UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, Washington 98115

August 31, 2016 150411WCR2016SF00144:ALR

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act, we enclose for your review the Draft Environmental Assessment (DEA) for Consideration of an Exempted Fishing Permit (EFP) to Fish with Longline Gear in the West Coast Exclusive Economic Zone (EEZ).

This DEA was completed to consider potential impacts of issuing an EFP authorizing the applicants to fish with longline gear in the U.S. West Coast EEZ, under specific terms and conditions. According to regulations, a National Marine Fisheries Service Regional Administrator may authorize "for limited testing, public display, data collection, exploratory, health and safety, environmental cleanup, and/or hazard removal purposes, the target or incidental harvest of species managed under an FMP [fishery management plan] or fishery regulations that would otherwise be prohibited" (50 CFR 600.745(b)). Issuance of an EFP, which is the proposed action analyzed in this DEA, would provide such authorization as fishing with longline gear in the U.S. West Coast EEZ is currently prohibited under the Fishery Management Plan for U.S. West Coast Highly Migratory Species Fisheries and Federal regulation at 550 CFR 660.712(a). The original application for the EFP was discussed during the March 2015 Pacific Fishery Management Council (Council) meeting and published on the Council's website at: *http://www.pcouncil.org/wp-content/uploads/H3a_Att1_Dupuy_etal_MAR2015BB.pdf.* A revised application for the EFP and the Council's additional recommendations regarding EFP issuance were published in the *FEDERAL REGISTER* on May 22, 2015 (80 FR 29662).

Additional copies of the DEA may be obtained from the comment coordinator identified below. The document is also accessible electronically through NMFS' West Coast Region website: *http://www.westcoast.fisheries.noaa.gov/fisheries/migratory_species/highly_migratory_species_rules_reg.html*.

Written comments should be submitted through mail or email to the comment coordinator identified below. Written comments submitted during the agency's public comment period must be received by October 2, 2016. When submitting email comments include the following document identifier in the comment subject line: Comments on DEA for LL EFP.

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Sincerely,

William W. Stelle, Jr.
Regional Administrator

Enclosure

Consideration of an Exempted Fishing Permit to Fish with Longline Gear in the West Coast Exclusive Economic Zone

Draft Environmental Assessment

NATIONAL MARINE FISHERIES SERVICE
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SEPTEMBER 2016

Cover Sheet

Draft Environmental Assessment
Consideration of an Exempted Fishing Permit to Fish with Longline Gear in the West Coast Exclusive Economic Zone

Proposed Action:	Issue an exempted fishing permit to allow longline fishing in the United States Economic Exclusive Zone off California and Oregon, which is currently prohibited. Under terms and conditions of the exempted fishing permit, a vessel or vessels would target swordfish, which is also currently prohibited to longline vessels pursuant to the Highly Migratory Species fishery management plan.
Type of Statement:	Environmental Assessment
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List of Acronyms

CCS	California Current System
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CPUE	Catch Per Unit Effort
CV	Coefficient of Variation
DGN	Drift Gillnet
DPS	Distinct Population Segment
DSBG	Deep-set Buoy Gear
DSLL	Deep-set Longline
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	Exempted Fishing Permit
ENP	Eastern North Pacific
ENSO	El Niño–Southern Oscillation
EPO	Eastern Pacific Ocean
ESA	Endangered Species Act
F	Fishing mortality
FMP	Fishery Management Plan
HMS	Highly Migratory Species
HMSMT	Highly Migratory Species Management Team
IATTC	Inter-American Tropical Tuna Commission
ISC	International Scientific Committee for Tuna in the North Pacific Ocean
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unreported, and Unregulated
LCH	Leatherback Critical Habitat
MMPA	Marine Mammal Protection Act
M/SI	Mortality and Serious Injury
MSY	Maximum Sustainable Yield
MUS	Management Unit Species
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPGO	North Pacific Gyre Oscillation
PBR	Potential Biological Removal
PCFG	Pacific Coast Feeding Group
PDO	Pacific Decadal Oscillation
PIFSC	Pacific Islands Fishery Science Center
RFMO	Regional Fisheries Management Organizations
SAR	Stock Assessment Report
SCB	Southern California Bight
SPR	Spawning Potential Ratio

SSB	Spawning Stock Biomass
SSLL	Shallow-set Longline
USFWS	United Sates Fish and Wildlife Service
WCNP	Western and Central North Pacific
WCNPO	Western and Central North Pacific Ocean
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean
WCR	West Coast Region
WNP	Western North Pacific
WPFMC	Western Pacific Fishery Management Council

Glossary

Biological Opinion: the written documentation of a section 7 consultation.

Incidental take: "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, or collect individuals from a species listed under the ESA. Incidental take is the non-deliberate take of ESA-listed species during the course of a Federal action (e.g., fishing under an FMP).

Incidental Take Statement: a requirement under the ESA section 7 consultation regulations; it is the amount of incidental take anticipated under a Proposed Action and analyzed in a biological opinion.

Mortality or serious injury (M/SI): a standard used for measuring impacts on marine mammals under the MMPA. Serious injury is defined as an injury likely to result in the mortality of a marine mammal.

Mean annual takes: the estimated number of marine mammals seriously injured or killed each year as a result of fishery interactions.

Potential Biological Removal (PBR): a requirement of the MMPA, it is the estimated number of individuals that can be removed from a marine mammal stock while allowing the stock to maintain or increase its population.

Section 7 consultation: a requirement of all discretionary Federal actions to ensure that the Proposed Action is not likely to jeopardize ESA-listed endangered or threatened species. Refers to section 7(a)(2) of the ESA.

Abstract

The National Marine Fisheries Service is proposing to issue an exempted fishing permit to authorize the use of longline gear in the United States Exclusive Economic Zone off California and Oregon, which is currently prohibited, to target swordfish (*Xiphias gladius*) and other highly migratory species. Management of the proposed longline exempted fishing permit would be covered under the *Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species*, which was developed by the National Marine Fisheries Service in collaboration with the Pacific Fishery Management Council. The Highly Migratory Species Fishery Management Plan was implemented in 2004 and allows for more comprehensive Federal management of fishery management plan fisheries supported by decision-making through the Council process. The action must conform to the Magnuson-Stevens Fishery Conservation and Management Act, the principal statutory basis for fishery management within the Exclusive Economic Zone, which extends from the outer boundary of state waters at 3 nautical miles to a distance of 200 nautical miles from shore. In addition to addressing Magnuson-Stevens Fishery Conservation and Management Act mandates, this document is an environmental assessment, pursuant to the National Environmental Policy Act of 1969, as amended. The purpose of this environmental assessment is to disclose and evaluate the effects of the Proposed Action on the human environment, considered by means of a range of alternatives, and to "[b]riefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" (40 CFR 1508.9). Therefore, this Environmental Assessment includes essential components of environmental impact analyses in accordance with the National Environmental Policy Act to consider a range of alternatives regarding longline fishing practices considered for an exempted fishing permit to assess the potential environmental impacts on the human environment that could result from the Proposed Action, if implemented. The impacts to the human environment (e.g., effects of the Proposed Action on the natural environment and the socioeconomic environment) were found to be insignificant.

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1 INTRODUCTION

This Environmental Assessment (EA) provides an analysis of alternatives regarding a Proposed Action by the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) to issue an exempted fishing permit (EFP) for the use of longline gear in the United States Exclusive Economic Zone (EEZ) off California and Oregon, which is currently prohibited, to target swordfish (*Xiphias gladius*) and other highly migratory species (HMS). This EA includes the essential components of environmental impact analyses in accordance with the National Environmental Policy Act (NEPA) necessary to assess the potential environmental impacts on the human environment that could result from the Proposed Action as well as similar actions in future years. Environmental impact analyses pursuant to NEPA have four essential components: (1) a description of the purpose and need for the Proposed Action, (2) alternatives that represent different ways of accomplishing the Proposed Action, (3) a description of the human environment affected by the Proposed Action, and (4) an evaluation of the expected direct, indirect, and cumulative impacts of the alternatives. The human environment includes the natural and physical environment and the relationship of people with that environment, as defined at 40 CFR 1508.14. These elements allow the decision maker to look at different approaches to accomplishing a stated purpose and need and the likely consequences of each alternative. Based on this structure, the document is organized into the following sections:

- Section 1 describes the purpose and need, the Proposed Action, the action area, and considerations that went into the development of this EA.
- Section 2 outlines the alternatives that have been considered to address the purpose and need of the Proposed Action.
- Section 3 describes the components of the human environment potentially affected by the Proposed Action (the "affected environment"). The affected environment represents the baseline condition, which would be potentially changed by the Proposed Action.
- Section 4 evaluates the effects of the alternatives on components of the human environment in order to provide the information necessary to determine whether such effects are significant, or potentially significant.
- Section 5 evaluates the cumulative effects of the alternatives on components of the human environment in order to provide the information necessary to determine whether such effects are significant, or potentially significant.

Additional sections (6 through 8) list contributors to this EA, information on EA distribution, and the references cited.

1.1 Proposed Action

The Proposed Action is to issue an EFP to allow two vessels to fish with longline gear in the United States EEZ, which is currently prohibited. Longline gear would be fished in both deep-set longline (DSLL; i.e., ~984 to 1,312 feet (~300 to 400 m) or deeper thermocline zone) and shallow-set longline (SSLL; i.e., < 328 feet (< 100 m) depth) gear configurations (Figure 1-1). The proposed action area is the United States EEZ off California and Oregon.

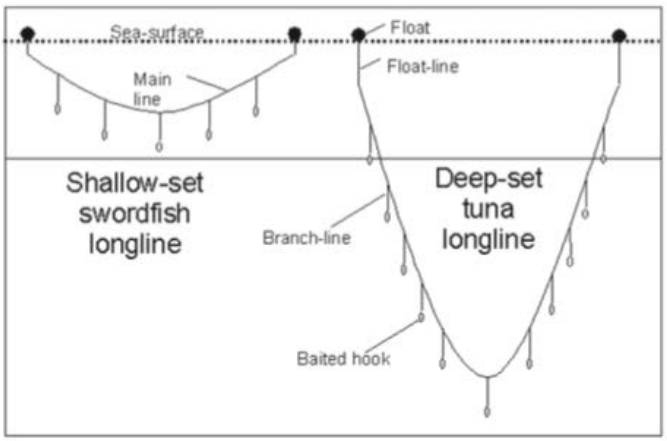

Figure 1–1. Longline configurations depicting shallow-set longline gear to target swordfish and deep-set longline gear to target tuna species (Maschal 2015).

1.2 Purpose and Need

When soliciting requests for EFP proposals, the Council's objective was to test gear types or methods that could serve as an alternative to using drift gillnets to catch swordfish in the United States West Coast EEZ, or to test different approaches to contemporary drift gillnet (DGN) fishery management practices. Since 1985, United States West Coast swordfish catch has declined 96 percent from 3,073 metric tons at a value of $11.9 million to 120 metric tons valued at $717,000 in 2013, in large part due to attrition in the DGN fishery (NMFS 2014a). At the current annual attrition rate of 10 percent, it is expected that the fishery will disappear (SWFSC 2010; NMFS 2014a). The purpose of EFPs are to allow fishing practices that are new to a fishery and not otherwise allowed under an FMP. The only gear type that currently is considered as an economically feasible alternative to DGN is pelagic longline (PFMC 2014). Therefore, the specific purpose of this EFP is to allow exploratory longline test-fishing to gauge impacts, and for the

applicants to determine whether this type of fishing is, in fact, economically viable and to assess the type and extent of interactions with protected species, and bycatch of non-targeted finfish.

The Proposed Action is needed because fishing with longline gear is currently prohibited in the West Coast EEZ by Federal regulation at 550 CFR 660.712(a). Furthermore, regulations prohibit targeting swordfish with longline gear (shallow setting) west of 150° W longitude (see 50 CFR 660.712(b)). Additionally, regulations under the Endangered Species Act (ESA) (50 CFR 223.206(d)(9)) prohibit targeting swordfish with longline gear on the high seas east of 150° W longitude. However, these prohibitions were put in place in 2004, prior to gear modifications in United States longline fisheries that have proven to be effective strategies for reducing sea turtle interactions, injuries, and mortalities (Boggs and Swimmer 2007; Gilman et al. 2007).

According to regulations, a NMFS Regional Administrator may authorize "for limited testing, public display, data collection, exploratory, health and safety, environmental cleanup, and/or hazard removal purposes, the target or incidental harvest of species managed under an FMP or fishery regulations that would otherwise be prohibited" (50 CFR 600.745(b)). Issuance of an EFP, which is the Proposed Action analyzed in this EA, would provide such authorization. The EFP would also provide data for fishery managers to compare catch rates between DSLL and SSLL gear configurations. An EFP is needed to test longline gear within the West Coast EEZ, as well as to test mitigation measures appropriate to minimize adverse environmental impacts. There are currently no other permits, licenses, or entitlements needed to take the Proposed Action.

1.3 Background

On July 2, 2014, the Pacific Fishery Management Council (hereafter, the Council) solicited EFP proposals to test alternative gears and/or new approaches or methods for the California large-mesh DGN fishery to target swordfish and other HMS. Applications for EFPs were submitted by February 9, 2015 to the Council for consideration during the March 2015 meeting. On March 20, 2015, the Council made recommendations to NMFS to consider issuing EFPs for the use of deep-set buoy gear and longline gear in the United States EEZ off of California and Oregon.

The Proposed Action only considers the EFP application for fishing DSLL and SSLL gear. At the March 2015 Council meeting, the Council recommended authorizing one vessel to fish year-round in areas within the EEZ. At the June 2015 Council meeting, the Highly Migratory Species Management Team (HMSMT) further recommended amending the March 2015 Council decision to allow at least two vessels to participate in the longline EFP. NMFS accepted public comment on the EFP application through June

22, 2015. If approved, the EFP would exempt a limited number of federally permitted commercial fishing vessels from requirements of the HMS FMP pertaining to non-authorized gear types and areas currently closed to longline fishing.

While currently there is a prohibition for longline fishing within the West Coast EEZ, this prohibition has not always been in place. The states of Washington and Oregon have never had a prohibition in place; however, longlining for swordfish within the California EEZ was prohibited in 1977 when the State of California's Fish and Game Commission issued regulations requiring that swordfish be taken only with hand-held hook and line or harpoon (14 C.C.R. § 107.12). The California State Legislature prohibited fishing lines in the ocean that exceed 900 feet (274 m). Then in 1991, the California State Legislature permitted targeting swordfish using longline gear outside of the EEZ off California (Holts 2001). However, swordfish and other fish caught by longline gear outside the EEZ could be landed in California only if a declaration indicating such intent was filed with the California Department of Fish and Game (now California Department of Fish and Wildlife or CDFW) prior to departure.

Because of changes in regulations and ocean conditions, vessels of the United States longline fleet historically have moved back and forth between California and Hawaii. A significant California-based SSLL fishery began in 1993 with the arrival of vessels from the Gulf of Mexico (PFMC 2015a). An active pelagic longline fishery based out of Hawaii already existed at that time. However, in 1991 the Western Pacific Fishery Management Council (WPFMC) implemented a moratorium on new entrants followed by a limited entry program in 1994 because the fishery had rapidly expanded in the late 1980s and early 1990s. The WPFMC was concerned about the negative effects of gear and market competition. This limited the ability of the Gulf longliners to enter the Hawaii fishery. By 1994, 31 vessels composed the California-based fishery, fishing the grounds beyond the EEZ and landing swordfish and tuna in California ports. These vessels fished alongside Hawaiian vessels in the area around 135° W longitude from September through January. Historically, vessels from Hawaii had the option of returning to Hawaii to land their catch or landing their catch on the West Coast. The California fishery declined from its peak in the mid 1990s because the Gulf vessels either acquired the permits necessary to enter the Hawaii fishery or returned to the Gulf. But the fishery demonstrated that swordfish were seasonally available, in the fall and winter, farther east than the Hawaii fleet had traditionally operated (PFMC 2015a).

When the Hawaii longline fishery closed in 2000 because of sea turtle bycatch concerns, twenty Hawaiian longline fishing vessels relocated to southern California to join the fishing fleet (Holts 2001; PFMC 2005). In 2001, NMFS developed the California swordfish longline observer program to document incidental take, and that same year the Council began developing the HMS FMP as the regulatory

guidelines for the management of the fishery (Berube et al. 2015). In 2004, two events occurred that caused the Hawaii fishery to reopen and the West Coast fishery to close. First, the Hawaii SSLL swordfish fishery reopened after incorporating measures to reduce sea turtle bycatch and mortality. These measures included: (1) use of circle hooks to replace J-hooks, (2) use of fish as bait instead of squid, (3) following sea turtle handling protocols, and (4) 100 percent observer coverage. When the Hawaii fishery reopened in 2004, there was a decline in sea turtle bycatch rates by 90 percent for loggerheads and 82.8 percent for leatherbacks (Gilman et al. 2007). There was also a significant reduction in the proportion of turtles that swallowed hooks and a significant increase in the proportion of caught turtles that were released after removal of all terminal tackle, which likely increased the survival rates of those turtles. Second, NMFS implemented the HMS FMP that prohibited West Coast-based SSLL fishing vessels to target swordfish. However, these prohibitions were based on old longline gear fishing practices (i.e., J-hooks and squid bait) rather than those used in Hawaii starting in 2004 and proposed for EFP fishing (i.e., circle hooks, mackerel-type bait, sea turtle handling procedures, 100 percent observer coverage, etc.).

When the west coast SSLL fishery was closed and longline vessel operators were only allowed to deep-set their gear, almost all vessels that had migrated to California returned to Hawaii (Ito and Childers 2014). The California longline fishery decreased to fewer than six vessels, with only a single West Coast-based vessel targeting tuna for many years. Meanwhile, federally permitted Hawaii longline vessels have been allowed to unload their catch in California.

Irrespective of changes in United States fishing practices, the demand for swordfish in the United States has been consistent over the last few decades (Berube et al. 2015). During the 1980s and into the mid-1990s, domestically caught swordfish generally supplied the United States demand. Since 1997, however, the proportion of imported swordfish to all swordfish consumed increased, with the United States importing on average 75 percent of the swordfish it consumed. The highest proportion imported was 81 percent in 2002 and 2004, making the United States one of the largest markets for foreign-caught swordfish (Berube et al. 2015). A large share of these imports come from regions with fragile leatherback turtle populations (SWFSC 2015a), thus raising some concern for the transfer of fishing effort to fleets with higher interaction rates with protected species that domestic regulations were intended to safeguard. Meanwhile, the biomass of swordfish stocks off of the United States West Coast is considered to be well above levels necessary to produce maximum sustainable yield on a continuing basis (ISC 2014a).

2 ALTERNATIVES

This EA discusses a total of six alternatives: three that were analyzed in detail and three that were considered, but not analyzed in detail.

2.1 Alternatives Considered

2.1.1 Alternative 1, No Action

Under Alternative 1, the EFP would not be granted and no longline fishing would occur within the West Coast EEZ. All current regulations applicable to longline fishing under the HMS FMP would continue to apply.

2.1.2 Alternative 2

Under Alternative 2, NMFS would approve the EFP. The EFP would allow two vessels to fish with longline gear in the United States EEZ off California and Oregon, to target swordfish and other highly migratory species. The applicants have stated that they would be using shallow-set and deep-set gear configurations. Typically, longline gear is set at a shallower depth (< 328 feet (< 100 m)) to target swordfish, and set at a deeper depth (~984 to 1,312 feet (~300 m to 400 m) or deeper thermocline zone) to target tuna. Each vessel would complete approximately 45 trips annually. Approximately 1,200 hooks per set would be deployed for SSLL and 2,500 hooks per set would be deployed for DSLL. Expected level of fishing effort for the 2-year EFP is 225,000 hooks for DSLL and 108,000 hooks for SSLL, as illustrated below (Doyle Hanan, pers. comm., Hanan and Associates, December 18, 2015):

Expected Level of Effort for EFP Fishing	
Deep-set Longline	Shallow-set Longline
45 sets annually	45 sets annually
2,500 hooks per set	1,200 hooks per set
112,500 hooks annually	54,000 hooks annually
225,000 hooks total over the duration of the 2-year EFP	108,000 hooks total over the duration of the 2-year EFP
Total hooks over the 2-year EFP for Deep-set and Shallow-set = 333,000 hooks	

The following terms and conditions would be part of the EFP issuance:

1. 100 percent observer coverage.
2. No fishing within 50 nautical miles of the mainland shore and islands (Figure 2-1).
3. No fishing within the designated critical habitat for leatherback sea turtles (USFWS 2011) (Figure 2-1).
4. No fishing within the Southern California Bight (SCB) (see description below in 2.1.2.2, Figure 2-1).
5. In the first year, EFP fishing is prohibited in waters north of the Oregon/California border (42° N latitude).
6. In the second year, EFP fishing is prohibited in waters north of the Washington/Oregon border (46° 15' N latitude).
7. A species limit would be placed on the number of hooked or entangled protected species (for our purposes, leatherback and loggerhead sea turtles) (Subsection 3.4, Protected Species) during the duration of EFP fishing. The limit would be equal to the number of animals expected to be caught using catch rates from a subset of data from the Hawaii longline fishery used as a proxy for EFP fishing (Subsection 3.3, Fish Stock Status). If a limit is reached, EFP fishing would cease immediately.

Species Limits on Hooked or Entangled Animals for the Duration of the EFP	
Leatherback sea turtles	Loggerhead sea turtles
Limit = 2*	Limit = 1

* The limit on leatherback sea turtles refers to encounters, not mortality.

8. If an observer records an observed mortality of a leatherback sea turtle, EFP fishing would cease immediately.
9. Apply all current sea turtle take mitigation measures (e.g., for SSLL only 18/0 or larger circle hooks, and if the hook point is offset, it must be offset by no more than 10°, and use of mackerel-type fish bait) set forth in the Hawaii longline fishery as described at 50 CFR §665.812.
10. A bycatch limit for marlins would be 57 animals (Subsection 3.3, Fish Stock Status); if the limit is met, EFP fishing would cease immediately and EFP fishing would be closed for the remainder of the EFP.

11. Attempt to cut branch lines as close to the hook as possible to reduce the amount of trailing line from hooked marine mammals, and cut away as much line as possible from entangled marine mammals.
12. Compliance with sea turtle protection measures as required under specified handling and resuscitation techniques pursuant to 50 CFR 660.712(b), such as possession and use of line clippers, wire or bolt cutters, and dip nets to disengage hooked or entangled animals.
13. Require vessels fishing with the SSLL gear configuration to begin setting at night (defined below).
14. Compliance with seabird avoidance and protection measures pursuant to 50 CFR 660.712(c), such as specified handling of hooked animals, proper discharge of offal, utilization of proper branch line weights, and use of blue dyed bait.
15. Use NMFS-approved de-hooking device.
16. Possession of a valid Protected Resources Workshop certification pursuant to 50 CFR 660.712(e).

2.1.2.1 Rationale for Terms and Conditions

Under these terms and conditions the EFP would pertain to two vessels, which would allow gathering of information that is expected to be helpful in analyzing whether longline fishing could potentially minimize interactions with protected species and be an economically advantageous alternative for current DGN fishery participants. As recommended by the HMSMT at the March 2015 Council meeting, the decision to allow at least two vessels to participate would provide additional effort to allow catch rates of target and non-target species to be measured with greater precision, and provide additional flexibility to compare and contrast SSLL and DSLL across vessels. Further, scientists from the Southwest Fisheries Science Center (SWFSC) indicated that an increase in the number of participants would contribute towards gathering a greater volume of data, which could support more precise estimates of target species catch and non-target species interaction rates. Having 100 percent observer coverage on board would allow independent verification of total catch (including bycatch), protected species take and interactions, and area of operation.

Species limits would establish a limit on protected species hooked or entangled in the gear for animals of concern (i.e., Pacific leatherback sea turtles and the north Pacific distinct population segment [DPS] of loggerhead sea turtles). If any limit were reached, fishing operations would cease after retrieval of remaining gear in the water. EFP fishing would be closed for the remainder of the EFP. Additionally, in considering limits it is very important to distinguish between take or catch (some type of encounter with the fishing gear) and actual mortality, because mortality rates can be significantly lower than 100 percent

depending on the fishery (DSLL or SSLL), species, and type of encounter (lightly entangled versus a deeply ingested hook for example). A limit based on takes is easier to monitor and enforce, but in arriving at a value for the limit, the difference between a take and actual mortality would be considered. Therefore, because leatherback sea turtles are critically endangered, if mortality of a leatherback sea turtle is observed, then fishing would cease for the remainder of the EFP.

The limitation on the type of hooks and bait is consistent with current Federal regulations (50 CFR 665.813 (f) and (g)) applicable to vessels fishing under the WPFMC Pelagics FMP. This hook and bait type has been demonstrated to reduce the likelihood and severity of sea turtle takes (Boggs and Swimmer 2007).

The requirement to set the SSLL gear at night is intended to reduce accidental hooking and/or entanglement of seabirds. Seabirds typically get hooked when the line is being deployed off the back of the vessel while the baited hooks are flying through the air or on the surface of the water before the gear sinks. The birds dive for the bait, get hooked, and are dragged underwater and drown. Because seabirds are less active at night, the night setting requirement reduces these interactions. Pacific Islands Regional Office's seabird compliance guide for the Hawaii-based longline fishery defines setting at "night" to mean that gear deployment must begin at least 1 hour after local sunset, and retrieval completed no later than 1 hour before local sunrise, using the minimum vessel lights necessary to conform to navigation rules and best safety practices (NMFS 2014b).

Although there is no overriding conservation concern for striped marlin, California laws and policies only allow for recreational fishing of this species (commercial landings are prohibited). The Council recommended an incidental catch limit for this species to address concerns (such as local depletion) shared by the recreational fishing community. Therefore, NMFS has placed a species limit on the number of striped marlin caught over the duration of EFP fishing. The limit would be equal to the number of animals expected to be caught using catch rates from a subset of data from the Hawaii longline fishery used as a proxy for EFP fishing (Section 3.3, Fish Stock Status).

The prohibition on operating within 50 nautical miles from the mainland shore and islands, and the prohibition on fishing in waters north of the Oregon/California border in the first year and north of the Oregon/Washington border in the second year, are also based on a recommendation from the Council during the March 2015 meeting (PFMC 2015b). NMFS expanded the recommended no-fishing zone to include the Leatherback Critical Habitat (LCH) and the SCB. These additions to the no-fishing zone are

intended to reduce gear conflicts with other commercial and recreational fishing vessels and to lower the probability of potential encounters with leatherback sea turtles.

