IFQ	Bottom Trawl	100		2			3
	IFQ	Bottom Trawl	100				1	

Puget Sound in Washington where short-tailed albatross are unlikely to occur. There has been no documented harm to short-tailed albatross from derelict gear.

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

Within the action area, oiling of short-tailed albatross due to spills occurring in the marine environment remains a risk. This risk is most prevalent in areas subject to offshore drilling, tanker transport of crude oil, or shipping lanes. To date, there have been no documented circumstances of oil contamination of this species rising to the level of injury or mortality of short-tailed albatross in the action area, so it is not possible to quantify the risk to the species, or the interaction of the proposed action with this threat.

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

State governments do manage fisheries that are occurring in the action area. The NMFS Observer program does include state managed fisheries. Although as with the PCGF, coverage is not a 100 percent. The NMFS Observer Program, coverage from 2002-2009, has observed no harm to short-tailed albatross from state fisheries (Jannot et al. 2011, page 56). No fishing by other nations is occurring in the action area.

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

Hazen et al. (2012, entire) looked at predicted habitat shifts of Pacific top predators in a changing climate. They concluded that within the Pacific Coast EEZ, chlorophyll is estimated to increase and the area is expected to remain a high biodiversity area into the future (Hazen et al. 2012, page 4). They also caution that as offshore habitat decreases or becomes less accessible, there may be increased use in the upwelling-driven California Current Marine Ecosystem leading to greater competition among top predators, and also a higher risk of anthropogenic impacts such as shipping traffic and fisheries bycatch (Hazen et al. 2012, page 4).

In addition to the PCGF, additional short-tailed albatross threats include: other regulated fisheries, oil pollution, plastic, and contaminants. No mortality of short-tailed albatross is

known to have occurred in the action area from these other threats, although such effects may not be directly observed and/or may result in sub-lethal impacts. See "3.6 Threats, beginning on page 21, for a full description of the effects of these activities on short-tailed albatross.

4.3 Short-tailed Albatross Recovery Plan

Specific to the action area the Recovery Plan for Short-tailed Albatross recommends continued research on fisheries operations and mitigation measures (Recovery Action Five). Substantial progress has been made in developing seabird bycatch avoidance measures that minimize seabird bycatch in demersal longline fisheries. This work needs to be continued, and further research needs to be conducted on other aspects of commercial fisheries (e.g. pelagic longline and trawl fisheries) (USFWS 2008, page 48).

5. EFFECTS OF THE ACTION

Effects of the action refer to the permanent or temporary direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action that will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action, occur later in time, but are still reasonably certain to occur.

6. EFFECTS TO SPECIES

6.1 Direct Effects

6.1.1. Hook-and-Line Fishery

As was documented by the bycatch event in 2011 and described above in the Consultation History section, vessel and gear interactions with the PCGF are likely to result in mortality of short-tailed albatross from entanglement in fishing gear, particularly longline gear.

The anticipated adverse effects of the proposed action on short-tailed albatross include direct mortality, or injury likely leading to mortality. Birds are attracted to baited hooks primarily when the gear is set, although birds may also interact with fishing vessels when hauling in catch or discharging offal. Birds attempting to steal bait may be hooked, pulled underwater as the mainline is set, and drowned. Birds may sustain injuries from interactions with baited hooks during the process of setting and hauling back the main line, which could seriously impair their ability to fly or forage, and may result in mortality. Birds may sustain injuries, which could seriously impair their ability to fly or forage, or death from striking the trawl/sonar wires. Short-tailed albatross appear to have the greatest potential for interaction with sablefish fisheries, as at sea sighting and satellite-tracking data indicate that the birds most often frequent the continental shelf break on the U.S. Pacific Coast, areas where sablefish fisheries occur (Guy et al. 2013).

The PCGF has killed one known short-tailed albatross due to hooking and drowning on a longline hook. No additional harm to short-tailed albatross has been observed from any other regulated (Federal, State or other Nation) or non-regulated fishery in the action area. However, short-tailed albatross are susceptible to bycatch when baited hooks are accessible during foraging, particularly when setting baited hooks.

Seabird mortality related to bycatch has shown to threaten species viability in albatrosses (Weimerskirch and Jouventin 1987, Gales 1997). To reduce incidental take of short-tailed

albatross, NMFS requires vessels using longline gear in the WCGF to employ bird avoidance techniques, such as using buoy or streamer lines with performance standards specified in regulations (80 FR 71975, Figure 4). Regulations were revised in 2014 as a result of the 2012 consultation with the USFWS which included provisions to require the use of streamer lines on boats over 55 feet in length.

Following completion of the 2012 biological opinion on the PCGF (USFWS 2012), Melvin (2016) investigated the use and effectiveness of seabird deterrents in the Pacific Coast groundfish longline fleet. The study concluded that use of double streamer lines, as required by the 2012 biological opinion, were effective at minimizing seabird bycatch except when floating gear was used (Figure 6). Additionally, when comparing boat size, small and large vessels both have identical sink profiles and similar risk of incidentally hooking albatrosses.

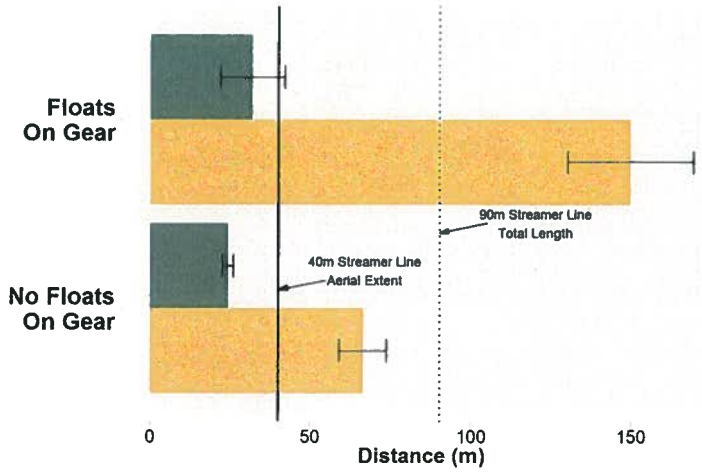

Figure 6. Distance astern at which streamers cover both floating and non-floating fishing gear; floating gear remains exposed to seabirds behind the deployed streamer line (Melvin et al. 2015).

In addition to research on streamer lines, other bird deterrent methods have been investigated since the 2012 biological opinion (Melvin 2016). One alternative deterrent reviewed was the use of lasers to prevent seabird bycatch. Laser deterrence was examined in conjunction with trawl gear "because it represented a worst-case challenge for seabird deterrence: large aggregations of birds feeding on an abundant food source (continuous offal discharge)." Results indicated that seabirds showed little detectable response to the laser beam during daylight hours. The study concluded that lasers may be more effective deterrent at low light levels and response may be species-specific.

During outreach efforts with local fishing communities, attendees suggested that night-setting was and effective means of avoiding bird bycatch (Melvin et al. 2015). Gladics et al. (2017) reviewed the effectiveness of night-setting using observer program data to compare setting time and albatross bycatch rates. Their analysis clearly indicates that night-setting reduces the rate of bycatch, particularly after civil twilight and before civil dawn (Figure 7). For this reason, setting at night is an effective alternative seabird avoidance measure to minimize impacts on short-tailed albatross.

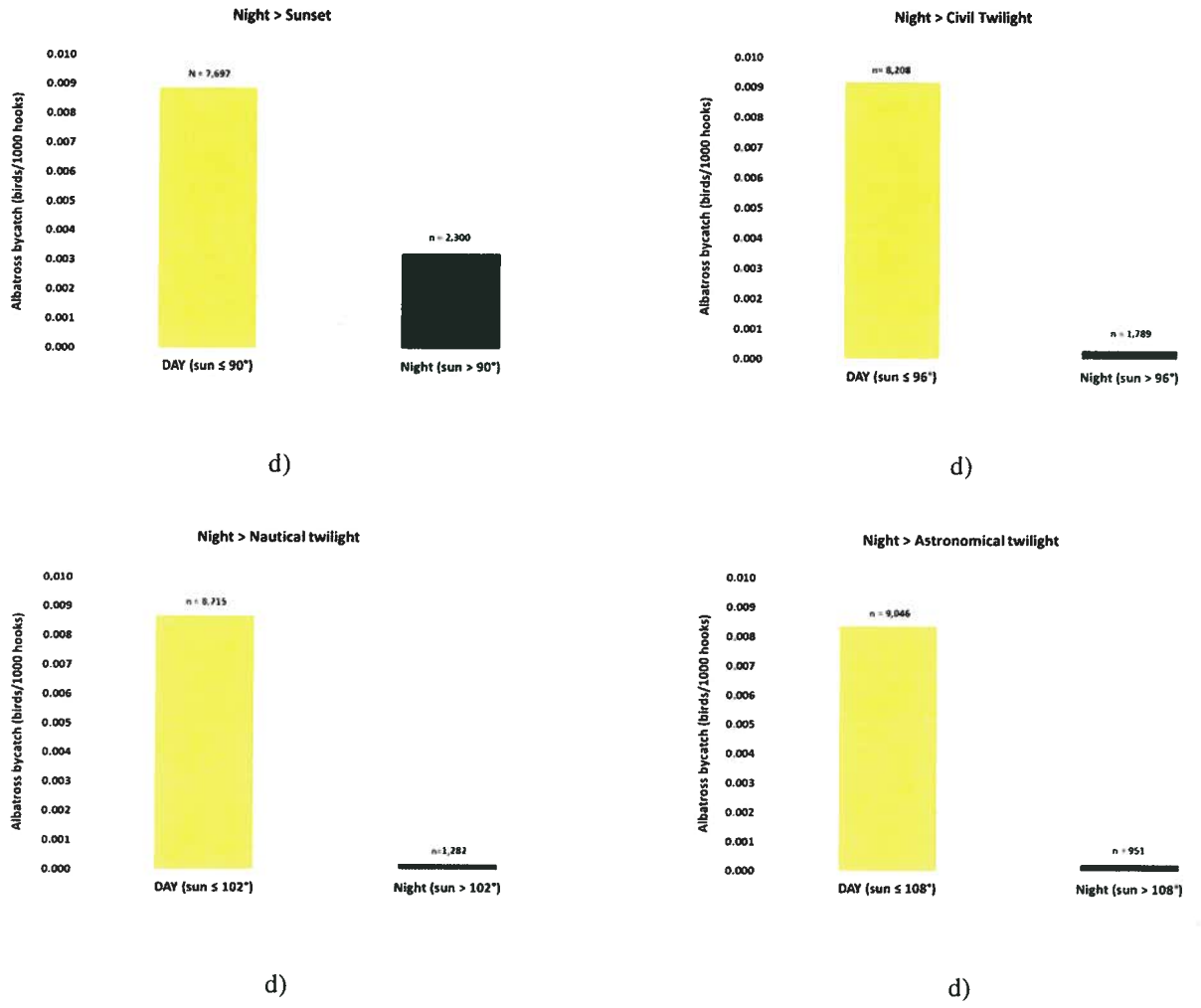

Figure 7. Albatross bycatch rate (birds caught/1000 hooks) in 9,997 sets categorized as day or night where night sets were defined as those deployed a) after sunset or before sunrise (sun angle >90°), b) after civil dusk or before civil dawn (sun angle (>96°), c) after nautical dusk or before nautical dawn (sun angle >102°), and d) after astronomical dusk or before astronomical dawn (sun angle >108°) (Gladics et al., 2017).

