DRAFT

Marine Mammal Protection Act
Section 101(a)(5)(E) - Negligible Impact Determination
Central North Pacific Humpback Whale
Hawaii Sperm Whale
Main Hawaiian Islands Insular False Killer Whale

National Marine Fisheries Service
Protected Resources Division
Pacific Islands Regional Office
May 2014

Table of Contents

Tables

1.0 List of Abbreviations

BRT	Biological Review Team
BSAI	Bering Sea and Aleutian Islands
CFR	Code of Federal Regulations
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CNP	Central North Pacific
EEZ	Exclusive Economic Zone
ESA	Endangered Species Act
FEP	Fishery Ecosystem Plan
FKWTRP	False Killer Whale Take Reduction Plan
FMP	Fishery Management Plan
F_r	Recovery Factor
GAMMS	Guidelines for Assessing Marine Mammal Stocks
IWC	International Whaling Commission
LOA	Length Overall
LOF	List of Fisheries
M&SI	Mortality and Serious Injury
MHI	Main Hawaiian Islands
MHI IFKW	Main Hawaiian Islands Insular false killer whale
MMPA	Marine Mammal Protection Act
MNPL	Maximum Net Productivity Level
mtDNA	Mitochondrial DNA
nDNA	Nuclear DNA
NID	Negligible Impact Determination
N_{MIN}	Minimum population estimate
NMFS	National Marine Fisheries Service
NOAA	National Ocean and Atmospheric Administration
OSP	Optimum Sustainable Population
PBR	Potential Biological Removal
R_{MAX}	Maximum theoretical net productivity rate
SAR	Stock Assessment Report

2.0 Executive Summary

Section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq.*, states that NOAA's National Marine Fisheries Service (NMFS) shall for a period of up to three years allow the incidental taking of marine mammal species listed under the Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*, by persons using vessels of the United States and those vessels which have valid fishing permits issued by the Secretary (50 CFR 216.103**;** 50 CFR 229.2) in accordance with section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1824(b) (50 CFR 660), while engaging in commercial fishing operations, if NMFS makes certain determinations. NMFS must first determine, after notice and opportunity for public comment, that:

(1) the incidental mortality and serious injury (M&SI) from commercial fisheries will have a negligible impact on the affected species or stock;

(2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and

(3) where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

This document presents the analyses for determining whether the incidental M&SI from the Hawaii deep and shallow-set longline fisheries will have a negligible impact on the Central North Pacific (CNP) stock of humpback whales, the Hawaii stock of sperm whales, and the Main Hawaiian Islands insular stock of false killer whales[1] (MHI IFKW).

Fisheries Considered for Authorization

The MMPA mandates that each commercial fishery be classified by the level of M&SI of marine mammals that occurs incidental to each fishery. The List of Fisheries (LOF) classifies U.S. commercial fisheries into one of three Categories according to the level of incidental M&SI of marine mammals. This classification is based on the rate, in numbers of animals per year, of incidental M&SI of marine mammals due to commercial fishing operations relative to a stock's Potential Biological Removal (PBR) level, defined (50 CFR 229.2) as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (OSP). A fishery may qualify as one Category for one marine mammal stock and another for a different marine mammal stock. A fishery is categorized on the LOF at its highest classification (*e.g.*, fishery qualifying for Category III for one marine mammal stock and for Category II for another marine mammal stock will be listed under Category II). Category I fisheries have frequent

[1] The population was recently listed as a Distinct Population Segment (DPS) under the ESA but will be referred to as a stock throughout this document since it is an MMPA determination.

incidental M&SI of marine mammals and Category II fisheries have occasional incidental M&SI of marine mammals (16 U.S.C. 1387(c) (1); 50 CFR 229.2). Category III fisheries have a remote likelihood of, or no known incidental M&SI of marine mammals. The Hawaii deep-set longline fishery is the only Category I fishery currently considered for authorization and the Hawaii shallow-set longline fishery is the only Category II fishery currently considered for authorization in this region. All other Category II and III fisheries that interact with the marine mammal stocks observed around Hawaii are state-managed and are not considered for authorization under this permit. The total human-related M&SI calculated to make a negligible impact determination for this authorization include all human sources, such as commercial fisheries and ship strikes.

Criteria for Determining Negligible Impact

In 1999 NMFS adopted criteria for making negligible impact determinations for MMPA 101(a)(5)(E) permits (64 FR 28800; May 27, 1999). In applying the 1999 criteria to determine whether M&SI incidental to commercial fisheries will have a negligible impact on a listed marine mammal stock, Criterion 1 (total human-related serious injury and mortality are less than 10% PBR) is the starting point for analysis. If this criterion is satisfied (*i.e.*, total human-related M&SI are less than 0.1 PBR), the analysis would be concluded as a negligible impact. The remaining criteria describe alternatives under certain conditions, such as fishery mortality below the negligible threshold but other human-caused mortality above the threshold, or fishery and other human-caused mortality between the negligible threshold and PBR for a stock that is increasing or stable. If Criterion 1 is not satisfied, NMFS may use one of the other criteria as appropriate.

The time frame for this analysis includes the most recent 5-year period for which available data have been processed (January 1, 2007 through December 31, 2011). The NMFS Guidelines for the Assessment of Marine Mammal Stocks (GAMMS) and the subsequent GAMMS II provide guidance that, when available, the most recent five-year time frame of commercial fishery incidental serious injury and mortality data is an appropriate measure of effects of fishing operations on marine mammals (Wade and Angliss 1997). A five-year time frame provides enough data to adequately capture year-to-year variations in take levels, while reflecting current environmental and fishing conditions as they may change over time. Additionally, because the permit issued under MMPA section 101(a)(5)(E) is for a three-year period, the most up-to-date data available for complete years are used (i.e., 2007-2011).

Humpback whale

Criterion 1 was not satisfied for the CNP stock of humpback whales because the total human-related M&SI for humpback whales is not less than 10% PBR. The 5-year (2007-2011) annual average M&SI from all human-caused sources is 13.59 or 22.2% of the PBR (61.2 animals). As a result, the other criteria must be examined for the CNP humpback stock. Criterion 2 would be satisfied if total human-related M&SI are greater than PBR and the total fisheries-related mortality is less than 10% of PBR. Criterion 2 was not satisfied, because fisheries-related mortality alone exceeds 10% PBR. The estimate of fisheries-related mortality is 9.35, which is 15.28% of the PBR.

Criterion 3 provides that if total fisheries-related M&SI are greater than 10% PBR and less than PBR, and the population is stable or increasing, fisheries may be permitted subject to individual review and certainty of data. Specifically, NMFS must consider any increases in permitted

M&SI, and, as M&SI approach the PBR level, NMFS must consider the importance of uncertainties in elements such as population size, reproductive rates, and fisheries-related mortalities.

The CNP stock of humpback whales meets the conditions of Criterion 3. Total fisheries-related M&SI (9.35 animals per year) is greater than 10% PBR (6.1 animals) and less than PBR (61.2 animals). The population is increasing at an estimated rate of 5.5-6% per year (Allen and Angliss 2013; Calambokidis et al. 2008).

Hawaii Sperm whale

For the Hawaii stock of sperm whales, Criterion 1 was satisfied because the total human-related M&SI is less than 10% PBR. The five-year (2007-2011) annual average M&SI from all human sources is 0.7, which is 6.86% of the PBR (10.2 animals).

MHI Insular False killer whale

Criterion 1 was not satisfied for the MHI IFKW stock because the total human-caused M&SI exceeds 10% PBR. The PBR for the MHI IFKW is 0.3 animals (Carretta et. al 2013b), and 10% PBR is 0.03 animals. The five-year (2007-2011) average annual M&SI from all human-caused sources is estimated to be 0.1 animals (rounded from 0.06), which is 33.3% of the PBR. Criterion 2 was also not satisfied, because fisheries-related mortality alone exceeds 10% PBR. The estimate of fisheries-related mortality is the same as the estimate of total human-caused mortality, which is 33.3% of the PBR.

Criterion 3 allows that if total fisheries-related M&SI are greater than 10% PBR and less than PBR, and the population is stable or increasing, fisheries may be permitted subject to individual review and certainty of data. Although the PBR level is a conservative standard that will allow recovery of a stock, there are reasons for individually reviewing fisheries if M&SI are above the threshold level. Specifically, NMFS must consider any increases in permitted M&SI, and, as M&SI approach the PBR level, NMFS must also consider the importance of uncertainties in elements such as population size, reproductive rates, and fisheries-related mortalities.