The SCB is a region that includes waters off the southern California coast and the Channel Islands south of Point Conception. Under the EFP terms and conditions, fishing would not be allowed in this region because of its proximity to major metropolitan areas that attract higher densities of recreational activities. For the purpose of enforcing such a boundary, we propose one similar to that described in the 2003 HMS FMP FEIS (PFMC 2003) under Pelagic Longline Fishery Management Measures Alternative 4 (refer to pages 8 through 31). The description in the FMP is as follows: "Prohibit fishing with longline gear north of Pt. Conception within 25 [nautical] miles of shore and, south of Pt. Conception, east of a line from Pt. Conception to the western tip of San Miguel Is., to the northwest tip of San Nicholas Is. to the intersection of longitude 118° 00' 00' W. with the southern boundary of the U.S. EEZ." When considering an EFP for longline fishing in 2007, the Council proposed that the intersection with the EEZ boundary be at 118° 45' 00" W. This and three other adjustments were made to the proposed boundary line. First, the intersection of the 30 nautical mile buffer from the mainland and the line defining the SCB was moved west of a line drawn from Point Conception through the western tip of San Miguel Island so that this intersection occurs at the boundary of the Channel Island National Marine Sanctuary (i.e., Sanctuary waters would be excluded from the fishing area). Second, instead of setting the boundary at the western tip of San Nicholas Island, this waypoint is set at the state waters boundary off of the island (i.e., 3 nautical miles). Lastly, and based on the Council's recommendation during the March 2015 meeting to increase the no-fishing zone to 50 nautical miles from shore, the no-fishing zone is outlined by a union between the SCB and 50 nautical miles from both the mainland and islands. Figure 2–1 shows the boundary line in combination with the 50 nautical mile mainland buffer. The coordinates for this boundary line are as follows:

33° 57' 21" N, 120° 31' 44" W – Intersection with 50 nautical mile mainland buffer
33° 15' 00" N, 119° 40' 00" W – State waters boundary off western tip of San Nicholas Island
31° 06' 08" N, 118° 45' 00" W – Intersection with southern EEZ boundary

2.1.3 Alternative 3, Preferred Alternative

Under Alternative 3, NMFS would approve the EFP as described in Alternative 2. All of the terms and conditions under Alternative 2 would apply to Alternative 3 with a slight adjustment to the limits placed on hooked or entangled leatherback and loggerhead sea turtles that may be caught during the duration of EFP fishing. Under Alternative 3, these limits would increase one additional animal for each species expected to be captured. The limit would be equal to the number of animals expected to be caught

(calculated as a rate in Subsection 4.4, Protected Species), plus one animal. If a limit is reached, EFP fishing would cease immediately.

Species Limits on Hooked or Entangled Animals for the Duration of the EFP	
Leatherback sea turtles	Loggerhead sea turtles
Limit = 3*	Limit = 2

*The limit on leatherback sea turtles refers to encounters, not mortality. If an observer records a mortality of a leatherback sea turtle, fishing would cease immediately.

2.1.3.1 Rationale for Terms and Conditions

Under these terms and conditions, the EFP would be identical to Alternative 2 except for increasing the EFP limit on the number of hooked or entangled protected species caught in EFP fishing by one animal per species with a limit. Because the limits are set based on the expected level of hooked or entangled protected species caught (expressed as a rate per 1,000 hooks) in the Hawaii longline fishery used as a proxy, we would add one animal to the limit to account for potential variability in catch rates because of fishing in a different area (i.e., within the United States mainland EEZ) and the variability in the probability of when the limit would be caught. For example, the leatherback sea turtle limit in Alternative 2 is two leatherback sea turtles based on setting 108,000 SSLL hooks and 225,000 DSLL hooks during the duration of the EFP. Because we do not know when the two encounters of a leatherback sea turtle would occur, that is, it could occur in the first set, the thirtieth set, or the last set of the EFP, and if the second encounter happens before the last set of the EFP then the EFP would end prior to all sets being completed under Alternative 2. Under Alternative 3, we add one additional animal (up to three leatherback sea turtles and two loggerhead sea turtles) to allow the EFP to catch the expected encounters of leatherback and loggerhead sea turtles without ending the EFP. This one additional animal indicates a calculated risk in allowing the EFP to continue to use the maximum effort (108,000 SSLL and 225,000 DSLL hooks) without exceeding the species limits and ending the EFP prior to all sets.

2.2 Alternatives Considered but Not Analyzed

2.2.1 Alternative 4

Approve the longline EFP application as submitted (January 26, 2015) by the applicants:

1. Allow three vessels to participate.
2. 100 percent observer coverage.
3. No-fishing boundaries would range from 30 to 100 nautical miles seaward of the mainland shore.
4. No fishing within the SCB.

5. EFP proposed for a 2-year period with the option of continuing for up to 4 years pending review and evaluation; however, applicants are willing to consider a shorter initial term, perhaps as little as 6 months.
6. Descending from the main line is some number of branch lines each ending in a single circle hook with or without a light stick, and mackerel-type bait consistent with regulations enacted for the Hawaii SSLL swordfish fishery found at 50 CFR 660.33 (d), (f) and (g).
7. From 400 to 1,200 hooks may be deployed per set.
8. Each trip would consist of approximately 14 sets, approximately 14,000 hooks per trip.
9. Use traditional longline gear consisting of a main line strung horizontally across 31 to 62 miles (50 to 100 km), supported at appropriate intervals by vertical float lines connected to surface floats.
10. Possession and use of de-hooking devices when appropriate.
11. Attempt to cut branch lines as close to the hook as possible to reduce the amount of trailing line from hooked marine mammals, and cut away as much line as possible from entangled marine mammals.
12. Compliance with sea turtle protection measures as required under specified handling and resuscitation techniques pursuant to 50 CFR 660.712(b), such as possession and use of line clippers, wire or bolt cutters, and dip nets to disengage hooked or entangled animals.
13. Compliance with seabird avoidance and protection measures pursuant to 50 CFR 660.712(c), such as specified handling of hooked animals, proper discharge of offal, utilization of proper branch, line weights, and use of blue-dyed bait.
14. Possession of a valid Protected Resources Workshop certification pursuant to 50 CFR 660.712(e).

In considering Alternative 4, NMFS staff identified several reasons not to include it for further analysis:

- It included more vessels than the Council or HMSMT recommended.
- The total expected level of fishing effort was not specified.
- It did not include a limit on marlin catches as recommended by the Council.
- Initial discussions regarding compliance with ESA section 7 indicated that the conditions to minimize incidental take of ESA-listed species were likely insufficient (e.g., fishing was allowed within the LCH).

2.2.2 Alternative 5

Approve the longline EFP application as submitted (i.e., apply all the provisions listed under Alternative 4) with the following additional conditions that the Council recommended during the March 2015 meeting:

1. Allow only one vessel to participate.
2. 100 percent observer coverage.
3. Fishing is prohibited within 50 nautical miles of the mainland shore and islands.
4. No fishing within the SCB.
5. EFP fishing prohibited in waters north of the Washington/Oregon border (46° 15' N latitude), and in the first year EFP fishing is prohibited in waters north of the Oregon/California border.
6. Applicants must specify the level of expected fishing effort beyond the first 6 months of the term of the EFP.
7. NMFS to close fishing under any EFP for the remainder of the year if the amount of an ESA-listed species taken in that EFP fishery is lower of either double the amount of incidental take estimated in an ESA Biological Opinion prepared for the activity or 10 animals.
8. A bycatch limit for marlins would be developed by NMFS; the fishery would close for the remainder of the year if the bycatch limit is reached.

NMFS decided not to analyze Alternative 5 in further detail mainly because a comparison between SSLL and DSLL fishing activities (as recommended by the HMSMT) would not be possible with the participation of only one vessel. Initial discussions regarding compliance with ESA section 7 indicated that the provisions to minimize incidental take of ESA-listed species were likely insufficient (e.g., fishing was allowed within the LCH). Additionally, the hard caps set on ESA-listed species taken in the EFP were not considered based on best available science.

2.2.3 Alternative 6

Approve the longline EFP as recommended by the Council during the March 2015 meeting (i.e., apply all the provisions listed under Alternative 4) and allow up to two vessels to participate.

NMFS' consideration of Alternative 6 was based on an HMSMT recommendation during the June 2015 meeting. The HMSMT recommended "…amending the March 2015 Council decision to allow at least two vessels to participate. Additional effort would allow catch rates of target and non-target species to be measured with greater precision, and provide additional flexibility to compare and contrast SSLL and DSLL fishing across vessels. Scientists from the SWFSC indicate that effort from only a single vessel

would not provide sufficient information; increasing the number of participants would contribute towards gathering a greater volume of data, which would support more precise estimates of target species catch and non-target species interaction rates." Similar to Alternative 5, NMFS ultimately decided not to analyze Alternative 6 in further detail when initial discussions regarding compliance with ESA section 7 indicated that the conditions to minimize incidental take of ESA-listed species were likely insufficient.

Figure 2–1. Coastwide view of the proposed no-fishing zone boundary that encompasses shoreside of the 50 nautical mile line, the Leatherback Critical Habitat, and the Southern California Bight (R. Morse, pers. comm., December 2, 2015).

3 AFFECTED ENVIRONMENT

3.1 Introduction

Based on preliminary screening, the environmental components identified for further evaluation and discussion in this section include fisheries in the action area and in the vicinity of the action area, commonly caught species, other species in the action area (including protected species), essential fish habitat, critical habitat, and the socioeconomic environment.

Because pelagic longline fishing is not permitted within the United States West Coast EEZ, there are no fishery-dependent records for describing baseline conditions of a longline fishery within the proposed action area (i.e., United States West Coast EEZ off California and Oregon). Fishery-dependent data from both the Hawaii longline fishery (including both shallow-set and deep-set) and the United States domestic DGN fishery will be used as proxies for the purpose of evaluating baseline conditions and analyzing impacts of the Proposed Action. Given the similarity in gear, techniques, and volume of observer records, the Hawaii longline fishery provides the best potential catch per unit effort (CPUE) estimates for considering impacts of the Proposed Action. NMFS considered those estimates to identify commonly caught management unit species, other commonly caught species, and uncommonly caught species, as well as likely catch rates for other species that may be taken under the Proposed Action.

Given the disparate fishing areas between the Proposed Action and the entire Hawaii longline fleet, NMFS staff stratified the Hawaii observer records to compute CPUE estimates from fishing that occurred in areas east of 140° W longitude. In effect, the information presented in this section relies on the portion of Hawaii longline fishery effort that occurs closest to our action area, yet outside the United States EEZ off of California. Stratifying the data in this way reduces, to some degree, the otherwise likely bias towards the suite of species and magnitude of interactions in coastal areas and warmer waters surrounding the Hawaiian Islands.

The DGN fishery operating primarily off the coast of California provides the closest approximation to the spatial and temporal scope of the proposed action area. Observer records from the DGN fishery can help inform opinions about the potential suite of target, non-target, prohibited finfish, and other species likely to interact with fishing gear in the proposed action area, despite differences in gear type.

Numerous species are caught in HMS fisheries and therefore are considered in detail. Those to be actively managed are termed Management Unit Species (MUS) under the HMS FMP and are shown in Table 3-1 (PFMC 2011a). MUS of the HMS FMP are considered candidates for active management, meaning that

the fisheries for these species may need to be managed through the Council process and that management measures and regulations may result (PFMC 2011a). These MUSs would likely be the primary target species for the EFP.

Table 3–1. HMS FMP Management Unit Species.

Common Name	
Striped marlin	*Kajikia audax**
Swordfish	*Xiphias gladius*
Common thresher shark	*Alopias vulpinus*
Shortfin mako shark	*Isurus oxyrinchus*
Blue shark	*Prionace glauca*
North Pacific albacore	*Thunnus alalunga*
Yellowfin tuna	*T. albacares*
Bigeye tuna	*T. obesus*
Skipjack tuna	*Katsuwonus pelamis*
Pacific bluefin tuna	*T. thynnus*
Mahi-mahi or Dolphinfish	*Coryphaena hippurus*

*Previously, striped marlin were included in the genus *Tetrapturus* (Collette et al. 2006).

3.2 Fisheries in the Action Area or in the Vicinity of the Action Area

Below are descriptions of current longline fisheries taking place outside the United States West Coast EEZ followed by a discussion of non-longline fisheries occurring in the action area. The Hawaii longline fisheries and the United States West Coast DGN fishery are described in detail, in part, because the fishery-dependent data from these fisheries serve as proxies in identifying a baseline for the Proposed Action. Further, these fisheries, as well as other fisheries in the action area, are included in this section because they may share fishing areas and catch limits and/or harvest guidelines for HMS species likely to be harvested by the EFP applicants.

3.2.1 United States West Coast-based Deep-set Tuna Longline Fishery

A small United States West Coast-based pelagic longline fishery has been operating out of southern California ports for the past several years. This fishery deploys DSLL gear to target tuna (primarily bigeye tuna, *Thunnus obesus*) on the high seas within the boundaries of the equator and 35° N latitude and between the United States' and Mexico's EEZ boundaries (200 nautical miles from shore) and 140° W longitude for a fall through spring or early summer fishing season. For many years, a single vessel participated in this fishery, primarily targeting tuna using DSLL gear with a percentage of swordfish and other HMS taken incidentally. At the present time, any longline fishing by West Coast-based vessels must take place on the high seas outside of the United States EEZ. Logbook data from the West Coast are

submitted to the West Coast Region (WCR) office in Long Beach, California and maintained at SWFSC. Additionally, the NMFS WCR observer program has consistently observed this fishery since 2005. Observer records show observer coverage has maintained at 100 percent for the years 2005 to 2014 except in 2005 (observed 1 of 2 trips= 50 percent) and 2013 (observed 2 of 3 trips= 66 percent).

3.2.2 Hawaii Longline Fishery (Deep-set and Shallow-set)

The target species of the Hawaii fishery are the broadbill swordfish and tuna (*Thunnus spp*.), but a host of other marine species are captured incidentally in this fishery. This fishery deploys deep-set and shallow-set gear and operates mainly in the Northern Central Pacific Ocean. The NMFS Pacific Islands Fishery Science Center (PIFSC) provides logbook summaries for all longline vessels, including SSLL and DSLL vessels landing product in Hawaii. Most longline vessels targeting tuna and swordfish currently operate out of Hawaii ports (SWFSC 2015b). Observer catch estimates of commonly caught MUSs, other commonly caught species, uncommonly caught species, and protected species are presented below (Tables 3–2, 3–3, 3–4, and 3–5) by SSLL and DSLL fishery. As stated above, we truncated the data to include only records with the gear set east of the140° W longitude.

While the history of the Hawaii fishery extends further back in time, regulations put in place on April 2, 2004 (Fed. Reg. 17329) for the purpose of reducing bycatch and interactions with protected species resulted in significant changes to the practices of the fleet and thus the CPUE for many species affected by the fishery. The SSLL fishery now utilizes gear consisting of, among other things, large 18/0 circle hooks and mackerel-type bait. Therefore, we used a subset of Hawaii longline fishery observer data from 2004 to 2014 because the fishing gear used during these years more closely represents that of the Proposed Action (i.e., large 18/0 circle hooks and solely mackerel-type bait as opposed to 9/0 J-hooks with a mixture of squid, mackerel, and other bait types). For consistency, we truncated the DSLL fishery sector data used to the same time period we used for the SSLL fishery.

Table 3–2. Total observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii shallow-set longline fishery years 2004 through 2014. The total number of hooks observed was 1,950,983.

Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Commonly Caught Management Unit Species							
Swordfish	20240	18200	682	1358			10.374
Shark, Blue	12476		10827	1649			6.395
Shark, Shortfin Mako	2918	210	1955	753			1.496
Mahi-mahi or Dolphinfish	2909	2269	556	84			1.491
Tuna, Albacore	2036	1602	213	221			1.044
Other Commonly Caught Species							
Lancetfish, Longnose	3566		316	3250			1.828
Escolar	1793	1160	384	249			0.919
Opah	1253	843	308	102			0.642
Stingray, Pelagic	1079	114	873	92			0.553
Oilfish	986	77	748	161			0.505
Uncommonly Caught Species							
Tuna, Bigeye	747	637	80	30			0.383
Pomfret, Brama spp.	553	302	114	137			0.283
Mola, Common	153		148	5			0.078
Shark, unidentified	114		101	10		3	0.058
Pomfret, Sickle	111	104	4	3			0.057
Spearfish, Shortbill	106	23	48	35			0.054
Bony Fish, unidentified	81		72	9			0.042
Shark, Bigeye Thresher	81	3	62	16			0.042
Ribbonfish, Tapertail	77	22	15	40			0.039
Shark, unidentified. Mako	41		33	8			0.021
Marlin, Striped	32	6	20	6			0.016
Snake Mackerel	21			21			0.011
Tuna, Skipjack	17	16	1				0.009
Shark, Salmon	13	2	4	7			0.007
Shark, unidentified Thresher	11		9	2			0.006
Tuna, unidentified	10	4	3	3			0.005
Bony Fish, other identified	9	2	2	5			0.005
Shark, Longfin Mako	9	1	8				0.005
Shark, Common Thresher	7		6	1			0.004
Pomfret, Dagger	7		5	2			0.004
Wahoo	6	6					0.003
Tuna, Bluefin	5	5					0.003

Table 3–2. Continued. Total observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii shallow-set longline fishery years 2004 through 2014. The total number of hooks observed was 1,950,983.

Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Uncommonly Caught Species							
Tuna, Yellowfin	5	5					0.003
Cigarfishes	5	2	2	1			0.003
Crestfish	4		2	2			0.002
Marlin, Blue	3	1	1	1			0.002
Mola, Sharptail	3		3				0.002
Pomfret, Lustrous	3	2	1				0.002
Shark, Oceanic White-Tip	3		3				0.002
Billfish, unidentified	2		1	1			0.001
Pomfret, Rough	2		1	1			0.001
Yellowtail	2	2					0.001
Dogfish, Velvet	1			1			0.001
Mola, Slender	1		1				0.001
Ribbonfish, Scalloped	1		1				0.001
Shark, Cookie Cutter	1			1			0.001
Shark, Gray Reef	1		1				0.001
Shark, Pelagic Thresher	1		1				0.001
Shark, Tiger	1		1				0.001

Table 3–3. Total protected species observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii shallow-set longline fishery years 2004 through 2014. The total number of hooks observed was 1,950,983.

Protected Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Birds							
Albatross, Black-footed	19			3	16		0.010
Albatross, Laysan	11			1	10		0.006
Marine Mammals							
Beaked Whale, Ginkgo-toothed	1				1		0.001
Beaked Whale, Mesoplodont	1				1		0.001
Dolphin, Bottlenose	1			1			0.001
Dolphin, Risso's	10			3	7		0.005
Dolphin, Short-beaked Common	1				1		0.001
Dolphin, Striped	3				3		0.002
Sea Lion, unidentified	1				1		0.001
Seal, Northern Elephant	2				2		0.001
Sea Turtles							
Turtle, Leatherback	19				19		0.010
Turtle, Loggerhead	9				9		0.005
Turtle, unidentified hardshell	1				1		0.001

Table 3–4. Total observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii deep-set longline fishery years 2004 through 2014. The total number of hooks observed was 576,668.

Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Commonly Caught Management Unit Species							
Tuna, Bigeye	2901	2772	94	35			5.031
Mahi-mahi or Dolphinfish	1092	942	73	77			1.894
Shark, Blue	512	1	485	26			0.888
Other Commonly Caught Species							
Lancetfish, Longnose	2450		215	2235			4.249
Opah	1523	1471	40	12			2.641
Pomfret, Sickle	942	921	14	7			1.634
Snake Mackerel	746	84	371	291			1.294
Escolar	530	398	104	28			0.919
Uncommonly Caught Species							
Tuna, Skipjack	212	194		18			0.368
Spearfish, Shortbill	146	135	2	9			0.253
Marlin, Striped	140	139	1				0.243
Tuna, Yellowfin	112	109	3				0.194
Swordfish	95	35	19	41			0.165
Pomfret, Dagger	94	5	76	13			0.163
Wahoo	87	85		2			0.151
Shark, Shortfin Mako	68	10	49	9			0.118
Shark, Bigeye Thresher	48	7	37	4			0.083
Stingray, Pelagic	42	2	35	5			0.073
Pompano	16	11		5			0.028
Marlin, Blue	14	12	2				0.024
Pomfret, Brama spp.	14	4	5	5			0.024
Escolar, Longfin	13		5	8			0.023
Remora/Suckerfish	11		11				0.019
Tuna, Albacore	9	9					0.016
Shark, unidentified Thresher	9		9				0.016
Crestfish	7	2	3	2			0.012
Oilfish	7	2	5				0.012
Tuna, unidentified	6		2	4			0.010
Bony Fish, unidentified	3		3				0.005
Bony Fish, other identified	2			2			0.003
Cigarfishes	2			2			0.003
Dogfish, Velvet	2		2				0.003

Table 3–4. Continued. Total observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii deep-set longline fishery years 2004 through 2014. The total number of hooks observed was 576,668.

Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Uncommonly Caught Species							
Gemfish, Black	2			2			0.003
Puffer, Pelagic	2		2				0.003
Ribbonfish, Tapertail	2		1	1			0.003
Scabbardfish, Razorback	2	2					0.003
Billfish, unidentified	1			1			0.002
Fanfishes	1		1				0.002
Hammerjaw	1			1			0.002
Mola, Common	1		1				0.002
Mola, Sharptail	1		1				0.002
Sailfish	1	1					0.002
Shark, Crocodile	1			1			0.002
Shark, Pelagic Thresher	1		1				0.002

Table 3–5. Total protected species observed catch in numbers of animals and catch-per-unit-effort in number of animals per 1,000 hooks of effort east of 140° W for the Hawaii deep-set longline fishery years 2004 through 2014. The total number of hooks observed was 576,668.

Protected Species	Total Caught	Number Kept	Number Returned				Catch per 1,000 Hooks
			Alive	Dead	Injured	Unknown	
Birds							
Albatross, Black-footed	1			1			0.002

3.2.3 Drift Gillnet Fishery

Drift gillnet fishing initially developed in southern California to target thresher sharks, and the fishery experienced periods of rapid growth and attrition thereafter. Swordfish replaced thresher shark as the primary target species of the DGN in 1981 because of the fourfold higher price per pound of swordfish (NMFS 2015). Drift gillnet quickly replaced harpoon as the primary method for catching swordfish because of the greater CPUE (drift gillnet has a swordfish catch rate about 2 to 3 times higher) and concomitant reduced cost of fishing (Coan et al. 1998). The fishery peaked in the mid 1980s with about 250 vessels participating. However, to reduce interactions with non-target fish, marine mammals, sea turtles, and sharks, regulations stipulating gear modification and area closures were enacted. Since then, the number of active participants in the DGN fishery has declined by nearly half, from 78 vessels in 2000 to 40 in 2004, and has remained under 50 vessels. Further, since 2013, fewer than 20 vessels have actively

participated in the fishery. This fishery deploys gear in the United States EEZ off the coast of California and Oregon, with a fishing season that runs from May through January.

In 1990, California established an official drift gillnet observer program to document the marine mammal, sea turtle, seabird, and target and non-target fish species takes (Hanan et al. 1993). Since 1990, NMFS has sought to obtain 20 percent observer coverage of the DGN fishery each year, per recommendations from the SWFSC (NMFS 1989). NMFS increased its target observer coverage rate to 30 percent in 2013. Observer catch estimates for target, major non-target, minor non-target, and prohibited finfish species are presented below. For the purposes of this document, the assessment of impacts are analyzed for those species that have been captured in the DGN fishery in quantities greater than 10 animals per 100 observed fishing sets. These are referred to as major non-target species. The species captured in quantities less than 10 animals per 100 observed sets are referred to as minor non-target species in the fishery. These species did not, for the most part, involve species for which there are pressing resource conservation concerns, given their infrequent capture in the DGN fishery. Table 3–6 shows target, major non-target, and minor non-target species caught, and observed catch rates. The determination whether a species is a major or minor non-target species is based on observer records from the 2001/2002 fishing season through the 2013/2014 fishing season. Table 3–7 shows observed prohibited species caught in numbers of animals from the 2001/2002 fishing season through the 2013/2014 fishing season. Table 3–8 shows observed protected species caught in numbers of animals and their disposition from the 2001/2002 fishing season through the 2013/2014 fishing season. The catch rate of observed protected species caught ranged from 0.0374 to 3.514 (mean = 0.5028) animals per 100 sets observed over the 14-year period and 2,675 observed sets. The two protected species shaded in gray (Table 3–8) have catch rates higher than 3 animals per 100 observed sets, whereas the unshaded animals have catch rates below 0.75 animals per 100 observed sets.

Table 3–6. Target, major non-target, and minor non-target fish species catch rates per 100 observed drift gillnet sets, 2001/2002 through 2013/2014 fishing seasons (NMFS 2015).

Target Species	**DGN Catch per 100 Observed Sets**
Swordfish	205.5
Common Thresher Shark	87.0
Major Species	**DGN Catch per 100 Observed Sets**
Bullet Mackerel	14.8
Common Mola	891.7
Blue Shark	111.9
Louvar	10.5
North Pacific Albacore	117.7
Opah	93.2
Pacific Bluefin Tuna	41.3
Pacific Bonito	30.2
Pacific Mackerel	66.3
Shortfin Mako Shark	126.2
Skipjack Tuna	97.7
Minor Species	**DGN Catch per 100 Observed Sets**
Bat Ray	0.0043
Bay Pipefish	0.0004
Blue Marlin	0.0051
California Skate	0.0004
Crestfish	0.0004
Escolar	0.0008
Jack Mackerel	0.0121
King of the Salmon	0.0004
Longfin Mako Shark	0.0020
Longnose Lancetfish	0.0004
Manta	0.0004
Mobula	0.0012
Oarfish	0.0004
Oilfish	0.0047
Pacific Electric Ray	0.0043
Pacific Hake	0.0012
Pacific Pomfret	8.3919
Pacific Sardine	0.0047
Pelagic Stingray	0.0433
Pelagic Thresher Shark	0.0004
Prickly Shark	0.0008
Remora	0.0074
Round Stingray	0.0004
Salmon Shark	2.1858
Sevengill Shark	0.0004
Smooth Hammerhead Shark	0.0027
Soupfin Shark	0.0008
Spiny Dogfish	0.0008
Striped Marlin	0.0402
White Seabass	0.0008
Yellowfin Tuna	9.5238
California Yellowtail	0.0121

Table 3–7. Observed prohibited species drift gillnet catch in numbers, 2001/2002 through 2013/2014 fishing seasons.

Species	DGN Catch in Numbers
Basking Shark	2 (1 released alive and 1 dead)
Great White Shark	None
Megamouth Shark	5 (all released alive)
Pacific Halibut	None
Pacific Salmon	None

Table 3–8. Observed protected species drift gillnet catch in numbers, 2001/2002 through 2013/2014 fishing seasons.