In addition to longline gear, hook-and-line gear may consist of handheld rods and tackle. This gear type is allowed under Federal regulations in the recreational sector. It is unlikely to affect the short-tailed albatross both because this gear type tends to be used nearer shore, outside of areas frequented by the albatross and because the nature of a rod and tackle limits the exposure of the gear to seabirds. The activity is conducted close to the vessel usually in the proximity of humans, causing the line and bait to be less attractive to seabirds than other hook-and-line gear that tends to sink slowly for a comparatively long distance aft of the vessel.

The hook-and-line fishery, particularly longline gear, may cause injury or mortality of short-tailed albatross that attack baited hooks, become hooked or entangled, and are injured or drowned. Although such an event may be relatively rarely observed, the likelihood remains given the scope of the action and the behavior and distribution of short-tailed albatrosses along the U.S. west coast. The implementation of streamers to deter seabirds will likely reduce the likelihood of injury and mortality. However, the measure is not 100 percent effective, and some parts of longlines remain accessible to seabirds beyond the aerial extent of the streamers,

especially when floating gear is in use. For these reasons, we expect the hook-and-line fishery to result in a relatively small amount of injury or mortality of short-tailed albatross.

6.1.2. Trawl groundfish fishery

The trawl fisheries on the Pacific Coast compromise a portion of the total harvest for the WCGF. Seabirds, including short-tailed albatross, are attracted to trawl vessels when fish waste from processing is discharged. Seabirds are commonly observed in large flocks around plumes with macerated discards (Figure 8). Birds attracted to the trawl vessels are at risk when the birds strike cables in the air or water or become entangled in the nets (Bartle 1991, Weimerskirch et al. 2000, Sullivan et al. 2006, Melvin et al. 2011, Guy et al. 2013). Cable interactions include trawl warps, the cables that pull the net, and data transmission cables, also called third wires (Sullivan et al. 2006, Melvin et al. 2011). The third wire is part of a trawl's sonar system, which provides a view of the area in front of the net to the mouth of the net, the water column, and target fish. Large winged birds, such as the short-tailed albatross, are more susceptible to cable strikes than smaller winged birds (CCAMLR 2006, Melvin et al. 2011). Onboard observations of birds (including Laysan albatross) colliding with the third wire have been made by researchers and observers (Labunski and Kuletz 2003, Jannot et al. 2017).

Several southern hemisphere fisheries banned the use of third wires in the early 1990's due to albatross mortality from third wire strikes (Bartle 1991, Weimerskirch et al. 2000). Warp strikes have also been documented to kill albatross in several southern hemisphere fisheries (CCAMLR 2006, Sullivan et al. 2006, Tamini et al. 2015, Parker et al 2013a). Wireless, hull mounted acoustic systems are available in place of third wire communication device; however, the third wire system is more reliable and maximizes fishing efficiency (Dietrich and Melvin 2007,

Figure 8. Flocks of seabirds trailing ships processing Pacific whiting 30 miles off the coast of Newport, Oregon (Gillson 2003).

Melvin et al. 2011). There is no documented short-tailed albatross mortality from third wire strikes.

To date, striking of trawl vessels or gear by the short-tailed albatross has not been reported by observers. However, observers on trawl vessels are rarely stationed on deck; instead they are below-deck in the fish processing area (Guy et al. 2013). The observer program in the trawl fishery is not structured to observe bycatch mortality in trawls. To be observed, the bycatch must make it into the net, which is rare if the bird strikes the third wire or warp cables. Trawl-induced mortality is difficult to quantify because birds that strike the cables often fall into the water and go unobserved (Dietrich and Melvin 2007, Zador and Fitzgerald 2008, Melvin et al. 2011, Parker et al. 2013a, Parker et al. 2013b). Anecdotal and observational information from trawl observers recorded that seabird mortality occurred, but the mortalities were not observed in samples (Labunski and Kuletz 2003).

Bycatch estimates are biased low in the trawl fishery, but determining the magnitude of the bias is difficult. Despite 100 percent observer coverage of much of the trawl fleet, the observation of the actual catch is much lower and generally focused on the ship factory, but cable-strike related mortality is not routinely monitored (Guy et al. 2013). Observers are required to document short-tailed albatross sightings (NMFS 2016). However, Melvin et al. (2011) found fisheries observers failed to detect most net mortality of any seabirds. Fishery observers detected only three in 200 trawls, while seabird observers detected 17 in 170 of those same trawls (Melvin et al. 2011), and similar lack of detection has been observed in other trawl fisheries (Parker et al. 2013a and 2103b).

As described in the biological assessment (NMFS 2016), the proposed project includes research to determine the extent to which seabirds interact with trawl cables (Jannot et al. 2017). This work was initiated in 2016 on catcher-processor vessels targeting Pacific whiting. Catcher-processor vessels targeting Pacific whiting (at-sea hake) release fish processing waste and deploy trawl gear on the same vessel, often simultaneously, thereby attracting birds to the area of aerial trawl cables where strikes result, and therefore, are expected to represent a worst-case scenario for potential injury or mortality.

Jannot et al. (2017) sampled daylight trawls to determine whether cable strikes occur, to what degree the observed strikes result in likely mortality, and of those mortalities, what proportion of the resulting carcasses are recovered. The first year of the study observed 738 heavy strikes (bird changes course, falls in water, or is dragged under water) by black-footed albatross. Based on the mortality rates for other albatrosses in other areas, they estimated that approximately 12% resulted in mortality, or 85 black-footed albatrosses were estimated to have died as a result of the cable strikes observed. Furthermore, two black-footed albatross carcasses were recovered during the study for which mortality was attributed to cable strike. Their preliminary findings were that large amounts of unaccounted for mortality could result from cable strikes in the trawl fishery, and the ongoing study will continue to examine this source of mortality to develop an unbiased estimate of the trawl-associated albatross mortality in the PCGF (Jannot et al. 2017).

Short-tailed albatross mortality is a rare event in the WCGF. However, due to the difficulty in assessing bycatch in the trawl fishery, the possibility exists that short-tailed albatross could be taken in the trawl fishery. Within the GOA and BSAI trawl fishery there have been documented Laysan albatross mortality (Labunski and Kuletz 2003). As mentioned above seabirds, including short-tailed albatross, are attracted to discards from trawl vessels. The attraction to trawl vessels

combined with the overlap of the trawl fleet with the range of the short-tailed albatross makes interactions with the fleet likely (Guy et al. 2013).

6.2 Indirect Effects

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

6.2.1. Derelict gear

Derelict fishing gear and debris lost off of fishing vessels can accumulate within the action area. Debris that floats in the water column can be consumed by seabirds, including the short-tailed albatross, when the birds are foraging. The ingestion of plastic may compromise seabirds and can result in dehydration and starvation, intestinal blockage, internal injury, and exposure to dangerous toxins (Sievert and Sileo 1993). Short-tailed albatross on Torishima commonly regurgitate large amounts of plastic debris (USFWS 2003).

Lost fishing gear, including pots, has the potential for entanglement hazards (USFWS 2008, page 30). Because this Fishery focuses on groundfish, the netting is designed to sink, and it is more likely to sink rather than to remain suspended. In the high-energy environment of the open ocean, the time over which derelict nets remain suspended may be shorter when compared to a lower energy environment like the inner Puget Sound (NRC 2007, page 15). No known harm to short-tailed albatross has occurred due to derelict gear from the PCGF.

6.2.2. Contaminants/Oil Pollution

The potential release of contaminants due to fishing activities also exists. Vessels that are damaged or sink may release oil from fuel tanks. Contaminants from onboard seafood processing discharge may also be an indirect effect. However, little research has been done to quantify the amount of contaminants in the discharge. As discussed under direct effects, the size of the discharge pieces influences whether short-tailed albatross may consume them.

6.2.3. Offal Discharge

Large flocks of seabirds are attracted to discarded waste from fish processing which increases the risk injury or mortality associated with fishing vessels in the vicinity of the discharge plume (Zador and Fitzgerald 2008). In Sullivan et al (2006), researchers found that all mortalities in their study occurred at the time of factory discharge, and is representative of the catcher-processor vessels targeting Pacific whiting (at-sea hake) sector of the PCGF.

Catcher-processor vessels targeting Pacific whiting (at-sea hake) release fish processing waste and deploy trawl gear on the same vessel, often simultaneously, thereby attracting birds to the area of aerial trawl cables where strikes result, and therefore, are expected to represent a worst-case scenario for potential injury or mortality. As previous described in "Direct Effects," interactions with trawl gear in the at-sea hake catcher-processor fleet resulted in recovery of two black-footed albatross carcasses and an estimated mortality of 85 black-footed albatrosses

(Jannot et al. 2017). Short-tailed albatrosses were not observed, as expected for such a comparatively rare species, but the species would likely be similarly susceptible to cable strikes that result in injury or mortality.