The MHI IFKW stock meets the initial conditions of Criterion 3 for the 2007-2011 time period. Total fisheries-related M&SI (0.1 animals per year) is greater than 10% PBR (0.03 animals) and less than PBR (0.3 animals). MHI insular false killer whales are believed to have declined markedly during the 1990s, although their current population trajectory is unknown (Oleson et al. 2010). Fisheries-related mortality from the longline fisheries has declined since the MHI longline exclusion zone was implemented seasonally, reducing the historic threat level. Additionally, threats from the deep-set and shallow-set longline fisheries are expected to have been reduced even further through implementation of the False Killer Whale Take Reduction Plan.

Negligible Impact Determinations

Based on the criteria outlined in 1999 (64 FR 28800), the 2013 Alaska and U.S. Pacific draft Marine Mammal Stock Assessments (SARs) (Allen and Angliss 2013, Carretta et al. 2013b), and the best scientific information and data available, NMFS has determined that for a period of up to three years, M&SI incidental to the Hawaii deep-set and the shallow-set longline fisheries will have a negligible impact on the CNP stock of humpback whales, the Hawaii stock of sperm

whales, and the MHI IFKW stock. Therefore, vessels that operate in these identified commercial fisheries within the range of the CNP humpback whale, the Hawaii sperm whale, and MHI IFKW stocks may be permitted subject to their individual review and the certainty of relevant data, and provided that the other provisions of section 101(a)(5)(E) are met.

3.0 Introduction

Section 101(a)(5)(E) of the Marine Mammal Protection Act (MMPA), 16 U.S.C. 1361 *et seq*., states that NOAA's National Marine Fisheries Service (NMFS), as delegated by the Secretary of Commerce, shall for a period of up to three years allow the incidental taking of marine mammal species listed under the Endangered Species Act (ESA), 16 U.S.C. 1531 *et seq.*, by persons using vessels of the United States and those vessels which have valid fishing permits issued by the Secretary (50 CFR 216.103**;** 50 CFR 229.2) in accordance with section 204(b) of the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. 1824(b) (50 CFR 660), while engaging in commercial fishing operations, if NMFS makes certain determinations. NMFS must first determine, after notice and opportunity for public comment, that:

(1) the incidental mortality and serious injury (M&SI) from commercial fisheries will have a negligible impact on the affected species or stock;

(2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and

(3) where required under section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock.

The purpose of this document is to explain the analysis and rationale for determining whether the mortality and serious injury incidental to U.S. commercial fisheries will have a negligible impact on the Central North Pacific (CNP) stock of humpback whales (*Megaptera novaeangliae*), the Hawaii stock of sperm whales (*Physeter macrocephalus*), and the Main Hawaiian Islands Insular false killer whale (MHI IFKW) stock (*Pseudorca crassidens*) which are listed as endangered under the ESA (*i.e.*, determination (1), above). Two commercial fisheries in Hawaii and several commercial fisheries in Alaska within the range of the CNP humpback whale population have been observed to interact with and, in some cases, cause incidental M&SI to, this stock. The Hawaii deep-set longline fishery has also been observed to interact with the Hawaii stock of sperm whales, and the MHI IFKW stock. The fisheries that have been known to interact with these stocks are listed in Table 1.

Table 1. Table showing the fisheries that interact with the CNP stock of humpback whales, Hawaii sperm whales, and the MHI Insular false killer whale stock.

Fishery	Category	Marine Mammal Stock
Hawaii deep-set tuna longline	I	Central North Pacific humpback whales, Hawaii sperm whales , and Main Hawaiian Islands Insular false killer whales
Hawaii shallow-set swordfish longline fishery	II	Central North Pacific humpback whales
Alaska Bering Sea Aleutian Islands pollock trawl	II	Central North Pacific humpback whales
Alaska Cook Inlet salmon set gillnet	II	Central North Pacific humpback whales
Alaska Southeast salmon drift gillnet	II	Central North Pacific humpback whales
Alaska Cook Inlet salmon purse seine	II	Central North Pacific humpback whales
Alaska Kodiak salmon purse seine	II	Central North Pacific humpback whales
Alaska Yakutat salmon set gillnet	II	Central North Pacific humpback whales
Alaska Southeast Alaska crab pot	III	Central North Pacific humpback whales
Alaska Southeast Alaska shrimp pot	III	Central North Pacific humpback whales

3.1 Process and Criteria for Issuing a MMPA section101(a)(5)(E) Permit

Among the requirements of MMPA section 101(a)(5)(E) to issue a permit to take ESA-listed marine mammals incidental to commercial fishing, NMFS must determine whether the taking of marine mammals would have a negligible impact on the affected species or stock(s) of marine mammals. Such determinations are required only under MMPA section 101(a)(5) and are currently required in authorizing the take of small numbers of any stock of marine mammals incidental to activities other than commercial fishing (Sections 101(a)(5)(A) and (D)) or in permitting the take of threatened or endangered marine mammals incidental to commercial fishing operations (section 101(a)(5)(E)).

Within the MMPA's provisions, NMFS must determine if the taking (by harassment, injury, or mortality – or a combination of these) incidental to specified activities will have a negligible impact on the affected species or stocks of marine mammals. For permitting the take of threatened or endangered marine mammals incidental to commercial fishing operations, NMFS must determine if M&SI incidental to commercial fisheries will have a negligible impact on the affected species or stock(s) of marine mammals.

NMFS has implemented the Small Take Program, including a qualitative definition of negligible impact, through regulations at 50 CFR 216.103, and has relied upon qualitative and quantitative approaches to quantify the levels of taking that would result in a negligible impact to affected stocks of marine mammals. The quantitative approach is easier to assess for M&SI than for non-lethal takes because M&SI are considered removals from the population and can be evaluated by well-documented models of population dynamics.

NMFS' regulations implementing the MMPA amendments of 1981 included a regulatory definition for "negligible impact":

> Negligible impact *is an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.* (50 CFR 216.103[2])

This qualitative definition of negligible impact was the standard NMFS used to implement the Small Take Program from its beginning in 1981 through 1994, when additional amendments to the MMPA were enacted and a more quantitative approach was developed for assessing what level of removals from a population stock of marine mammals could be considered a negligible impact. The qualitative definition remains the only regulatory definition of negligible impact for implementing the MMPA.

In 1998, NMFS published a notice (63 FR 71894; December 30, 1998) advising the public that the agency was extending for a 6-month period the 3-year permit issued nationwide to fisheries in 1995 to authorize the taking of threatened or endangered marine mammals. This notice also informed the public that NMFS considered the 6-month extension of the permit as an opportunity to review existing criteria for the issuance of permits and to address issues that have arisen since the permits were first issued. NMFS solicited public comments to develop alternatives to 10% of PBR as a criterion for determining negligible impact; however, none were received.

Having received no comments upon which to develop alternatives for determining negligible impact, NMFS published a notice proposing to issue permits under MMPA section 101(a)(5)(E) (64 FR 28800; May 27, 1999). The notice contained a statement that NMFS, through internal deliberation, had adopted the following criteria for making negligible impact determinations for such permits:

> 1. The threshold for initial determination will remain at 10% PBR. If total human-related M&SI are less than 10% PBR, all fisheries may be permitted.
>
> 2. If total human-related M&SI are greater than PBR, and fisheries-related mortality is less than 10% PBR, individual fisheries may be permitted if management measures are being taken to address non-fisheries-related M&SI. When fisheries-related M&SI is less than 10% of the total, the appropriate management action is to address components that account for the major portion of the total.
>
> 3. If total fisheries-related M&SI are greater than 10% PBR and less than PBR and the population is stable or increasing, fisheries may be permitted subject to individual review and certainty of data. Although the PBR level has been set up as a conservative standard that will allow recovery of a stock, there are reasons for individually reviewing fisheries if M&SI are above the threshold level. First, increases in permitted M&SI should be carefully considered. Second, as M&SI approach the PBR level, uncertainties

[2] 50 CFR 216.103 specifically applies to the Small Take Program. However, the definition of "negligible impact" in 50 CFR 229.2, which implements MMPA sections 101(a)(5)(E) and 118, provides, "*Negligible impact* has the same meaning as in §216.103 of this chapter."

in elements such as population size, reproductive rates, and fisheries-related mortalities become more important.

4. If the population abundance of a stock is declining, the threshold level of 10% PBR will continue to be used. If a population is declining despite limitations on human-related M&SI below the PBR level, a more conservative criterion is warranted.