Protected Species	Total Caught	Number Returned	
		Alive	Dead
Marine Mammals			
Whale, Humpback	1	1	
Whale, Gray	2		2
Whale, Short-finned Pilot	3		3
Whale, Minke	1	1	
Whale, Sperm	2	1	1
Whale, unidentified	1	1	
Dolphin, Bottlenose	1		1
Dolphin, Risso's	6		6
Dolphin, Short-beaked Common	85	1	84
Dolphin, Long-beaked Common	11		11
Dolphin, Northern Right Whale	17		17
Dolphin, unidentified Common	3		3
Dolphin, Pacific White-sided	11		11
Porpoise, Dall's	1		1
Sea Lion, California	94	1	93
Seal, Northern Elephant	6		6
Birds			
Northern Fulmar	20	19	1
Cassin's Auklet	1		1
Bird, unidentified	1		1
Sea Turtles			
Turtle, Leatherback	2	2	
Turtle, Loggerhead	2	2	

3.2.4 Other Fisheries Operating in the Action Area or in the Vicinity of the Action Area

The following fisheries operate within the action area or in the vicinity of the action area, and may catch HMS incidentally and/or share quota with the EFP applicants: the surface hook-and-line fishery for albacore; the harpoon fishery for swordfish; the California set gillnet fishery; the California small mesh

drift gillnet fishery; the coastal tuna purse seine fishery for yellowfin, skipjack, and bluefin tunas; the United States tuna purse seine fishery; United States West Coast HMS recreational fisheries; and illegal, unreported, and unregulated (IUU) fishing fleets.

3.3 Fish Stock Status

For the purposes of this document, the various fish stocks that may be affected by the Proposed Action have been grouped into three categories: commonly caught HMS management unit species, other commonly caught species, and uncommonly caught species. The three categories of fish stocks in this subsection reflect the likelihood of species to be caught by participant vessels of the EFP, and are based on catch records from the Hawaii longline and United States West Coast DGN fisheries.

Note the use of catch per 1,000 hooks as a measure of catch rate for the Hawaii longline fishery and catch per 100 sets as a measure of catch rate for the DGN fishery. Therefore, catch rates between the Hawaii longline fishery and the DGN fishery are not necessarily comparable effort estimates; thus, these catch rates should not be compared. Also note that stock assessments performed on the species identified below are performed by different groups (e.g., Inter-American Tropical Tuna Commission (IATTC), International Scientific Committee for Tuna in the North Pacific Ocean (ISC), NMFS, etc.) that may use different biological reference points to assess stock status and may use different definitions for stock boundaries.

3.3.1 Commonly Caught HMS Management Unit Species

Management unit species of the HMS FMP that have been captured in quantities greater than 0.5 animals per 1,000 hooks observed in either the deep-set or the shallow-set Hawaii longline fishery west of 140° W longitude, or captured in quantities greater than 10 animals per 100 sets in the DGN fishery are considered commonly caught management unit species (Tables 3–2, 3–4, and 3–6). These species are considered either susceptible to longline gear and/or occur in the action area, and therefore may be affected by the Proposed Action.

3.3.1.1 Swordfish (*Xiphias gladius*)

The Pacific swordfish stock off the west coast is an underutilized domestic resource (Berube et al. 2015). The most recent stock assessment for swordfish in the North Pacific identifies two stocks: a Western and Central North Pacific Ocean (WCNPO) stock and an Eastern Pacific Ocean (EPO) stock. The WCNPO stock is healthy, while the EPO stock is subject to overfishing. The WCNPO stock has been in a healthy condition for over a decade (Sippel 2015). The Proposed Action and existing United States West Coast

fisheries operate within the WCNPO stock area. For the WCNPO in 2012 (the terminal year of the assessment), the relative stock biomass (B/B_{MSY}; where B is the biomass, MSY is the maximum sustainable yield, and B_{MSY} is the stock biomass that would produce MSY). The B/B_{MSY} was estimated at 1.20 and the relative harvest rate (H/H_{MSY}, where H is the harvest level) was 0.58; the probability of the annual harvest rate exceeding H_{MSY} was zero. Comparable statistics for the EPO stock are 1.87, 1.11, and 0.55. Thus, while stock biomass in the EPO is well above the level necessary to achieve MSY, there is a greater than 50 percent probability that this stock is subject to overfishing. Based on Federal logbook records, the United States catch of EPO swordfish was 4.4 tons (4 metric tons) in 2012—all of which was caught by Hawaii longline vessels.

Data from the Hawaii longline fisheries indicate that swordfish have been caught at a rate of 0.165 fish per 1,000 hooks observed in the DSLL fishery and 10.374 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.1.2 Blue Shark (*Prionace glauca*)

Blue sharks are rarely landed or marketed in the DGN fishery, with most caught in the longline fishery. Recent estimates show longline fishing may be responsible for 85.2 percent of total catch. From 2004 to 2014, estimated catch of blue shark has remained steady at an average of 50,706 tons (46,000 metric tons) annually. The blue shark is currently listed as near threatened by the IUCN (International Union for Conservation of Nature).

Recent blue shark stock assessments occurred in 2013 and 2014. These models calculated a range of MSY for the north Pacific blue shark stock using catch, effort, and size composition data for the period 1972 to 2012, and accounted for a broad range of uncertainties about blue shark stock dynamics. The data were grouped into 18 fisheries; however, Japan, Chinese Taipei, Mexico, and the United States account for 95 percent of the estimated catch. Both assessments indicate that, relative to MSY, the north Pacific blue shark stock is not overfished and overfishing is not occurring. In 2011, stock biomass and spawning biomass exceeded MSY, and annual fishing mortality was estimated to be well below the fishing mortality rate that would produce MSY when the stock biomass is sufficient for producing MSY on a continuing basis (or F_{MSY}; where F is a measurement of the rate of removal of fish from a population by fishing) (ISC 2013; Rice et al. 2014).

Data from the Hawaii longline fisheries indicate that blue sharks have been caught at a rate of 0.888 fish per 1,000 hooks observed in the DSLL fishery and 6.395 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.1.3 Bigeye Tuna (*T. obesus*)

The distribution of bigeye tuna stretches across the Pacific Ocean. Stock status of bigeye tuna is assessed every year. Like in previous assessments, the IATTC scientific staff conducted an assessment in 2015 based on the assumption that there is a single stock of bigeye tuna in the EPO and that net movement is minimal between the EPO and the Western and Central Pacific Ocean (WCPO, defined as west of 150° W). The results of the recent assessment indicated a recovery trend for bigeye tuna in the EPO during 2005 through 2009. However, the spawning biomass declined from 2010 through 2013, and persisted at its lowest historic levels through 2013. This decline could have been related to a series of below-average recruitments that coincided with a series of strong La Niña events. The spawning biomass ratio (the ratio of the spawning biomass at that time to that of the unfished stock) was estimated to have increased slightly, from 0.19 in 2013 to 0.22 at the start of 2015. This increase in spawning potential ratio (SPR; where SPR is simply a ratio of mature eggs per recruit in a fish population to what it would have been if the population had never been fished) in the 2015 assessment was driven mainly by the recent increase in the CPUE of the longline fisheries that catch adult bigeye tuna.

At the beginning of 2015, fishing mortality rates were estimated to be below the level corresponding to MSY, whereas recent levels of spawning biomass were estimated to be slightly above that level (McKechnie et al. 2015; Aires-da-Silva and Maunder 2015). Therefore, the stock is not considered to be either overfished or subject to overfishing. At current levels of fishing mortality, spawning biomass was predicted to continue rebuilding and to stabilize at about 0.25 (above the level corresponding to MSY [0.21]) when assuming that recent levels of effort and catchability continue and average recruitment levels persist. However, these interpretations were highly sensitive to the assumptions made about the steepness parameter of the stock-recruitment relationship, the assumed rates of natural mortality for adult bigeye tuna, the growth curve, and the weighting assigned to the size-composition data, in particular to the longline size composition data.

The IATTC scientific staff also collaborated with Secretariat of the Pacific Community in 2015 to examine the sensitivity of the WCPO bigeye tuna stock assessment results to the inclusion of EPO dynamics within the Pacific-wide model. In part, the impetus for this research was driven by a large amount of Pacific Tuna Tagging Programme data from bigeye tagging efforts between 180° and 140° W since 2008. These data indicate extensive longitudinal movement of bigeye tuna, particularly from west to east, across the IATTC's management boundary at 150° W (Aires-da-Silva and Maunder 2015). The intent of the sensitivity analysis was to evaluate potential biases in the typical approach of separate assessments for the EPO and WCPO. The results of this sensitivity analysis estimated the dynamics of

bigeye tuna in the WCPO similarly to the WCPO-only model. Therefore, the assessment authors concluded that it is reasonable to continue to provide management recommendations on the basis of regional stock assessment models (McKechnie et al. 2015).

Data from the Hawaii longline fisheries indicate that bigeye tuna have been caught at a rate of 5.031 fish per 1,000 hooks observed in the DSLL fishery and 0.383 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). Bigeye tuna are also a commonly caught species in the United States West Coast DSLL fishery. In accordance with IATTC Resolutions, the United States institutes catch limits for bigeye tuna caught by United States vessels in the EPO (e.g., 79 Fed. Reg. 19487, April 9, 2014). These limits have been met or exceeded in recent years.

3.3.1.4 Shortfin Mako Shark (*Isurus oxyrinchus*)

Shortfin mako is the leading HMS FMP shark species caught in California's recreational fishery (PFMC 2003). The majority are caught by anglers fishing with rod-and-reel gear from private vessels in the SCB from June through October, peaking in August. Historically, makos have been esteemed as a prized game fish along the United States East Coast. During the early 1980s, they increased in prominence as a popular game fish, and annual catch estimates peaked in 1987 at 22,000 fish. Since 2001, annual catch estimates have ranged from 2,000 to 6,000 fish, with a percentage of sharks successfully released by southern California fishermen practicing catch-and-release fishing.

Because basic population dynamic parameters for this species of shark are unknown, it is being managed under the HMS FMP with a precautionary harvest guideline of 165 tons (150 metric tons). Clear effects of exploitation have not been shown. Therefore, the local stock tentatively is not considered overfished. The IUCN currently lists the shortfin mako as near threatened.

Data from the Hawaii longline fisheries indicate that shortfin mako sharks have been caught at a rate of 0.118 fish per 1,000 hooks observed in the DSLL fishery and 1.496 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.1.5 Mahi-mahi or Dolphinfish (*Coryphaena hippurus*)

West coast fishermen access the northern range of mahi-mahi and there are no HMS FMP harvest guidelines recommended at this time (NMFS 2003). United States commercial fisheries in the western and central Pacific harvest the majority of mahi-mahi caught by United States vessels (WPFMC 2009). In 2013, more than 1.5 million pounds of Pacific mahi-mahi, valued at more than $4.1 million, was harvested from Hawaii and the West Coast. There is currently no available stock assessment for mahi-

mahi. Although the population is not formally assessed, scientists assume mahi-mahi populations are stable because the species is highly productive and widely distributed throughout the tropical/subtropical Pacific (NOAA 2016a). Mahi-mahi can handle relatively high fishing rates, but precautionary management seeks to maintain current harvest levels. The total landings for all of the United States West Coast commercial HMS landings in 2013 and 2014 were 0.99 and 18.7 tons (0.9 and 17 metric tons), respectively (PFMC 2015c).

Data from the Hawaii longline fisheries indicate that mahi-mahi have been caught at a rate of 0.028 fish per 1,000 hooks observed in the DSLL fishery and 1.491 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.1.6 North Pacific Albacore Tuna (*Thunnus alalunga*)

North Pacific albacore tuna total stock biomass and female spawning stock biomass (SSB; where SSB is defined as total weight of fish in a stock that are old enough to reproduce) experienced a long-term decline from the 1970s to 1990 (ISC 2014b). Albacore tuna stocks recovered through the 1990s, followed by fluctuations without trend in the 2000s. Based on an evaluation of the estimated current *F* (where *F* is defined a measurement of the rate of removal of fish from a population caused by fishing; *F* 2010-2012) against selected *F*-based reference points, the SSB average of the ten historically lowest SSB estimates (ATHL; where ATHL is defined as the average of the ten historically lowest SSB estimates) is estimated to be 129,891 tons (117,835 metric tons), which is more than twice the SSB_{MSY} level (i.e., the spawning stock biomass level that produces MSY). Based on these reference points, the North Pacific albacore tuna stock is not experiencing overfishing and is most likely not in an overfished condition. Currently, there are no quotas or harvest guidelines established for North Pacific albacore catch under the HMS FMP.

Data from the Hawaii longline fisheries indicate that albacore tuna have been caught at a rate of 0.016 fish per 1,000 hooks observed in the DSLL fishery and 1.044 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.1.7 Skipjack Tuna (*Katsuwonus pelamis*)

It has not been possible to estimate the status of the stock relative to MSY because of uncertainties in estimates of natural mortality and growth (Maunder 2016). However, as a part of the tropical tuna fishing portfolio, we are able to make additional inferences about the health of skipjack tuna by comparing it to bigeye tuna. The current assessment for bigeye tuna estimates that fishing mortality is less than F_{MSY}. Both biomass and fishing effort for skipjack tuna have remained relatively constant over the previous decade. Therefore, it is also assumed that skipjack tuna biomass is above B_{MSY} and that skipjack fishing

mortality is less than F_{MSY}. Additionally, skipjack tuna have higher productivity than bigeye tuna, and both exploitation rates and average weight have been stable in recent years. The IATTC concluded that there is no credible risk to skipjack tuna.

Data from the Hawaii longline fisheries indicate that skipjack tuna have been caught at a rate of 0.368 fish per 1,000 hooks observed in the DSLL fishery and 0.009 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). However, for the purposes of this analysis, skipjack tuna are considered a commonly caught MUS species because they occur in the action area and are caught at relatively high rates in the DGN fishery (Table 3–6).

3.3.1.8 Common Thresher Shark (*Alopias vulpinus*)

The common thresher shark is currently listed as vulnerable on the IUCN Red List of Threatened Species, which reflects the global population status of thresher sharks. In August 2014, Friends of Animals requested common thresher sharks be listed as endangered or threatened under the Endangered Species Act, or, alternatively, delineated as six DPSs with each segment being listed as endangered or threatened. Friends of Animals cited fishing pressure, life history characteristics, and the lack of regulatory mechanisms to protect the sharks as the reasons for the listing. In March 2015, NMFS determined the action described in the petition was warranted for the species globally, but not warranted for the DPS because of the failure to support the identification of discrete populations (80 Fed. Reg. 11379, March 3, 2015).

In the EPO, populations have been slowly increasing over the past two decades because of gill net regulations imposed in 1990, which effectively eliminated commercial thresher shark fishing. NMFS has initiated efforts to conduct a full stock assessment. Currently, a regional harvest guideline of 375 tons (340 metric tons) is in place under the HMS FMP.

Data from the Hawaii longline fisheries indicate that common thresher sharks have not been observed in the DSLL fishery but have been caught at a rate of 0.004 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). However, for the purposes of this analysis, common thresher sharks are considered a commonly caught MUS species as they occur in the action area and are caught at relatively high rates in the DGN fishery (Table 3–6).

3.3.1.9 Pacific Bluefin (*Thunnus thynnus*)

Using fishery data from 1952 through 2010, the 2012 stock assessment for Pacific bluefin tuna reported biomass at or near the lowest levels in the time series, and CPUE and catch data through 2011 suggested

the risk of decline in spawning stock biomass in future years (ISC 2014c). In 2014, the ISC produced an updated stock assessment, which showed that Pacific bluefin biomass continues to remain at historically low levels and that the stock is experiencing high exploitation rates above all biological reference points. Based on the results of the assessments, NMFS determined that the stock is overfished and experiencing overfishing (78 Fed. Reg. 41033, July 9, 2013 and 80 Fed. Reg. 12621, March 10, 2015, respectively). In response to the status of the stock, NMFS imposed commercial and recreational catch limits through a series of rulemakings to reduce the relative impacts of the United States fleet on the bluefin stock (78 Fed. Reg. 33240, June 4, 2013; 79 Fed. Reg. 28452, May 16, 2014; 80 Fed. Reg. 38986, July 9, 2015; 80 Fed. Reg. 44887, July 30, 2015). The United States commercial fishery has yet to meet or exceed the commercial catch limits for Pacific bluefin tuna in the EPO.

Data from the Hawaii longline fisheries indicate that bluefin tuna have not been observed in the DSLL fishery but have been caught at a rate of 0.003 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). However, for the purposes of this analysis, Pacific bluefin tuna are considered a commonly caught MUS species because they occur in the action area and are caught at relatively high rates in the DGN fishery (Table 3–6).

3.3.2 Other Commonly Caught Species

Fishes other than HMS MUSs that have been captured in quantities greater than 0.5 animals per 1,000 hooks observed in either deep-set or shallow-set Hawaii longline fishery data west of 140° W longitude are considered other commonly caught species.

3.3.2.1 Longnose Lancetfish (*Alepisaurus ferox*)

The longnose lancetfish is one of the most commonly caught non-target bony fish species cumulatively caught on observed sets from 2004 to 2007 in the Hawaii longline fisheries (WPFMC 2009). However, there is scant information available on the population dynamics for this species.

Data from the Hawaii longline fisheries indicate that longnose lancetfish have been caught at a rate of 4.249 fish per 1,000 hooks observed in the DSLL fishery and 1.828 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.2.2 Opah (*Lampris regius*)

Data from the Hawaii longline fisheries indicate that opah have been caught at a rate of 2.641 fish per 1,000 hooks observed in the DSLL fishery and 0.642 fish per 1,000 hooks observed in the SSLL fishery

(Table 3–2 and Table 3–4). Opah have never been assessed, but there is no evidence that populations are in decline or that fishing rates are too high.

3.3.2.3 Sickle Pomfret (*Taractichthys steindachneri*)

Monchong is a generic local name given to two deepwater pomfret species: the sickle pomfret, *Taractichthys steindachneri*, and the lustrous pomfret, *Eumegistis illustris* (WPFMC 2009). The sickle pomfret is commonly incidentally caught in pelagic longline fisheries throughout the North Pacific. Both monchong species are valued by Hawaii seafood wholesale and processing firms who have successfully promoted it in the fresh market and restaurant trade. Concerns over the sustainability of current pomfret removal rates with respect to recruitment prompted the WPFMC, in coordination with PIFSC, to launch an investigation into expanding knowledge of pomfret life history and ecology.

Data from the Hawaii longline fisheries indicate that sickle pomfret have been caught at a rate of 1.634 fish per 1,000 hooks observed in the DSLL fishery and 0.057 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4).

3.3.2.4 Snake Mackerel (*Gempylus serpens*)

Data from the Hawaii longline fisheries indicate that snake mackerel have been caught at a rate of 1.249 fish per 1,000 hooks observed in the DSLL fishery and 0.011 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). There is scant information available on the population dynamics for this species.

3.3.2.5 Escolar (*Lepidocybium flavobrunneum*)

Data from the Hawaii longline fisheries indicate that escolar have been caught at a rate of 0.919 fish per 1,000 hooks observed in the DSLL fishery and 0.919 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). There is scant information available on the population dynamics for this species.

3.3.2.6 Pelagic Stingray (*Pteroplatytrygon [Dasyatis] violacea*)

The pelagic stingray is found worldwide in latitudes spanning the tropical to temperate waters. They are one of the most common shark and ray species caught in longline fisheries (Williams 1997). Data from the Hawaii longline fisheries indicate that pelagic stingray have been caught at a rate of 0.073 fish per 1,000 hooks observed in the DSLL fishery and 0.553 fish per 1,000 hooks observed in the SSLL fishery

(Table 3–2 and Table 3–4). There is scant information available on the population dynamics for this species.

3.3.2.7 Oilfish (*Ruvettus pretiosus*)

Data from the Hawaii longline indicate that oilfish have been caught at a rate of 0.012 fish per 1,000 hooks observed in the DSLL fishery and 0.505 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). There is scant information available on the population dynamics for this species.

3.3.3 Uncommonly Caught Species

Species that are captured in quantities less than 0.05 animals per 1,000 hooks and/or not likely to be in the proposed action area or caught by longline gear are referred to as uncommonly caught species. Refer to Tables 3–2 and 3–4 for lists of the species of fish considered uncommonly caught. Except for some of the species listed as prohibited species (Tables 3–7 and 3–9), uncommonly caught species do not include species for which there are pressing resource conservation concerns. Given their infrequent capture in the Hawaii longline fishery, none of these species, except for striped marlin, are evaluated in detail.

3.3.3.1 Prohibited Species

Table 3–9 lists the prohibited non-HMS species designated under the HMS FMP. In general, prohibited species must be released immediately if caught, unless other provisions for their disposition are established, including for scientific study (76 Fed. Reg. 56327, September 13, 2011).

Table 3–9. HMS FMP prohibited species.

Common Name	Scientific Name
Great white shark	*Carcharodon carcharias*
Basking shark	*Cetorhinus maximus*
Megamouth shark	*Megachasma pelagio*
Pacific halibut	*Hippoglossus stenolepis*
Pink salmon	*Onchorhynchus gorbuscha*
Chinook salmon	*O. tshawytscha*
Chum salmon	*O. keta*
Sockeye salmon	*O. nerka*
Coho salmon	*O. kisutch*

Data from the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude indicate there were no recorded interactions of any HMS FMP prohibited species. Observer data from the DGN fishery from 2001/2002 through 2013/2014 fishing seasons show two basking sharks

(one released alive and one dead) and five megamouth sharks (all released alive) were observed caught (Table 3–7).

3.3.3.2 Striped Marlin (*Kajikia audax*)

Striped marlin are considered an uncommonly caught species in reference to the proxy data sets for the Proposed Action alternatives. However, because other resource user groups have expressed concerns about the potential for interactions with the proposed longline EFP activities and the need for a species-specific limit on striped marlin, striped marlin are discussed in this section in more detail than other species. Data from the Hawaii longline fisheries indicate that striped marlin have been caught at a rate of 0.243 fish per 1,000 hooks observed in the DSLL fishery and 0.016 fish per 1,000 hooks observed in the SSLL fishery (Table 3–2 and Table 3–4). A species limit would be based on these rates and would be equal to the number of animals expected to be caught during the EFP (i.e., 57 animals). Because catch rates between the Hawaii longline fishery and the DGN fishery are not directly comparable, NMFS considers the overall rates of interactions with striped marlin in these fisheries to be low.

Genetic and tagging studies of striped marlin suggest four Pacific stocks of striped marlin: Southwest Pacific, Eastern Pacific, and two North Pacific stocks, including a Western and Central North Pacific (WCNP) stock generally located to the west of 140° W longitude and an eastern North Pacific stock generally located to the east of the 140° W (ISC 2015a). NMFS recently determined that the WCNP stock of striped marlin is subject to overfishing and is overfished based on the stock assessment completed by the ISC in July 2012 (separate from the eastern North Pacific stock assessment). West coast commercial fisheries do not interact with the WCNP stock, but rather may interact with the eastern North Pacific stock, which is not overfished or experiencing overfishing (Maunder and Hinton 2010). Additionally, prohibitions on the sale of striped marlin on the United States West Coast provide a strong disincentive for west coast commercial fishermen to catch striped marlin in general.

The results of the most recent assessment for the striped marlin in the northeast Pacific Ocean indicate that the stock biomass increased since 2003 to 5,622 tons (5,100 metric tons) in 2009, and that SSB also increased. The ratio of SSB/SSB_{MSY} was estimated to be 1.5. Fishing effort levels in 2007 to 2009 were estimated to be below those expected at MSY. Dead discards and catches were estimated to occur at a level 50 percent below MSY; therefore, the stock is expected to increase over the near term should this level of removals continue (Maunder and Hinton 2010).

3.4 Protected Species

This section describes the protected species in the action area (Table 3–10). Because pelagic longline fishing is not permitted within the United States West Coast EEZ, there are no fishery-dependent records for describing baseline conditions of a longline fishery within the action area. Therefore, catch records from the Hawaii longline fisheries from 2004 through 2014 fishing seasons (Tables 3–3 and Table 3–5) and east of 140° W longitude and DGN fishery from 2001/2002 through 2013/2014 fishing seasons (Table 3–8) are used to determine species most likely to be affected.

Table 3–10. Protected species in the action area.

Species/Stock	**ESA Status (July 2016)**
Marine Mammals	
Mesoplodon spp.	Not listed
Bottlenose dolphin • California coastal stock • California/Oregon/Washington stock	Not listed
Risso's dolphin	Not listed
Common dolphin • Long-beaked spp. • Short-beaked spp.	Not listed
Striped dolphin	Not listed
California sea lion	Not listed
Northern elephant seal	Not listed
Guadalupe fur seal	Threatened
Humpback whale *	Endangered *(revision pending)* **Note:* *On April 21, 2015, NMFS proposed to remove the current range-wide listing and identified 14 DPSs and proposed to list two as threatened and two as endangered (80 Fed. Reg. 22304). Final listing decision is expected in 2016.*
Gray whale • western North Pacific stock • eastern Pacific stock	 Endangered Delisted
Short-finned pilot whale, CA/OR/WA stock	Not listed
Minke whale	Not-listed
Sperm whale	Endangered
Northern right whale dolphin	Not listed
Pacific white-sided dolphin	Not listed
Dall's porpoise	Not listed
Dwarf sperm whale	Not listed
Pygmy sperm whale	Not listed
Fin whale	Endangered
Blue whale	Endangered
Sei whale	Endangered
Killer whale • southern resident DPS • Eastern north Pacific offshore stock	 Endangered Not listed
Baird's beaked whale	Not listed
Cuvier's beaked whale	Not listed
Northern fur seal	Not listed
Harbor seal	Not listed
Steller sea lion, eastern DPS	Delisted

Table 3–10. Continued. Protected species in the action area.

Sea Turtles	
Leatherback turtle	Endangered
Loggerhead turtle • north Pacific Ocean DPS	Endangered
Olive ridley turtle	Endangered/Threatened
Green turtle • east Pacific Ocean DPS	Threatened
Marine and Anadromous Fish	
Pacific eulachon (*Thaleichthys pacificus*) southern DPS	Threatened
Chinook (*Oncorhynchus tshawytscha*)	Endangered
Sacramento River winter, evolutionarily significant unit (ESU)	Threatened
Chinook, Central Valley Spring ESU	Threatened
Chinook, California Coastal ESU	Endangered
Coho (*Oncorhynchus kisutch*)	Threatened
Central California Coastal ESU	Endangered
Coho, S. Oregon/N. CA Coastal ESU	Threatened
Steelhead (*Oncorhynchus mykiss*), Southern California DPS	Threatened
Steelhead, South-Central California DPS	Threatened
Steelhead, Central California Coast DPS	Threatened
Steelhead, California Central Valley DPS	Endangered
Steelhead, Northern California DPS	Endangered
Scalloped hammerhead (*Sphyrna lewini*) eastern Pacific DPS	Endangered

* Species listing status under revision.