Seabird attraction to vessels varies based on the type and amount of discard. Discards from fish processing vary greatly within the fleet, with the largest of catcher processors operating fish meal plants that result in little discard, to other vessels that discard macerated offal (Zador and Fitzgerald 2008, Melvin et al. 2011). Vessels operating fish meal plants provide very little biomass in their overboard discharge and as a result attract fewer seabirds than those with macerated discharge (Melvin et al. 2011, Abraham et al. 2008). While the extent to which offal discharge impacts short-tailed albatross is unclear, the release of such discharge increases the risk of injury and mortality.

Methods observed to effectively reduce albatross strikes or bycatch include use of streamer lines, night-setting, elimination of the third wire in favor of wireless net monitoring systems, and use of a "snatch block" to reduce the aerial extent of the cable (Sullivan et al. 2006, Zador and Fitzgerald 2008, Melvin et al. 2011, Tamini et al. 2015).

6.2.4. Habitat and trophic effects

Pacific Coast groundfish fisheries target relatively large, commercially valuable fish species, including rockfish, hake, and various mid-water and bottom fish (see "Description of the fisheries" above). Short-tailed albatross feed on squid, small fish (including bonitos [Sarda sp.], flying fishes [Exocoetidae] and sardines [Clupeidae]), flying fish eggs, and crustaceans, which are generally not targeted by demersal and trawl fisheries (USFWS 2003). Indirect trophic effects of the Pacific Coast groundfish fisheries are also expected to be minor and in fact may positively affect the abundance of squid and small fishes through removal of their predators (Kaplan 2009).

6.3 Estimating short-tailed albatross bycatch in the sablefish longline fishery using a Bayesian modeling approach

To explore alternative approaches to bycatch estimation of short tailed albatross, NOAA applied statistical models to characterize uncertainty in short-tailed albatross bycatch in the LE sablefish longline fishery. Although this fishery is just a small portion of the overall action, longline fishing is the most likely activity to result in take of short-tailed albatross (see Threats, Commercial Fishing). Because only one bird was encountered as bycatch from 2002-2014, simple Bayesian models were used to estimate variances of total bycatch. These methods have been used with other rare bycatch species, including cetaceans, delphinids, pinnipeds, sea turtles, and some sharks (Martin et al. 2015). To do this, NOAA modeled bycatch rate as constant and inferred annual expected mortality, given a specified level of effort. Fleet-wide bycatch of short-tailed albatross from the sablefish longline fleet was estimated using data on observer coverage obtained from the NWFSC WCGOP (summarized in Table 6).

The general modeling approach was to use a simple Poisson process model, where the total number of bycatch events were assumed to follow a Poisson distribution,

$$n_{take\,y} \sim Poisson(\lambda y = \theta \cdot Ey),$$

where Ey represents the effort in year y, θ is an estimated bycatch rate, λy represents the mean expected bycatch, and $n_{take.}$ represents the number of observed bycatch events (or take events)

in year y. The estimated bycatch rate $\boldsymbol{\theta}$ is assumed constant through time, but the quantity $\boldsymbol{\theta \cdot Ey}$ includes uncertainty (as $\boldsymbol{\theta}$ is estimated). Thus, time series of the mean bycatch can be generated for a given species, with a given metric of effort. All uncertainty in these time series originates from fluctuating levels of effort through time (percent observer coverage only affects the expansion). We used a Bayesian model (Martin et al. 2015) to generate mean and 95 percent CIs of the parameter $\boldsymbol{\theta}$, as well as for $\boldsymbol{\theta \cdot Ey}$.

Table 6. Fishing effort, observer coverage, and short-tailed albatross observed takes in the LE sablefish fishery 2002–2014 (data from the WCGOP).

Year	Vessels (#)	Trips (#)	Sets (#)	Hooks (#)	Observed Retained Catch (mt)	Fleet-wide Landed Catch (mt)	Observer coverage (percent)	Observed STAL takes (#)
2002	25	68	391	779,624	190.79	790.75	24	0
2003	14	47	349	733,602	222.85	1,028.64	22	0
2004	17	45	320	490,342	179.08	1,305.94	14	0
2005	26	101	663	1,454,151	481.45	1,259.67	38	0
2006	19	67	469	939,951	295.90	1,368.96	22	0
2007	22	75	517	1,034,046	298.49	1,072.49	28	0
2008	18	77	539	1,244,141	330.03	1,088.53	30	0
2009		46	287	649,327	98.22	1,440.97	7	0
2010	21	143	756	1,739,950	340.18	1,290.47	26	0
2011	23	98	673	1,405,444	240.74	1,147.48	21	1
2012	17	88	532	1,580,075	227.19	1,054.97	22	0
2013	18	57	351	1,043,026	165.96	736.00	23	0
2014	17	85	486	1,174,141	199.75	737	27	0

Because observer coverage is less than 100 percent, and variable through time, we also need to expand the estimated bycatch, $\boldsymbol{\theta \cdot Ey}$, to the fleet-wide level. One approach for expansion would be to divide $\boldsymbol{\theta \cdot Ey}$ by the percent observer coverage; however, this ignores uncertainty in the expansion. We accounted for uncertainty in the expansion by treating the observer coverage and estimated bycatch ($\boldsymbol{\theta \cdot Ey}$) as known ('p', 'x', respectively) and sampling from the distribution of total bycatch (N) in proportion to the Binomial density function. This process was repeated for each Markov Chain Monte Carlo (MCMC) draw, to propagate uncertainty in the estimates through the uncertainty in the expansion.

6.4 BA Risk Assessment

The Bayesian models estimated the take risk based on the observed fleet and associated observed take. The risk assessment fit models using three different measures of fishing effort to estimate take, each of which was extrapolated using a binomial expansion to estimate the fleet-wide short-tailed albatross take :

1. Number of observed sets
2. Observed retained catch
3. Number of observed hooks.

The Bayesian modeling analyses showed that fleet-wide estimates of bycatch were very similar using the three measures of effort (Table 7). The upper confidence limit of the model with the highest anticipated bycatch is expected to represent the maximum bycatch rate of short-tailed albatross, and will ensure that we do not underestimate the injury or mortality that may occur.

The highest estimate is based on effort measured by baited hooks, which are also the primary attractant to short-tailed albatross. We expect that estimates of risks to short-tailed albatross associated with baited hooks to most closely represent the potential for bycatch to occur. The median estimated annual bycatch of short-tailed albatross is 0.425 birds/year with an upper confidence limit of 2.44 birds/year (Table 7). Therefore, in consideration of this uncertainty, we anticipated that the maximum *observed* annual bycatch in the sablefish fishery would not exceed 0.425 birds/year or a realistic observation of one bird killed or injured in longline gear in any 2-year period. Furthermore, the maximum Bayesian estimate of annual bycatch would not exceed 2.44 short-tailed albatrosses per year as a result of the continued operation of the sablefish fishery within the WCGF.

Table 7. Estimated bycatch of short-tailed albatross in the WCGF fleet (NMFS 2016).

Measure of Fishing Effort	Estimated Annual Bycatch	Upper Confidence Limit
Observed Sets	0.23 to 0.61	0.84 to 2.33
Observed Retained Catch	0.22 to 0.42	0.79 to 1.56
Observed Hooks	0.22 to 0.63	0.85 to 2.44

This bycatch rate could be affected by several factors: 1) the number of hooks deployed annually, 2) population changes in the short-tailed albatross (which is currently increasing at the rate of 7.5-8.5% annually), 3) the proportion of the fishing effort that is observed (i.e., observer coverage), or 3) incidences of observed bycatch of short-tailed albatross. If these factors occur during the duration of the proposed project, we anticipate a change in the estimated rate of bycatch. However, the impact on the rate of bycatch is expected to be relatively small and not cause large impacts to the short-tailed albatross population within the action area.

Probability-based methods are useful where actual bycatch is dominated by zeroes -- there is reduced bias from rare events, it incorporates uncertainty, and it is less reliant on assumptions, especially those involving using another species as a proxy. The resultant estimates are generally lower than proxy estimates, which were likely inflated due to assumptions of which ratio of short-tailed albatross and black-footed albatross are relevant as well as behavioral differences between the two species. The model-based Bayesian approach also reduces volatility through its formal use of all information contained in the time series, reduces arbitrary decision-making about how many years of data to combine, and it enables probabilistic inference for bycatch and mortality within years, conditional on fishing effort (Martin et al. 2015).

The actual take and the estimates of short-tailed albatross bycatch presented here are based on years prior to the implementation of consistent seabird bycatch mitigation measures, which have been shown to drastically reduce seabird bycatch in Alaskan groundfish fisheries (Melvin 2000). While some longline vessels in the groundfish fishery used streamer lines and other seabird avoidance gear voluntarily, organized efforts promoting the use of streamer lines did not begin until recently. Washington Sea Grant initiated a NMFS-supported streamer line distribution pilot program with tribal fisheries in 2009 and with non-tribal fisheries in the major longline ports in Oregon and Washington in 2010 (Gladics et al. 2017). WCGOP observers began documenting the use and characteristics of seabird avoidance gear on fixed gear vessels in 2009, and this information should be available for future analyses of bycatch of short-tailed albatross in future years.

Since the risk assessment only estimated take within the LE Sablefish sector of the PCGF, the potential for harm or mortality of short-tailed albatrosses in other sectors were not considered in this estimate. As discussed in the "EFFECTS OF THE ACTION," other longline and trawl-

related mortality or injury may occur. However, such interactions have never been observed within the PCGF, and the ability to estimate the likelihood of occurrence is problematic. We anticipate this low level of interactions and observations to continue and any such interactions would be encompassed in the conservative maximum estimated take of five birds in any two-year period, as estimated via the Bayesian model. Furthermore, given the lack of observations of injury or mortality in sectors other than the LE sablefish fishery, we believe the rate of observed injury or mortality would not exceed the estimated average of one bird in two years.

6.5 Consistency with Recovery Plan

Specific to the action area the Recovery Plan for short-tailed albatross recommends continued research on fisheries operations and mitigation measures to reduce take (Recovery Action Five). NMFS is currently supporting research to determine the impact of the trawl fishery on short-tailed albatross and measures that will reduce bycatch of short-tailed albatross specific for the PCGF. Additionally NMFS support of Washington Sea Grant has included outreach to the longline industry, and the construction and distribution of bycatch reduction devices. Outreach included training in proper use of streamer lines. These actions resulted in regulations (80 FR 71975) to install streamer lines on boat using longline gear greater than or equal to 55 feet in length.