5. If total fisheries-related M&SI are greater than PBR, permits may not be issued.

This set of criteria maintained (from 1995) 10% of PBR as the starting point in negligible impact determinations and explicitly noted ways in which determinations could deviate from the default. Criterion 3 notes that NMFS may give special consideration if the affected stock of marine mammals is stable or increasing and may permit take incidental to fishing even if incidental removals exceed 10% of PBR but are below PBR.

Relying upon the criteria outlined in 1999 (64 FR 28800), the draft 2013 U.S. Pacific and Alaska SARs (Carretta et al. 2013b), and the best scientific information and data available, NMFS has determined that for a period of up to three years, M&SI incidental to the Hawaii deep-set and shallow-set longline fisheries will have a negligible impact on the CNP stock of humpback whales, the Hawaii stock of sperm whales, and the MHI IFKW stock based on the analysis that follows.

4.0 Action Area(s)

The action area includes the U.S. Exclusive Economic Zones (EEZs) around the U.S. Pacific Islands and the high seas waters where Hawaii-based fishing vessels using longline gear configurations managed under the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) (Figure 1). These areas include the EEZs around the Hawaiian Islands and the U.S. Pacific Remote Island Areas (Kingman Reef; Palmyra, Johnston, and Midway Atolls; and Howland, Baker, Jarvis, and Wake Islands).

The MHI Longline Fishing Prohibited Area was created in 1992 to reduce conflict between longline fisheries and pelagic troll and handline fisheries (57 FR 7661, March 2, 1992). The outer extent of the boundary changed seasonally to allow longline fishing to occur closer to the windward shores of the MHI between October and January. In late 2012, the False Killer Whale Take Reduction Plan (FKWTRP) regulations modified the prohibited area to maintain closure of the February-September boundary (the larger area) year-round, which provides greater protection to MHI IFKW from the effects of commercial longline fishing. In addition, the FKWTRP regulations established a Southern Exclusion Zone (SEZ) that would be closed to the deep-set longline fishery for varying periods if NMFS observes specific levels of M&SI of Hawaii pelagic false killer whales on deep-set trips within the EEZ around Hawaii (Figure 2).

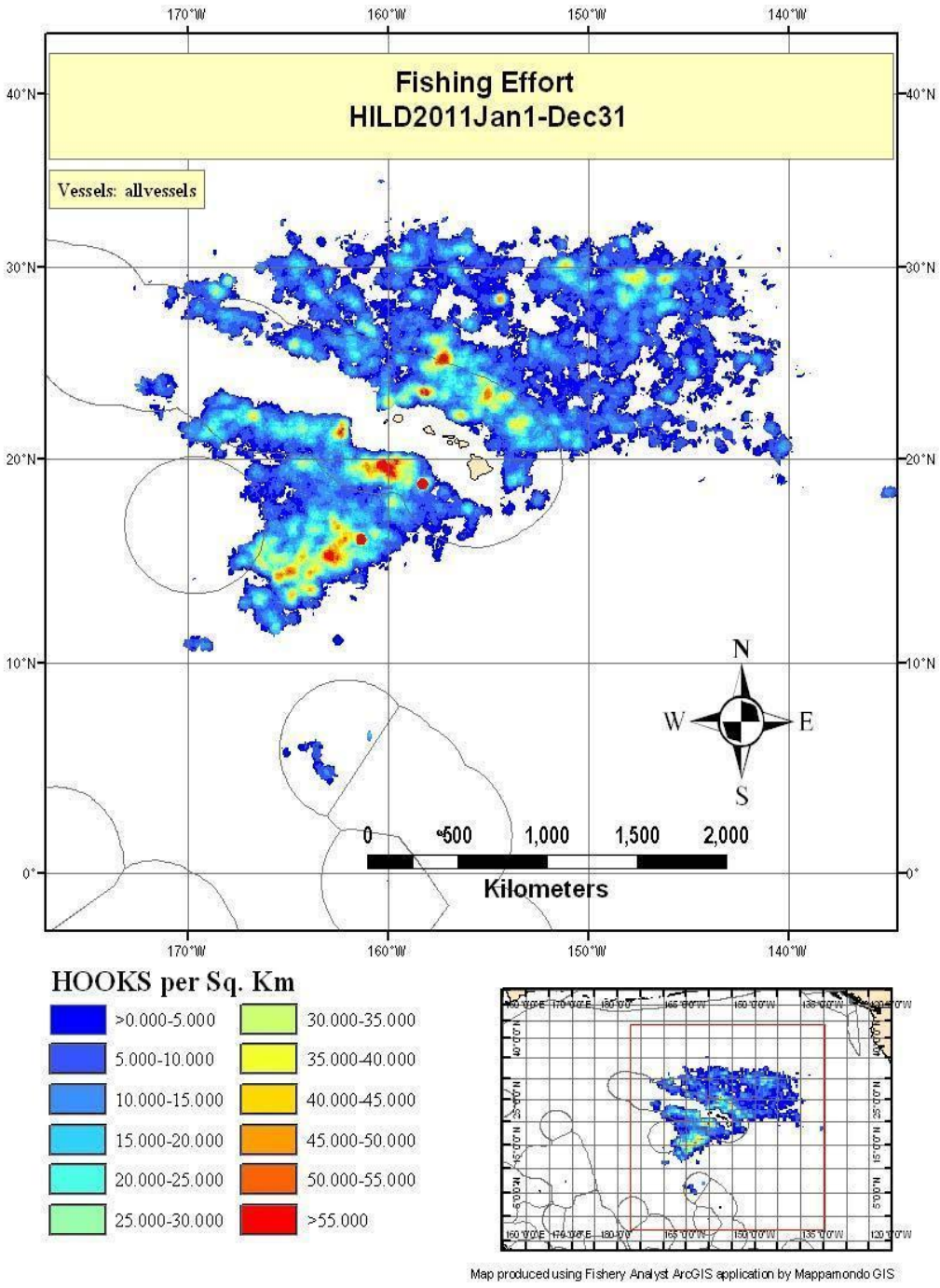

Figure 1. Spatial distribution of fishing effort by the Hawaii longline deep-set longline fishery, 2011. Spatial distribution of reported logbook fishing effort by the Hawaii deep-set longline fishery in 2011. Effort in some areas is not shown in order to preserve data confidentiality. Source: NMFS PIFSC unpublished.