3.4.1 Marine Mammals

All marine mammals in the waters of the United States are protected under the Marine Mammal Protection Act (MMPA). The MMPA and its implementing regulations set out strict guidance for monitoring marine mammal stocks and estimating human impacts on these stocks. Annually, NMFS is required to produce a Stock Assessment Report (SAR) that provides updated status and population estimates for each marine mammal stock in a region, and is based on the most recently available information. In addition to estimating the stock's population, NMFS must identify sources of human-caused mortalities and calculate the maximum anthropogenic mortalities that can be sustained by the stock if the stock is to persist at its current population or increase. Potential biological removal (PBR) is the maximum number of animals, not including natural mortalities, which may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

Most of this information may be found in the most recent published United States Pacific Marine Mammal SARs (Carretta et al. 2015); however, not every species was updated or revised in the latest publication, thus some species are cited using the 2013 SARs (Caretta et al. 2014). Under the MMPA, strategic stocks are those marine mammal stocks that are: (1) listed as endangered or threatened under the ESA, (2) likely to become listed under the ESA, or (3) when annual human-caused mortality and serious injury is greater than sustainable levels (i.e., above PBR). Depleted status applies to those species or stocks that have been determined to be below their optimum sustainable population or are listed as endangered or threatened under the ESA.

3.4.1.1 Marine Mammals Considered Likely to be Affected

As previously described, there has not been a longline fishery in the United States West Coast EEZ so there are no observer records or logbooks from which to draw conclusions on which marine mammals may be affected by the Proposed Action within the action area. Therefore, this section broadly covers marine mammals in the action area. As in previous subsections in Section 3, catch records from both the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude (Table 3–3 and Table 3–5), and observer records from the DGN fishery from 2001/2002 through 2013/2014 fishing seasons (Table 3–8), are used to highlight protected species in the action area likely to be affected by the Proposed Action. The Hawaii longline fisheries are the only fisheries that currently use gear (e.g., circle hooks and mackerel bait) similar to that prescribed for the Proposed Action, but these fisheries occur in the vicinity of, as opposed to in, the action area. However, the DGN fishery has operated within the proposed time and area. Most DGN activity occurs from September 1 through January 31, roughly the same time period as the proposed longline EFP fishery.

Catch of protected species observed caught in numbers of animals and CPUE in number of animals per 1,000 hooks of effort east of 140° W for Hawaii SSLL fishery for the years 2004 to 2014 are shown in Table 3–3. The total number of hooks observed during this period in the Hawaii SSLL fishery was 1,950,983. Over the 11-year span of data collection, eight species of marine mammals were caught with rates ranging from 0.001 to 0.005 animals per 1,000 hooks. These species include the Mesoplodont beaked whale (including the ginkgo-toothed whale), the bottlenose dolphin, Risso's dolphin, the short-beaked common dolphin, the striped dolphin, an unidentified sea lion, and the northern elephant seal. In the Hawaii DSLL fishery for the years 2004 to 2014, there were no observed catches of marine mammals (Table 3–5). While there are no records of catch of California sea lions and Guadalupe fur seals in the proxy data sets, we assumed the unidentified sea lion to be a California sea lion given their abundance

relative to other stocks, and we included the Guadalupe fur seal because of recent (2015) interactions with the Hawaii longline fishery, despite these interactions occurring outside of the action area.

Catch of protected species observed caught in numbers of animals and CPUE in number of animals per 100 observed sets in the DGN fishery for the fishing seasons 2001/2002 to 2013/2014 are shown in Table 3–8. Over the 14-year span of data collection, 16 species of marine mammals were caught with rates ranging from 0.0374 to 3.514 animals (mean = 0.5028) per 100 observed sets. Only two protected species were caught at rates above 0.75 animals per 100 observed sets: short-beaked common dolphin and the California sea lion. However, the Hawaii longline fisheries catch rates are generally considered a better proxy for the Proposed Action, so those rates are reported for those species in this subsection. Other protected species that were identified in the DGN fishery dataset, but not in the Hawaii longline fisheries datasets, were caught at rates below 0.75 animals per 100 sets (i.e., well below 0.75 animals in most cases) and include the humpback whale, the gray whale, the short-finned pilot whale, the minke whale, the sperm whale, the bottlenose dolphin, the long-beaked common dolphin, the northern right whale dolphin, the Pacific white-sided dolphin, Dall's Porpoise, and the northern elephant seal.

Two key differences between EFP fishing and the DGN fishery should be considered. First, fishing under the longline EFP would occur at least 50 nautical miles offshore of the United States West Coast and islands as well as outside of the SCB and LCH areas. These fishing grounds are not a precise match to those of the DGN fleet (e.g., some of the DGN fishing occurred within 50 nautical miles). Second, the DGN observer records are unlikely to represent expected catch rates in the proposed longline EFP because of differences in fishing practices and gear selectivity. Nevertheless, the DGN fishery serves as an appropriate proxy for the action area based on its disposition towards similar target species.

Not only must the proxy data sets be viewed with caution because of the differences in the fishing gear, fishing grounds, and ultimately catch rates, but also because takes of protected species are very rare. Quantifying the likelihood of takes based upon such rare events is difficult and may not allow for reasonable projections of future takes, particularly in instances where so little is known about the nature of the interaction and the cause for entanglements. The rest of this subsection includes status descriptions for each marine mammal stock considered likely to be affected by the Proposed Action, using catch rates from the Hawaii longline fisheries and the DGN fishery as general proxies for baseline conditions. Marine mammals marked with an asterisk (*) represent strategic stocks.

Ginkgo-toothed and Mesoplodont beaked whales (*Mesoplodon* spp.): There are least 14 species in the genus *Mesoplodon*, but because of the difficulty in identifying the six species of Mesoplodont beaked

whales found in the action area, including Hubbs' (*M. carlhubbsi*), pygmy beaked whale or lesser beaked whale (*M. peruvianus*), gingko-toothed (*M. gingkodens*), Blainville's (*M. densirostris*), Perrin's (*M. perrini*), and Stejneger's (*M. stejnegeri*) beaked whales, and the rarity of sightings, little species-specific information is currently available.

During the 2005 to 2008 surveys, the combined estimate of abundance for all species of *Mesoplodon* beaked whales in California, Oregon, and Washington waters out to 300 nautical miles is 1,024 (coefficient of variation or CV = 0.77) animals. This estimate does not include sightings of unidentified beaked whales made during 2005 and 2008, some of which may have included beaked whales of the genus *Mesoplodon* (Carretta et al. 2015). With a minimum population estimate of 389 animals, the estimated PBR for this group of species is 3.9 mesoplodont beaked whales per year and the average serious injury and annual mortality of mesoplodont beaked whales in United States commercial fisheries is estimated to be zero animals, based on data from 2004 through 2008. This group of species is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

Bottlenose dolphin (*Tursiops truncatus*)—California/Oregon/Washington offshore stock: The offshore bottlenose dolphin differs from the coastal bottlenose dolphin in that they have a larger body, are darker in color, and have smaller flippers. The SARs designated offshore bottlenose dolphins found in the waters off California/Oregon/Washington as one stock. The most comprehensive multi-year average abundance is the geometric mean abundance estimate for California, Oregon, and Washington waters based on the 2005 and 2008 ship surveys, or 1,006 (CV = 0.48) offshore bottlenose dolphins (Carretta et al. 2015). With a minimum population estimate of 684 animals, the calculated PBR level for this stock is 5.5 animals per year. The average annual estimated mortality of this stock in United States commercial fisheries is 0.2 animals, based on data from 2007 through 2011. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Risso's dolphin (*Grampus griseus*): Risso's dolphins in California/Oregon/Washington waters are considered one stock in the SARs. The best estimate of population abundance for this stock is 6,272 (CV = 0.30), with a minimum population estimate of 4,913 animals. PBR for this stock is estimated to be 39 animals per year. The mean annual serious injury and mortality in commercial fisheries for this stock is estimated to be 1.6 (CV = 0.99) animals, based on data from 2004 through 2008. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Short-beaked common dolphin (*Delphinus delphis*)—California/Oregon/Washington stock: Surveys show wide distribution from the coast and out to at least 300 nautical miles from shore. The 2005 to 2008

geometric mean abundance estimate for California, Oregon, and Washington waters based on the two ship surveys is 411,211 (CV = 0.21) short-beaked common dolphins, with a minimum population estimate of 343,990 animals and an estimated PBR of 3,440 animals per year. The mean annual serious injury and mortality in commercial fisheries for short-beaked common dolphins in United States commercial fisheries is 65 (CV = 0.29) animals, based on information from 2004 to 2008. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Striped dolphin (*Stenella coeruleoalba*)—California/Oregon/Washington stock: Striped dolphins in California/Oregon/Washington waters are considered one stock in the SARs. The best estimate of population abundance for this stock is 10,908 (CV = 0.34), with a minimum population estimate of 8,231 animals. PBR for this stock is estimated to be 82 animals per year. The mean annual serious injury and mortality in commercial fisheries for this stock is estimated to be zero animals, based on data from 2004 through 2008. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

California sea lion (*Zalophus californianus*): The population abundance estimate for this stock was based on a 2008 pup census and was estimated to be around 296,750 animals, with a minimum population estimate of 153,337. The PBR for this stock is calculated to be 9,200 animals per year. Estimated mean annual take in commercial fisheries is greater than 331 (CV = 0.14) animals, based on data from 2008 to 2012; however, this is an underestimate based on stranding data. Takes have been documented during those years in the DGN fishery, the California halibut and white seabass set gillnet fishery, the California small-mesh drift gillnet, the California purse-seine fishery, and the California/Oregon/Washington groundfish trawl fishery. Other threats to this stock include shooting, power plant entrainment, marine debris, and boat collisions. The stock is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

Northern elephant seal (*Mirounga angustirostris*): The best estimate of population abundance for the California breeding stock is 179,000 from 2014 data, with a minimum population estimate of 81,368 animals. PBR for this stock is calculated to be 4,882 animals per year (Carretta et al. 2015). Threats to this stock include mortality and injury in fishing gear (greater than 4.0 mean annual takes per year, based on data from 2008 through 2012). Takes have been documented in the DGN fishery, the California halibut and white seabass set gillnet fishery, the California small-mesh drift gillnet, and the California/Oregon/Washington groundfish trawl fishery. Other threats include shooting, entanglement in marine debris, power plant entrainment, tar, and boat collisions. The stock is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

***Guadalupe fur seal (*Arctocephalus townsendi*):** In 1993, the abundance of Guadalupe fur seals was estimated to be 7,408 animals, with a minimum population of 6,443 animals. There are no recent estimates of this stock found in the SARs. The estimated PBR level is 91 animals per year, where the vast majority of the estimate would apply towards mortality in Mexico. There have been recent reports of Guadalupe fur seals in the Hawaii longline fishery (C. Fahy, pers. comm., NMFS, Lead–Marine Mammal and Sea Turtle Team, January 20, 2016). Incidental take in Mexican fisheries is unknown. This species is listed as a threatened species under the ESA and it is therefore considered strategic and depleted under the MMPA (Carretta et al. 2015).

***Humpback whale (*Megaptera novaeangliae*):** Along the United States West Coast, one stock is currently recognized and includes animals that appear to be part of two separate feeding groups: a California and Oregon feeding group and a northern Washington and southern British Columbia feeding group (Calambokidis et al. 2008; Barlow et al. 2011). Barlow (2010) recently estimated 1,090 (CV = 0.41) humpback whales from a 2008 summer/fall ship line-transect survey of California, Oregon, and Washington waters. Abundance estimates from photographic mark-recapture surveys conducted in California and Oregon waters every year from 1991 through 2011 represent the most current estimates (Calambokidis 2013). These estimates include only animals photographed in California and Oregon waters and not animals that are part of the separate feeding group found off Washington State and southern British Columbia (Calambokidis et al. 2009). California and Oregon estimates range from approximately 1,100 to 2,600 animals, depending on the choice of recapture model and sampling period (Figure 2). The best estimate of abundance for California and Oregon waters is the 2008 through 2011 Darroch estimate of 1,729 (CV = 0.03) whales, which is also the most precise estimate (Calambokidis 2013). With a minimum population estimate of 1,878 humpback whales, the PBR for this stock is 22 humpback whales per year; however, because this stock spends approximately 50 percent of its time outside United States waters, the PBR allocation for United States waters is 11 humpback whales per year. Because the humpback whale is listed as an endangered species under the ESA, the stock is classified as strategic and depleted under the MMPA (Carretta et al. 2015).

Although the best population estimates were given above, NMFS recently completed a comprehensive status review of the humpback whale under the ESA and announced a proposal to revise the listing status of the species. NMFS proposed to divide the globally listed endangered species into 14 distinct population segments (DPSs), remove the current species-level listing, and in its place list two DPSs as endangered and two DPSs as threatened (80 Fed. Reg. 22304, April 21, 2015). The remaining ten DPSs are not proposed for listing based on their current statuses. Three of the proposed DPSs occur in the action area, but only one DPS is considered threatened under the ESA.

Gray whale (*Eschrichtius robustus*): The population size of the Eastern North Pacific (ENP) gray whale stock has increased over several decades, despite an unusual mortality event in 1999 and 2000, and has been relatively stable since the mid-1990s. Abundance estimates of gray whales reported by Calambokidis et al. (2014) show a high rate of increase in the late 1990s and early 2000s, but have been relatively stable since 2003. In 2010, the International Whaling Commission Standing Working Group on Aboriginal Whaling Management Procedure noted that different names had been used to refer to gray whales feeding along the United States West Coast. The group agreed to designate animals that spend the summer and autumn feeding in coastal waters of the Pacific coast of North America from California to southeast Alaska as the Pacific Coast Feeding Group (PCFG [IWC 2012]). While the PCFG is recognized as a distinct feeding aggregation (Calambokidis et al. 2012; Mate et al. 2010; Frasier et al. 2011; Lang et al. 2011; IWC 2012), the status of the PCFG as a population stock remains unresolved (Weller et al. 2013). A NMFS task force, charged with evaluating stock status of the PCFG, noted that "both the photo-identification and genetics data indicate that the levels of internal versus external recruitment are comparable, but these are not quantified well enough to determine if the population dynamics of the PCFG are more a consequence of births and deaths within the group (internal dynamics) rather than related to immigration and/or emigration (external dynamics)." Further, given the lack of significant differences found in nDNA (or nuclear deoxyribonucleic acid) markers between PCFG whales and other ENP gray whales, the task force found no evidence to suggest that PCFG whales breed exclusively or primarily with each other, but interbreed with ENP whales, including potentially other PCFG whales. Additional research is needed to better identify recruitment levels in the PCFG and further assess the stock status of PCFG whales (Weller et al. 2013). In contrast, the task force noted that Western North Pacific (WNP) gray whales should be recognized as a population stock under the MMPA, and NMFS prepared a separate report for WNP gray whales in 2014.

At this time, based on lack of evidence to support the PCFG as a separate stock, the most recent estimate of abundance for the ENP whales based on a 2010/2011 southbound survey is estimated to be 20,990 (CV = 0.05) animals, with a minimum population estimate of 20,125 animals. The PBR for this stock is 624 animals per year. The mean annual serious injury and mortality in known commercial United States fisheries is greater than 4.4 gray whales, based on data from 2008 through 2012 (Carretta et al. 2015). The gray whale was removed from the endangered species list in 1994 as a result of its strong recovery, and it is not classified as a strategic stock under the MMPA (Angliss and Outlaw 2005).

Short-finned pilot whale (*Globicephala macrorhynchus*): For the purposes of the SARs, short-finned pilot whales in the EEZ off California/Oregon/Washington are considered one stock. Short-finned pilot

whales were once common off the coast of southern California. However, since a strong El Niño event in 1982 and 1983, few sightings were made between 1984 and 1992, despite increased survey efforts. Sightings still remain rare. The best estimated population abundance based on the geometric mean abundance estimate from the 2005 and 2008 ship-board surveys is 760 (CV = 0.64) animals, with a minimum estimated population of 465 short-finned pilot whales. The PBR for this stock is 4.6 animals per year. The mean annual estimated serious injury and mortality of short-finned pilot whales in commercial fisheries is zero animals, based on data from 2004 to 2008. The mean annual human-caused mortality is less than the PBR; therefore, this stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Minke whale (*Balaenoptera acutorostrata*): The SARs designated minke whales offshore California/Oregon/Washington as one stock. The population abundance for this stock of minke whales is 478 (CV = 1.36), based on ship surveys from 2005 and 2008, with a minimum population estimate of 202 whales. The PBR for this stock is 2.0 whales/year. The mean annual estimated serious injury and mortality of minke whales because of known United States commercial fisheries is zero animals, based on data from 2004 to 2008. Minke whales are not classified as a strategic stock under the MMPA because of the low estimated number of ship strikes and takes in commercial fisheries (Carretta et al. 2014).

***Sperm whale (*Physeter macrocephalus*):** The SARs divided sperm whales into three discrete groups for management purposes, including waters off California/Oregon/Washington, Hawaii, and Alaska. Previous estimates of sperm whale abundance from 2005 (3,140, CV = 0.40) (Forney 2007) and 2008 (300, CV = 0.51) (Barlow 2010) show a ten-fold difference that cannot be attributed to human-caused or natural population declines and likely reflect inter-annual variability in movement of animals into and out of the study area. New estimates of sperm whale abundance in California, Oregon, and Washington waters out to 300 nautical miles are available from a trend-model analysis of line-transect data collected from six surveys conducted from 1991 to 2008 (Moore and Barlow 2014) using methods similar to previous abundance trend analyses for fin whales (Moore and Barlow 2011) and beaked whales (Moore and Barlow 2013). Abundance trend models incorporate information from the entire 1991 through 2008 time series to obtain each annual abundance estimate, yielding estimates with less inter-annual variability. The best estimate of sperm whale abundance in the California Current is the trend-based estimate from the 2008 survey of 2,106 animals (CV = 0.58), which is corrected for diving animals not seen during surveys. The minimum population abundance estimate is 1,332 whales and the PBR for this stock is estimated to be 12.7 animals. The mean annual serious injury and mortality in commercial fisheries is less than 1.7 (CV = 0.95) sperm whales, based on data collected from 2001 to 2012. Fisheries documented to have taken sperm whales include the DGN fishery (average 1.3 over 12 years, based on the observed

serious injury mortality of 2 sperm whales in 2010, which extrapolated to 16 animals for that year) and unknown fisheries, based on stranded whales. Sperm whales are formally listed as endangered under the ESA, and consequently the California to Washington stock is automatically classified as a depleted and strategic stock under the MMPA (Carretta et al. 2015).

Long-beaked common dolphin (*Delphinus capensis*)—California stock: Common dolphins *(Delphinus sp.)* off California are classified into two stocks: the short-beaked California/Oregon/Washington stock and the long-beaked California stock. Because the long-beaked common dolphin has been recognized as a different species from the short-beaked common dolphin only in the last decade (Heyning and Perrin 1994; Rosel et al. 1994), much of the available information has not differentiated between the two. The two species are often found together, making it difficult to distinguish the different stocks. The most recent abundance estimates for the long-beaked common dolphin stock are 62,447 (CV = 0.80) and 183,396 (CV = 0.41) dolphins, based on 2008 and 2009 ship line-transect surveys, respectively. The geometric mean abundance estimate for California, Oregon, and Washington waters based on two ship surveys conducted in 2008 and 2009 is 107,016 long-beaked common dolphins. With a minimum population estimate of 76,224 animals, PBR is estimated to be 610 animals per year. The estimated mean annual take (serious injury and mortality) for long-beaked common dolphins in United States commercial fisheries is 13 animals, based on data from 2006 to 2010. Fisheries threats include the California/Oregon shark/swordfish drift gillnet fishery, the California angel shark/halibut and other species large mesh set gillnet fishery, tuna purse seine, and other unknown fisheries. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Northern right-whale dolphin (*Lissodelphis borealis*): The SARs designated the northern right-whale dolphin found in the waters of California/Oregon/Washington as one stock. The estimated population abundance for this stock, based on the geometric mean abundance estimate from the 2005 and 2008 surveys, is 8,334 (CV = 0.40) animals, with a minimum population estimate of 6,019 animals. Based on this minimum population, the estimated PBR is 48 animals per year. The mean annual serious injury and mortality of northern right whale dolphins in United States commercial fisheries is estimated to be 3.6 animals, based on observer data in the California DGN fishery from 2004 through 2008. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Pacific white-sided dolphin (*Lagenorhyncus obliquidens*): The SARs have grouped Pacific white-sided dolphins into two discrete, non-contiguous areas: waters off California/Oregon/Washington (northern and southern stocks) and Alaskan waters. Based on the geometric mean estimate from the 2005 and 2008 ship-board surveys, the population abundance estimate for the California/Oregon/Washington stock is

26,930 (CV = 0.28) animals, with a minimum population estimate of 21,406 animals. The calculated PBR is 171 animals per year. The mean annual serious injury and mortality in United States commercial fisheries for this stock is estimated to be 11.8 (CV = 0.88) animals per year, based on data from 2007 to 2011, with 11.6 (CV = 0.88) attributed to the DGN fishery. This stock of Pacific white-sided dolphins is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

Dall's porpoise (*Phocoenoides dalli*): The SARs designated Dall's porpoise in California/Oregon/Washington as one stock. The most recent estimate of Dall's porpoise abundance is the geometric mean of estimates from 2005 and 2008 shipboard surveys of California, Oregon, and Washington waters, or 42,000 (CV = 0.33) animals, with a minimum population estimate of 32,106 Dall's porpoise. The estimated PBR for this stock is 257 animals per year. The average minimum estimated annual mortality and serious injury for Dall's porpoise in United States commercial fisheries is greater than or equal to 0.4 animals per year, based on data through 2008. There were no documented takes in the DGN fishery from 2004 to 2008. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

3.4.1.2 Other Marine Mammals in the Action Area

The status descriptions for each marine mammal stock that is present in the action area but not likely to be affected by the Proposed Action are included in this subsection, based on catch rates from the Hawaii longline fisheries and the DGN fishery as general proxies for baseline conditions, because catch rates of total protected species observed caught in numbers of animals was zero (Table 3–3, Table 3–8, and Table 3–9).

Dwarf sperm whale (*Kogia sima*): The SARs designated the dwarf sperm whales offshore California/Oregon/Washington as one stock, and it was distinguished from the pygmy sperm whale in 1966. The species is distributed in deep waters throughout ocean basins and along the continental slopes of the North Pacific. No information is available to estimate the population size of this stock, thus a PBR level is not possible to estimate. The dwarf sperm whale has not been seen in recent surveys off the United States West Coast and there have been no incidental takes of dwarf sperm whales observed in United States fisheries based on information from the most recent years of data. Thus, this stock of dwarf sperm whales is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

Pygmy sperm whale (*Kogia breviceps*): For the purpose of the SARs, pygmy sperm whales found within the EEZ off the coasts of California/Oregon/Washington are considered one stock. At-sea sightings of *Kogia* species are very rare, so seasonality and distribution have not been identified. The rarity of

sightings likely reflects the cryptic nature of this species (they are detected almost exclusively in extremely calm sea conditions), rather than an absence of animals in the region. The best estimate of abundance for this stock is the mean of 2005 and 2008 shipboard line-transect surveys, or 579 (CV = 1.02) animals, with a minimum population estimate of 271. PBR for this stock of pygmy sperm whales is 2.7 animals per year. The mean annual serious injury and mortality in United States commercial fisheries is estimated to be zero animals, based on data from 2004 to 2009. Other possible threats include anthropogenic noise, including air guns, although injuries or mortalities as a result of this would be difficult to document. Because the average annual incidental take is not greater than the PBR for this stock of pygmy sperm whale, it is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

***Fin whale (*Balaenoptera physalus*):** The SARs recognized three stocks of fin whales in the North Pacific: the California/Oregon/Washington stock, the Hawaii stock, and the Alaska stock. The best estimate of fin whale abundance in California, Oregon, and Washington waters out to 300 nautical miles is from trend-model analysis of line-transect data form 1991 through 2008 that generated an estimate for 2008 of 3,051 (CV = 0.18) animals. This is likely an underestimate because it excludes some fin whales that could not be identified in the field and that were recorded as "unidentified rorqual" or "unidentified large whale." With a minimum population estimate of 2,598 animals, the PBR for this stock is 16 animals. The mean annual serious injury and mortality in known commercial United States fisheries is zero fin whales, based on data from 2007 through 2011. Ship strikes were implicated in the deaths of seven fin whales and the injury of another from 2007 to 2011. During 2007 to 2011, there were an additional four injuries of unidentified large whales attributed to ship strikes. Additional mortality from ship strikes probably goes unreported because the whales do not strand or, if they do, they do not always have obvious signs of trauma. The average observed annual mortality and injury as a result of ship strikes is 1.6 fin whales per year for the period 2007 to 2011. Fin whales are listed as endangered under the ESA; therefore, this stock of fin whales is classified as depleted and strategic under the MMPA (Carretta et al. 2015).

***Blue whale (*Balaenoptera musculus*):** The SARs recognized the eastern North Pacific stock of blue whales as one stock. The best estimate of population abundance for this stock of blue whales is 1,647 (CV = 0.07) animals, with a minimum population estimate of 1,551 blue whales. The PBR for this stock is estimated at 9.3 animals per year; however, because this stock spends three-quarters of their time outside of the United States EEZ, PBR is 2.3 animals per year. The mean annual serious injury and mortality in known commercial United States fisheries is zero blue whales, based on data from 2001 through 2013. Blue whales are also threatened by ship strikes. Documented mortalities of blue whales as a

result of ship strikes have occurred during 1980, 1986, 1987, 1993, and 2002. Ship strikes were implicated in the deaths of four blue whales and serious injury of a fifth whale from 2009 to 2013 (Carretta et al. 2015). Five deaths occurred in 2007, the highest number recorded for any year. One additional whale was seriously injured in 2010 and its prorated serious injury value is 0.56. During 2009 to 2013, there were an additional two serious injuries of unidentified large whales attributed to ship strikes, some of which may have been blue whales (Carretta et al. 2016). Blue whale mortality and injuries attributed to ship strikes in California waters averaged 0.9 per year for 2009 to 2013. The blue whale is listed as endangered under the ESA; therefore, this stock is classified as a depleted and strategic stock under the MMPA (Carretta et al. 2016).

***Sei whale (*Balaenoptera borealis*):** The SARs have divided sei whales in the North Pacific into two stocks: the eastern North Pacific stock (east of longitude 180°) and the western North Pacific stock (Carretta et al. 2005). Because sightings are so rare, there have been no direct estimates of sei whale abundance in the North Pacific based on sighting surveys (Carretta et al. 2005). Only two confirmed sightings and five possible sightings of sei whales were made in California, Oregon, and Washington waters during extensive ship and aerial surveys from 1991 to 2001. The best estimate of abundance for California, Oregon, and Washington waters out to 300 nautical miles is the unweighted geometric mean of the 2005 and 2008 estimates, or 126 (CV = 0.53) sei whales. With a minimum population estimate of 83 animals, the PBR for this stock is 0.17 animals per year. There have been zero interactions with United States commercial fishing gear from 2004 through 2008, and zero documented ship strikes. The sei whale is listed as an endangered species under the ESA, and it is classified as a depleted and strategic stock under the MMPA (Carretta et al. 2014).