6.6 Population Effects

The operation of the PCGF is imposing additional (non-natural) mortality on short-tailed albatross. The mortality from PCGF is very likely higher than the one mortality observed in the past 28 years (Table 2) given the difficulties associated with observing rare interactions in challenging environmental conditions. Based on the more comprehensive Bayesian analysis of these interactions across the LE sablefish sector, mortality is estimated at 2.44/year. Furthermore, interactions with trawl cables, particularly associated with vessels that simultaneously discharge offal while trawl gear is deployed, likely increase this estimated mortality. However, the fishery is 100 percent observed, and given the lack of observed short-tailed albatross strikes, it is anticipated that the associated short-tailed albatross mortality is very low. Although the likely rate of harm is uncertain and difficult to assess, we anticipate that the additional mortality would not be likely to increase the Bayesian estimate beyond the rate of 2.5/year due to the relatively small catcher-processor hake fleet (10-11 vessels/year) and the lack of observed interactions in the trawl fishery despite 100 percent observer coverage in the sector.

In addition to directly reducing the population size, harm of these individual short-tailed albatross will also result in a reduction to the population growth rate as a result of lost future reproductive success of the birds killed and the temporary loss of reproductive success of the mates of any adult birds killed by this action. A further indirect effect of albatross-fisheries interactions is the lowered future reproductive and survival potential suffered by those individuals who may suffer short- or long-term debilitating injuries that do not necessarily result in mortality.

The Short-tailed Albatross Recovery Plan reported that a population decline would occur if an additive mortality of 5-6 percent above current conditions, including ongoing mortality, was to occur (USFWS 2008, page 19). At a population of 4,996 birds, that is 249-300 birds per year above current mortality (rounded up). At an estimated mortality rate of no more than 2.5 birds per year from the continued operation of the PCGF, this is less than 1.0 percent of the additional

mortality level required to cause a decline in the species' population (i.e., 2.5 annual mortalities/249 additional yearly mortality needed x 100 = 0.98 percent). When combined with the estimated 3 birds per year expected to be taken as a result of the Alaska groundfish fishery (USFWS 2015), the total expected take of these actions will result in less than 6 birds per year, or 2.2 percent of the additional mortality level expected to cause a decline in the species' population. Therefore, the proposed action, even when considering additional anticipated mortality in Alaska, will not appreciably reduce the likelihood that the short-tailed albatross population will survive.

The current growth rate of the short-tailed albatross population is estimated at between 7.5 (USFWS 2014) and 8.5 percent (P. Sievert, pers. comm. 2017), and this growth is concurrent with the continuing operation of the PCGF. Mortality from the PCGF has and will prevent killed birds from producing young and contributing to recovery. Given that the population has increased at a rapid rate in conjunction with the operation of this fishery, and that the current estimated annual mortality is less than 2.5 birds/year, it is the USFWS's opinion that the proposed action will not appreciably reduce the likelihood of the short-tailed albatross population to recover.

Short-tailed albatross mortality and population growth rate will need to be monitored into the future to ensure that the PCGF stays within expected impacts to the species. Mortality from the PCGF is likely to change due to fishery changes, such as changes in fishing effort or gear type, and better observer coverage. Mortality may increase with a growing short-tailed albatross population, and may decrease with additional streamer line use. The population growth rate is likely to change due to changes in threats, and it is likely to slow as the population grows (for example, due to resource limitations).

Additionally, implementation of streamer lines and other sea bird bycatch reduction measures will help reduce the likelihood of a short-tailed albatross will be injured or drowned from commercial longline hooks. We believe seabird bycatch reduction methods will help to keep short-tailed albatross mortality at a low level in this Fishery, even with a growing short-tailed albatross population in this fishery and others.

7. CUMULATIVE EFFECTS

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

Whereas the action area includes state waters, the continued operation of state fisheries is being considered for cumulative effect to short-tailed albatross. Additionally state fisheries occasionally occur in the EEZ, such as the pink shrimp fishery. This situation occurs when a specific fishery is not regulated by the NMFS, is regulated by the state and the targeted species overlaps with the EEZ.

There is no documented harm to short-tailed albatross due to state fisheries. The NMFS Observer Program report included data for the following state fisheries sectors, 2002 – 2014 (Jannot et al. 2017, pages 35-45), and observed no interactions with short-tailed albatross:

- Commercial state-permitted shrimp trawl (observer coverage of 4 - 14 percent);

- Commercial California halibut (observer coverage of 3 - 100 percent);
- Commercial fixed gear state-permitted nearshore (Oregon/California)(observer coverage of 2 – 8 percent).

Unobserved fisheries include Tribal (non-hake), state fisheries not listed above, non-regulated fisheries, recreational, and research.

If we scaled down the analysis of the EEZ (3-200 nautical miles off shore) to the state waters (0-3 nautical miles), the level of expected harm would be 1.5 percent of the harm expected in Federal waters, based on area only, and likely much lower given the offshore distribution of short-tailed albatross. Based on estimated harm of about 2.44 short-tailed albatross killed per year from the proposed action in Federal waters, 1.5 percent equates to an estimated mortality of 0.0036 short-tailed albatross a year or about one short-tailed albatross every 278 years.

The short-tailed albatross is a continental shelf edge specialist. They can be relatively common nearshore, but only where upwelling hotspots occur (Piatt et al. 2006, page 7). From observer data on the Pacific Coast the short-tailed albatross appears highly associated with the breaking of the continental north from the Monterey Bay area of California (Figure 3). Within the action area, the continental shelf break occurs minimally in state waters (0-3 miles off shore).

Therefore, we have determined that due to the short-tailed albatross preferring the area of the continental shelf break and that the area of state waters, where the majority of state fishing is occurring, that there is a potential for harm, but it is extremely small.

A potential for oil spills exists in the action area which could affect short-tailed albatross.

Vessels that have sunk or been damaged in the action area may periodically release oil from fuel tanks. Historically, oil spills have occurred along the Pacific Coast of North America from a variety of sources, including shipwrecks and oil well blowouts. To date, no known deaths of short-tailed albatross can be directly attributable to oil contamination, although a significant threat exists.

Discarded plastic cigarette lighters and light sticks that drift away from longline gear, among other plastic debris, float in the water column and are consumed by seabirds while they are foraging. The ingestion of plastic may compromise seabirds and result in dehydration and starvation, intestinal blockage, internal injury, or exposure to dangerous toxins (Sievert and Sileo 1993, page 214). Both Laysan and black-footed albatross that occur within Hawaiian waters have been documented to be impacted by plastic debris.

Derelict gear will continue to accumulate in the action area, as long as fisheries continue to lose fishing gear. As cumulative effects include all other non-Federal fishing, some gear types are expected to float and pose a threat to short-tailed albatross. Although in the high energy environment that the short-tailed albatross uses, open ocean, the time derelict gear remains suspended may be shorter then in protected environments such as the Puget Sound in Washington (NRC 2007, page 15). No known harm to short-tailed albatross has occurred due to derelict gear.

Climate change is not expected to reduce the biodiversity in the Pacific Coast EEZ (Hazen et al. 2012, page 11). Therefore, climate change is not expected to directly impact prey availability for short-tailed albatross. There may be indirect effects from climate change due to more top predators moving into the action area to take advantage of this stable area of biodiversity.

Increase in top predators may lead to greater competition for prey and/or may result in more predation from sharks. Sharks may scavenge albatross that have been already injured or killed within the action area, but the actual effect of this activity on short-tailed albatross cannot be quantified at this time. The potential impact to short-tailed albatross from greater competition for prey also cannot be quantified at this time. Therefore, USFWS is unable to predict the extent that climate change will have on short-tailed albatross within the action area.

As the potential harm to short-tailed albatross from state fisheries and other threats in the action area are extremely small, USFWS does not believe that cumulative impacts change the expected population growth rates from those discussed above.

8. CONCLUSION

After reviewing the current status of the short-tailed albatross, the environmental baseline for the action area, the effects of the proposed action on the short-tailed albatross, and the cumulative effects, it is the USFWS's biological opinion that the activity, as proposed, is not likely to jeopardize the continued existence of the short-tailed albatross.

Our findings are based on the following assumptions and factors: (1) the proposed action is likely to result in interactions between short-tailed albatross and PCGF causing injury or mortality to individuals attempting to steal bait from hooks during longline setting and haulback, or from striking trawl cables or the sonar cable; (2) calculations of the rate at which injuries or mortalities are likely to occur from PCGF indicate that approximately fewer than five short-tailed albatross is likely to suffer injury or death in any two-year period in the action area; (3) other methods of fishing not covered by the NMFS Observer Program proposed to be implemented through the proposed action have a very low likelihood of adverse effects rising to the level of significant injury or death to the short-tailed albatross; and (4) the estimated rate of injury or death of the species will not preclude the survival or recovery of the species, nor substantially delay the rate at which the species could recover in the absence of this injury or mortality.

This conclusion is consistent with the Short-tailed Albatross Recovery Plan with states that the short-tailed albatross are not declining due to seabird bycatch in commercial fisheries (USFWS 2008, page 19), including the recommendation to continue to collect bycatch information to contribute to detection of deleterious population-level effects (USFWS 2008).

INCIDENTAL TAKE STATEMENT

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

intended as part of the agency action is not considered to be a prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by NMFS so that they become binding conditions of any grant or permit issued to any applicant, as appropriate, for the exemption in section 7(o)(2) to apply. NMFS have a continuing duty to regulate the activities covered by this Incidental Take Statement. If NMFS (1) fails to assume and implement the terms and conditions or (2) fails to require cooperators to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, NMFS must report the progress of the action and its impact on the species to the USFWS as specified in this Incidental Take Statement. [50 CFR §402.14(i)(3)]

9. AMOUNT OR EXTENT OF TAKE

The USFWS anticipates take of no more than one short-tailed albatrosses in two years or an average estimated take (calculated via the Bayesian model described in sections 6.3 and 6.4, pages 40-39) of no more than five birds per two-year period as a result of this continuing action. The incidental take is expected to be in the form of injury and mortality, due to bird injured or drowned as a result of encounters with hook and line groundfish gear, or taken by collision with trawl gear, including the third wire and warp cables.