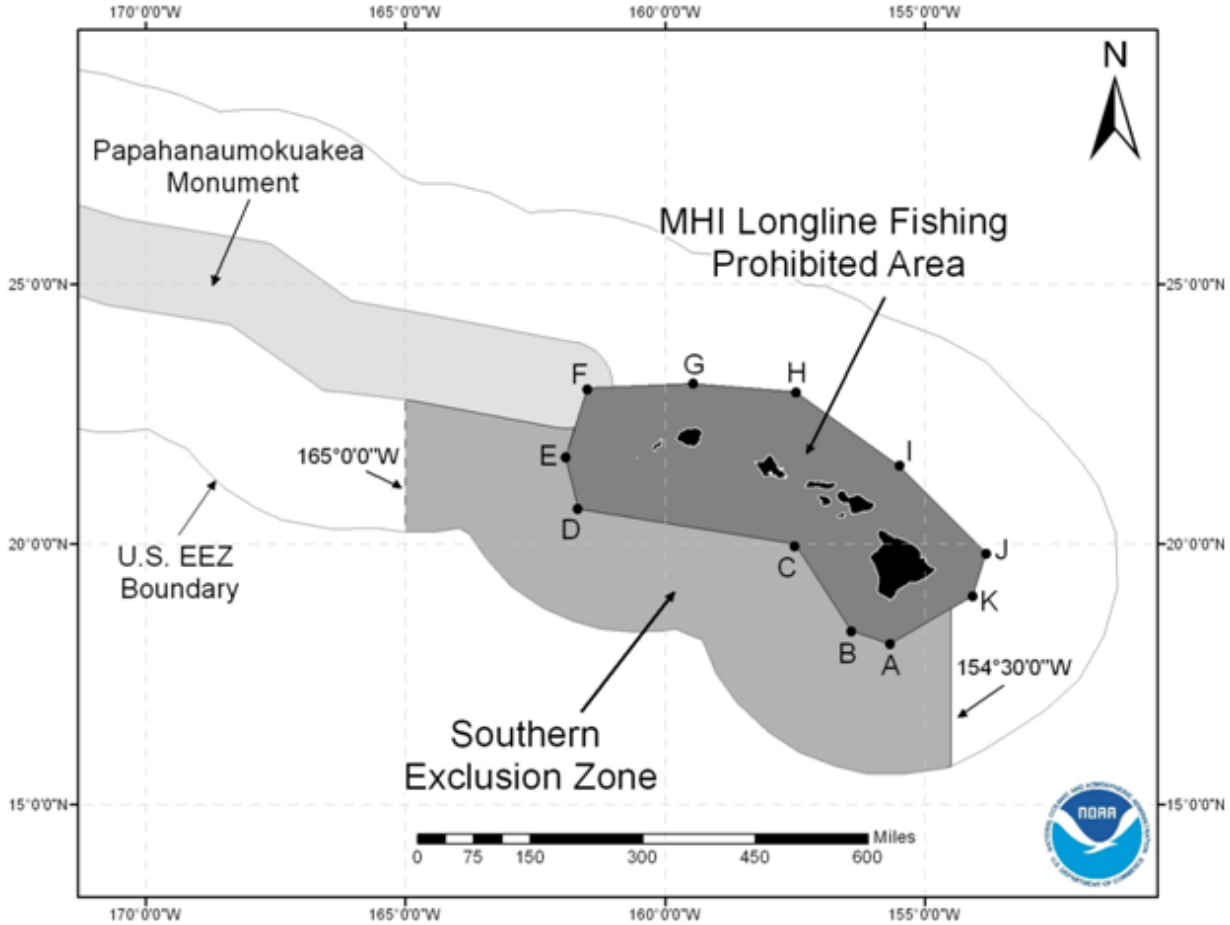

Figure 2. Longline fishing prohibited areas around the MHI. The year-round MHI Longline Fishing Prohibited Area boundary is shown as modified by the FKWTRP regulations. The Southern Exclusion Zone is only closed to deep-set fishing if observed bycatch thresholds are met. Source: **FKWTRP Final EA**.

5.0 Category I and II Fisheries in the Action Areas

Under the MMPA, fisheries are classified according to their incidental M&SI of marine mammals. Each fishery is evaluated on a per-stock basis, thus a fishery may qualify as one Category for one marine mammal stock and another for a different marine mammal stock. A fishery is categorized on the MMPA LOF at its highest classification (e.g., a fishery qualifying for Category III for one marine mammal stock and for Category II for another marine mammal stock will be listed under Category II). Category I fisheries have frequent incidental M&SI of marine mammals and Category II fisheries have occasional incidental M&SI of marine mammals. Category III fisheries have a remote likelihood of, or no known incidental M&SI, of marine mammals. Category III fisheries are not required to obtain section 101(a)(5)(E) permits but are required to report incidental M&SI resulting from fishing operations. Accordingly, Category III fisheries are not further discussed in this analysis.

The fisheries included in Table 1 have been classified as either a Category I or II fishery in the 2014 List of Fisheries (79 FR 14418, March 14, 2014), based on the level of M&SI of marine mammals that occurs incidental to each fishery. Of these fisheries, the Hawaii deep-set and

shallow-set longline fisheries are the only federally-managed fisheries that have had documented interactions with ESA-listed marine mammal species off Hawaii and are described below. Several fisheries in Alaska have documented interactions with CNP humpback whales and those interactions will be considered in this analysis, however, only the Hawaii deep-set and shallow-set longline fisheries will be covered under this authorization.

A full description of these and all the Category I and II fisheries listed in the LOF may be found in the published 2013 Pacific and Alaska Draft SARs (Carretta et al. 2013b; Allen and Angliss 2013), and online at http://www.nmfs.noaa.gov/pr/interactions/lof/.

Table 2. Category I and II Fisheries off Hawaii and Alaska (sources: 2014 List of Fisheries (**79 FR 14418**). Bold font indicates stocks that are being analyzed in this NID.

Fishery	**ESA-Listed Marine Mammals Incidentally Killed/Injured**
Category I	
Hawaii deep-set longline*	- **False killer whale, Main Hawaiian Islands (MHI) Insular stock (MHI Insular DPS)** - **Sperm whale (Hawaii stock)**
Category II	
Hawaii shallow-set longline	- **Humpback whale, CNP stock**
Hawaii shortline	- None documented
Alaska Bering Sea Aleutian Islands pollock trawl	- **Humpback whale, CNP** and WNP stocks - Bearded seal, Alaska stock (Beringia DPS) - Ringed seal, Alaska stock (Arctic subspecies) - Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Bristol Bay salmon drift gillnet	- Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Bristol Bay salmon set gillnet	- None documented
Alaska Peninsula/Aleutian Islands salmon set gillnet	- Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Peninsula/Aleutian Islands salmon drift gillnet	- None documented
Alaska Cook Inlet salmon drift gillnet	- Beluga whale, Cook Inlet stock (Cook Inlet DPS) - Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Cook Inlet salmon set gillnet	- Beluga whale, Cook Inlet stock (Cook Inlet DPS) - **Humpback whale, CNP stock** - Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Kodiak salmon set gillnet	- Steller sea lion, Western U.S. stock (Western U.S. DPS) - Sea otter, Southwest Alaska stock (Northern sea otter, Southwest Alaska DPS)
Alaska Prince William Sound salmon drift gillnet	- Steller sea lion, Western U.S. stock (Western U.S. DPS)
Alaska Yakutat salmon set gillnet	- **Humpback whale, CNP stock**
Alaska Southeast salmon drift gillnet	- **Humpback whale, CNP stock**
Alaska Cook Inlet salmon purse seine	- **Humpback whale, CNP stock**
Alaska Kodiak salmon purse seine	- **Humpback whale, CNP stock**
Alaska Bering Sea, Aleutian Islands rockfish trawl	- None documented
Alaska Bering Sea, Aleutian Islands flatfish trawl	- Bearded seal, Alaska stock (Beringia DPS) - Humpback whale, WNP stock - Ringed seal, Alaska stock (Arctic subspecies) - Steller sea lion, Western U.S. stock (Western U.S. DPS)

.

The following provides a brief description of each Category I and II fishery analyzed herein, beginning first with the Hawaii fisheries and then the Alaska fisheries that interact with the Hawaii stock of sperm whales and the CNP stock of humpback whales. This does not include those fisheries that are State-managed or with "None documented" recorded in Table 2 under

"ESA-Listed Marine Mammals Incidentally Killed/Injured." NMFS described each Category I and II fishery in detail in the final 2012 LOF (76FR 73912; November 29, 2011) and these descriptions can also be found at http://www.nmfs.noaa.gov/pr/interactions/lof/

Hawaii Fisheries

The Hawaii-based longline fisheries consist of two separately managed fisheries: the deep-set (tuna-target) fishery and the shallow-set (swordfish-target) fishery. The fisheries' regulatory history is described in the Pelagics FEP (WPFMC 2009). They are limited access fisheries, with 164 transferable permits of which approximately 130 are currently active (see Table 3). Vessels active in these fisheries are limited to 101 ft in length.

Hawaii-based longline vessels vary their fishing grounds depending on their target species. Most effort is to the north and south of the Hawaiian Islands between the equator and 40°N and longitudes 140° and 180°W; however, the majority of deep-set fishing occurs south of 20ºN (Figure 1) and the majority of shallow-set fishing occurs north of 20ºN. The deep-set longline fishery operates year-round, although vessel activity increases during the fall and is greatest during the winter and spring months.

The annual number of trips for the Hawaii-based longline fisheries has remained relatively stable, but there was a shift from mixed-target and swordfish-target trips to tuna-target trips from the early 1990s up to 2002. In the years 2000-2003, this shift reflected the regulatory closure of the shallow-set and mixed-target fisheries. In 2004, the shallow-set longline fishery was reopened but participation was limited to only six trips. In 2011, there were 1,388 combined longline trips (1,306 deep-set and 82 shallow-set), which resulted in a combined total of 18,623 sets (17,155 deep-set and 1,468 shallow-set).

Effort in the combined longline fishery, measured by the number of hooks set, has varied slightly: 2007 (40,211,326); 2008 (41,580,233); 2009 (39,492,259); 2010 (39,001,014) and 2011 (42,377,729).

In the 2009 LOF, NMFS split the Category I HI swordfish, tuna, billfish, mahi mahi, wahoo, oceanic sharks longline/set line fishery (the HI-based longline fishery) into two separately managed commercial fisheries: (1) the Category I HI deep-set (tuna target) longline fishery; and (2) the Category II HI shallow-set (swordfish target) longline fishery (73 FR 73032, December 1, 2008). This split was warranted because the shallow-set and deep-set longline fisheries have different target species, operating patterns, management regimes, and marine mammal interaction rates. The two fisheries are still listed separately under these same categories in the 2014 LOF (79 FR 14418).