***Killer whale (*Orcinus orca*):** While there is no reliable way to distinguish the two main stocks of killer whales that might be found off the United States West Coast (eastern north Pacific offshore stock and the west coast transient stock) from sightings at sea, photographs of individual animals can provide a rough proportion. The best estimate of the population size of both stocks within 300 nautical miles of the coasts of California/Oregon/Washington is 691 (CV = 0.49) animals, with the eastern north Pacific offshore stock comprising 466 animals (minimum estimate of 361 animals). Because this stock is transboundary, it is difficult to estimate PBR; however, given the minimum population estimate, estimated PBR for the eastern north Pacific offshore stock is 1.6 animals (Carretta et al. 2014). There have been zero killer whales of this stock observed taken in United States commercial fisheries, based on data from 1997 to 2001. Because the estimated mean annual take is less than this stock's PBR, this killer whale stock is not classified as strategic under the MMPA (Carretta et al. 2014). The west coast transient stock is also a transboundary stock and includes killer whales from British Columbia. Based on the most recent SARs

for the United States West Coast and Alaska, the population of the west coast transient stock ranges from 314 to 874 animals (Angliss and Outlaw 2005). A minimum estimate of the population of west coast transient killer whales is 314 animals. Given this, the PBR for this stock is 3.1 animals (Angliss and Outlaw 2005). The minimum mortality rate estimated from commercial fisheries is zero, although little is known regarding the serious injury or mortality of killer whales incidental to Canadian commercial fisheries. Collisions with vessels have also been documented for killer whales, but none have been estimated for this stock. Given the level of human-caused mortality and serious injury (0 animals per year), this stock is not classified as a strategic stock under the MMPA (Carretta et al. 2014).

The eastern north Pacific Southern Resident stock is most commonly seen in the inland waters of Washington State and southern Vancouver Island. Individuals from this stock have been observed in Monterey Bay, California in January 2000 and March 2003; near the Farallon Islands in February 2005; and off Point Reyes in January 2006. In 2014, the estimated population size of this stock was 78 animals and PBR is 0.14 whales per year (Carretta et al. 2016). The total fishery mortality and serious injury for this stock is estimated to be zero. Following a 2004 status review, this stock was identified as a distinct population segment and listed as endangered under the ESA on November 18, 2005 (70 Fed. Reg. 69903). Risks to the population include the local, large, commercial whale watching industry as well as high levels of recreational boating and commercial shipping, noise generated from vessels, and high levels of contaminants (Carretta et al. 2016). Because this stock is listed as endangered under the ESA, this stock is classified as strategic and depleted under the MMPA.

Baird's beaked whale (*Berardius bairdii*): The SARs designated Baird's beaked whales in the EEZ waters off the coasts of California, Oregon, and Washington as one stock. Sightings of Baird's beaked whales have been rare, even during ship and aerial transect surveys. The best population estimate, based on ship surveys from 2005 and 2008, was 907 (CV = 0.49) animals, with a minimum population estimate of 466. There is no information on trends in abundance, and the PBR for this stock is 4.7 animals per year. Mean annual take levels by United States commercial fisheries are estimated to be zero animals, based on data from 2007 through 2011. There have been zero observed beaked whales interacting with the DGN fishery since the pinger regulations were put in place in 1997 (NMFS 2015). Additional threats may be anthropogenic noise, especially military sonars, or other commercial and scientific activities involving the use of air guns. The total fishery and serious injury for this stock can be considered insignificant and approaching zero and it is not classified as a strategic stock under the MMPA. Baird's beaked whales are not listed as threatened or endangered under the ESA nor is it classified as a depleted stock under the MMPA (Carretta et al. 2014).

Cuvier's beaked whale (*Ziphius cavirostris*): The SARs designated the Cuvier's beaked whales in the EEZ waters off California/Oregon/Washington as one stock. Sightings of Cuvier's beaked whales off the United States West Coast have been infrequent, although they are the most commonly encountered beaked whale in this region. Seasonal trends are not apparent from stranding records. Early abundance estimates were imprecise and biased low by an unknown amount because of the large proportion of time this species spends submerged, and because ship surveys before 1996 covered only California waters and thus did not include animals off Oregon and Washington. A trend-based analysis of line-transect data from surveys conducted between 1991 and 2008 yielded new estimates of Cuvier's beaked whale abundance. The new estimate is substantially higher than the previous estimate in part because it accounts for the portion of unidentified beaked whale sightings likely to be Cuvier's beaked whales and because of a correction factor missed by observers increases in rough observing conditions. The best estimate of abundance is represented by the model-averaged estimate for 2009 of 6,590 (CV = 0.55) animals, with a minimum population estimate of 4,481 animals. The estimated PBR for this stock is 45 animals per year, and the average annual estimated take (serious injury and mortality) in the United States commercial fisheries is zero animals based on data from 2007 to 2011. As mentioned above, since 1996 when pingers were first used in this fishery, no beaked whales have been observed taken in the DGN fishery. As with other beaked whales, anthropogenic noise may also threaten the Cuvier's beaked whale, particularly mid-frequency active sonars, although the extent of this threat is unknown. Because the estimated annual average incidental mortality of this stock of Cuvier's beaked whale does not exceed its PBR level, it is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

Northern fur seal (*Callorhinus ursinus*): The SARs recognized two separate stocks of northern fur seals within United States waters: (1) an eastern North Pacific stock, mostly found on the Pribilof Islands in the Bering Sea, and (2) a San Miguel Island stock. In 2011, the total pup count at San Miguel Island was 3,092. Based on the 2011 count and an expansion factor, the most recent population estimate of the San Miguel Island stock is 12,368 northern fur seals. Currently, a coefficient of variation (CV) for the expansion factor is unavailable. With a conservative minimum population estimate of 5,395 animals, the PBR for this stock is 403 animals per year. While northern fur seals taken incidentally in commercial fisheries off California, Oregon, and Washington could have originated from the Pribilof Islands, NMFS considers any takes of this species to be from the San Miguel Island stock. There have been very few documented takes in United States commercial fisheries (none documented from 2007 through 2011) and few mortalities as a result of other human causes, although some northern fur seal mortalities were documented in research science cruises in recent years that are being analyzed and mitigated/permitted. This stock is not classified as a strategic stock under the MMPA (Carretta et al. 2015).

***Steller sea lion (*Eumetopias jubatus*):** The eastern stock of Steller sea lions breeds on rookeries located in southeast Alaska, British Columbia, Oregon, and California; there are no rookeries located in Washington. The population abundance estimate for this stock was based on data from the 2009 to 2013 pup census and was estimated using pup multipliers of either 4.2 or 5.2 (Pitcher et al. 2007). The population is estimated to be within the range of 60,131 (14,317 × 4.2) and 74,448 (14,317 × 5.2) animals, with a minimum population estimate of 36,551 animals based on data from 2009 through 2012 for Oregon pup counts (NMFS, unpublished data *in* Caretta et al. 2014) to as recent as 2013 for Oregon and southeast Alaska. The total mean annual mortality rate from all fisheries is 17.0 animals based on data from 2005 to 2009 (Breiwick 2013). On December 4, 2013, the eastern stock of Steller sea lion was removed from the list of threatened species under the ESA (78 Fed. Reg. 66140). NMFS for now will continue, under the MMPA, to classify the stock as depleted and strategic; the recovery factor of 0.75 is maintained and PBR is 1,645 (Carretta et al. 2015).

3.4.2 Sea Turtles

Four species of marine turtles may be found in the area of the Proposed Action, and they are listed along with their ESA status in Table 3–9. Two of the four sea turtle species within the action area have been observed taken in both the Hawaii SSLL fishery (2004 through 2014 fishing seasons and east of 140° W longitude) and the DGN fishery for seasons (2001/2001 through 2013/2014), but no sea turtles were observed taken in the Hawaii DSLL fishery. There was one unidentified hardshell turtle reported in the Hawaii SSLL observations, which we assume is a loggerhead sea turtle based on the fact that it was a hardshell turtle (i.e., not a leatherback sea turtle) and the only hardshell turtle reported in the Hawaii dataset was the loggerhead sea turtle. Both green sea turtles and olive ridley sea turtles are also described in this subsection because they are present in the action area. Based on observer records in the Hawaii longline fishery, leatherback sea turtles were the most commonly observed sea turtle entangled and injured, and loggerheads were the second most commonly observed sea turtle species (Table 3–3). For the DGN fishery, leatherback and loggerhead sea turtles were entangled or injured in equal numbers (Table 3-8). Table 3–5 provides the number of observed takes of sea turtles in the DGN fishery between the 2001/2002 and 2013/2014 fishing seasons (with about 20 percent observer coverage).

On October 10, 2012, NMFS announced a 5-year review of Kemp's ridley (*Lepidochelys kempii*), olive ridley (*Lepidochelys olivacea*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) sea turtles under the Endangered Species Act of 1973, as amended (77 Fed. Reg. 61573). A 5-year review is based on the best scientific and commercial data available at the time of the review. NMFS

issued a request for information as the first part of the review process. The last review of these species occurred in 2007.

3.4.2.1 Sea Turtles Considered Likely to be Affected

This subsection describes sea turtles present in the action area and that have been observed taken in both the SSLL Hawaii longline fishery and the DGN fishery. No sea turtles were observed interacting with the DSLL Hawaii longline fishery. As in previous subsections in Section 3, Affected Environment, catch records from both the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude (Table 3–3 and Table 3–5), and observer records from the DGN fishery from 2001/2002 through 2013/2014 fishing seasons (Table 3–8), are used to highlight sea turtles in the action area likely to be affected by the Proposed Action.

Leatherback Sea Turtles (*Dermochelys coriacea*): The leatherback sea turtle is listed as endangered under the ESA throughout its global range. Leatherback sea turtles are found throughout the world and populations and trends vary in different regions and nesting beaches. In 1980, the leatherback sea turtle population was estimated at approximately 115,000 (adult females) globally (Pritchard 1982). By 1995, one estimate claimed this global population of adult females had declined to 34,500 (Spotila et al. 1996). A current global population estimate is not available, but details on what is known of populations are provided below.

In the Pacific, western leatherback populations have declined more than 80 percent and eastern Pacific leatherbacks have declined by more than 97 percent since the 1980s (NOAA 2016b). Migratory routes of leatherback sea turtles originating from eastern and western Pacific nesting beaches are not entirely known for the entire Pacific population; however, satellite tracking of post-nesting females and foraging males and females, as well as genetic analyses of leatherback sea turtles caught in United States Pacific fisheries or stranded on the west coast of the United States indicate that the leatherbacks found off the United States West Coast are from the western Pacific nesting populations, specifically boreal summer nesters. Unlike western Pacific leatherbacks, which nest year round, eastern Pacific leatherbacks all nest in the winter (December through March) and postnesting movements indicate that they stay within the eastern South Pacific (Eckert and Sarti 1997; Shillinger et al. 2008) and therefore are not expected to be found within the proposed action area.

Based on satellite tracking data from leatherbacks nesting on western Pacific beaches or foraging off California, some leatherback sea turtles will move into United States coastal waters as early as spring, often coming directly from foraging areas in the eastern equatorial Pacific (Benson et al. 2011).

Leatherbacks will move into areas of high abundance and density of gelatinous prey (e.g., *Chrysaora fuscescens* and *Aurelia spp.*) along the United States West Coast when upwelling relaxes and sea surface temperatures increase and retention areas develop (Benson et al. 2011). These coastal foraging areas are primarily upwelling *shadows*, regions where larval fish, crabs, and jellyfish are retained in the upper water column during relaxation of upwelling.

Three main areas of foraging have been documented on the United States West Coast: in California over the coastal shelf in waters of 57.2° to 60.8° F (14 to 16° C), particularly off central California; along the continental shelf and slope off Oregon and Washington, particularly off the Columbia River plume; and offshore of central and northern California at sea surface temperature fronts in deep offshore areas, although this area was not regularly used (Benson et al. 2011). Researchers estimated an average of 178 leatherback sea turtles (CV = 0.15) were present between the coast and roughly the 50 fathom isobath off California. Abundance over the study period was variable between years, ranging from an estimated 366 leatherbacks (1990) to 20 leatherbacks (1995) (Benson et al. 2007). Bioenergetics studies reveal that adults consume on average 143 to 258 pounds (65 to117 kg) of jellyfish per day to meet their energetic demands (Jones et al. 2012). With jellyfish populations increasing in the Pacific, leatherback sea turtles are likely not resource limited (Jones et al. 2012), although the distribution of these dense prey patches may cause leatherbacks, which are primarily prey specialists, to concentrate in particular hot spots, as described above.

Data from the Hawaii longline fishery from the 2004 through 2014 fishing seasons and east of 140° W longitude indicate leatherback sea turtles have not been observed caught in the DSLL fishery; however, nineteen leatherback sea turtles were observed caught in the SSLL fishery. All nineteen of the leatherback sea turtles were released alive. From the 2001/2002 through 2013/2014 fishing seasons, there have been two leatherback sea turtles observed caught in the DGN fishery. Both were released alive.

Loggerhead Sea Turtles—North Pacific Ocean DPS Loggerhead Turtles (*Caretta caretta*): On September 22, 2011, the United States Fish and Wildlife Service (USFWS) and NMFS published a final rule listing nine DPSs of loggerhead sea turtles (76 Fed. Reg. 58868). The North Pacific Ocean DPS of loggerheads was listed as endangered. In the action area, loggerheads compose the North Pacific Ocean DPS.

The North Pacific loggerhead DPS nests primarily in Japan (Kamezaki et al. 2003), although low-level nesting may occur outside of Japan in areas surrounding the South China Sea (Chan et al. 2007; Conant et al. 2009). Nesting beach monitoring in Japan began in the 1950s on some beaches, and grew to

encompass all known nesting beaches starting in 1990 (Kamezaki et al. 2003). Along the Japanese coast, nine major nesting beaches (greater than 100 nests per season) and six submajor beaches (10 to 100 nests per season) exist, including Yakushima Island where 40 percent of nesting occurs (Kamezaki et al. 2003). Census data from 12 of these 15 beaches provide composite information on longer-term trends in the Japanese nesting assemblage. As a result, Kamezaki et al. (2003) concluded a substantial decline (50 to 90 percent) in the size of the annual loggerhead nesting population in Japan since the 1950s. As discussed in the 2011 final ESA listing determination, current nesting in Japan represents a fraction of historical nesting levels (Conant et al. 2009) (76 Fed. Reg. 58868, September 22, 2011). Nesting declined steeply from an initial peak of approximately 6,638 nests in 1990 to 1991, to a low of 2,064 nests in 1997. During the past decade, nesting increased gradually to 5,167 nests in 2005 (Conant et al. 2009), declined and then rose again to a record high of 11,082 nests in 2008, and then 7,495 and 10,121 nests in 2009 and 2010, respectively (Matsuzawa 2008, 2009, 2010). At the November 2011 Sea Turtle Association of Japan annual sea turtle symposium, the 2011 nesting numbers were reported to be slightly lower at 9,011 (NMFS 2012a).

Thus, for the 20-year period 1990 to 2010, the total number of nests per year for the North Pacific DPS ranged between 2,064 and 11,082 nests. Assuming a clutch frequency of four nests per female per year (Van Houtan 2011), the number of nesting females recorded per year between 1990 and 2010 ranged between 516 and 2,771. The total number of adult females in the population was estimated at 7,138 for the period 2008 to 2010 by Van Houtan (2011).

Loggerhead sea turtles that have been documented off the United States West Coast are primarily found south of Point Conception, California in the Southern California Bight. In Oregon and Washington, records have been kept since 1958, with nine strandings recorded over approximately 54 years (less than one stranding every 6 years) (NMFS Northwest Region stranding records database, 1958 to 2012, unpublished data, *in* NMFS 2015).

Data from the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude indicate loggerhead sea turtles have not been observed caught in the DSLL fishery; however, nine loggerhead sea turtles were observed caught in the SSLL fishery (one additional unidentified hardshell turtle was also observed in the SSLL fishery). All nine of the loggerhead sea turtles and the one unidentified hardshell sea turtle were released alive. From the 2001/2002 through 2013/2014 fishing seasons, there have been two loggerhead sea turtles observed caught in the DGN fishery. Both were released alive.

3.4.2.2 Other Sea Turtles in the Action Area

This subsection describes sea turtles present in the action area but not observed taken in either the Hawaii longline fishery or the DGN fishery. As in previous subsections in Section 3, Affected Environment, catch records from both the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude (Table 3–3 and Table 3–5), and observer records from the DGN fishery from 2001/2002 through 2013/2014 fishing seasons (Table 3–8), are used to highlight sea turtles in the action area likely to be affected by the Proposed Action.

Olive Ridley Sea Turtles (*Lepidochelys olivacea*): Although the olive ridley sea turtle is regarded as the most abundant sea turtle in the world, olive ridley nesting populations on the Pacific coast of Mexico are listed as endangered under the ESA; all other populations are listed as threatened.

The eastern Pacific population is thought to be increasing, while there is inadequate information to suggest trends for other populations. The global status of olive ridleys is described in the 5-year status review (NMFS and USFWS 2007a). Eastern Pacific olive ridley sea turtles nest primarily in large *arribadas* on the west coasts of Mexico and Costa Rica. Since reduction or cessation of egg and turtle harvest in both countries in the early 1990s, annual nest totals have increased substantially. On the Mexican coast alone in 2004 to 2006, the annual total was estimated at 1,021,500 to 1,206,000 nests annually (NMFS and USFWS 2007a). Eguchi et al. (2007) counted olive ridleys at sea, leading to an estimate of 1,150,000 to 1,620,000 turtles in the eastern tropical Pacific in 1998 to 2006. The 5-year status review (NMFS and USFWS 2007a) describes *arribadas* occurring in northeastern India at Gahirmatha and Ryshikulya, with 1,000 to 100,000 turtles and 10,000 to 200,000 turtles, respectively, occurring per *arribada*. A number of other locations in western and eastern India are also described as sites of potential solitary nesting activity, but nesting activity is unquantified at these locations (NMFS and USFWS 2007a). Survey effort on India beaches has fluctuated over the years and methods used to census nesting populations have also changed. As a result, reported trends and abundance numbers may be somewhat speculative and potentially unreliable. The most reliable abundance estimate for Gahirmatha during the 1999 *arribada* was approximately 180,000 nesting females, with long-term data indicating the population may be in decline (NMFS and USFWS 2007a). In contrast, there are no known *arribadas* of any size in the western Pacific, and apparently only a few hundred nests scattered across Indonesia, Thailand, and Australia (Limpus and Miller 2008). Data are not available to analyze trends (NMFS and USFWS 2007a).

Because the Proposed Action is most likely to occur primarily east of 140° W longitude, thus closer to the Eastern Pacific nesting and foraging sites, it is reasonable to assume that this eastern Pacific population

would be more likely to be affected by the Proposed Action. This is a large population. The largest known *arribadas* in the eastern Pacific are off the coast of Costa Rica (approximately 475,000 to 650,000 females estimated nesting annually) and in southern Mexico (approximately > 1,000,000 nests per year at La Escobilla in Oaxaca [Marquez et al. 2005]). On the Mexican coast alone, the annual total of nests was estimated to average between 1.0 and 1.2 million from 2004 to 2006 (NMFS and USFWS 2007a). An independent estimate based on the number of turtles observed in the water at sea produced an estimate of 1.2 to 1.6 million turtles in the eastern tropical Pacific in 1998 to 2006 (Eguchi et al. 2007).

Data from the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude indicate that olivey ridley sea turtles have not been observed caught in the DSLL fishery or in the SSLL fishery. However, there was one unidentified hardshell turtle observed in the SSLL fishery so we have included olive ridley turtles (Table 3–3). The one unidentified hardshell sea turtle was released alive. From the 2001/2002 through 2013/2014 fishing seasons, there have been no olive ridley sea turtles observed caught in the DGN fishery.

Green Sea Turtles (*Chelonia mydas*): On April 6, 2016, the USFWS and NMFS published a final rule listing eleven DPSs of green sea turtles (81 Fed. Reg. 20057) that changed the listing status of some of the populations (similar to the agency's action on loggerhead sea turtles). In the action area, green sea turtles compose the East Pacific Ocean DPS. The East Pacific Ocean DPS of green sea turtles was listed as threatened under the final rule.

The range of the East Pacific Ocean DPS extends from 41° N southward along the Pacific coast of the Americas to central Chile (40° S longitude) and westward to 142° W longitude and 96° W longitude. The offshore boundary of this DPS is a straight line between these two coordinates. The DPS exhibits an estimated total nester abundance of 20,112 females at 39 nesting sites. The largest nesting aggregation (Colola, Michoacán, Mexico) hosts more than 10,000 nesting females. Recent conservation efforts have led to increasing abundance at numerous nesting sites throughout the range of the East Pacific Ocean DPS. In addition to the increasing trends at Michoacán, Seminoff et al. found stable to slightly increasing nesting trends at Galápagos nesting beaches, which host the second largest nesting aggregation of the DPS (Seminoff et al. 2015). Within the DPS there is additional substructure, and four regional genetic stocks have been identified; however, stocks mix at foraging areas. Nesting occurs at both insular and continental sites, providing some spatial diversity.

Two populations of green sea turtles are found in two areas adjacent to the action area and may be affected by the Proposed Action. South San Diego Bay serves as important habitat for a resident

population of up to about 60 juvenile and adult green sea turtles in this area (Eguchi et al. 2010). There is also an aggregation of green sea turtles that appear to be persistent in the San Gabriel River and surrounding coastal area in the vicinity of Long Beach (Lawson et al. 2011). This group of green sea turtles has only recently been identified and very little is known about their abundance, behavior patterns, or relationship with the population in San Diego Bay.

Data from the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude indicate that green sea turtles have not been observed caught in the DSLL fishery or in the SSLL fishery. However, there was one unidentified hardshell turtle observed in the SSLL fishery, so we have included green sea turtles (Table 3–3). The one unidentified hardshell sea turtle was released alive. From the 2001/2002 through 2013/2014 fishing seasons, there have been no green sea turtles observed caught in the DGN fishery.

3.4.3 Seabirds

This subsection describes seabirds in the action area and presents those seabird species most likely to be affected by the Proposed Action along with their stock status. As with previous subsections, fishery-dependent data from the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude are used as proxy datasets for describing baseline conditions and identifying species likely to be affected by the Proposed Action. Additionally, the presence of seabird species interactions in the DGN fishery data from 2001/2002 through 2013/2014 fishing seasons are used to further inform baseline conditions. Although no interactions with short-tailed albatross occurred in the observer records for the Hawaii longline or DGN fisheries (Table 3-4, Table 3-5 and Table 3-8), they are include under other seabirds in the action area because of their ESA-listed status and their presence in the action area.

3.4.3.1 Seabirds Considered Likely to be Affected

Species of seabirds caught in the Hawaii longline fisheries are considered likely to be affected by the Proposed Action. Over the 11-year span of data collection in the Hawaii longline fisheries, 30 seabirds were caught in the SSLL fishery with catch rates ranging from 0.006 to 0.010 caught per 1,000 hooks (Table 3–3), and one seabird was caught in the DSLL fishery with a catch rate of 0.002 caught per 1,000 hooks (Table 3–5). In the SSLL fishery, these species include the black-footed albatross and the Laysan albatross, and in the DSLL fishery only one black-footed albatross was caught.

Black-footed albatross *(Phoebastria nigripes)*: NMFS (2010) and Rivera (2006) provide profiles for this species. Breeding distribution is almost entirely restricted to the Hawaiian Islands with the exception of small colonies off Japan (USFWS 2005). In Hawaii, colonies occur in the northwestern Hawaiian

Islands and Kaula and Lehua in the main Hawaiian Islands. They have also recently recolonized Wake. During the breeding season, adults range mostly to the north and east of the Hawaii colonies. Adults that are brooding chicks forage closer to the colonies, within 100s of miles/kilometers. After brooding, birds transit to continental shelf areas of North America while feeding chicks. Nonbreeding individuals distribute throughout the North Pacific between 20° and 58° N (USFWS 2005).

Direct counts of populations cannot be made because not all birds (e.g., juveniles and some adults) return to the breeding colonies every year. Instead, the numbers of breeding pairs, or numbers of active nests, are used to assess the health of albatross populations. Environmental factors such as foraging success may influence how many albatrosses return to a colony to breed. Therefore, foraging success should not be considered to assess short-term changes in population. However, this measurement can be used to assess long-term trends in populations. The current black-footed albatross worldwide population estimate, with most counts from the 2010 nesting season, is approximately 67,215 breeding pairs. Based on a model, 67,215 breeding pairs would represent over 300,000 black-footed albatross (76 Fed. Reg. 62504, October 7, 2011).

Laysan albatross (*P. immutabilis*): NMFS (2010), Rivera (2006), and USFWS (2005) provide profiles for this species. The breeding range is centered in the Hawaiian Islands, with smaller colonies on the Bonin Islands of Japan and islands off western Mexico. Over 99 percent of the world's Laysan albatrosses breed in the northwestern Hawaiian Islands. They also nest on Kauai, Lehua, and Oahu in the main Hawaiian Islands. They have recolonized Wake and Johnston, and one pair successfully bred on Wake in 2001.

Breeding adults forage primarily to the north and northwest of Hawaii to the Gulf of Alaska and Aleutian Islands. During nonbreeding periods, adults disperse widely throughout the North Pacific. Because variables such as population structure, mortality, and individual breeding frequency are not fully understood, a total world population estimate cannot be determined for this species. Instead, an estimate of total numbers of nesting pairs has been used to monitor Laysan albatross populations. The worldwide breeding population was estimated at 590,000 pairs in 2005 (NMFS 2010). Other breeding sites are in Japan and Mexico.

3.4.3.2 Other Seabirds in the Action Area

Catch rates of total protected seabirds observed caught in numbers of animals and CPUE in number of animals per 100 observed sets in the DGN fishery for the fishing seasons 2001/2002 to 2013/2014 are shown in Table 3–8. Over the 14-year span of data collection, a total of 22 protected seabirds were

observed caught with rates ranging from 0.0374 to 0.7477 birds per 100 observed sets. There were no seabirds caught with higher rates. The seabird species caught include the northern fulmar, Cassin's auklet, and one unidentified seabird. Using the DGN fishery as a proxy, brief summaries are included below regarding the status of additional seabird species known to exist in the action area and thus may have some potential to be affected by the Proposed Action. We also include a brief summary of the short-tailed albatross because it is known to exist in the action area and is listed under the ESA as endangered throughout its range.