To account for interannual variability in actual take levels, a floating two-year period beginning on January 1, 2017, will be used to quantify the observed and estimated total reported take in each two-year period. Incidental take should not exceed an estimated five albatross in a two-year period or 1 observed albatross in a two-year period.

10. EFFECT OF THE TAKE

In the accompanying biological opinion, the USFWS determined that this level of anticipated take is not likely to result in jeopardy to the species.

11. REASONABLE AND PRUDENT MEASURES

The USFWS believes the following reasonable and prudent measures (RPM) are necessary and appropriate for NMFS to minimize take of short-tailed albatross:

RPM 1. NMFS shall minimize the risk of short-tailed albatross interacting with hooks and lines. Because short-tailed albatross are caught and killed by baited hooks in longline fisheries, minimization measures shall be employed to reduce the likelihood that they will attack the baited hooks.

RPM 2. NMFS shall minimize the risk of short-tailed albatross interacting with trawl cables. Because short-tailed albatross are vulnerable to striking aerial trawl cables, particularly in the catcher-processor fleet, minimization measures shall be explored and implemented to reduce the likelihood that they interact with trawl gear.

RPM 3. NMFS shall continue to convene a multi-stakeholder, Pacific Coast Groundfish and Endangered Species Working Group as an advisory body to the NMFS and USFWS for the purposes of reducing risk to short-tailed albatross. This group will work toward

eliminating data gaps and facilitate adaptive management to minimize and avoid take of short-tailed albatross.

RPM 4. NMFS shall monitor and report all observed, reported and estimated take of short-tailed albatross interactions with fishing vessels and gear within the PCGF, and evaluate and report on the efficacy of avoidance and minimization measures.

RPM 5. NMFS shall facilitate the salvage of short-tailed albatross carcasses taken in the PCGF. Because of their rarity and unique life history traits, every effort should be made to retain short-tailed albatross carcasses for scientific and educational purposes.

12. TERMS AND CONDITIONS

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

Terms and conditions include monitoring, review, reporting, (see 50 CFR 402.14(i)(3)) and disposition of specimens (see 50 CFR 402.14(i)(1)(v)).)

1. T&C 1 for RPM 1

To ensure the effectiveness of the existing regulations (50 CFR Part 660.61; NMFS 2015a), NMFS shall:

a. Amend or refine regulations to mandate vessels that use the longline gear to:

   i) Employ streamer lines in the commercial longline fishery of the PCGF consistent with the Alaska streamer line regulations for Federal waters, including the use of single streamer lines on boats 26-55 feet in length, OR

   ii) Set longlines after civil sunset

b. Conduct research that investigates:

   i) new or improved methods of reducing bycatch of short-tailed albatross that are safe and effective within the longline fishery.

   ii) the effect of floating gear on albatross bycatch and improved methods to minimize risk of bycatch.

   iii) vessel effect on seabird bycatch, and determine, if feasible, whether the use of additional minimization measures would further reduce bycatch for individual vessels.

   iv) If new information is revealed that determines that this T&C should be updated, the BO shall be amended, as appropriate.

c. NMFS shall implement regulation amendments as soon as practical, but initiation of implementation shall not exceed a three-year period after issuance of this biological opinion.

d. Continue to provide assistance to the Tribes with implementation of streamer use on tribal vessels, and shall encourage and assist with the development of Tribal regulations requiring streamer use as information and resources become available.

1. T&C 2 for RPM 1

To ensure appropriate implementation of measures that minimize seabird take, NMFS shall:

a. Distribute bulletins to permit holders covering vessel instructions for proper use of streamer lines. Additional topics that shall be covered the materials include:

   i) Status of short-tailed albatross population and observations of the species in the vicinity of the PCGF fishing area.

   ii) Short-tailed albatross notification requirements (see T&C 1 for RPM 5).

   iii) Disposition of short-tailed albatross specimens (see T&C 2 for RPM 5).

2. T&C 1 for RPM 2

To minimize the risk of short-tailed albatross interacting with trawl cables, NMFS shall:

a) Continue to conduct research that investigates the extent of take associated with trawl gear and new or improved management actions that minimize take as a result of interactions with trawl gear in the PCGF. Management actions that should be examined include:

   i) The use and effectiveness of streamer lines when using trawl gear;

   ii) The degree to which minimizing the aerial extent of trawl cables affects the risk of bird strike; and

   iii) Feasible offal management techniques that decrease attraction of short-tailed albatross to the vicinity of aerial lines.

b) Based on the research and findings of NMFS's investigations into trawl-associated mortality or injury, implement measures that minimize potential for short-tailed albatross interactions with trawl gear.

3. T&C 1 for RPM 3

To ensure effectiveness of the established PCGF Endangered Species Workgroup (ESA Workgroup), NMFS shall:

a. At a minimum, convene formally on a biennial basis and informally annually, as needed, to consider all new information, compliance with these terms and conditions, and results of take estimation (see T&C 3 for RPM 3).

b. Consider recommendations made by the ESA Workgroup regarding changes to the PCGF that are intended to reduce risk of harm to short-tailed albatross (e.g., new analyses or reports, changes to sampling protocols, additional conservation measures to implement, updating species risk assessments, recommendations regarding compliance with these terms and conditions, and advise if reinitiation is warranted).

c. Make ESA Workgroup recommendations available to USFWS and PFMC.

4. T&C 2 for RPM 3

NMFS shall update methods for the BA's risk assessment for short-tailed albatross as recommended by the ESA Workgroup or when reinitiation of consultation is required. Consider the following information when developing future estimates:

a. Current available data from short-tailed albatross telemetry work.

b. NMFS Groundfish observer program's data on all observed short-tailed albatross vessel and gear interactions and information on injured and killed short-tailed albatross.

c. Any additional reports by other NMFS managed fisheries operating in the action area of short-tailed albatross vessel and gear interactions and information on injured and killed short-tailed albatross.

d. PCGF fishing effort.

e. NMFS shall report on information provided to vessel operators regarding measures minimizing seabird take.

5. T&C 3 for RPM 3

NMFS shall consult with the ESA Workgroup and USFWS to consider methods to improve the estimates of incidental take of short-tailed albatross in unobserved fisheries.

6. T&C 1 for RPM 4

To ensure monitoring and reporting of all observed and reported interactions with fishing vessels and gear; estimate take of short-tailed albatross within the Pacific Coast Groundfish Fisheries; and evaluate and report on the efficacy of avoidance and minimization measures NMFS shall update the WCGOP to include specific guidance for endangered or threatened species, namely:

a. Develop procedures to improve observers' prioritization of short-tailed albatrosses observations in the existing WCGOP.

b. Require WCGOP to collect the following information:

- Time of initiation and completion of observed set
- Number of hooks deployed with each observed set.
- Configuration of the gear used, particularly whether using floating or sinking gear.

c. Maintain observer coverage in the OA Fixed Gear and Limited Entry Sablefish fisheries at or above historic levels.

7. T&C 2 for RPM 4

To provide information that is unavailable on unobserved vessels, NMFS shall:

a. Implement a logbook requirement for longline fisheries, especially for those fisheries with low observer coverage rates as recommended by the Pacific Fisheries Management Council (2015), the Pacific Coast Groundfish ESA Workgroup (2015), and GMT (2012), or at a minimum, develop methods to provide better record of gear type deployed, time of day for gear deployment, and overall effort (i.e., number of hooks).

b. This information shall be utilized to improve the short-tailed albatross risk assessment for these fisheries to and reported annually with the updated risk assessment.

8. T&C 3 for RPM 4

NMFS shall complete a biennial report to be submitted to State Supervisor, USFWS, 2600 SE 98th Ave, Suite 100, Portland, OR 97266, and to the Pacific Coast Groundfish and Endangered

Species Workgroup. The report shall include any pertinent new information and document effects of the PCGF on endangered or threatened species:

9. T&C 1 for RPM 5

Report and continue to require observers and commercial fishers report all mortality and injury of short-tailed albatross to:

Office	Phone Number
Newport Field Office Supervisor, Newport Oregon	Weekdays: 541-867-4558, x. 237 Cell: 541-961-6904
Law Enforcement	503-682-6131

10. T&C 2 for RPM 5

NMFS shall disseminate the following short-tailed albatross disposition instructions to fishers and observers within the PCGF.

1. If a dead, injured, or sick short-tailed albatross individual is located, call USFWS 503-231-6179 for handling and disposition instructions. If an observer is on board, they shall be responsible for the disposition of dead, injured, or sick birds, otherwise the boat captain shall be responsible.
2. Care should be taken in handling sick or injured specimens to ensure effective treatment and in the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured short-tailed albatross or preservation of biological materials from a dead animal, the boat captain or observer has the responsibility to carry out instructions provided by USFWS to ensure that the specimen is not unnecessarily disturbed.
3. Live birds must be retained in a safe location. Release overboard shall occur if it looks normal and exhibits all of the following traits: the bird is capable of holding its head erect, and the bird responds to noise and motion stimuli; the bird breathes without noise; the bird can flap both wings, and it can retract the wings to a normal folded position on the back; and the bird is capable of elevating itself to stand on both feet, with its toes pointed in the proper direction (forward); and it is dry.
4. Injured or sick albatross are to be retained in a safe location.
5. Dead short-tailed albatross must be frozen immediately, with identification tags attached directly to the carcass, and a duplicate identification tag attached to the bag or container holding the carcass. Ideally, the specimen should be frozen at -40 degrees Fahrenheit. Identification tags must include all of the following information: species, date of mortality, name of vessel, location (latitude and longitude) of mortality, observer or captain's name (or both), and any band numbers and colors if the specimen has any leg bands. Leg bands must remain attached to the bird.
6. If the bird is retained alive or dead, it must be surrendered as soon as possible as directed by the USFWS.

The USFWS believes that a yearly average of one short-tailed albatross will be incidentally taken as a result of the proposed action. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of

incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the USFWS the need for possible modification of the reasonable and prudent measures.