The HI deep-set (tuna target) longline/set line fishery is listed as a Category I fishery as a result of the fishery's M&SI to the HI pelagic stock of false killer whales. Other stocks observed to be incidentally killed or injured in this fishery from 2007-2011 include: false killer whale (MHI Insular and Palmyra Atoll stocks), bottlenose dolphin (*Tursiops truncatus*), pantropical spotted dolphin (*Stenella attenuata*), Risso's dolphin (*Grampus griseus*), short-finned pilot whale (*Globicephala macrorhynchus*), HI sperm whale , and striped dolphin (*Stenella coeruleoalba).* In the most recent 5 years analyzed for the 2014 LOF (2007-2011) the deep-set longline fishery was

not observed to interact with the CNP humpback whale stock. However, in previous years it has interacted with CNP humpback whales. Observer coverage in the deep-set longline fishery is approximately 20% annually.

The HI shallow-set longline fishery was closed from 2001 to 2004 as the result of a Federal court order. Since 2004, this fishery has been subject to strict management measures to reduce sea turtle interactions, including: prescribed use of large circle hooks and fish bait, annual limits on turtle takes, and 100% onboard observer coverage. NMFS considered data from 2007 to 2011 in the most recent (2014) LOF tier analysis, which takes into account operation of the shallow-set longline fishery under this management regime. This fishery is listed as a Category II fishery as a result of the fishery's M&SI of the HI pelagic stock of false killer whales. From 2007-2011, there have been observed mortalities or injuries in the shallow-set longline fishery to the following marine mammals: Blainville's beaked whale, bottlenose dolphin, false killer whale (pelagic stock), humpback whale, Kogia species whale (pygmy or dwarf sperm whale), Risso's dolphin, short-finned pilot whales, striped dolphin, and short-beaked common dolphin (*Delphinus delphis*).

Both fisheries are subject to the recently implemented False Killer Whale Take Reduction Plan (FKWTRP) (77 FR 71260). Measures include gear requirements for the deep-set longline fishery including the use of weak circle hooks and strong leaders, longline area closures, and measures to improve captain and crew response to hooked and entangled marine mammals. The gear requirements became effective on February 27, 2013 and all other measures were effective on December 31, 2012.

The shortline fishery is a Category II fishery and is permitted through the State of Hawaii Commercial Marine License program. This fishery was added to the 2010 LOF as a Category II fishery (74 FR58859, November 16, 2009), and efforts are underway to obtain data on interactions between shortlines and marine mammals. Baird and Gorgone (2005) documented high rates of dorsal fin disfigurements consistent with injuries from unidentified fishing line for false killer whales belonging to the MHI insular stock. It is unknown whether these injuries might have been caused by longline gear, shortline gear, or other hook-and-line gear used around the main Hawaiian Islands. While there is anecdotal information that this fishery may interact with MHI insular false killer whales, there are no reported interactions; therefore, this fishery will not be addressed further in this analysis or covered under this authorization.

Observer Information

NMFS' fishery observer program for the Hawaii-based longline fishery began in 1990, with the voluntary sampling of fishing operations in order to collect fishery data and to verify unconfirmed reports of interactions between swordfish vessel operations and protected species (Dollar 1991). A mandatory observer program was implemented in April 1994 to better characterize and understand the effects of the incidental take of sea turtles, seabirds, and marine mammals by the Hawaii-based longline fishery. Since 2000, NMFS has maintained observer coverage levels at approximately 20% of all deep-set longline fishing vessels in Hawaii (Table 3). In 2004, the NMFS Pacific Islands Region restructured the observer program by separating the shallow-set and deep-set components. Current requirements include 100% observer coverage

for shallow-set trips and 20% observer coverage for deep-set trips. The annual observer coverage level for the deep-set longline fishery in 2012 was 20.4%; and coverage for the shallow-set longline fishery was 100%.

Table 3. Summary of Hawaii Longline Observer Program for the deep-set longline fishery from 2004-2012.

Year	Active Vessels	Total Trips*	Estimated total Fishing effort (sets)	Total number of Observed Sets	Percent Observer Coverage
2004	125	1344	15,902	3,958	24.6
2005	124	1377	16,550	4,602	26.1
2006	127	1300	16,452	3,605	21.2
2007	129	1382	17,815	3,506	20.1
2008	127	1314	17,885	3,915	21.7
2009	127	1221	16,810	3,520	20.6
2010	122	1216	16,085	3,580	21.1
2011	129	1306	17,155	3,540	20.3
2012	128	1309	18,069	3,659	20.4
Avg	**126**	**1,308**	**16,9969**	**3765**	**21.8**

*From the PIRO Observer program annual reports.

Alaska Fisheries

Federally-Managed Groundfish Fisheries

All fisheries below are listed as Category II fisheries in the 2014 LOF, based on the level of M&SI of marine mammals that occurs incidental to the fishery. There are no Category I fisheries in the Alaska action area. Full descriptions of the fisheries can be found in the June 2004 Alaska Groundfish Fisheries Final Supplemental Programmatic Environmental Impact Statement, and online at http://www.nmfs.noaa.gov/pr/interactions/lof/.

Bering Sea Aleutian Islands (BSAI) flatfish trawl

In 2008 the Amendment 80[3] program allocated most of the BSAI rock sole, flathead sole, and yellowfin sole allocations to the trawl catcher processor sectors using bottom trawl gear. Other vessel categories and gear types catch some rock sole, flathead sole, other flatfish incidentally in other directed fisheries. In 2010, 34 vessels targeted flatfish in the BSAI. Rock sole is generally targeted during the roe season, which is January through March (North Pacific Fishery Management Council 2001). Then these vessels shift to several different targets; notably Atka mackerel, arrowtooth flounder, flathead sole, yellowfin sole, Pacific cod, and Pacific ocean perch. Vessels also can go into the Gulf of Alaska to fish for arrowtooth, Pacific cod, flathead sole, and rex sole. In the BSAI, most of the rock sole, flathead sole, and other flatfish fisheries occur on the continental shelf in the eastern Bering Sea in water shallower than 200 m. Some fishing effort follows the contour of the shelf to the northwest and extends as far north as Zhemchug Canyon. Very few rock sole, flathead sole, and other flatfish are taken in the Aleutian Islands due to the limited shallow water areas present. Management measures for the BSAI groundfish fisheries constrain fishing both temporally and spatially. This fishery is federally

[3] Amendment 80 to the Bering Sea and Aleutian Islands (BSAI) Fishery Management Plan (FMP).

managed under the BSAI FMP. The authorized gear, fishing season, criteria for determining fishing seasons, and area restrictions by gear type are defined in the regulations implementing the BSAI FMP (50 CFR 679). Since 2008 there has been 100% observer coverage in this fishery Between 2007 and 2011 there were two CNP humpback whale M&SI in this fishery (Allen and Angliss 2013).

Bering Sea Aleutian Islands pollock trawl

In 2010, 95 vessels targeted pollock in the BSAI management area. The pattern of the modern pollock fishery in the BSAI is to focus on a winter, spawning-aggregation fishery. The A season fishery is January 20 through June 10. Fishing in this season lasts about 8-10 weeks depending on the catch rates. The B season is June 10 through November 1. Fishing in the B season is typically September through October and has been conducted to a greater extent west of 170°W longitude compared to the A season fishing location in the southern Bering Sea. Directed fishing is closed for pollock in all areas from November 1 to January 20. Fishing is also closed around designated rookeries and haulouts out to 20 nm and closed within Steller sea lion foraging areas in the Bering Sea and Aleutian Islands. The Bering Sea pollock total allowable catch is allocated 40 % to the A season and 60 % to the B season. No more than 28% of the annual directed fishing allowance for pollock can be taken inside the Sea Lion Conservation Area in the southern Bering Sea before April 1. The authorized gear, fishing season, criteria for determining fishing seasons, and area restrictions by gear type are defined in the regulations implementing the BSAI FMP (50 CFR 679). Observer coverage ranged from 85-98% from 2007-2011. Between 2007 and 2011 there was one incidental CNP humpback whale M&SI in this fishery (Allen and Angliss 2013).