Cassin's Auklet (*Ptychoramphus aleuficu*): Cassin's auklets occur in marine pelagic waters from Alaska to Baja, California. Auklets are abundant throughout their range, with an estimated 88,000 birds (Seattle Audubon Society 2016). In California, the auklet occurs year-round, where 80 percent of the breeding population is found on the Farallon Islands; 17 percent are found on Prince Island and elsewhere in the Channel Islands; and 3 percent are found on Castle Rock, off Del Norte County, and Green Rock, off Humboldt County (California Interagency Wildlife Task Group 2006 *in* NMFS 2015). Cassin's auklet is not listed as either threatened or endangered by the State of California or by the Federal government.

From the 2001/2002 through 2013/2014 fishing seasons, there has been one Cassin's auklet observed caught in the DGN fishery. It was released dead.

Northern Fulmar (*Fulmarus glacialis*): The northern fulmar occurs globally (Phillips et al. 1999) from the Aleutians and the coasts of Alaska and Canadian Arctic to southern California, and in the north Atlantic south to North Carolina, as well as northern Eurasia (Denlinger 2006). Fulmars are a pelagic species, coming to shore only to breed. Fulmars are an abundant seabird, with a world population estimated at 15 to 20 million breeding pairs (Phillips et al. 1999) of which an estimated 1.4 million breeding individuals occur in the North Pacific (Nevins and Harvey 2003).

The fulmar can be seen feeding at the surface diving for its prey, or commonly behind fishing vessels foraging on fish waste thrown overboard (Phillips et al. 1999). Prey consists of crustaceans, fish, small squid, and jellyfish. Studies have suggested that commercial fishing may have contributed to the expansion in breeding numbers and range of the northern fulmar over the last two centuries (Phillips et al. 1999). The Northern fulmar is not listed as endangered or threatened.

From the 2001/2002 through 2013/2014 fishing seasons, there have been 19 northern fulmar observed caught in the DGN fishery. Eighteen were released alive and one was released dead.

Short-tailed Albatross (*Phoebastria albatrus*): Short-tailed albatrosses forage widely across the temperate and subarctic North Pacific, 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 west coast of the United States more than has been reported in previous surveys (Guy et al. 2013). Historically, millions of short-tailed albatrosses bred in the western North Pacific on several islands south of the main islands of Japan (USFWS 2011). Today, most breeding activity occurs at two island colonies: the largest, on Torishima, is home to about 85 percent of the world's population, and the remainder nest on Minami Kojima, in the Senkaku Island Group, northwest of Taiwan. In the northwestern Hawaiian islands, a pair of short-tailed albatrosses have nested and successfully fledged three chicks on Eastern Island at Midway Atoll since 2010 (USFWS 2014). The short-tailed albatross is listed as endangered under the ESA. The current worldwide population of short-tailed albatross is currently estimated at 4,354 individuals and the 3-year running average population growth rate on Torishima since 2000 ranges from 5.2 to 9.4 percent per year (USFWS 2014).

From the 2001/2002 through 2013/2014 fishing seasons, there have been no short-tailed albatross observed caught in the DGN fishery or over the 11-year span of Hawaii longline fishery data collection east of 140° W longitude.

3.4.4 Marine Fishes

As listed in Table 3–9, several ESA-listed marine fishes exist in the action area. All species of salmonids, except the steelhead stocks, are listed as prohibited species under the HMS FMP (Table 3–7). However, there is no evidence of interactions between salmonids and longline gear (NMFS 2011). Further, no capture of any ESA-listed marine fish has been observed in the United States West Coast DSLL fishery or the Hawaii longline fisheries. Therefore, these species are not further analyzed.

3.5 Climate Variability and Climate Change

Two mesoscale climate phenomena likely affect frontal activity and the distribution of tuna, other target and non-target finfish, and protected species found in the action area. The first is the El Niño-Southern Oscillation (El Niño), which is characterized by a relaxation of the Indonesian Low and subsequent weakening or reversal of westerly trade winds that cause warm surface waters in the western Pacific to shift eastward. Although the effects can be global, an El Niño event brings warm waters and a weakening of coastal upwelling off the West Coast. Tunas and billfish are found farther north during El Niño years (Field and Ralston 2005). La Niña, a related condition, results in inverse conditions, including cooler water in the eastern tropical Pacific and California Current System (CCS).

The second mesoscale climate phenomenon likely to affect the distribution of species in the action area is the Pacific Decadal Oscillation (PDO). It has important ecological effects in the CCS. Regime shifts indicated by the PDO have a periodicity operating at both 15- to 25-year and 50- to 70-year intervals (Schwing 2005). The PDO indicates shifts between warm and cool phases. The warm phase is characterized by warmer temperatures in the northeast Pacific (including the West Coast), and cooler-than-average sea surface temperatures and lower-than-average sea level air pressure in the central north Pacific; opposite conditions prevail during cool phases.

Recent reports by the Intergovernmental Panel on Climate Change (IPCC) have made it clear that the Earth's climate is changing, and with it the environmental conditions in the ocean are also changing (IPCC 2007). Climate change can affect the marine environment by impacting the established hydrologic cycle (a change in precipitation and evaporation rates) and by increasing the incidence of disease in aquatic organisms (Roessig et al. 2004). Climate change has been associated with other effects to the marine environment, including rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels, and circulation (IPCC 2007). These effects are leading to shifts in the range of species; changes in algal, plankton, and fish abundance (IPCC 2007); and causing damage to coral reefs (Scavia et al. 2002). Plankton studies demonstrate that climate change is affecting phytoplankton, copepod herbivores, and zooplankton carnivores, which affect ecosystem services, such as oxygen production, carbon sequestration, and biogeochemical cycling, and conclude that fish, seabirds, and marine mammals will need to adapt to a changing spatial distribution of primary and secondary production within pelagic marine ecosystems (Richardson et al. 2004).

The CCS is known have large natural fluctuations in its oceanography and coastal pelagic species abundance, which could have a direct impact on the abundance and location of Pacific bluefin in the EPO. Baumgartner et al. (1992) and Field et al. (2009) looked at deposits of coastal pelagic fish scales and were able to identify historic periods or regimes of anchovy and sardine abundance that they suggest are linked to large-scale climate phenomena. For example, during the 1930s through the 1950s when the California Current was undergoing a warm period as reflected in the PDO (Mantua et al. 1997), sardines were highly abundant; however, these populations experienced steep declines as the California Current and the North Pacific entered a cool period.

Studies conducted by Perry et al. (2005) indicate that climate change is affecting marine fish distributions in ways that may have important ecological impacts on fish as well as important impacts on commercial fisheries. Impacts to commercial fisheries include: (1) increases in ocean stratification leading to less

primary production, which in turn leads to less overall energy for fish production; (2) shifts in mixing areas of water zones leading to decreases in spawning habitat and decreased stock sizes; and (3) changes in currents that may lead to changes in larval dispersals and retention among certain habitats, which could lead to decreases in stock sizes or availability of resources to certain fisheries (Roessig et al. 2004).

3.6 Essential Fish Habitat and Critical Habitat

Essential fish habitat (EFH) for HMS species is described in Appendix F of the HMS FMP (NMFS 2003). EFH consist of the epipelagic and mesopelagic zones of neritic ocean waters. Critical habitat has not been designated or proposed within the action area for most ESA-listed marine mammals, sea turtles, fish, or invertebrates. Designated critical habitat for Steller sea lions (eastern DPS) is not within the action area, including waters surrounding Año Nuevo Island, Sugarloaf Island, and the southeast Farallon Islands in California; Pyramid Rock at Rogue Reef; and Long Brown Rock and Seal Rock at Orford Reef in Oregon (50 CFR 226). Critical habitat includes associated aquatic zones 3,000 feet seaward in state and federally managed waters from the baseline of each rookery (50 CFR 226.202(b)). The Proposed Action includes a no-fishing zone that contains all the waters surrounding the islands described above and aquatic zones designated as critical habitat.

Critical habitat was recently designated off the United States West Coast for leatherback sea turtles (77 Fed. Reg. 4170, January 26, 2012), which has been included within the proposed no-fishing zone for this action. In the final rule designating LCH, NMFS identified one primary constituent element essential for the conservation of leatherback sea turtles in marine waters off the United States West Coast—the occurrence of prey species, primarily scyphomedusae (commonly known as jellyfish) of the order Semaeostomeae (e.g., *Chrysaora*, *Aurelia*, *Phacellophora*, and *Cyanea*), of sufficient condition, distribution, diversity, abundance, and density necessary to support individual as well as population growth, reproduction, and development of leatherback sea turtles. The designated critical habitat is fully contained within the proposed no-fishing zone and longline fishing does not normally observe bycatch of jellyfish.

3.7 Socioeconomic Environment

3.7.1 Fisheries and Current Regulatory Environment

Because of the use of proxy datasets, the current regulatory environment is described in Subsection 3.2, Fisheries in the Action Area or in the Vicinity of the Action Area, for the Hawaii longline fishery and the DGN fishery.

3.7.2 Fisheries in the Action Area or Fisheries Used as a Proxy for the Action Area

The socioeconomic environment affected by the Proposed Action includes the producers and consumers of swordfish and other market species that are caught and landed by fisheries targeting swordfish, as well as processors and other providers of supporting services to the industry and fishing communities that benefit from direct and indirect revenue and employment impacts. Currently, there are no longline vessels fishing within the West Coast EEZ. Therefore, the landings of swordfish and other HMS species into United States West Coast ports primarily come from the DGN and harpoon fleet, the United States West Coast DSLL fishery, and the Hawaii longline vessels that fish on the high seas (Figure 3–1 and 3–2).

Overall, swordfish fishing effort and landings have significantly declined on the United States West Coast. In 2013, 73 DGN permits were issued by the CDFW, but only 19 of the permittees were active in the fishery (CDFW 2014). Much of the attrition in the DGN fleet is attributed to the closure of the Pacific Leatherback Conservation Area, which was implemented in 2001. Following this closure, attrition in the fishery reached 100 percent in northern California ports and ranged from 55 to 75 percent in southern California ports (Figure 3–3). The harpoon fishery has always been a low volume fishery and continues to be so today. In recent years, landings from Hawaii longline vessels have made up the greater proportion of swordfish landings in California (Figure 3–2). In 2014, Hawaii longline vessels landed over 479.5 tons (435 metric tons) of swordfish in California ports, whereas 120 tons (109 metric tons) were landed by DGN and harpoon vessels (107 tons [97 metric tons] and 13 tons [12 metric tons], respectively) (PFMC 2015c).

During the 1980s and into the mid 1990s, domestically caught swordfish generally supplied United States demand. The highest proportion imported was 81 percent in 2002 and 2004, making the United States one of the largest markets for foreign-caught swordfish (SWFSC 2010; NMFS 2014a). Importing such a large proportion of swordfish to meet the high United States demand is in part due to the decline in domestic swordfish fishing effort (PFMC 2011b). With an average price per pound of $2.45 in 2014 for longline-caught swordfish landed on the United States West Coast, the Hawaii vessels demonstrate the value of landing swordfish in United States west coast ports (PMFC 2015c).

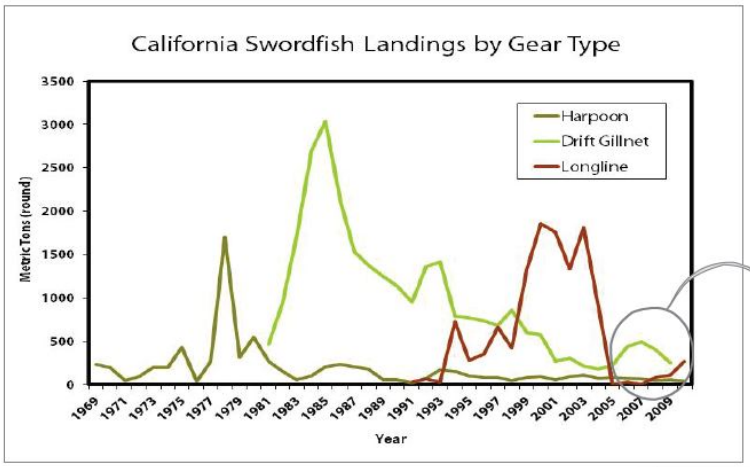

Figure 3-1. California swordfish landings by gear type 1969 to 2009. Source: NMFS 2012b (swordfish proceedings).

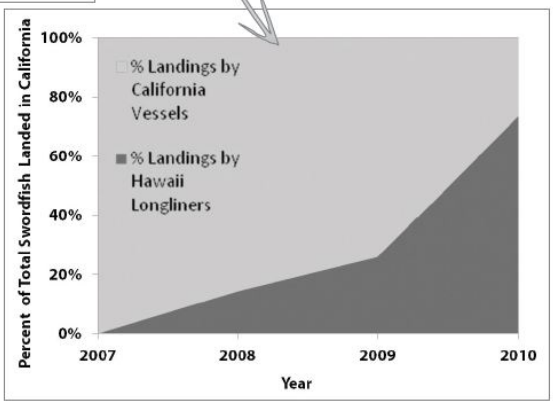

Figure 3-2. California swordfish landings by vessel origin 2007 to 2010. Source: NMFS 2012b (swordfish proceedings).

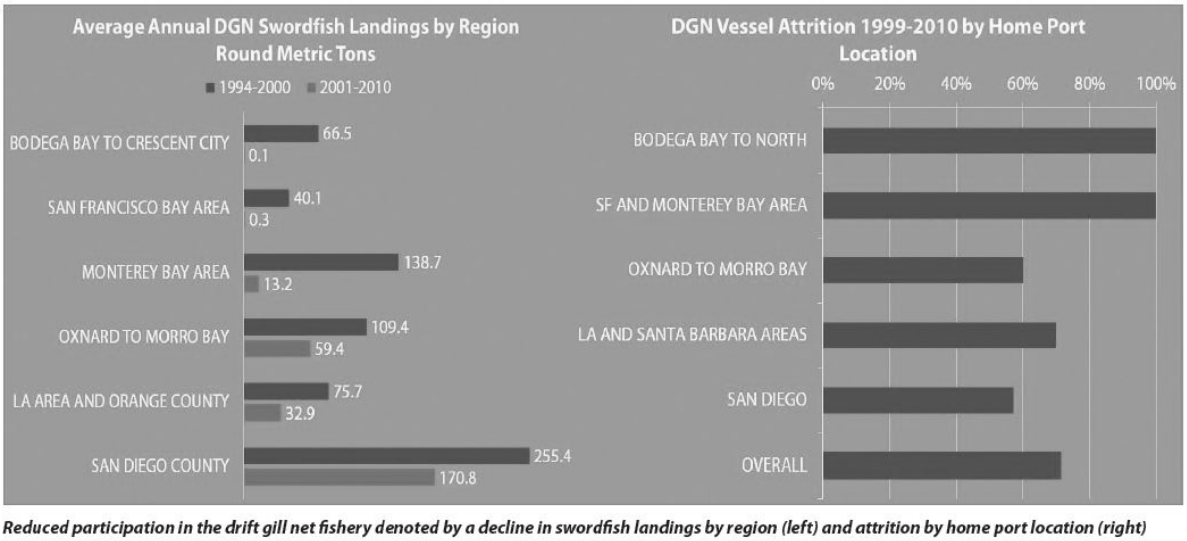

Figure 3-3. Reduced participation in the drift gillnet fishery denoted by a decline in swordfish landings by region (left) and attrition by home port location (right). Source: NMFS 2012b (swordfish proceedings).

4 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This section analyzes the effects of the Proposed Action alternatives on the resources described in Section 3, Affected Environment—fisheries, fish stocks, protected species, essential fish habitat and critical habitat, and the socioeconomic environment. The impact analysis in this EA is based on expected fishing effort under each of the alternatives compared to a baseline level, which was described in Section 3, Affected Environment. To estimate impacts of expected effort levels under the action alternatives, observer records from the Hawaii-based DSLL and SSLL fisheries and the DGN fishery were used as proxies. The estimates derived from the Hawaii longline fishery and the DGN fishery are the best comparatives in lieu of the absence of a longline fishery within the West Coast EEZ; however, there are some notable differences among the operations of these fisheries and those of the Proposed Action. While the catchability of the Hawaii longline fisheries can be expected to be similar to that of the Proposed Action with almost identical gear, fishing is prohibited in the action area. Although the DGN fishery takes place in the action area, it is unclear how to compare the catchability, and therefore how to compare effort of this gear type to the Proposed Action. For this EA, we used post-2004 Hawaii-based longline observer records for those trips that were executed east of 140° W longitude in an effort to minimize potential bias from fishing that may have taken place closer to the Hawaiian Islands and before the implementation of, among other mitigation measures included in the Proposed Action, the mandatory use of circle hooks and mackerel-type bait. Thus, these trips and records represent the best match of gear and operational methods the applicants would employ. However, recognizing that differences in catch compositions between the Hawaii-based longline records and the proposed alternatives may be likely due to differences in fishing areas, we used the DGN observer records to show further resources in the action area that may be affected by the Proposed Action. These resources include fisheries in the action area or in the vicinity of the action area, fish stocks, protected species, essential fish habitat, and the social and economic environment.

The expected level of effort in number of hooks deployed over the 2-year duration of both action alternatives being considered is presented in Subsection 2.1.2, Alternative 2, and Subsection 2.1.3, Alternative 3. The number of hooks deployed is identical for Alternative 2 and Alternative 3. Over the duration of the EFP, the SSLL component of expected effort is 108,000 hooks and the DSLL component is 225,000 hooks. The two EFP action alternatives include, among other mitigation measures, species limits on certain protected species that may be hooked or entangled, limitations on the type of hooks and bait, and the requirement to set SSLL gear at night to reduce the potential take of protected species such

as leatherback sea turtles, loggerhead sea turtles, and seabirds. The action alternatives also include constraints on fishing areas that may affect expected effort.

4.2 Fisheries in the Action Area or in the Vicinity of the Action Area

For the purposes of this analysis, the various fisheries in the action area or in the vicinity of the action area that may be affected by the Proposed Action are the United States West Coast-based deep-set tuna longline fishery (Subsection 3.2.1, United States West Coast-based Deep-set Tuna Longline Fishery), the Hawaii longline fishery (Subsection 3.2.2, Hawaii Longline Fishery [Deep-set and Shallow-set]), the drift gillnet fishery (Subsection 3.2.3, Drift Gillnet Fishery), and other fisheries described in Subsection 3.2.4, Other Fisheries Operating in the Action Area or in the Vicinity of the Action Area. In the following subsections, all the fisheries have been grouped together with the exception of a reference to the recreational fishery, which targets striped marlin.

4.2.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted, therefore there would be no impacts to fisheries in the action area or in the vicinity of the action area.

4.2.2 Alternative 2 and Alternative 3

Fisheries in the action area or in the vicinity of the action area may share in catch limits for species likely to be harvested during EFP fishing under Alternatives 2 and 3. These fisheries are not expected to be affected by the action alternatives given the relatively small short-term increase in total longline effort and catch. Additionally, even though striped marlin are considered an uncommonly caught species (in reference to the proxy data sets for the proposed action alternatives), because of concerns expressed by resource user groups about the potential for interactions with the proposed longline EFP activities, the proposed catch limits would be in place under both proposed action alternatives (described in Subsection 3.3.3.2). The catch limit on striped marlin is based on the expected number of striped marlin caught. Therefore, Alternative 2 and Alternative 3 have set a striped marlin catch limit based on the expected catch of 57 animals (described in Subsection 3.3.3.2). These potential impacts on fisheries in the action area or in the vicinity of the action area are not expected to be significant.

4.3 Fish Stocks

For the purposes of this analysis, the various fish stocks that may be affected by the Proposed Action have been grouped into three categories: commonly caught management unit species, other commonly caught

species, and uncommonly caught species. In the following subsections, other commonly caught species and uncommonly caught species have been grouped together.

4.3.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted, and therefore no impacts to fish stocks would occur.

4.3.1.1 Commonly Caught Management Unit Species

Impacts to commonly caught management unit species would remain the same as in the baseline condition described in Subsection 3.3.1, Commonly Caught Management Unit Species. Therefore, there would be no significant impacts to commonly caught management unit species under this alternative.

4.3.1.2 Other Commonly Caught Species and Uncommonly Caught Species

Impacts to other commonly caught species and uncommonly caught species would remain the same as in the baseline condition described in Subsection 3.3.2, Commonly Caught Species and Subsection 3.3.3, Uncommonly Caught Species. Therefore, there would be no significant impacts to other commonly caught species and uncommonly caught species under this alternative.

4.3.2 Alternative 2

Impacts to commonly caught management unit species, other commonly caught species, and uncommonly caught species under Alternative 2 are principally reflected in the expected catch of these species, which is a function of the expected effort discussed in Subsection 4.1. Evaluation of the consequences of this alternative includes the entire affected environment, as described in Section 3 of this document.

Projected catches of commonly caught management unit species, other commonly caught species, and uncommonly caught species are presented in Table 4–1 for SSLL fishing under the EFP and in Table 4–2 for DSLL fishing under the EFP. Both tables are based on catch rates from the Hawaii-based longline fisheries observer records for east of 140° W longitude; these fisheries include use of circle hooks and mackerel-type bait. Expected catch over the 2-year EFP was calculated by multiplying the expected level of effort for the SSLL component of EFP fishing (108,000 hooks) and DSLL component of EFP fishing (225,000 hooks) and the respective catch rates for species in Table 3–2 and Table 3–4. Under this action alternative, leatherback sea turtles, loggerhead sea turtles, and striped marlin catch limits are proposed (Subsection 2.1.2, Alternative 2). If any of these catch limits are met or exceeded, EFP fishing would cease. This would lead to a decrease in potential catch of fish stocks, further reducing the severity of

impacts and decrease the likelihood of a significant effect on the health of fish stocks as a result of this action. Potential impacts under the 2-year EFP are discussed in the subsections below.

Table 4–1. Projected total SSLL EFP catch in numbers of fish.

Species	Catch per 1,000 Hooks	Projected Catch in Numbers of Fish
Commonly Caught Management Unit Species		
Swordfish	10.374	1120.4
Shark, Blue	6.395	690.6
Shark, Shortfin Mako	1.496	161.5
Mahi-mahi or Dolphinfish	1.491	161.0
Tuna, Albacore	1.044	112.7
Other Commonly Caught Species		
Lancetfish, Longnose	1.828	197.4
Escolar	0.919	99.3
Opah	0.642	69.4
Stingray, Pelagic	0.553	59.7
Oilfish	0.505	54.6
Uncommonly Caught Species		
Tuna, Bigeye	0.383	41.4
Pomfret, Brama spp.	0.283	30.6
Mola, common	0.078	8.5
Shark, unidentified	0.058	6.3
Pomfret, Sickle	0.057	6.1
Spearfish, Shortbill	0.054	5.9
Bony Fish, unidentified	0.042	4.5
Shark, Bigeye Thresher	0.042	4.5
Ribbonfish, Tapertail	0.039	4.3
Shark, unidentified Mako	0.021	2.3
Marlin, Striped	0.016	1.8
Snake Mackerel	0.011	1.2
Tuna, Skipjack	0.009	0.9
Shark, Salmon	0.007	0.7
Shark, unidentified Thresher	0.006	0.6
Tuna, unidentified	0.005	0.6
Bony Fish, other identified	0.005	0.5
Shark, Longfin Mako	0.005	0.5
Shark, common Thresher	0.004	0.4
Pomfret, Dagger	0.004	0.4
Wahoo	0.003	0.3
Tuna, Bluefin	0.003	0.3

Table 4–1. Continued. Projected total SSLL EFP catch in numbers of fish.

Species	Catch per 1,000 Hooks	Projected Catch in Numbers of Fish
Uncommonly Caught Species		
Tuna, Yellowfin	0.003	0.3
Cigarfishes	0.003	0.3
Crestfish	0.002	0.2
Marlin, Blue	0.002	0.2
Mola, Sharptail	0.002	0.2
Pomfret, Lustrous	0.002	0.2
Shark, Oceanic White-Tip	0.002	0.2
Billfish, unidentified	0.001	0.1
Pomfret, Rough	0.001	0.1
Yellowtail	0.001	0.1
Dogfish, Velvet	0.001	0.1
Mola, Slender	0.001	0.1
Ribbonfish, Scalloped	0.001	0.1
Shark, Cookie Cutter	0.001	0.1
Shark, Gray Reef	0.001	0.1
Shark, Pelagic Thresher	0.001	0.1
Shark, Tiger	0.001	0.1

Table 4–2. Projected total DSLL EFP catch in numbers of fish.

Species		
Commonly Caught Management Unit Species		
Tuna, Bigeye	5.031	1,131.9
Mahi-mahi or Dolphinfish	1.894	426.1
Shark, Blue	0.888	199.8
Other Commonly Caught Species		
Lancetfish, Longnose	4.249	955.9
Opah	2.641	594.2
Pomfret, Sickle	1.634	367.5
Snake Mackerel	1.294	291.1
Escolar	0.919	206.8
Uncommonly Caught Species		
Tuna, Skipjack	0.368	82.7
Spearfish, Shortbill	0.253	57.0
Marlin, Striped	0.243	54.6
Tuna, Yellowfin	0.194	43.7
Swordfish	0.165	37.1
Pomfret, Dagger	0.163	36.7
Wahoo	0.151	33.9
Shark, Shortfin Mako	0.118	26.5
Shark, Bigeye Thresher	0.083	18.7
Stingray, Pelagic	0.073	16.4
Pompano	0.028	6.2
Marlin, Blue	0.024	5.5
Pomfret, Brama *spp*.	0.024	5.5
Escolar, Longfin	0.023	5.1
Remora/Suckerfish	0.019	4.3
Tuna, Albacore	0.016	3.5
Shark, unidentified Thresher	0.016	3.5
Crestfish	0.012	2.7
Oilfish	0.012	2.7
Tuna, unidentified	0.010	2.3
Bony Fish, unidentified	0.005	1.2
Bony Fish, other identified	0.003	0.8
Cigarfishes	0.003	0.8
Dogfish, Velvet	0.003	0.8

Table 4–2. Continued. Projected total DSLL EFP catch in numbers of fish.

Species		
Uncommonly Caught Species		
Gemfish, Black	0.003	0.8
Puffer, Pelagic	0.003	0.8
Ribbonfish, Tapertail	0.003	0.8
Scabbardfish, Razorback	0.003	0.8
Billfish, unidentified	0.002	0.4
Fanfishes	0.002	0.4
Hammerjaw	0.002	0.4
Mola, common	0.002	0.4
Mola, Sharptail	0.002	0.4
Sailfish	0.002	0.4
Shark, Crocodile	0.002	0.4
Shark, Pelagic Thresher	0.002	0.4

4.3.2.1 Commonly Caught Management Unit Species

Under Alternative 2, the estimated catch would be 1,159 swordfish (1,121 from SSLL and 38 from DSLL), 891 blue sharks (691 from SSLL and 200 from DSLL), 1,174 bigeye tuna (42 from SSLL and 1,132 from DSLL), 189 shortfin mako sharks (162 from SSLL and 27 from DSLL), 588 mahi-mahi (161 from SSLL and 427 from DSLL), 117 North Pacific albacore (113 from SSLL and 4 from DSLL), 83 skipjack tuna (1 from SSLL and 83 from DSLL), 5 common thresher sharks (1 from SSLL and potentially 4 from DSLL identified as unidentified thresher sharks), and 1 Pacific bluefin tuna (1 from SSLL and zero from DSLL). The potential impacts under Alternative 2 to commonly caught management unit species are discussed below.