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

13. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by implementing conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities designed to minimize or avoid adverse effects of a proposed action on listed species or designated critical habitat, to assist in the implementation of recovery plans or to obtain information.

The USFWS believes the following conservation recommendation will reduce the impact of the proposed action on short-tailed albatross within the action area:

- Calculate observer coverage level within the PCGF that will provide adequate data to predict harm to short-tailed albatross within a reasonable tolerance.
- In order for the USFWS to be kept informed of actions that minimize or avoid adverse effects or benefit listed species or their habitats, the USFWS requests notification regarding the implementation of any conservation recommendation.

14. REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your Biological Assessment. As provided in (50 CFR § 402.16), reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agencies' action that may affect listed species or critical habitat in a manner or to an extent not considered in this BO; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this BO; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation of formal consultation.

LITERATURE CITED

Alverson, R. 2011. Letter from the Fishing Vessel Owners, Association to the Pacific Fishery Management Council Re: Short-tailed Albatross. August 24, 2011. 1p.

Atkinson, I.A.E. 1985. The spread of commensal species of *Rattus* to oceanic islands and their effects on island avifaunas. Pp. 35-81 in: P.J. Morrs (ed.) Conservation of island birds. International Council of Bird Preservation Tech.

Austin, O.L. 1949. The Status of Steller's Albatross. Pacific Science 3: 283-295.

Bartle, J.A. 1991. Incidental capture of seabirds in the New Zealand subantarctic squid trawl fishery, 1990. Bird Conservation International 1:351-359.

California Department of Fish and Wildlife. 2017. 2017 California Commercial Fishing. California Department of Fish and Wildlife. Website Accessed April 17, 2017: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=140621&inline

[CCAMLR] Commission for the Conservation of Antarctic Marine Living Resources. 2006. Report of the twenty-fifth meeting of the Scientific Committee (SC-CAMLR-XXV). Annex 5, Appendix D. Commission for the Conservation of Antarctic Marine Living Resources, Hobart.

[COSEWIC] Committee on the Status of Endangered Wildlife in Canada. 2014. COSEWIC Assessment and Status Report on the Short-tailed Albatross *Phoebastria albatrus* in Canada - 2013. November 20, 2014. Government of Canada. Accessed January 25, 2017: http://www.sararegistry.gc.ca/default.asp?lang=En&n=DA30D568-1#_06_4

Cury, P.M., I.L. Boyd, S. Bonhommeau, T. Anker-Nilssen, R.J.M. Crawford, R.W. Furness, J.A. Mills, E.J. Murphy, H. Österblom, M. Paleczny, J.F. Piatt, J. Roux, L. Shannon, and W.J. Sydeman. 2011. Global seabird response to forage fish depletion—one-third for the birds. Science 334:1703-1706.

Deguchi, T., F. Sato, M. Eda, H. Izumi, H. Suzuki, R.M. Suryan, E.W. Lance, H. Hasegawa, and K. Ozaki. Translocation and hand-rearing result in short-tailed albatrosses returning to breed in the Ogasawara Islands 80 years after extirpation. Animal Conservation. 2016:1-9.

Dietrich, K.S. and E.F. Melvin. 2007. Alaska Trawl Fisheries: Potential Interactions with North Pacific Albatrosses. WSG-TR 07-01. Washington Sea Grant, Seattle, WA.

Dietrich, K. S., and S. Fitzgerald. 2010. Analysis of 2004-2007 Seabird Catch Data in Alaska Demersal Longline Fisheries. Saving North Pacific Seabirds: Can Alaska's Demersal Groundfish Longline Fishers Improve Their Performance? Alaska Fisheries Science Center Processed Report 2010-04.

Emura, N. W. Furuya, H. Ando, and T. Deguchi. Monitoring of Avifauna to Estimate the Effect of Ecological Restoration in Mukojima, Bonin Islands. Journal of the Yamashina Institute for Ornithology. 46:89-100.

ESA Workgroup (Pacific Coast Groundfish Endangered Species Workgroup). 2015. Supplemental Groundfish ESA Workgroup Report, Agenda Item D.4a. Report to Pacific Fisheries Management Council, June 2015, Spokane, WA. 10 pp.

Gales, R. 1997. Albatross populations: status and threats. in G. Roberson and R. Gales, editors. Albatross Biology and Conservation. Surrey Beatty & Sons Pty Limited, Chipping Norton, New South Wales, Australia. pp. 20-45.

Gillson, G. (2003). Virtual pelagic trip: Perpetua Bank. Retrieved September 30, 2015, from The Bird Guide: http://thebirdguide.com/pelagics/photo_trip.htm

Gilman, E., N. Brothers, and D. Kobayashi. 2005. Principles and approaches to abate seabird bycatch in longline fisheries. Fish and Fisheries 6(1): 35-49.

Gladics, A.J., E.F. Melvin, R.M. Suryan, T.P. Good, J.E. Jannot, T.J. Guy. 2017. Preventing Albatross Bycatch in the West Coast Sablefish Longline Fishery. Manuscript submitted for publication.

Good, T.P., E. Ward, V. Tuttle, J. Jannot, R. Sharma, N. Riley, and J. McVeigh. Observed and Estimated Bycatch of Short-tailed Albatross in U.S. West Coast Groundfish Fisheries 2014-2015. Northwest Fisheries Science Center, National Marine Fisheries Service, Seattle, WA. 20 pp.

Guy, T.J., S.L. Jennings, R.M. Suryan, E.F. Melvin, M.A. Bellman, L.T. Ballance, B.A. Blackie, D.A. Croll, T. Deguchi, T.O. Geernaert. 2013. Overlap of North Pacific albatrosses with the U.S. west coast groundfish and shrimp fisheries. Fisheries Research. 147:222-234.

Hasegawa, H. and A. DeGange. 1982. The short-tailed albatross *Diomedea albatrus*, its status, distribution and natural history. American Birds 6: 806-814.

Hazen, E.L., S. Jorgensen, R.R. Rykaczewski, S.J. Bograd, D.G. Foley, I.D. Jonsen, S.A. Shaffer, J.P. Dunne, D.P. Costa, L.B. Crowder, and B.A. Block. 2012. Predicted habitat shifts of Pacific top predators in a changing climate. Nature Climate Change (2012) doi:10.1038/nclimate1686. www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate1686.html Published online 23 September. PDF 21pp.

Jannot, J., E. Heery, M. Bellman, and J. Majewski. 2011. Estimated bycatch of marine mammals, seabirds, and sea turtles in the US west coast commercial groundfish fishery, 2002-2009. West Coast Groundfish Observer Program. National Marine Fisheries Service, Northwest Fisheries Science Center, 2725 Montlake Blvd E., Seattle, WA 98112.

Jannot, J.E., V. Tuttle, K. Somers, Y.W. Lee, and J. McVeigh. 2016. Marine Mammal, Seabird, and Sea Turtle Summary of Observed Interactions, 2002-2014. Northwest Fisheries Science Center, National Marine Fisheries Service, NOAA, Seattle, WA. 48 pp.

Jannot, J., T. Good, E. Melvin. 2017. Unobserved Seabird Interactions with Trawl Cables on U.S. West Coast Pacific Hake At-Sea Catcher Processor Vessels. Proected Sepceise Assessment Workshop. Seattle, WA, January 17-19, 2017.

Labunski, E.A. and K.J. Kuletz. 2003. Guide to the seabird observer notes database: a summary of NMFS groundfish fishery observer notes on seabirds. U.S. Fish and Wildlife Service unpublished report, Anchorage, AK.

Melvin, E.F. 2016. Final Report: Albatross conservation in the west coast longline fishery for sablefish. Washington Sea Grant, University of Washington, Seattle, WA. 11 pp.

Melvin, E.F., J. Parrish, K.S. Dietrich, and O.S. Hamel. 2001. Solutions to seabird bycatch in Alaska's demersal longline fisheries. Washington Sea Grant Program. Project A/FP-7. 53 pp. Accessed January 25, 2017: https://wsg.washington.edu/community-outreach/fisheries/seabird-publications/

Melvin E.F., K.S. Dietrich, S. Fitzgerald, and T. Cardoso. 2011. Reducing seabird strikes with trawl cables in the pollock catcher-processor fleet in the eastern Bering Sea. Polar Biology 34:215–226.

Melvin, E.F., T.J. Guy, R.M. Suryan, and A.J. Gladics. 2015. Preventing Albatross Bycatch in the West Coast Sablefish Longline Fishery. Presentation to the Pacific Fisheries Management Council, April 11-16, 2015, Rohnert Park, CA. http://www.pcouncil.org/wp-content/uploads/2015/04/F1a_SupSeaGrantPPT_Melvin_Seabirds_APR2015BB.pdf>. Accessed February 7, 2017.

NRC (Natural Resources Consultants, Inc.). 2007. Final report: Olympic Coast National Marine Sanctuary Derelict Fishing Gear Removal Project. December 28, 2007. 20 pp.

NMFS (National Marine Fisheries Service). 2004. Final Rule: Fisheries of the Exclusive Economic Zone off Alaska; Halibut Fisheries in U.S. Convention Waters Off Alaska; Management Measures to Reduce Seabird Incidental Take in the Hook-and-Line Halibut and Groundfish Fisheries. Federal Register 69:1930-1951.

NMFS (National Marine Fisheries Service). 2009. Final Rule: Groundfish Fisheries of the Bering Sea and Aleutian Islands Management Area and Gulf of Alaska, Seabird Avoidance Requirements Revisions for International Pacific Halibut Commission Regulatory Area 4E. Federal Register 74:13555-13559.

NMFS (National Marine Fisheries Service). 2011. Biological Assessment Continued Operation of the Hawaii-based Pelagic Longline Fisheries. Sustainable Fisheries Division, Pacific Islands Regional Office, National Marine Fisheries Service, Honolulu, Hawaii. July 12, 2011. 73 p.

NMFS (National Marine Fisheries Service) and USFWS (U.S. Fish and Wildlife Service). 2012. Memorandum of Understanding between NMFS and USFWS. June 14, 2012. 17pp.