Observer Program (AK federally-managed fisheries)

Observer requirements for fishing vessels operating in the EEZ off Alaska varied according to vessel size until recently. Until 2013, vessels under 125 feet length overall (LOA) and over 60 ft LOA were required to carry an observer 30% of their fishing time for each quarter of the year. Vessels 125 ft LOA and above were required to carry an observer 100% of the time during fishing operations. Some vessels under certain circumstances, such as vessels fishing for pollock in the BSAI under the American Fisheries Act, are required to carry two observers for 100% of their fishing time. Beginning in 2013, all sectors of the groundfish fishery, including vessels less than 60 feet length overall and the commercial halibut sector, are included in the new observer program but will not be discussed further in this document because the time period analyzed occurred prior to the reorganization of the observer program. Details to the new requirements can be found here: https://alaskafisheries.noaa.gov/sustainablefisheries/observers/.

Observer Program (AK state-managed fisheries)

The NMFS Alaska Regional Office operates a marine mammal observer program that collects information on marine mammal interactions in ten Category II state-managed commercial fisheries targeting salmon. Due to the high cost of observing these fisheries, only one or two fisheries were observed at a time for one to two years. To date, seven state fisheries have been observed in this way. Of those, one has been re-categorized to Category III due to minimal interactions with marine mammals (Prince William Sound set gillnet salmon fishery). Between 2007 and 2011 there were no known M&SI of CNP humpback whales in these fisheries. See http://alaskafisheries.noaa.gov/protectedresources/observers/mmop.htm for more information.

6.0 Marine Mammal Species Listed under the ESA in the Hawaii Action Area

According to the 2013 Draft Pacific and Alaska SARs (Carretta et al., 2013b; Allen and Angliss, 2013), there are nine species of marine mammals listed under the ESA that occur within the area of operation of Category I and II fisheries off Hawaii. These species, including their status, are listed in Table 4.

Table 4. ESA-Listed Marine Mammal Species off Hawaii.

Species	*MMPA Stock*	*ESA Listing Status*
Hawaiian monk seal (*Monachus schauinslandi*)	Hawaii	Endangered
Blue whale (*Balaenoptera musculus*)	Central North Pacific	Endangered
Fin whale (*Balaenoptera physalus*)	Hawaii	Endangered
MHI Insular false killer whale DPS	MHI Insular	Endangered
Humpback whale	Central North Pacific	Endangered
North Pacific right whale (*Eubalaena japonica*)	Eastern North Pacific	Endangered
Sei whale (*Balaenoptera borealis*)	Hawaii	Endangered
Sperm whale	Hawaii	Endangered

NMFS issued an MMPA 101(a)(5)(E) permit on May 28, 2010 (75 FR 29984) for the HI deep-set and shallow-set longline fisheries to incidentally take, during the course of commercial fishing operations, humpback whales, based on documented takes in the fishery. Since the 2010 permit was issued, there has been one observed interaction with a Hawaii sperm whale in the deep-set longline fishery in May 2011, and the MHI IFKW stock was listed as endangered under the ESA in November 2012 (77 FR 70915).

Since NMFS began observing the Hawaii longline fishery in 1990, fishery interactions have not been observed for blue whales, North Pacific right whales, fin whales, sei whales, and Hawaiian monk seals. Based on 22 years of observer data, logbook information, self-reports and stranding information (whale entanglement reports), NMFS does not anticipate takes of blue whales, North Pacific right whales, fin whales, sei whales, or Hawaiian monk seals by either of the Category I and II longline fisheries off Hawaii.

7.0 Marine Mammals Considered in This Analysis

For this assessment, NMFS will consider whether M&SI of the CNP humpback whale stock, the Hawaii sperm whale stock, and the MHI IFKW stock incidental to the Hawaii deep-set and shallow-set longline fisheries is negligible. However, in so doing, all human-caused M&SI (including from other commercial fisheries) are included in the analysis. Detailed information on these populations can be found in the recovery plans and SARs for the humpback, sperm whales, and MHI Insular false killer whales. Information from these sources that is relevant to this analysis is summarized below.

7.1 CNP Humpback Whales

Humpback whales were listed as endangered under the U.S. Endangered Species Act (ESA) in 1973. Critical habitat has not been designated for this species. The International Whaling

Commission (IWC) first protected humpback whales in the North Pacific in 1965. Humpback whales are listed as endangered under the ESA, and consequently the CNP stock is considered both "depleted" and "strategic" under the MMPA. *See* 16 USC § 1362(1) and (19). NMFS is conducting a global status review, including consideration of whether there are humpback populations warranting separate classification, downlisting, or removal from the ESA list. Humpback whales are also protected by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). This section discusses species information, the current status of CNP humpback whales, and threats to the stock.

7.1.1 Status of the Species

The humpback whale is distributed worldwide in all ocean basins. In winter, most humpback whales occur in the temperate and tropical waters of the Northern and Southern Hemispheres. No critical habitat has been designated. Below we provide a summary of CNP humpback whale population status, trends, and threats. For more detailed information on humpback whales, refer to the Humpback Whale Recovery Plan (NMFS 1991) and the SARs (Carretta et al. 2013b).

Because fidelity appears to be greater in feeding areas than in breeding areas, the stock structure of humpback whales is defined based on feeding areas. A photo-identification study conducted in 2004-2006 estimated the abundance of humpback whales in the entire north Pacific Basin to be approximately 18,000-20,000 (Calambokidis et al. 2008). The winter distribution of the central North Pacific stock is primarily in the Hawaiian Island archipelago. In summer the majority of whales from the central North Pacific stock are found in the Aleutian Islands, Bering Sea, Gulf of Alaska, and Southeast Alaska/northern British Columbia.

A total of 2,367 unique individuals were seen in the Hawaiian wintering areas during the 2-year period (3 winter field seasons over 2004, 2005, and 2006) of the Structure of Populations, Levels of Abundance, and Status of Humpbacks (SPLASH) study. Point estimates of abundance for Hawaii from SPLASH ranged from 7,469 to 10,103; the estimate from the best model was 10,103, but no associated coefficient of variation of the abundance estimate (CV) has yet been calculated. The minimum population estimate (N_{MIN}) represents the minimum population that a stock of unknown status would achieve and be maintained within optimum sustainable population (OSP) with 95% probability. N_{MIN} for this stock is calculated according to Equation 1 from the PBR Guidelines (Wade and Angliss 1997): $N_{MIN} = N/\exp(0.842 \times [\ln(1+[CV(N)]^2)]^{½})$. Conservatively using the lowest population estimate (N) of 7,469 and an assumed conservative CV(N) of 0.30 results in an N_{MIN} for this humpback whale stock of 5,833.

Estimated rates of increase for the CNP stock include values for Hawaii of 7.0% (from aerial surveys), 5.5-6.0% (from mark-recapture abundance estimates), and 10% (95% CI 3-16%) (from a model fit to mark-recapture data), and for the northern Gulf of Alaska a value of 6.6% (95% CI 5.2-8.6%) (from ship surveys) (Calambokidis et al. 2008). One-half R_{max} is defined in the MMPA as "one-half of the maximum theoretical or estimated "net productivity rate" of the stock at a small population size," where the term "net productivity rate" means "the annual per capita rate of increase in a stock resulting from additions due to reproduction, less losses due to natural mortality."Although there is no estimate of the maximum net productivity rate (R_{MAX}) for the CNP stock, NMFS assumes that R_{MAX} for this stock would be at least 7%. Hence, until additional data become available from the CNP humpback whale stock, it is recommended that 7% be employed as the maximum net productivity rate (R_{MAX}) for this stock.

Under the 1994 reauthorized MMPA, the PBR is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its OSP (16 USC 1362(20)). The PBR is the product of the minimum population estimate, one-half the maximum theoretical net productivity rate, and a recovery factor: $PBR = N_{MIN} \times 0.5R_{MAX} \times F_R$. The default value of 0.04 for the maximum net productivity rate is replaced by 0.07, which is the best estimate of the current rate of increase and is considered a conservative estimate of the maximum net productivity rate. For the CNP stock of humpback whale, using the smallest SPLASH study abundance estimate for 2004-06 for Hawaii of 7,469 (with an assumed CV of 0.300) and its associated N_{MIN} of 5,833, PBR is calculated to be 61.2 animals (5,833 x 0.035 x 0.3). A recovery factor of 0.3 is used in calculating the PBR based on the suggested guidelines of Taylor et al. (2003).