Swordfish

The estimated harvest of 1,159 swordfish represents a very minor fraction of the annual catches in the distribution area of the stock that includes the United States EEZ. The average weight for a swordfish caught in the DGN fishery within the action area is estimated to be approximately 150 pounds (68 kg) (Berube et al. 2015). Multiplying the average weight of 150 pounds (68 kg) by 1,159 individual swordfish gives an estimated catch of approximately 86.86 tons (78.8 metric tons) of swordfish caught while fishing under the EFP. Catches in the region have been fairly stable to declining in recent years. During the 2000s, the average annual reported catch of swordfish in the WCNPO was approximately 14,991 tons (13,600 metric tons). After 2007, annual catches decreased substantially to average around 11,000 tons

(10,000 metric tons) in 2001 to 2012 (ISC 2014a). The annual catch rates of 11,000 tons (10,000 metric tons) are well below the estimated exploitable biomass of about 77,000 tons (70,000 metric tons); the WCNPO stock is considered underutilized (Hinton and Maunder 2011; ISC 2014a). Recent assessments of the WCNPO swordfish stock indicate that the stock is healthy and has been healthy for over a decade (Sipple 2015). The WCNPO swordfish stock does not appear to have been overfished or to have experienced overfishing throughout most of the assessment time horizon of 1951 to 2012 (ISC 2104c). Based on the status summary for the most recent WCNPO swordfish stock assessments presented in Subsection 3.3.1.1, Swordfish (*Xiphias gladius*), coupled with the relatively small increase in total effort and catch on a regional basis, the short-term increase in swordfish catch anticipated under Alternative 2 is not expected to have a significant adverse effect on the health of the WCNPO stock.

Blue Shark

Estimated catches of blue sharks were highest from 1976 to 1989 with a peak estimated catch of approximately 99,000 tons (90,000 metric tons) in 1981. Over the past decade however, estimated catches in the North Pacific have remained steady at roughly 44,000 tons (40,000 metric tons) annually. Recent stock assessments use future catch projections under different fishing mortality (*F*) harvest policies to show that median blue shark biomass in the North Pacific is expected to remain above B_{MSY} (ISC 2013). The analyses further indicate that the stock is in a healthy condition and current levels of fishing mortality are sustainable in the short and long term. The estimated harvest of 891 blue sharks under the EFP, however, would represent a small incremental increase in overall fishing mortality. Based on the status summary for the most recent North Pacific Ocean blue shark stock assessment presented in Subsection 3.3.1.2, Blue Shark (*Prionace glauca*), the relatively small short-term increase in total effort is not expected to have a significant adverse effect on the health of the blue shark stock.

Bigeye Tuna

The estimated harvest of 1,174 bigeye tuna under the EFP (most of the catch would be from the DSLL sector of EFP fishing) represents a fraction of annual bigeye catches in the EPO. As mentioned in Subsection 3.3.1.3, Bigeye Tuna (*T. obesus*), NMFS implements limits on annual catch for bigeye tuna in the EPO. These catch limits are imposed in accordance with international resolutions. Once the catch limit is expected to be reached in any given year, NMFS closes commercial fishing for bigeye tuna to these vessels through the remainder of the calendar year.

Because bigeye tuna have a wide distribution and the majority of catches are made outside of United States waters by fishing vessels from other nations, international management measures are adopted by

consensus of regional fisheries management organizations (RFMOs). The catch of bigeye tuna under the EFP would be monitored with 100 percent observer coverage and would be in compliance with the catch limit for the EPO in any given year as implemented by NMFS in accordance with conservation and management measures adopted by the IATTC. Based on the most recent stock assessments, coupled with the relatively small increase in total effort (two vessels) and catch monitoring, and catch controls for the bigeye tuna catches in the EPO, the short-term increase in bigeye tuna catch under this action alternative is not expected to have a significant adverse effect on the health of the bigeye tuna stock in the EPO.

Shortfin Mako Shark

The shortfin mako shark is a data poor species (ISC 2015b). Using the Hawaii DSLL and SSLL observer records as a proxy, the anticipated catch of shortfin mako shark under the EFP would be 189 animals. Using data from the ISC, average weight for shortfin mako sharks caught in the DGN fishery within the action area is estimated to be approximately 53 pounds (24 kg) (ISC 2015c). Multiplying the average weight of 53 pounds (24 kg) by 189 mako sharks gives an estimated catch of approximately 4.96 tons (4.5 metric tons). United States West Coast landings of shortfin mako shark in 2014 were approximately 4.96 tons (24 metric tons) (PFMC 2015d). Summing the estimated catch under the Proposed Action results in a total expected catch estimate of 27 tons (24.5 metric tons), which does not exceed the HMS FMP harvest guideline of 165 tons (150 metric tons). Based on the summary information presented in Subsection 3.3.1.4, Shortfin Mako Shark (*Isurus oxyrinchus*), coupled with the catch estimates, average weight, and current landings, the short-term increase in mako shark catch under Alternative 2 is not expected to have a significant adverse effect on the health of the shortfin mako shark stock off the United States West Coast.

Mahi-mahi or Dolphinfish

Although the mahi-mahi population is not formally assessed, scientists consider the population to be stable because the species is highly productive and widely distributed throughout the tropical and subtropical Pacific. Very little is known about their population dynamics; however, there is no known resource conservation concern at this time. The estimated harvest of 588 mahi-mahi under the EFP would represent a small short-term incremental increase in overall fishing mortality. These factors would suggest that mahi-mahi catch under Alternative 2 is not expected to have a significant adverse effect on the health of Pacific mahi-mahi.

North Pacific Albacore Tuna

Annual United States landings of albacore tuna for the past 10 years (2001 to 2010) have averaged 15,221 tons (13,808 metric tons) and represent roughly 17 percent of the total north Pacific albacore tuna

landings. Of the United States fisheries operating during this period, the commercial surface fishery is the largest, averaging 86 percent of the annual United States landings, followed by the recreational fishery with roughly 9 percent, and finally the longline fishery with just 3 percent of the annual landings (ISC 2011). The north Pacific albacore tuna stock is considered to be healthy at current levels of recruitment and fishing mortality, and the sustainability of the stock is not threatened by overfishing. The estimated harvest of 117 North Pacific albacore under the EFP would represent a small incremental increase in overall United States fishing mortality. These factors would suggest that North Pacific albacore tuna catch under Alternative 2 would not trigger either an overfished or an overfishing condition. Based on stock status and summary information presented in Subsection 3.3.1.6, North Pacific Albacore Tuna (*Thunnus alalunga*), this alternative is not expected to have a significant adverse effect on the health of the North Pacific albacore tuna stock.

Skipjack Tuna

The HMS FMP management objectives for skipjack tuna stocks are, among others, those embodied in the goal of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), namely to ensure the long-term sustainability of fisheries and fish stocks by halting or preventing overfishing and by rebuilding overfished stocks. The estimated harvest of 83 skipjack tuna under the EFP, however, would represent a small short-term incremental increase in overall fishing mortality. Based on the most recent stock assessments, coupled with the relatively small increase in total effort (two vessels) and catch monitoring, the short-term increase in skipjack tuna catch under this action alternative would not trigger either an overfished or an overfishing condition. Based on stock status and summary information presented in Subsection 3.3.1.7, Skipjack Tuna (*Katsuwonus pelamis*), this alternative is not expected to have a significant adverse effect on the health of the skipjack tuna stock.

Common Thresher Shark

Thresher sharks are caught primarily in the DGN fishery that was first established to target thresher sharks in the late 1970s. By the mid 1980s, the fishery had shifted its focus to more lucrative swordfish. This shift resulted in a decrease of commercial landings from 1,984 tons (1,800 metric tons) in the early 1980s to below 220 tons (200 metric tons) in 2008 and 2009 (SWFSC 2015c). Recreational catch varies widely from year to year but has averaged roughly 22 tons (20 metric tons) annually in recent years. The HMS FMP includes a harvest guideline of 386 tons (340 metric tons) as established under the HMS FMP for common thresher shark catch. Using the Hawaii fisheries observer records as a proxy, the anticipated catch of common thresher sharks under the Proposed Action is five animals. However, common thresher sharks may be more available within the United States West Coast EEZ than on the high seas where the

Hawaii longline fisheries operate. Despite that, the projected catch is still not expected to have a significant effect on the health of common thresher sharks. The HMS FMP harvest guideline of 386 tons (340 metric tons) would not be exceeded by the estimated catch of common thresher sharks under the most liberal effort scenario of Alternative 2.

Pacific Bluefin Tuna

The estimated harvest of one bluefin tuna (from the Hawaii SSLL fishery data) under the EFP represents a minor fraction of the total catch average over a 10-year period (2003 to 2012) of 23,424 tons (21,250 metric tons) in the EPO (ISC 2014c). The average annual bluefin tuna landed catch by United States commercial vessels fishing in the EPO from 2010 to 2014 represents only 2 percent of the average annual landings for all fleets fishing in the EPO during that period (80 Fed. Reg. 12375, March 9, 2015). As mentioned in Section 3.3.1.9, Pacific bluefin tuna (*Thunnus thynnus*) are overfished and subject to overfishing, and catch limits are in place as part of a rebuilding effort. Once the catch limit is reached in any given year, NMFS closes commercial fishing for bluefin in the EPO to United States vessels through the remainder of the calendar year. The United States commercial fishery has yet to meet or exceed the commercial catch limits for Pacific bluefin tuna in the EPO.

Because Pacific bluefin tuna have a wide distribution and the majority of catches are made outside of United States waters by vessels from other nations, management measures are adopted by consensus of RFMOs. The catch of bluefin tuna under the EFP would be monitored with 100 percent observer coverage and would be in compliance with catch limits for the EPO in any given year as implemented by NMFS in accordance with conservation and management measures adopted by the IATTC. Based on a relatively small short-term increase in total effort (two vessels) and with 100 percent catch monitoring, the increase in Pacific bluefin tuna catch under Alternative 2 would be insignificant.

4.3.2.2 Other Commonly Caught Species and Uncommonly Caught Species

The species listed under other commonly caught species and uncommonly caught species (excluding prohibited species and marlin, which are discussed below) are caught at such low interaction rates that there are no resource concerns with respect to longline catches at this time. These factors would suggest that the impacts of Alternative 2 on other commonly caught species and uncommonly caught species in the action area are not expected to have a significant adverse effect. Additionally, the monitoring protocol for the EFP requires 100 percent observer coverage for all trips, including observer monitoring of the entire haul-back. NMFS would also provide each observer a satellite phone to ensure adequate

communication with the agency while at sea. As such, monitoring would be adequate to ensure adherence to HMS FMP management objectives.

Species designated as prohibited under the HMS FMP (Table 3–9) are included under uncommonly caught species because they are captured at low interaction rates. There were no prohibited species interactions recorded in the Hawaii longline fishery from 2004 through 2014 fishing seasons and east of 140° W longitude, but data from the DGN fishery showed interactions with two basking sharks and five megamouth sharks (Table 3-7). Because these two species are planktivorous and not considered susceptible to longline gear based on the Hawaii longline data, they are unlikely to be caught by longline fishing gear deployed for EFP fishing. These circumstances, coupled with low interaction rates and low fishing effort with only two vessels, the impacts of this alternative on prohibited species are not expected to have a significant effect.

Prohibited Species

Although striped marlin are considered an uncommonly caught species, they are discussed in detail in this subsection because of concerns expressed by other resource user groups about the potential for interactions with the proposed longline EFP.

The status of the striped marlin population appears to be healthy, and the expected catch under the EFP would be very minor and short term. Therefore, no significant adverse impact to the striped marlin population is expected under Alternative 2. Further, given that striped marlin distribution and abundance increases in the more tropical waters, such as areas targeted by the Hawaii longline fisheries, the actual catch of striped marlin under Alternative 2 may be less in the more temperate, coastal habitat that would be fished in the proposed action area. Further, because the no-fishing zone for this action alternative includes the entire SCB where recreational fishing effort typically occurs, no gear conflicts are expected to arise as a result of this alternative. Based on the status summary for the most recent North Pacific striped marlin stock assessments presented in Subsection 3.3.3.2, Striped Marlin (*Kajikia audax*), coupled with the relatively small short-term increase in total effort and catch on a regional basis, the increase in striped marlin catch anticipated under Alternative 2 is not expected to have a significant adverse effect on the health of the North Pacific stock.

4.3.3 Alternative 3

The impacts of Alternative 3 are expected to be the same as those for Alternative 2 except for a slight increase in the EFP limit on the number of hooked or entangled leatherback and loggerhead sea turtles.

Alternative 3 would allow for three leatherback and two loggerhead sea turtles hooked or entangled (Subsection 2.1.3, Alternative 3). As mentioned previously, it is uncertain if the proposed EFP catch rates would be similar to the catch rates observed in the Hawaii longline fishery given the differences in fishing areas. Because the limits in Alternative 2 are based on the expected level of hooked or entangled protected species caught in the Hawaii longline fishery, one additional take has been added to each limit to account for potential variability in catch rates because of fishing in a different area (i.e., within the United States mainland EEZ). While the limits under Alternative 3 allow for an additional take of the species, as in Alternative 2, fishing would cease under Alternative 3 with one observed leatherback sea turtle mortality.

4.3.3.1 Commonly Caught Management Unit Species

Like for Alternative 2, the impacts of Alternative 3 on commonly caught management unit species are not expected to be significantly adverse. Because the expected effort under Alternative 3 is the same as that for Alternative 2, there are no meaningful differences between the effects of the two alternatives on commonly caught management unit species.

4.3.3.2 Other Commonly Caught Species and Uncommonly Caught Species

The impacts of Alternative 3 on other commonly caught species and uncommonly caught species are expected to be the same as those for Alternative 2, and thus not significantly adverse. Because the expected effort under Alternative 3 is the same as that for Alternative 2, there are no meaningful differences between the effects of the two alternatives on other commonly caught species and uncommonly caught species.

4.4 Protected Species

For the purposes of this EA, the various protected species that may be affected by the Proposed Action have been grouped into three categories: marine mammals, sea turtles, and seabirds. These categories are based on catch records from the Hawaii longline fisheries west of 140° W longitude and the United States West Coast DGN fishery (Table 3–8). Potential interactions with protected species over the 2-year EFP were calculated by multiplying the expected level of effort for the SSLL component of EFP fishing (108,000 hooks) and the DSLL component of EFP fishing (225,000 hooks) and the respective interaction rates for species in Table 3–3 and Table 3–5.

4.4.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted.

4.4.1.1 Marine Mammals

Impacts to marine mammals would remain the same as in the baseline condition described in Subsection 3.4.1, Marine Mammals. No additional impacts to marine mammals are expected to occur under this alternative.

4.4.1.2 Sea Turtles

Impacts to sea turtles would remain the same as in the baseline condition described in Subsection 3.4.2, Sea Turtles. No additional impacts to sea turtles are expected to occur under this alternative.

4.4.1.3 Seabirds

Impacts to seabirds would remain the same as in the baseline condition described in Subsection 3.4.3, Seabirds. No additional impacts to seabirds are expected to occur under this alternative.

4.4.2 Alternative 2

Impacts to marine mammals, sea turtles, and seabirds under Alternative 2 are principally reflected in catch of the species, which are a function of the estimate of effort discussed under Section 4.1. Evaluation of the consequences of the alternative includes the entire affected environment, as described in Section 3, Affected Environment.

Projected catches of marine mammals, sea turtles, and seabirds are presented in Table 4–3 for SSLL fishing under the EFP and Table 4–4 for DSLL fishing under the EFP, which both used Hawaii-based longline fisheries observer records west of 140° W longitude as a proxy for trips utilizing circle hooks and mackerel-type bait. Interaction estimates over the 2-year EFP are provided based on expected level of effort for the SSLL component of EFP fishing (108,000 hooks) and DSLL component of EFP fishing (225,000 hooks) and multiplied across the expected interaction rates derived from the Hawaii longline observer data (Table 3–2 and Table 3–4) to come up with expected take in numbers of animals.

Table 4–3. Projected total SSLL EFP catch in numbers of protected species.

Protected Species		
Birds		
Albatross, Black-footed	0.010	1.1
Albatross, Laysan	0.006	0.6
Marine Mammals		
Beaked Whale, Ginkgo-toothed	0.001	0.1
Beaked Whale, Mesoplodont	0.001	0.1
Dolphin, Bottlenose	0.001	0.1
Dolphin, Risso's	0.005	0.6
Dolphin, Short-beaked common	0.001	0.1
Dolphin, Striped	0.002	0.2
Sea Lion, unidentified	0.001	0.1
Seal, Northern Elephant	0.001	0.1
Sea Turtles		
Turtle, Leatherback	0.010	1.1
Turtle, Loggerhead	0.005	0.5
Turtle, unidentified hardshell	0.001	0.1

Table 4–4. Projected total DSLL EFP catch in numbers of protected species.

Protected Species	**Catch per 1,000 Hooks**	**Projected Catch in Numbers of Animals**
Birds		
Albatross, Black-footed	0.002	0.4

4.4.2.1 Marine Mammals

Table 4–5 shows expected marine mammal catch under this alternative, along with the PBR and mean annual fishery level of mortality and serious injury (M/SI) of each marine mammal stock likely to be affected. Expected catch of marine mammals under this alternative is calculated using Hawaii SSLL fishery CPUE and the number of SSLL hooks proposed to be set in the EFP. The number of DSLL hooks set under the EFP is not used to determine expected EFP catch of marine mammals because no marine mammals were observed caught in the Hawaii DSLL fishery data used for this EA.

Marine mammals may experience minor adverse effects under Alternative 2 through hooking or entanglement in longline fishing gear, but this is expected to be a rare occurrence. Expected catch of all marine mammal stocks under this alternative is less than one animal per stock, and expected catch is zero for many stocks. In determining the severity of adverse effects, it is important to consider each stock's current mean annual fishery M/SI along with its PBR. The EFP catch of a single marine mammal of any stock, added to its mean annual M/SI, would not bring fishery M/SI over PBR for any marine mammal stock.

While this effects analysis uses catch rates from the Hawaii SSLL fishery, actual catch rates and species composition may differ because of the more coastal action area of this EFP. A tripling of Hawaii SSLL catch rates would leave the expected catch of most marine mammal stocks at less than one animal and many at zero. Catch of Risso's dolphin would be less than two animals under this increased catch rate scenario. The EFP catch of a single marine mammal of any stock, added to its mean annual M/SI, would not bring fishery M/SI over PBR for any marine mammal stock. The relatively small short-term increase in effort is not expected to have a significant adverse effect on the health of marine mammals.

This alternative contains a catch limit on leatherback sea turtles, loggerhead sea turtles, and striped marlin (Subsection 2.1.2, Alternative 2). If any of these catch limits are met or exceeded, EFP fishing would cease. This would lead to a decrease in potential catch of marine mammals, further reducing the severity of effects and decrease the likelihood of the action to have a significant effect on the health of marine mammals.

Table 4–5. Observed catch and catch per unit effort east of 140° W in the Hawaii SSLL fishery (2004 through 2014), expected EFP catch, PBR, and mean annual fishery M/SI of marine mammals. (C/O/W = California/Oregon/Washington).

Marine Mammals	Total Caught	Dead	Injured	Catch per 1,000 Hooks	Expected EFP Catch	PBR (Stock)	Mean Annual Fishery M/SI
Beaked Whale, Mesoplodont (including Ginkgo-toothed)	2		2	0.001	0.108	3.9 (C/O/W)	0
Dolphin, Bottlenose	1	1		0.001	0.108	5.5 (C/O/W offshore)	0.2
Dolphin, Risso's	10	3	7	0.005	0.54	39 (C/O/W)	1.6
Dolphin, Short-beaked common	1		1	0.001	0.108	3,440 (C/O/W)	65
Dolphin, Striped	3		3	0.002	0.216	82 (C/O/W)	0
Sea Lion, California*	1		1	0.001	0.108	9,200 (U.S.)	331
Seal, Northern Elephant	2		2	0.001	0.108	4,882 (CA Breeding)	4.0
Dolphin, Long-beaked common	0			0	0	610 (CA)	13
Dolphin, Northern Right Whale	0			0	0	48 (C/O/W)	3.6
Dolphin, Pacific White-sided	0			0	0	171 (C/O/W)	11.8
Porpoise, Dall's	0			0	0	257 (C/O/W)	>=0.4
Whale, Short-finned Pilot	0			0	0	4.6 (C/O/W)	0
Whale, Gray	0			0	0	624 (ENP)	4.26
Whale, Minke	0			0	0	2 (C/O/W)	0
Whale, Humpback**	0			0	0	11 (C/O/W)	>=4.4
Whale, Sperm**	0			0	0	12.7 (C/O/W)	1.7
Guadalupe Fur Seal**	0			0	0	91 (Mexico to CA)	0

*Unidentified Sea Lion assumed to be a California Sea Lion for purposes of this EA
**Strategic Stock

4.4.2.2 Sea Turtles

The likelihood of sea turtle take under Alternative 2 is low. Based on observer records from the Hawaii longline fisheries west of 140° W longitude and the biology and distribution of the species, a small number of sea turtles may be exposed to and affected by this alternative. For the purposes of analysis, sea turtles were divided into two groups: sea turtles considered likely to be affected (leatherback and loggerhead sea turtles) and other sea turtles in the action area (green and olive ridley sea turtles). Because other sea turtles in the action area (Section 3.4.2.2, Other Sea Turtles in the Action Area) were not observed taken in either the Hawaii longline fishery data or the DGN fishery, these green and olive ridley

sea turtles are not considered further in this analysis. Sea turtles considered likely to be affected (leatherback and loggerhead sea turtles) are discussed below.

Projections of potential catch of sea turtles are presented in Table 4–3. These values are based on interaction rates from the Hawaii-based longline fishery observer records west of 140° W longitude. Circle hooks with a 10 degree offset and mackerel-type bait were used during the fishing trips represented in the Hawaii-based longline datasets (Tables 4-3). Projections of potential catches were calculated by multiplying the interaction rates with the expected level of effort for the SSLL component of EFP fishing (108,000 hooks). There were no interactions with sea turtles in the Hawaii DSLL fishery; therefore, no catches are expected for this component of the EFP fishing,

This alternative contains catch and mortality limits on leatherback sea turtles, and catch limits on loggerhead sea turtles and striped marlin (Section 2.1.2, Alternative 2). If any of these catch limits are met or exceeded, EFP fishing would cease. Therefore, these limits further reduce the severity of effects and likelihood of the action to have a significant effect on the health of sea turtle populations.

Leatherback Sea Turtles

The expected number of hooked or entangled leatherback sea turtles for the 2-year duration of the EFP is two animals (Table 4-3). The limit for hooked or entangled leatherback sea turtles under Alternative 2 is two animals (Section 2.1.2, Alternative 2). Measures such as use of circle hooks and mackerel-type bait, fishery closures based on sea turtle interaction limits, area restrictions, proper handling of hooked and entangled turtles, and use of disentangling and de-hooking equipment along with 100 percent observer coverage would be employed under Alternative 2 and have been shown to reduce interactions with and mortality of leatherback sea turtles in United States Pacific longline fisheries (NMFS and USFWS 2013; Serafy et al.2012).

In considering the limits for leatherback sea turtles under Alternative 2, it is important to distinguish between take and catch, and actual mortality because mortality rates can be significantly lower than 100 percent depending on the type of encounter (Serafy et al. 2012). As stated above, EFP fishing would use circle hooks and mackerel-type bait, which has been shown to reduce the likelihood of leatherback sea turtle capture rates by 83 percent. When employing these measures, interactions are more likely to result in a superficial hooking, such as in the jaw or flipper, as opposed to deep ingestions that have been observed with J-hooks. Hence, when properly handled, a sea turtle with superficial hooking is believed to have higher probability of survival after being released than a deep-hooked animal.

Area closures include a 50 nautical mile no fishing zone from the mainland shore and islands, as well as areas of the LCH and the SCB. The LCH includes neritic waters influenced by coastal upwelling processes that produce abundant and dense aggregations of gelatinous prey off the central California coast where telemetry studies indicated that leatherback sea turtles forage (NMFS and USFWS 2013; Benson et al. 2011).

We expect to observe zero mortalities of leatherback sea turtles (i.e., Hawaii data from 2004 to 2014 includes an interaction rate of 0.01 with all turtles released alive). The observed mortality limits under Alternative 2 were set lower than the take limits as recent studies suggest that post-hook mortality is less than one. The observed mortality limit under Alternative 2 is one leatherback sea turtle. If a mortality is observed, then fishing would cease for the remainder of the EFP. The observed mortality limit is intended to be conservative. Post-interaction mortality can be estimated through field studies, but such studies are difficult to carry out (NOAA 2012). Conditions likely to influence the potential for interactions are highly variable, tracking turtles released at sea is difficult, costs are high, and detection of mortality using remote sensing technology is problematic. Recent research has aimed to overcome these challenges and provide estimates of post-release survival with higher levels of confidence. Despite extensive international research using a variety of methods, our ability to definitively determine a turtle's likelihood of survival based on location of hooking, amount of gear remaining attached at release, and the turtle's species and size, remain limited, and research findings are highly variable.

Leatherback sea turtles may experience minor adverse effects under this alternative through hooking or entanglement in longline fishing gear. Given the measures included to reduce the likelihood of such adverse effects, the relatively small short-term increase in total longline effort and catch, and the 100 percent observer coverage included in Alternative 2, any potential increase in leatherback sea turtle interactions under this alternative would most likely not have a significant effect on the health of leatherback sea turtle populations.

Loggerhead Sea Turtles—North Pacific Ocean DPS

The expected number of hooked or entangled loggerhead sea turtles for the 2-year duration of the EFP is one animal (Table 4–3). The limit for loggerhead sea turtles under Alternative 2 is one animal for the duration of the 2-year EFP (Section 2.1.2, Alternative 2). Measures under Alternative 2 (described above under leatherback sea turtles) have been shown to reduce interactions and mortality of sea turtles in United States Pacific longline fisheries (NMFS and USFWS 2007b; Serafy et al. 2012). EFP fishing would use circle hooks and mackerel-type bait, which have been proven to reduce the likelihood of

loggerhead sea turtle capture rates by 90 percent and are more likely to result in superficial hooking, such as in the jaw or flipper, as opposed to deep ingestions observed on J-hooks (Gilman et al. 2007; Serafy et al. 2012).