NMFS (National Marine Fisheries Service). 2014a. NOAA Fisheries Information Bulletin 14-49: NMFS Reports the Incidental Take of a Short-Tailed Albatross in the BSAI Hook-and-Line Groundfish Fishery, September 16, 2014. Sustainable Fisheries Division, Alaska Fisheries Science Center. <https://alaskafisheries.noaa.gov/node/20820>. Website accessed on February 6, 2107.

NMFS (National Marine Fisheries Service). 2014b. NOAA Fisheries Information Bulletin 14-52: NMFS Reports the Second Take of a Short-Tailed Albatross in the BSAI Hook-and-Line Groundfish Fishery, October 3, 2014. Sustainable Fisheries Division, Alaska Fisheries Science Center. < https://alaskafisheries.noaa.gov/node/17182> Accessed February 6, 2017.

NMFS (National Marine Fisheries Service) 2015a. Final rule: Fisheries Off West Coast States; PCGF; Seabird Avoidance Measures. Federal Register 80: 71975 – 71981.

NMFS (National Marine Fisheries Service). 2015b. NOAA Fisheries Information Bulletin 15-31. NMFS Reports the Incidental Take of a Short-Tailed Albatross in the BSAI Hook-and-Line Groundfish Fishery, May 20, 2105. Sustainable Fisheries Division, Alaska Fisheries Science Center. <https://alaskafisheries.noaa.gov/node/28260)>. Website accessed on February 6, 2107.

NMFS (National Marine Fisheries Service) 2015c. Programmatic Biological Assessment on the Effects of the Fishery Management Plans for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries and the State of Alaska Parallel Groundfish Fisheries on the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and the Threatened Alaska-breeding Population of the Steller's Eider (*Polysticta stelleri*). National Marine Fisheries Service, Alaska Region, Juneau, Alaska. 76 pp.

NMFS (National Marine Fisheries Service). 2016. Biological Assessment on the Continued Operation of the Pacific Coast Groundfish Fisheries, with appendices. Northwest Region, Seattle, WA. December 13, 2016.

NOAA (National Oceanic and Atmospheric Administration). 2017. NOAA Fisheries Pacific Coast Fisheries Permit System. NMFS, West Coast Regional Office. Website accessed on 1/10/2017. (https://www.webapps.nwfsc.noaa.gov/apex_ifq/f?p=112:23:::NO:::)

NWFSC (Northwest Fisheries Science Center). 2016. West Coast Groundfish Observer Program 2016 Catch Shares Training Manual. West Coast Groundfish Observer Program. NWFSC, 2725 Montlake Blvd. East, Seattle, Washington, 98112.

Oregon Department of Fish and Wildlife (ODFW). 2017. Oregon Administrative Rules: Division 004, Commercial Fisheries Other Than Salmon or Shellfish. Oregon Department of Fish and Wildlife, Salem, OR. Accessed on April 17, 2007, at http://www.dfw.state.or.us/OARs/04.pdf

Pacific Fishery Management Council. 2015. Council Meeting Record, Non-Salmon ESA Report. Agenda Item D.4. Pacific Fisheries Management Council, Spokane, WA, June 10-16, 2015. <http://www.pcouncil.org/wp-content/uploads/2015/12/June2015_Final_CouncilMeetingRecord.pdf> . Accessed February 7, 2017.

Pacific Fisheries Management Council. 2016. Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery. Portland, OR. 148 pp.

Parker, G., P. Brickle, S. Crofts, J. Pompert, and A. Wolfaardt. 2013a. Research into undetected seabird mortality in a demersal trawl fishery. Agreement on the Conservation of

Albatrosses and Petrels (ACAP): Fifth Meeting of the Seabird Bycatch Working Group. La Rochelle, France, 1-3 May 2013. 11 pp.

Parker, G. S. Crofts, J. Pompert, A. Wolfaardt, and P. Brickle. 2013b. In the wake of a factory trawler: Research into undetected seabird mortality. Unpublished Report, Falkland Islands Fisheries Department. Stanley, Falkland Islands. 25 pp.

Piatt, J.F., J. Wetzel, K. Bell, A.R. DeGange, G.R. Balogh, G.S. Drew, T. Geernaert, C. Ladd, and G.V. Byrd. 2006. Predictable hotspots and foraging habitat of the endangered short-tailed albatross (Phoebastria albatrus) in the North Pacific: implications for conservation. Deep Sea Research II 53: 387-398.

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

Sanger, G.A. 1972. The recent pelagic status of the short-tailed albatross (*Diomedea albatrus*). Biological Conservation 4(3): 186-193.

Sievert, P. 2012. STAL population estimates. Email to Bridgette Tuerler on 10/19/2012. Word document attached, STAL Pops Data_2012 Biol Opinion.doc. 1p.

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

Sullivan, B.J., T.A. Reid, L. Bugoni. 2006. Seabird mortality on factory trawlers in the Falkland Islands and beyond. Biological Conservation 131:495-504.

Suryan, R.M., G.R. Balogh, and K.N. Fischer. 2007. Marine Habitat Use of North Pacific Albatross During the Non-breeding Season and Their Spatial and Temporal Interactions with Commercial Fisheries in Alaska. North Pacific Research Board Project 532 Final Report. 69pp.

Tamini, L.L., L.N. Chavez, M.E. Góngora, O. Yates, F.L. Rabufetti, and B. Sullivan. 2015. Estimating mortality of black-browed albatross (*Thalassarche melanophris*, Temminck, 1828) and other seabirds in the Argentinean factory trawl fleet and the use of bird-scaring lines as a mitigation measure. Polar Biology (2015) 38:1867-1879.

Taylor, R.H., G.W. Kaiser, and M.C. Drever. 2000. Eradication of Norway Rats for Recovery of Seabird Habitat on Langara Island, British Columbia. Restoration Ecology 8: 151.

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

USFWS (U.S. Fish and Wildlife Service). 2000. Final Rule To List the Short-Tailed Albatross as Endangered in the United States. Federal Register, July 31, 2000. 46643- 46654.

USFWS. 2003. Programmatic Biological Opinion on the Effects of the Total Allowable Catch Setting Process for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries to the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and Threatened Steller's Eider (*Polysticta stelleri*). Anchorage Fish and Wildlife Field Office. Anchorage, AK. 42 pp.

USFWS (U.S. Fish and Wildlife Service). 2008. Short-tailed albatross recovery plan. Anchorage, AK, 105 pp.

USFWS (U.S. Fish and Wildlife Service). 2009. Short-tailed Albatross 5-Year Review. Anchorage, AK, 78 pp.

USFWS (U.S. Fish and Wildlife Service). 2012. Biological Opinion Regarding the Effects of the Continued Operation of the Pacific Coast Groundfish Fishery. Portland, Oregon. 48 pp.

Weimerskirch, H.D., D. Capdeille, G. Duhamel. 2000. Factors affecting the number and mortality of seabirds attending trawlers and long-liners in the Kerguelen area. Polar Biology 23:236-249.

Weimerskirch, H. and P. Jouventin. 1987. Population dynamics of the wandering albatross, *Diomedea exulans*, of the Crozet Islands - causes and consequences of the population decline. Oikos 49:315-322.

Yamashina Institute of Ornithology. 2011. Short-tailed albatross band recoveries through August 2011. Spreadsheet. 2p.

PERSONAL COMMUNICATIONS

Deguchi, Tomohiro. Researcher, Division of Avian Conservation, Yamashina Institute for Ornithology, Report to Short-tailed Albatross Recovery Team and emails. March 23, 2017.

Sievert, Paul R., Phd. Department of Environmental Conservation, University of Massachusetts. Presentation to the Short-tailed Albatross Recovery Team on the Population Growth of the Short-tailed Albatross. Tacoma, WA February 21, 2017.

APPENDIX A

1. CALIFORNIA LEAST TERN

The California least tern (*Sterna antillarum browni*) is the smallest of the North American terns and is found along the Pacific Coast of California, from San Francisco southward to Baja California. Critical habitat has not yet been designated for this species.

This species occurs in the part of the action area that will be subjected to boat traffic associated with the proposed action. Interactions with boat traffic are not identified as threats to the species within the Recovery Plan for the California Least Tern. The direct impact from boat traffic may affect, but are not likely to adversely affect California least terns.

California least tern are surface feeding birds, preying on a variety of small fishes in shallow waters. When breeding, they forage within a few hundred meters of the colony in waters < 18 m deep. The BA's Risk Assessment estimates that small pelagic fish are expected to increase in their abundance due to continuation of the PCGF. NMFS concluded that the indirect impacts from this Fishery may affect, but are not likely to adversely affect California least terns.

The USFWS concurs with NMFS that the proposed action is not likely to adversely affect California least terns, because adverse interactions with vessels and forage depletion are extremely unlikely to occur.

2. SOUTHERN SEA OTTER

Southern sea otters (*Enhydra lutris nereis*) are the smallest species of marine mammals in North America. They occupy nearshore waters along the mainland coastline of California from San Mateo County to Santa Barbara County. A small colony of southern sea otters also exists at San Nicolas Island, Ventura County, as a result of translocation efforts initiated in 1987. Critical habitat has not yet been designated for this species.

This species occurs in the part of the action area that will be subjected to boat traffic associated with the proposed action. Interactions with boat traffic are not identified as threats to the species. The direct impact from boat traffic may affect, but are not likely to adversely affect Southern sea otters.

The PCGF does not appear to compete with sea otters for prey species. Trophic models presented in the BA's Risk Assessment suggest that the Fishery is unlikely to affect the sea otters due to food web interactions. The indirect impacts from this Fishery may affect, but are not likely to adversely affect Southern sea otters.

The USFWS concurs with NMFS that the proposed action is not likely to adversely affect southern sea otters, because adverse interactions with vessels and forage depletion are extremely unlikely to occur.

3. BULL TROUT

Bull trout (*Salvelinus confluentus*) are members of the family Salmonidae and are a char native to Washington, Oregon, Idaho, Nevada, Montana and western Canada. This species and its critical habitat occur in the part of the action area that will be subjected to boat traffic associated with the proposed action. Interactions with boat traffic are not expected. Indirect impacts to bull trout's food base, which includes forage fish (USFWS 2010, page 63931), may occur. The BA's

Risk Assessment estimates that small pelagic fish are expected to increase in their abundance due to continuation of the PCGF.