7.1.2 Threats

Here we provide a brief summary of the threats to humpback whales as they are applicable to the negligible impact determination, but more detailed information can be found in the Humpback whale Recovery Plan (available at: http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf) and the SARs (available at: http://www.nmfs.noaa.gov/pr/sars/species.htm). Threats to humpback whales include vessel disturbance, climate change, illegal whaling or resumed legal whaling, reduced prey abundance due to overfishing or other factors (including climate change), habitat degradation, disturbance from low-frequency noise, disease, impacts related to research, and natural causes.

Entanglement in fishing gear poses a threat to individual humpback whales throughout the Pacific. The impact of fisheries on this humpback whale stock is likely underestimated, since the M&SI of large whales due to entanglement in gear may go unobserved because whales swim away with a portion of the net, line, buoys, or pots. This stock is not driving any of the Category I or II classifications for the fisheries described in this analysis. Fishery interactions with the Hawaii longline fisheries are described in detail in section 8.0.

Since 2012, the Hawaiian Islands Humpback Whale National Marine Sanctuary has received more than 230 reports of whales entangled in gear. From these reports 118 were confirmed to be large entangled whales, with at least 75 different individuals. Of the 118 reports, 115 were humpback whales. The number of confirmed reports of entangled whales in Hawaiian waters had been increasing in recent years but was lower during the 2012-2013 season (Lyman 2013). Most of the whales reported entangled in Hawaiian waters likely brought the gear with them from higher latitude feeding grounds, and none of the gear could be attributed to the Hawaii longline fisheries. Over the past several years the number of entanglements reported in local (Hawaii) pot gear has increased; 10 have been reported around the main Hawaiian Islands. While the whales are not typically at risk from drowning or immediate death, they are at increased risk of starvation, infection, physical trauma from the gear, and ship strikes as a result of the entanglement, which could lead to death much later in time. However, of the confirmed entanglements from 2007-2011 in Hawaii waters, 28 entanglements (i.e., those wherein the entangled whales were in Hawaiian waters, but not entangled in Hawaii-based longline fishery gear) have been determined to be serious (Bradford and Lyman 2013, NMFS 2012a). In 2012 there were 9 reported entanglements with one being described as not life threatening; injury determinations have not been made yet for those reported entanglements. Because most of the

gear entangling these whales did not originate in Hawaii, many of these serious injuries may have been included in entanglements also observed in Alaska.

The frequency at which collisions with humpback whales and vessels are occurring in Hawaiian waters appears to be increasing (Table 5), especially in the shallow waters (less than 100 fathoms) of the four-island region of Maui county and Penguin Banks, the preferred habitat of humpback whales wintering in Hawaii (Lammers et al. 2003). From 2007-2011 there were 36 vessel collisions reported to the Hawaiian Islands Humpback Whale National Marine Sanctuary resulting in 19.2 M&SI (Bradford and Lyman 2013). The average number of humpback whale deaths by ship strikes off Hawaii from 2007-2011 is at least 3.84 per year (Bradford and Lyman 2013), but this is considered a minimum since animals struck by ships may not be documented. Three types of collisions exist: collisions with little/no forewarning, collisions resulting from effort to avoid whales, and circumstantial collisions not reported but evidence of trauma known. The majority of the collisions are with boats from 19-80 feet in length, including both slow and fast moving vessels. None of these ship strikes resulted in a confirmed mortality, but some have been classified as serious injuries.

The increasing rate of whale and vessel collisions may have a number of contributing factors, one of which may be that the population of humpback whales in Hawaii is increasing (Lammers et al 2003). In addition, there is a corresponding rise in the number of vessels in the preferred habitat for humpback whales, a direct result of the growing popularity of eco-tourism in Maui and the surrounding areas. Efforts to reduce these interactions include: a regulation prohibiting approach within 100 yards (90m) of humpback whales in Hawaiian waters (50 CFR 224.103(a)); improved technological research into mapping models and radar and sonar detection systems; and a NOAA hotline to report humpback whale interactions.

7.1.3 Summary of Status

Population estimates for humpback whales in the entire North Pacific have increased substantially, from 1,200 animals in 1966 to approximately 18,000 to 20,000 humpback whales in 2004 to 2006 (Calambokidis et al. 2008). Although these estimates are based on different methods and the earlier estimate is extremely uncertain, the annual growth rate implied by these estimates is 7%. Although there is no estimate of the maximum net productivity rate for the Central North Pacific stock, it is reasonable to assume that the maximum net productive rate (Rmax) for this stock would be at least 7%. The increasing levels of anthropogenic noise in the world's oceans have been suggested to be a habitat concern for whales, particularly baleen whales, which may communicate using low-frequency sound. The estimated rate of total fisheries related M&SI with this stock is (9.35 animals per year) which is less than the PBR (61.2).

7.2 Hawaii Stock of Sperm Whales[4]

Sperm whales were listed as endangered under the U.S. Endangered Species Act (ESA) in 1973. Critical habitat has not been designated for this species. The IWC first protected sperm whales in the North Pacific in 1981. Sperm whales are also protected by the CITES and are designated as a

[4] The information in this section is from Carretta et al. 2013.

depleted stock under the MMPA. This section discusses species information, the current status of Hawaii sperm whales, and threats to the stock.

7.2.1 Status of the Species

Sperm whales are widely distributed across the entire North Pacific and into the southern Bering Sea in summer, but the majority are thought to be south of 40^{o}N in winter (Rice 1989; Gosho et al. 1984).

The SARs divide sperm whales within the Pacific U.S. EEZ into three discrete, non-contiguous stocks: 1) waters around Hawaii; 2) California, Oregon, and Washington waters; and 3) Alaskan waters. The Hawaii stock includes animals found both within the Hawaiian Islands EEZ and in adjacent high seas waters; however, because data on abundance, distribution, and human-caused impacts are largely lacking for high seas waters, the status of the Hawaii stock is evaluated based on data from U.S. EEZ waters of the Hawaiian Islands (NMFS 2005). Therefore the abundance estimate is a minimum since it does not take into account sperm whales on the adjacent high seas. Sperm whales appear to be a good candidate for acoustic surveys due to the increased range of detection; however, visual estimates of group size are still required (Barlow and Taylor 2005). A 2002 shipboard line-transect survey of the entire Hawaiian Islands EEZ resulted in an abundance estimate of 6,919 (CV=0.81) sperm whales (Barlow 2006). The recent 2010 shipboard line-transect survey of the Hawaiian Islands EEZ resulted in an abundance estimate of 3,354 (CV = 0.34) sperm whales (Bradford et al. 2013), including a correction factor for diving animals not observed during the survey. This is currently the best available abundance estimate for this stock. Following Barlow et al. (1995), the minimum population size is taken to be the log-normal 20th percentile of the 2010 abundance estimate (2,539 sperm whales) within the Hawaiian Islands EEZ. The broad and overlapping confidence intervals around the 2002 and 2010 estimates preclude assessment of trend with the available data. The PBR level for the Hawaiian stock of sperm whales is calculated as the minimum population size (2,539) within the U.S. EEZ of the Hawaiian Islands times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.2 (for an endangered species with Nmin > 1,500 and CV Nmin > 0.50, with low vulnerability to extinction (Taylor et al. 2003), resulting in a PBR of 10.2 sperm whales.

7.2.2 Threats

Here we provide a brief summary of the threats to sperm whales as they are applicable to the negligible impact determination, but more detailed information can be found in the Sperm Whale Recovery Plan (available at http://www.nmfs.noaa.gov/pr/pdfs/recovery/final_sperm_whale_recovery_plan_21dec.pdf) and the SARs (available at http://www.nmfs.noaa.gov/pr/sars/). Threats to sperm whales include vessel disturbance, climate change, illegal whaling or resumed legal whaling, reduced prey abundance due to overfishing or other factors (including climate change), habitat degradation, disturbance from noise, disease, pollution, impacts related to research, and natural causes.

Information on fishery-related mortality of sperm whales in Hawaiian waters is limited, but the gear types used in Hawaiian fisheries are responsible for marine mammal M&SI in other fisheries throughout U.S. waters. One stranded sperm whale was found in 1990 with fishing line and netting in its stomach, though it is unclear whether the gear caused its death, and what fishery the gear came from (NMFS Pacific Islands Region Marine Mammal Response Network).

Entanglement in fishing gear poses a threat to whales throughout the Pacific. The estimated impact of fisheries on this sperm whale stock is likely underestimated, since the M&SI of large whales due to entanglement in gear may go unobserved because whales swim away with a portion of the net, line, buoys, or pots. Fisheries-related M&SI with this stock is not driving any of the Category I or II classifications for the fisheries described in this analysis. Interactions with the Hawaii longline fisheries are described in detail in section 8.0.