Within the action area, observed takes of loggerhead sea turtles in the DGN fishery are likely related to oceanographic conditions and its effects on the distribution of loggerheads. Loggerhead sea turtles are found to be associated with a biological feature described as the Transition Zone Chlorophyll Front which is identified by the 18° C (~65.5° F) isotherm (Howell et al. 2008). Warm waters off Baja California Sur, Mexico, have recently been identified as a key feeding area for juvenile loggerhead sea turtles (NMFS and USFWS 2007b). Observer records from the DGN fishery strongly suggest that juvenile loggerheads move into the waters off California during El Niño years, and are generally found within the SCB. Therefore, interactions are more likely during El Niño events or periods of unusually warm water. It is not possible at this time to know whether an El Niño may occur or warm water conditions observed over past years in the West Coast EEZ will occur in the near future. However, because the waters of the SCB are included in the no fishing zone under this alternative, the likelihood of loggerhead sea turtles being affected is low.

Loggerhead sea turtles may experience minor adverse effects under this alternative through hooking or entanglement in longline fishing gear. Given the measures included to reduce the likelihood of such adverse effects, the relatively small short-term increase in total effort and catch, closure of the SCB to EFP fishing, and 100 percent observer coverage included in Alternative 2, the potential increase in loggerhead sea turtle interactions under this alternative would most likely not have a significant effect on the health of loggerhead sea turtle populations.

4.4.2.3 Seabirds

Under Alternative 2, EFP fishing would use large circle hooks and nighttime setting similar to seabird avoidance and protection measures instituted for the Hawaii longline fishery in 2004 pursuant to 50 CFR 660.712(c) (69 Fed. Reg. 18453, Apr. 7, 2004, as amended at 77 Fed. Reg. 15975, March 19, 2012). As described in Subsection 3.4.3, Seabirds, the various seabirds that may be affected by the action alternatives have been grouped into two categories: seabirds considered likely to be affected and other seabirds in the action area.

Seabirds considered likely to be affected were caught in the Hawaii longline fishery and have associated catch rates (Table 3–3 and Table 3–5). Based on the Hawaii interaction rates, three black-footed albatross and one Laysan albatross may be caught under Alternative 2. Black-footed albatross and Laysan albatross

are not listed under the ESA. Given the measures included to reduce the likelihood of such adverse effects, the relatively small increase in total effort and catch, and 100 percent observer coverage included in Alternative 2, the potential increase in black-footed albatross and Laysan albatross interactions under this alternative would most likely not have a significant effect on the health of black-footed albatross and Laysan albatross populations.

Other seabirds in the action area were caught in the DGN fishery. These seabirds were caught at such low rates that there is no resource concern at this time. Additionally, the EFP monitoring protocol requires 100 percent observer coverage for all trips, and observer protocols require monitoring the entire haul-back. NMFS would also provide each observer a satellite phone to ensure adequate communication with NMFS while at sea. As such, there would be a more than adequate amount of monitoring in place to ensure that HMS FMP management objectives are adhered to under Alternative 2.

Short-tailed albatross were included in this analysis because of their status as an endangered species (Section 3.4.3.2, Other Seabirds in the Action Area). However, it is not expected that short-tailed albatross would be taken by the EFP fishery based on seabird deterrents included in Alternative 2 and the lack of observed short-tailed albatross interactions with either the Hawaii-based or the DGN fishery. Therefore, based on the factors described above, Alternative 2 would most likely not have a significant effect on the health of the short-tailed albatross population.

4.4.3 Alternative 3

The impacts of Alternative 3 are expected to be the same as those for Alternative 2. However, there is some potential for a slight increase given the higher limit on the number of hooked or entangled leatherback and loggerhead sea turtles. Alternative 3 would allow for three leatherback and two loggerhead sea turtles hooked or entangled (Subsection 2.1.3, Alternative 3). As mentioned previously, it is uncertain if the proposed EFP interaction rates would be similar to the interaction rates observed in the Hawaii longline fishery given the differences in fishing areas. Because the limits in Alternative 2 are based on the expected level of hooked or entangled protected species caught in the Hawaii longline fishery, one additional take has been added to each limit to account for potential variability in interaction rates because of fishing in a different area (i.e., within the United States mainland EEZ). While the limits under Alternative 3 allow for an additional take of the species, as under Alternative 2, fishing would cease under Alternative 3 with one observed leatherback sea turtle mortality.

4.4.3.1 Marine Mammals

The impacts of Alternative 3 on marine mammals are expected to be the same as those for Alternative 2, and thus not significantly adverse. Because the expected effort under Alternative 3 is the same as that for Alternative 2, there are no meaningful differences between the effects of the two alternatives on marine mammals.

4.4.3.2 Sea Turtles

Under Alternative 3, the amount of catch and severity of effects to leatherback and loggerhead sea turtles are expected to be the same as under Alternative 2, as described above in Subsection 4.2.2.2, except in regard to setting a higher limit (by one animal) on the number of hooked or entangled leatherback and loggerhead sea turtles. If either of these species catch limits are met or exceeded, EFP fishing would cease. The observed mortality limit for leatherback sea turtles is the same under this alternative as for Alternative 2 (i.e., one animal).

Leatherback and loggerhead sea turtles may experience minor adverse effects under this alternative, through hooking or entanglement in longline fishing gear. Given that the expected effort under Alternative 3 is the same as that expected under Alternative 2, and coupled with the relatively small increase in catch limits for leatherback and loggerhead sea turtles by one animal, this action alternative is not expected to have a significant adverse effect on the health of leatherback and loggerhead sea turtles.

4.4.3.3 Seabirds

The impacts of Alternative 3 on seabirds are expected to be the same as those for Alternative 2, and thus not significantly adverse. Because the expected effort under Alternative 3 is the same as that for Alternative 2, there are no meaningful differences between the effects of the two alternatives on seabirds.

4.5 Essential Fish Habitat and Critical Habitat

4.5.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted, and therefore there would be no impacts.

4.5.2 Alternative 2 and Alternative 3

Longlines are pelagic fishing gear deployed in open water between the surface and bottom of the ocean. Given the biophysical characteristics of the water column, the gear does not affect the biophysical habitat. For this reason, there is no likelihood that the action alternatives would significantly impact EFH.

Critical habitat has not been designated or proposed within the action area for most ESA-listed marine mammals, sea turtles, fish, or invertebrates. Designated critical habitat for Steller sea lions (eastern DPS) includes waters surrounding Año Nuevo Island, Sugarloaf Island, and the southeast Farallon Islands in California; Pyramid Rock at Rogue Reef; and Long Brown Rock and Seal Rock at Orford Reef in Oregon (50 CFR 226.202(b), October 1, 2009). Critical habitat includes associated aquatic zones 3,000 feet seaward in state and federally managed waters from the baseline of each rookery. The waters around the islands designated as critical habitat for the Steller sea lion are located within the proposed no-fishing zone for both action alternatives (Alternative 2 and Alternative 3). Año Nuevo Island is 0.41 nautical miles off the California coast (north of Santa Cruz, California), Sugarloaf Island is 0.15 nautical miles off the California coast (near Mendocino Canyon), and the southeast Farallon Islands are 23 nautical miles off San Francisco, California. The rest of the islands (Pyramid Rock at Rogue Reef and Long Brown Rock and Seal Rock at Orford Reef in Oregon) are within 3 nautical miles of the Oregon coast. Critical habitat was also recently designated off the United States West Coast for leatherback sea turtles (77 Fed. Reg. 4170, January 26, 2012), all of which has been included within the proposed no-fishing zone for the action alternatives. Further, and as described in Subsection 3.4.2.1, Sea Turtles Considered Likely to be Affected, jellyfish (a key prey species for leatherback sea turtles) are not typically observed as catch in longline fisheries. The action alternatives are not expected to have a significant effect on EFH and critical habitat.

4.6 Social and Economic Environment

4.6.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted. There would be no effect to the social environment but compared to the action alternatives there could be a potential loss of income to the applicants.

4.6.2 Alternative 2

Alternative 2 would have a minor economic benefit for the applicants and is unlikely to affect other fisheries operating within the action area or in the vicinity of the action area (i.e., Section 3.2.4, Other Fisheries Operating in the Action Area or in the Vicinity of the Action Area). Fishing under the EFP is an opportunity that does not currently exist. The EFP applicants would share in harvest limits set for species targeted by other fisheries; however, their share of the catch is not expected to create allocation issues. Further, the EFP catch would be monitored.

Under Alternative 2, EFP fishing is expected to generate a catch of approximately 1,159 swordfish. Multiplying the average weight of 150 pounds (68 kg) by 1,159 swordfish provides an estimated catch of approximately 173,724.3 pounds (78.8 metric tons). The average price per pound for longline caught swordfish landed on the west coast was $2.45 in 2014 (PMFC 2015c). Therefore, EFP fishing under this action alternative would generate $425,625 in revenue based on projected catch levels, average weight of a caught swordfish, and price per pound for swordfish.

4.6.3 Alternative 3

Alternative 3 is the same as Alternative 2 with respect to the social and economic environment, and thus would have minor positive impacts. There are no meaningful differences between the two alternatives in terms of effects on the social and economic environment.

5 CUMULATIVE IMPACTS

This section of the EA addresses the significance of the expected cumulative impacts as they relate to the federally managed highly migratory species fisheries.

5.1 Past, Present, and Reasonably Foreseeable Future Actions Other than the Proposed Action

The scope of past and present actions for the affected resources encompasses actions that occurred after FMP implementation in 2004 (PFMC 2003) and, more specifically, during the baseline period, 2004 to 2015, which is the temporal context within which affected resources are described in Section 3, Affected Environment. For endangered species and other protected resources, the scope of past and present actions is determined by analysis pursuant to the ESA and MMPA, including biological opinions for the highly migratory species fishery and marine mammal stock assessment reports. The temporal scope of future actions for all affected resources extends about 10 years into the future. This period was chosen in order to characterize conditions during potential periods for which exempted fishing permits for longline fishing activities in the EEZ may be considered and/or granted.

5.1.1 Fishing-Related Actions

Past fishery management actions contribute to the current status of managed stocks. Management measures directly or indirectly control catch and thereby affect stock status, fishing opportunity, harvester costs and net revenue, and personal income and employment in fishing communities. Because of the transboundary nature of highly migratory species stocks and fisheries, management decisions affecting these stocks and fisheries occur at both domestic and international scales. Present fishery management actions for fisheries that target highly migratory species in the EPO are codified in regulations located at 50 CFR 660 Subpart K, and 50 CFR 300 Subparts B, C, and O. Past and present management actions for longline fisheries that occur in the vicinity of the action area are also described in more detail in Subsection 1.3, Background. Ongoing and reasonably foreseeable actions with potentially detectable effects are summarized below.

5.1.1.1 Regulatory Adjustments in HMS Fisheries

To guide domestic management activities for highly migratory species fisheries occurring in the United States West Coast EEZ, the Council developed the HMS FMP to coordinate state, Federal, and international management. NOAA Fisheries, on behalf of the United States Secretary of Commerce, partially approved the Management Plan on February 4, 2004. The majority of the implementing regulations became effective on April 7, 2004. The reporting and record keeping provisions became

effective February 10, 2005. The Council and NMFS regularly consider modifications, changes, or updates to management measures prescribed in the HMS FMP, which are codified in the corresponding regulations. NMFS implements these decisions under the MSA.

- ***Biennial Management:*** The Council's biennial management process includes consideration of updates or changes to measures in the HMS FMP for determining the status of stocks based on reference points and/or adjusting various catch limits or harvest guidelines for management unit species. NMFS then works on implementing any such recommendations resulting from that process. A primary goal for conducting the biennial management process is to comply with National Standard 1 by adopting conservation and management measures that prevent overfishing while achieving optimum yield on an ongoing basis.

- ***Other EFPs to Target Swordfish and other HMS Species:*** As discussed in Subsection 1.3, Background, the Council and NMFS have solicited for, and are in the process of reviewing and administering, EFPs for other fishing activities that target HMS species, including swordfish. Therefore, in addition to the fisheries described in Chapter 3, Affected Environment, there may be some additional vessels operating in the action area under EFPs. Currently, other EFPs have been administered to enable vessels to set deep-set buoy gear (DSBG) within the United States West Coast EEZ. The DSBG activities are expected to occur closer to shore than the Proposed Action and result in fewer catches. For any EFPs that are administered, including those for DSBG, participation and the operational period are severely limited to minimize risk of unintended or unforeseen consequences. Despite that EFPs provide for exemptions from current regulations, such exemptions are typically minimal to the extent that permitted vessels are expected to operate within the confines of current regulations from which they have not explicitly been exempted. Further, EFPs' activities must be conducted consistent with all other applicable laws.

In addition to domestic fishery management processes, the United States (along with many other fishing nations) participates in international organizations (e.g., RFMOs) to support the conservation and management of highly migratory species on larger geographic scales. RFMOs adopt living marine resource conservation and management measures for oceanic regions (i.e., including multiple national jurisdictions and the high seas) through consensus on resolutions. The measures in these resolutions are binding for their members. The United States is a member of the IATTC, which is the RFMO responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels in the eastern Pacific Ocean (generally east of the 150° W meridian), and of the Western and Central

Pacific Fisheries Commission (WCPFC), which plays a parallel role in the western and central Pacific Ocean (generally west of the 150° W meridian). The United States' obligations under the IATTC and WCPFC are most pertinent to consider with regard to cumulative effects on fisheries and resources in the action area as well as fisheries in the vicinity of the action area that also have effects on and are affected by the status of resources in the action area. The IATTC and WCPFC have adopted resolutions to control catch of highly migratory species that are also management unit species in the HMS FMP. Similar to the domestic management process, the RFMOs renegotiate catch controls on an ongoing basis. NMFS implements these resolutions under the Tuna Conventions Act. Worth particular mention are catch limits for United States vessels that fish for bigeye and bluefin tuna in the EPO.

- ***Bigeye:*** NMFS implemented IATTC Resolution C-13-01 in June 2013, which instituted a 551 ton (500 metric ton) limit on the annual commercial catch of bigeye tuna in the eastern Pacific Ocean by longline vessels greater than 78.74 feet (24 m) in overall length for 2014 through 2016 (79 Fed. Reg. 19487, April 9, 2014); this catch limit is the same as that implemented for 2011 through 2013 (76 Fed. Reg. 68332, November 4, 2011). Once that limit is reached, NMFS closes commercial fishing for bigeye tuna to these vessels through the remainder of the calendar year. The closure became effective in November of 2013 (78 Fed. Reg. 70002, November 4, 2013), in late October of 2014 (79 Fed. Reg. 63562, October 24, 2014), and in August of 2015 (80 Fed. Reg. 46515, August 5, 2015). The latest Resolution on bigeye catch limits for the EPO will be renegotiated for years beyond 2016. As described in Subsection 3.3.1, Commonly Caught Management Unit Species, the latest assessment results show that fishing effort has been below the level corresponding to MSY, and that the stock is neither overfished nor subject to overfishing, but rather continues to recover. Therefore, it is not expected that IATTC resolutions, at least in the near future, will result in more constraining catch limits for bigeye tuna than are currently in place in the EPO.

- ***Bluefin:*** NMFS implemented IATTC Resolution C-14-06 in accordance with advice from the Council to institute catch and trip limits that apply to United States commercial vessels that fish for Pacific bluefin tuna in the EPO during 2015 and 2016. The rule implemented a 661 ton (600 metric ton) catch limit for both years combined (80 Fed. Reg. 38986, July 8, 2015). On January 15, 2016, NMFS published a notice announcing that the 2016 catch limit is 468 tons (425 metric tons) (81 Fed. Reg. 2110). Resolution C-14-06, which was intended to aid in the rebuilding of the stock, included reduced limits in comparison to previous IATTC resolutions on bluefin tuna catches in the EPO. There was no closure of bluefin tuna fishing opportunity in 2015. It is expected that these reduced catch limits will persist as necessary to rebuild the stock.

5.1.1.2 Illegal, Unregulated, and Unreported (IUU) Fishing

Some IUU fishing may occur in the vicinity of the action area with some effects to management unit species of the HMS FMP and protected species. Information on catch, effort, and protected species interactions for these activities is sparse and difficult to obtain. Nonetheless, it is expected that these activities likely contribute some negative impacts on management unit species of the HMS FMP.

5.1.1.3 Protected Species Avoidance

Other Federal fisheries target highly migratory species within the United States West Coast EEZ and may interact with ESA-listed sea turtles and other ESA-listed species. These fisheries were considered in the 2004 Biological Opinion on the HMS FMP (NMFS 2004). Additionally, NMFS Protected Resources Division issued a Biological Opinion for the west coast drift gillnet fishery and amended the associated incidental take statement in 2013 (NMFS 2013). Biological opinions provide terms and conditions intended ensure monitoring and avoidance of interactions with protected species, namely marine mammals and sea turtles. Many of these terms and conditions have been implemented as regulations for these fisheries at 50 CFR 660 Subpart K. Other protected species avoidance measures for fisheries that occur in the vicinity of the action area and that target highly migratory species have been implemented as regulations at 50 CFR 300 Subparts B, C, and O.

New tools are becoming available to fishermen to assist them in evaluating how best to allocate their effort such that they are able to improve their odds of avoiding protected species. One such tool that has been employed by Hawaii longline fisheries is Turtle Watch (Howell et al. 2008; NOAA 2016c). A similar tool, called EcoCast (PFMC 2016), is in development for use along the United States West Coast. This particular tool is expected to predict in near real-time, the spatial distributions of protected species as well as target stocks for fisheries under current environmental conditions. The predictions are based on tagging and fishery observer data as well as oceanographic data. Use of these types of tools by EFP participants and/or by other fishermen participating in fisheries that target HMS species within and in the vicinity of the United States West Coast EEZ may incrementally and cumulatively reduce the potential for fishery interactions with protected species.

5.1.1.4 Ecosystems

The Council developed measures to protect unfished and unmanaged forage fish species pursuant to an initiative identified in the Pacific Coast Fishery Ecosystem Plan for the United States Portion of the California Current Large Marine Ecosystem. This action involves amending all current FMPs to prohibit

targeted harvest of specified forage species. These protections could benefit both currently unmanaged fish stocks and managed stocks that depend on forage fish.

5.1.2 Non-fishing-related Actions, Including Climate Change

In addition to fishery management actions, other past, present, and reasonably foreseeable future actions are considered (e.g., water pollution and climate change).

5.1.2.1 Water Pollution

A variety of activities introduce chemical pollutants and sewage into the marine environment and cause changes in water temperature, salinity, dissolved oxygen, and suspended sediment. Although these activities tend to affect nearshore waters, they adversely impact identified affected biological resources if a substantial part of these resources' life cycles occur in these waters. Examples of these activities include, but are not limited to, agriculture, port maintenance, coastal development, marine transportation, marine mining, dredging, the disposal of dredged material, and natural and human-induced disasters in the coastal zone. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality, and they may, indirectly, constrain the sustainability of the managed resources, non-target or prey species, and protected resources.

5.1.2.2 Other Authorities for Conserving Marine Resources

The MSA (50 CFR 600.930) imposes an obligation on other Federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH. NMFS also reviews certain activities that are regulated by Federal, state, and local authorities and that cause adverse effects on the marine environment through processes required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The jurisdiction of these activities is in "waters of the U.S." and includes both riverine and marine habitats. Under the Fish and Wildlife Coordination Act (Section 662), agencies must consult with USFWS over certain activities affecting freshwater habitats and seabirds. This act provides another avenue for review of actions by other Federal and state agencies that may impact resources that NMFS manages. NMFS and USFWS share responsibility for implementing the ESA. Federal agencies are required to ensure that their activities do not jeopardize the continued existence of species listed under the ESA or result in the destruction or adverse modification of designated critical habitat for those species. This provides a way for NMFS to review actions by other entities that may impact endangered and protected resources whose management units are under NMFS' jurisdiction.

5.1.2.3 Cyclical and Ongoing Climate Change

Section 3.5, Climate Variability and Climate Change, describe the effects of climate on ecosystem components. Cyclical phenomena include El Niño–Southern Oscillation (ENSO), Pacific Decadal Oscillation (PDO), and North Pacific Gyre Oscillation (NPGO). As noted in Section 3.5, Climate Variability and Climate Change, shifts in the geographic range of target, non-target or prey, and protected species may cause the biggest climate change-related impact on fisheries.

5.2 Effects of Past, Present, and Reasonably Foreseeable Future Actions and Net Cumulative Effects

In Section 3, Affected Environment, the environmental components likely to be affected by the Proposed Action are identified and described. Therefore, the significance of the cumulative effects of the action alternatives are discussed in relation to those affected environmental components as grouped below:

- Fish stocks (Subsection 3.3, Fish Stock Status)
- Protected species, including marine mammals, sea turtles, and seabirds (Section 3.4, Protected Species)
- Fisheries and the socioeconomic environment (Subsection 3.2, Fisheries in the Action Area or Fisheries in the Vicinity of the Action Area, and Subsection 3.7, Socioeconomic Environment)
- Essential fish habitat and critical habitat (Subsection 3.6, Essential Fish Habitat and Critical Habitat)

Cumulative effects have been considered principally in terms of any increase in catch, take, or mortality to various species that may be caught or taken in the EFP fishery, including such impacts on other fisheries. Subsection 5.1.1, Fishing-related Actions, and Subsection 5.1.2, Non-fishing-related Actions, including Climate Change, describe the range of other actions and activities contributing to or diminishing catch, take, or mortality. Because the cumulative effects of past and present actions and likely conditions that are described for each of the alternatives in Section 3, Affected Environment, this section focuses on the likely impacts of the reasonably foreseeable actions described in Subsection 5.1, Past, Present, and Reasonably Foreseeable Future Actions Other than the Proposed Action, that may occur and the expectations for cumulative effects under the different alternatives. Overall, the incremental effects of the action alternatives are very small relative to baseline levels, and cumulative effects are not expected to be significant.

5.2.1 Alternative 1, No Action

Under the No-action Alternative, the EFP would not be granted. Alternative 1 would not introduce any additional impacts to the human environment than what may be expected based on past, present, and

reasonably foreseeable future actions other than the Proposed Action. These expectations are described below.

Any future regulatory adjustments to catch limits or harvest guidelines for commonly caught management unit species could mean changes to effort levels in other HMS fisheries. Should additional effort occur as a result of increases in catch limits or harvest guidelines, it is unlikely to have negative effects on commonly caught management unit species because the new harvest specifications, whether derived from a domestic or international management process, would be based on changes in the status of these fish stocks or populations. There could be some minor negative effects to other commonly caught species or uncommonly caught species of fish and marine mammals, sea turtles, and seabirds as additional effort in other HMS fisheries may result in more incidental catch of these species. However, any such negative effects are unlikely to occur without completing consultations or other procedures to determine whether additional protected species avoidance measures are needed to offset the potential for increased negative effects and/or to continue conserving marine resources under other authorities. Additional effort could result in minor or major beneficial impacts to affected fisheries and fishing communities depending on the magnitude of increased allowable catch and whether additional catch results in additional revenue. Conversely, future regulatory adjustments to decrease catch limits or harvest guidelines for commonly caught management unit species would likely yield impacts in the opposite direction for all affected resources and fishing communities while impacts to commonly caught management unit species would likely remain the same.

As additional EFPs may be considered and administered for fishing activities that target swordfish and other highly migratory species, any negative effects of those EFPs would likely be mitigated through existing regulations, terms and conditions of the permit, and/or consultations or other procedures to determine consistency with applicable laws. With regard to fish stocks in particular, it is expected that catch limits and harvest guidelines would continue to apply. However, there could be some additional competition among resource users either for access to fishing grounds or to secure a portion of the allowable catch. Nonetheless, the process by which EFPs are considered would likely uncover expectations for negative impacts and result in additional mitigation measures to ensure that a derby fishery and/or other public safety concerns do not arise from such conflicts.

Climate change and water pollution would likely have negative effects on the affected resources and fisheries described in Section 3, Affected Environment, over the long term, whereas the actions taken to protect resiliency of the Pacific Coast would likely have minor positive and incremental effects, which could become major over the long term. The magnitude of these effects would depend on the ability of

these resources and fisheries to adapt to such changes. It is unlikely that water pollution would have major effects because of the highly migratory nature of the fish, protected species, and seabirds in the affected environment. Fisheries that target highly migratory species tend to occur further offshore, whereas water pollution concerns tend to be more severe in nearshore environments. Climate change will likely require fisheries to invest additional search time and/or the ability to shift fishing and processing effort with changes in the distribution of customary target species. However, climate change may also cause warmer-water highly migratory species to inhabit customary fishing grounds in higher abundances. Therefore, effects to fisheries and fishing communities would depend on the degree to which fisheries and fishing communities are able to offset potential losses in catches of more temperate-water species with gains in catches of warmer-water species.

Other than preventing some short-term economic gains that might be realized by the EFP applicants under the action alternatives, the No-action alternative would not yield additional impacts on the human environment beyond those described above. Therefore, the net cumulative impacts of this alternative are expected to be insignificant.

5.2.2 Alternative 2

The cumulative effects for Alternative 2 are generally the same as those for the No-action Alternative. Because Alternative 2 is expected to result in additional catch of commonly caught fish species, it is also expected to yield more beneficial effects for participant vessels and fishing communities where landings would occur. With increased catch of commonly caught species, a higher likelihood of incidental catch and/or take of aforementioned uncommonly caught species of fish and protected species is also expected; thus, the any negative cumulative effects for these species could increase. Nonetheless, such a scenario is unlikely as fishing activities under Alternative 2 are subject to conservative terms and conditions and are not exempt from existing or future catch limits, harvest guidelines, and compliance with other management measures and authorities for conserving marine resources. Therefore, the net cumulative effects of Alternative 2 are expected to be insignificant.

5.2.3 Alternative 3

The cumulative effects for Alternative 3 are generally the same as those for Alternative 2. However, because more interactions with potentially constraining sea turtle species (i.e., leatherbacks and loggerheads) may occur before fishing under the EFP would be required to cease, Alternative 3 may yield more fishing effort than Alternative 2. While the higher range of effort was considered for both Alternative 2 and Alternative 3, the likelihood of the activities being required to cease is greater under

Alternative 2 than Alternative 3. Therefore, Alternative 3 may result in more catch of commonly caught fish species than Alternative 2 and may yield more beneficial effects for fishery participants and fishing communities. However, with more catch of commonly caught fish species under Alternative 3, the negative cumulative effects for incidentally caught or entangled species may also increase under Alternative 3. Any such increase in the magnitude of negative cumulative effects would be minor and, like for Alternative 2, would be tempered by conservative terms and conditions (i.e., including the same observed mortality limits for leatherback sea turtles as Alternative 2) and required compliance with existing or future catch limits, harvest guidelines, other management measures, and other authorities for conserving marine resources. Therefore, the net cumulative effects of alternative 3 are expected to be insignificant.

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