No habitat modifications will occur with the proposed action.

The USFWS concurs with NMFS that the proposed action is not likely to adversely affect bull trout, because adverse interactions with vessels and forage depletion are extremely unlikely to occur.

4. BULL TROUT CRITICAL HABITAT

Critical habitat was designated for bull trout in 2010. Marine waters, including coastal rivers, estuaries, and nearshore waters, provide bull trout access to a productive forage base and to overwintering areas protected from extreme flow events. The "marine" foraging, migration, and associated overwintering habitats are important to bull trout in the Olympic Peninsula for maintaining diversity of life history forms and for providing access to productive forage areas. Critical habitat is designated for a very narrow band of shallow water off the Washington coast, and does not occur within the EEZ.

Boat traffic through critical habitat will not modify critical habitat. Indirect impacts to primary constituent element number three, which includes an abundant food base of forage fish (USFWS 2010, page 63931), may occur. The BA's Risk Assessment estimates that small pelagic fish are expected to increase in their abundance due to continuation of the PCGF.

The USFWS concurs with NMFS that the proposed action is not likely to adversely affect bull trout critical habitat, because adverse interactions of primary constituent elements with vessels and forage depletion are extremely unlikely to occur.

5. MARBLED MURRELET

The marbled murrelet (*Brachyramphus marmoratus*) is a small long-lived diving seabird that nests mainly in canopy of mature and old-growth coniferous forests. Marbled murrelets have a naturally low reproductive rate. Murrelets spend most of their lives in the marine environment where they forage and consume a diversity of prey species, including small fish and invertebrates.

Marbled murrelets usually feed in shallow, near-shore water less than 98 feet (30 m) deep (Huff et al. 2006, page 19), but are thought to be able to dive up to depths of 157 feet (47 m) (Mathews and Burger 1998, page 71). During the breeding season, marbled murrelets are usually found within five miles from shore off of Washington, just over three miles off shore from of Oregon and within two miles from shore off of California (Huff et al 2006, pages 33 and 41). Although little information is available on marbled murrelet distribution outside the breeding season, limited information on winter/non-breeding non-breeding season distribution suggests they disperse and can be found farther from shore (Strachan et al. 1995, page 247).

The marbled murrelet distribution overlaps to some extant with the fishing operations of the PCGF, particularly outside the nesting season. In addition, throughout the year transiting vessels pass through waters occupied by murrelets. Fishing vessels and personnel on the vessels may disturb foraging and loafing murrelets; however, we do not anticipate that the effects will be measurable, as marbled murrelets should be able to move away from these disturbances without adverse effects.

Fishing gear types that have been identified in the Recovery Plan and/or subsequent five year reviews as affecting murrelets include: gill nets, purse seine and hooks from sport fisheries (USFWS 1997, page 56; McShane et al. 2004, page 2-15 and 5-23, USFWS 2009, page 66). This Fishery does not include the use of purse seines.

Extensive marbled murrelet mortality has occurred from gill-net fishing (USFS 1997, page 58). The PCGF does include gill-nets but only in CA below latitude 38°N and beyond three miles from the coast. Although marbled murrelets may be found outside of the breeding season farther south and farther from the coast, we expect that the density of marbled murrelets will be very low in these areas. During the breeding season, marbled murrelets are expected to be closer to the coast in California. The low density of marbled murrelets in the area of gill net use, combined with the low gill net effort, makes it extremely unlikely that marbled murrelet entanglement will occur due to the continued operations of the PCGF. USFWS does acknowledge that we know little about winter distribution. Reinitiation would be required if we learn that marbled murrelets are occurring beyond three miles in California, overlapping with PCGF gill net use, at densities that make gill net entanglement more likely.

Marbled murrelet mortality from hooking with fishing lures and entanglement with fishing lines from sport fisheries appears to occur sporadically in localized areas (McShane et al. page 5-23). Overlap of marbled murrelets with the PCGF's sport/recreational fisheries sector is expected in Washington from three to five miles offshore and in Oregon just beyond three miles offshore. Some hooked marbled murrelets can be unhooked and released alive, significantly increasing their chance of survival. However, the recreational bottom fishing that is part of the proposed action does not focus on concentrations of murrelet prey fish, and it is unlikely that marbled murrelets would be exposed to the sport/recreational fishing of ground fish in Federal waters.

Effects to marbled murrelets have not been detected with other gear types (e.g., trawl, longline, and pots) and are not expected because there is little spatial overlap of these fisheries with concentrations of marbled murrelets, and due to marbled murrelet avoidance behaviors. All of these gear types are deployed farther than three miles from shore, where marbled murrelet densities are generally lower than they are closer to shore. Furthermore, LE fixed-gear fisheries generally operate at depths below 80 fathoms, deeper than the foraging range of murrelets. Unlike albatross, marbled murrelets are not known to congregate near fishing boats. Additionally, trawl netting is likely to be visible to murrelets due to large diameter of the netting, and there is evidence that net visibility reduces entanglement risk to marbled murrelets (Carter and Sealy 1982, pp. 217-218). In combination, these factors make marbled murrelet entanglement in other gear types discountable..

Therefore, direct effects from fishing and transiting vessels may affect but are not likely to adversely affect marbled murrelets.

Marbled murrelets prey on a variety of small fishes and invertebrates. The BA's Risk Assessment using trophic modeling found that small pelagic fish and large zooplankton are expected to increase in their abundance with continuation of this Fishery. The small fish marbled murrelets consume include juvenile rockfish, a targeted species complex for the PCGF. Rockfish are also predicted to increase in abundance, by the Risk Assessment. Therefore, the indirect impact from this Fishery may affect, but is not likely to adversely affect marbled murrelets.

Impacts from derelict fishing gear (nets and pots) are a newly-recognized threat to marbled murrelets (USFWS 2009, page 60). The threat from derelict fishing nets appears to be high in the Puget Sound and San Juan Islands (parts of Conservation Zone 1, along with the Strait of Juan de Fuca) and the severity of the threat in this conservation zone is high. The PCGF does not occur in any of the conservation zones, as defined in USFWS 1997, pages 125-130. As stated above, there is some overlap of this Fishery and marbled murrelets elsewhere, and derelict gear can drift into marbled murrelet habitat. In the high-energy environment of the open ocean where the PCGF occurs, the time over which derelict nets remain suspended may be shorter when compared to a lower energy environment like the inner Puget Sound (NRC 2007, page 15). The USFWS' 2009 status review, page 60, anticipated the presence of derelict fishing nets along the coasts of Oregon and California to be limited, based on the lack of near-shore net fisheries and the high energy environment. Within the Puget Sound where the threat from derelict gear is considered high, no marbled murrelets have been documented in any derelict nets recovered (USFWS 2009, page 60). As this Fishery focuses on groundfish, the netting is designed to sink and it is more likely to sink rather than to remain suspended. Therefore, we do not anticipate that murrelets will become entangled in derelict gear from this Fishery.

The USFWS concurs with NMFS that the proposed action is not likely to adversely affect marbled murrelets, because adverse interactions with vessels and gear, and forage depletion are extremely unlikely to occur.

LITERATURE CITED

Carter, H. R., and Sealy, S. G. 1984. Marbled murrelet mortality due to gill-net fishing in Barkley Sound, British Columbia. In Marine Birds: Their Feeding Ecology and Commercial Fisheries Relationships, pp. 212–220. Ed. by D. N. Nettleship, G. A. Sanger, and P. F. Springer. Special Publication Canadian Wildlife Service, Ottawa.

Huff, Mark H., M.G. Raphael, S.L. Miller, K.S. Nelson, and J. Baldwin, tech. coords. 2006. Northwest Forest Plan—The first 10 years (1994-2003): status and trends of populations and nesting habitat for the marbled murrelet. General Technical Report PNW-GTR-650. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 149 pp.

Mathews, N.J.C., and A.E. Burger. 1998. Diving depth of a marbled murrelet. Northwestern Naturalist 79:70-71.

McShane, C., T. Hamer, H. Carter, G. Swartzman, V. Friesen, D. Ainley, R. Tressler, K. Nelson, A. Burger, L. Spear, T. Mohagen, R. Martin, L. Henkel, K. Prindle, C. Strong, and J. Keany. 2004. Evaluation report for the 5-year status review of the marbled murrelet in Washington, Oregon, and California. Unpublished report. EDAW, Inc. Seattle, Washington. Prepared for the U.S. Fish and Wildlife Service, Region 1. Portland, Oregon. 370pp.

NRC (Natural Resources Consultants, Inc.). 2007. Final report: Olympic Coast National Marine Sanctuary Derelict Fishing Gear Removal Project. December 28, 2007. 20 pp.

Strachan, G., M. McAllister, and C.J. Ralph. 1995. Marbled murrelet at-sea and foraging behavior. Pp. 247-254 In: Ecology and conservation of the marbled murrelet (C.J. Ralph, G.L. Hunt, M.G. Raphael, and J.F. Piatt, eds.). General Technical Report PSW-GTR-152. Albany, CA. Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture. 420 pp.

USFWS (U.S. Fish and Wildlife Service). 2004b. Marbled murrelet (*Brachyramphus marmoratus*) 5-year review. U.S. Fish and Wildlife Service, Oregon Fish and Wildlife Office, Region 1, Portland, OR. 28 p.

USFWS (U.S. Fish and Wildlife Service). 2006. California least tern (*Sternula antillarum browni*) 5-Year Review Summary and Evaluation. U.S. Fish and Wildlife Service, Carlsbad, CA. 35 p.

USFWS (U.S. Fish and Wildlife Service). 1997. Recovery plan for the threatened marbled murrelet (*Brachyramphus marmoratus*) in Washington, Oregon, and California. Fish and Wildlife Service, Portland, Oregon. 203 pp.

USFWS (U.S. Fish and Wildlife Service). 2009. Marbled Murrelet (*Brachyramphus marmoratus*) 5 year review. U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, Lacey, WA, June 12, 2009. 108 pp.

USFWS (U.S. Fish and Wildlife Service). 2010. Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States. Federal Register, October 18, 2010. 63898-64070.