In addition to the interactions reported by the Hawaii longline observer program, there has been one confirmed sperm whale entanglement in Hawaiian waters between 2003 and 2012. The sperm whale was observed near Kauai in 2010 with a ball of red line and netting near the mouth region. The whale swam backwards and was able to shed the gear; the interaction was subsequently determined to not be a serious injury (Bradford & Lyman 2013). Before that interaction, the only other sperm whale in the database was the stranded sperm whale in 1990, which had ingested gear described earlier.

There are no reported vessel collisions with sperm whales in the database maintained by the NMFS Pacific Islands Region Marine Mammal Response Network.

7.2.3 Summary of Status

Current and historic estimates for the abundance of sperm whales in the North Pacific are considered unreliable (Allen and Angliss 2013). The abundance of sperm whales in the North Pacific was reported to be 1,260,000 prior to exploitation, which by the late 1970s was estimated to have been reduced to 930,000 whales (Rice 1989). The status of sperm whales in Hawaiian waters relative to OSP is unknown, and there are insufficient data to evaluate trends in abundance. The estimated rate of fisheries related M&SI within the Hawaiian Islands EEZ (0.7 animals per year) is less than the PBR (10.2). Neither population size nor the potential effects of interactions with international pelagic longline and other fisheries on the high seas are known.

7.3 Main Hawaiian Islands Insular False Killer Whale Stock

The MHI IFKW was listed as endangered under the ESA in November 2012 (77 FR 70915) and therefore is depleted under the MMPA. Critical habitat has not been designated for this species. False killer whales are also protected under CITES. This section discusses species information, the current status of MHI IFKW, and threats to the stock.

7.3.1 Status of the Stock[5]

Stock Definition and Geographic Range

False killer whales are found worldwide mainly in tropical and warm temperate waters (Stacey et al. 1994). Genetic, photo-identification, and telemetry studies indicate there are three demographically-independent populations of false killer whales in Hawaiian waters. Genetic analyses indicate restricted gene flow between false killer whales sampled near the MHI, NWHI, and in pelagic waters of the Eastern (ENP) and CNP (Chivers et al. 2007, 2010, Martien et al.

[5] The information in Section 7.3.1 is from Carretta et al., 2013b.

2011). Chivers et al. (2010) expanded previous analyses with additional samples and analysis of 8 nuclear DNA (nDNA) microsatellites, revealing strong phylogeographic patterns consistent with local evolution of haplotypes nearly unique to false killer whales occurring nearshore within the Hawaiian Archipelago. Analysis of 21 additional samples collected during a 2010 shipboard survey in Hawaiian waters reveals significant differentiation in both mitochondrial DNA (mtDNA) and nDNA between false killer whales found near the MHI and the NWHI (Martien et al. 2011).

The draft 2013 SAR recognizes three stocks of false killer whales with overlapping ranges within Hawaiian waters: 1) the MHI insular stock, which includes animals inhabiting waters within 140 km (approx. 75 nmi) of the main Hawaiian Islands, 2) the NWHI stock, which includes animals inhabiting waters within 93 km (50 nmi) of the NWHI and Kauai, 3) the Hawaii pelagic stock, which includes false killer whales inhabiting waters greater than 40 km (22 nmi) from the main Hawaiian Islands, including adjacent high seas waters.

These stock ranges include several areas of overlap (Figure 3). Waters within 40 km of Kauai and Niihau are an overlap zone between the NWHI and MHI insular stocks. The three stocks overlap within 40 km and 93 km around Kauai and Niihau, and the MHI insular and pelagic stocks overlap from 93 km to 140 km around these islands. The MHI insular and pelagic stocks overlap between 40 km and 140 km from shore between Oahu and Hawaii Island. Finally, the NWHI and pelagic stocks overlap within 93 km of the NWHI, inside the Papahānaumokuākea Marine National Monument.

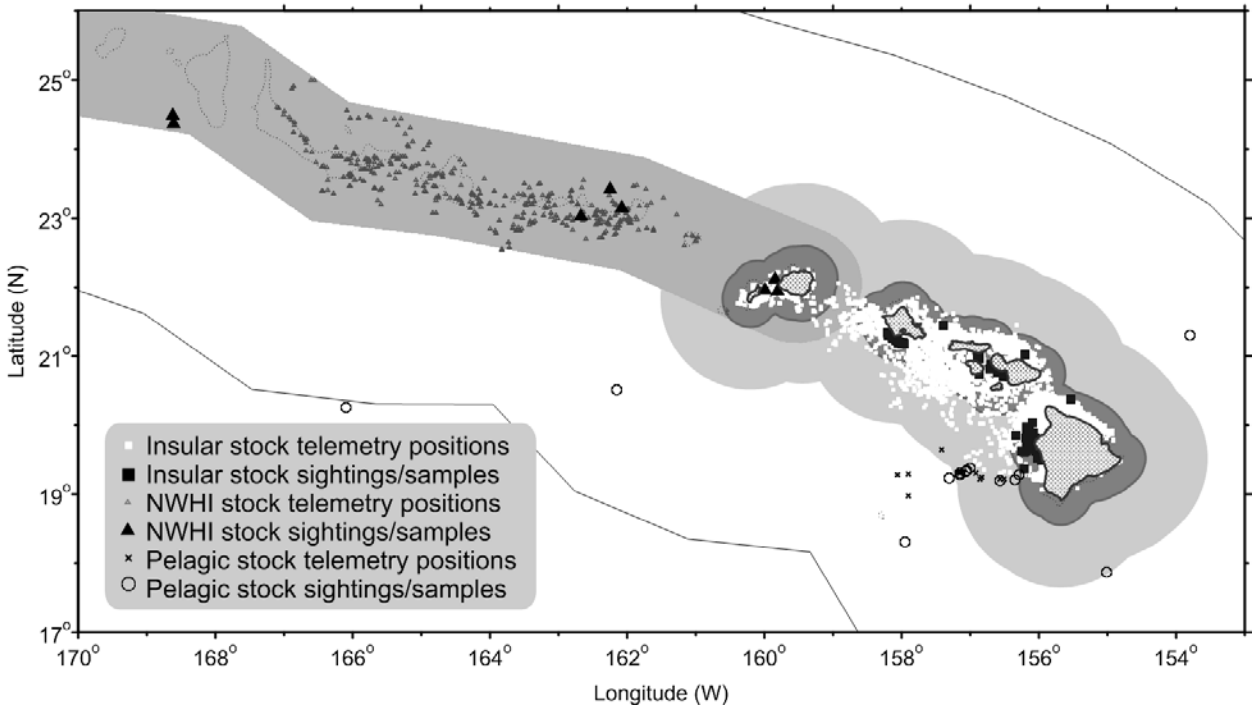

Figure 3. Stock boundaries of MHI insular, NWHI insular, and pelagic false killer whales from the draft 2013 SAR. Also shown are sighting, biopsy, and telemetry records of false killer whale identified as being part of the MHI insular (square symbols), NWHI (triangle symbols), or pelagic (open and cross symbols) stocks. The darkest gray area is the 40-km MHI insular core area; lightest gray area is the 40-km to 140-km insular-pelagic overlap zone

(Baird et al. 2010, Baird unpublished data; reproduced from Forney et al. 2010); medium gray area is the 50-nm (93-km) Papahanaumokuakea Marine National Monument boundary extended to the east to encompass Kauai, representing the NWHI stock boundary. The MHI insular, NWHI, and pelagic stocks overlap near Kauai and Niihau (Carretta et al. 2013b).

Based on the information described above the endangered MHI IFKW is assumed to be the sole occupant of the waters in the MHI from shore to 40 km between Hawaii Island and Oahu (the "core range"). In addition the MHI insular stock of false killer whale shares habitat with the pelagic and NWHI stocks within 93 km of shore around Kauai and Niihau, and with the pelagic stock from 40 km to 140 km from the MHI. NMFS assumes all false killer whales offshore of 140 km are from the pelagic stock.

Abundance of false killer whales in Hawaiian waters has been estimated using shipboard line-transect surveys of the entire Hawaiian EEZ, as well as aerial line-transect surveys and photographic capture-recapture analysis. The aerial surveys and photo-identification efforts covered only portions of the range of false killer whales in Hawaii. MHI IFKW were recognized as being separate from pelagic false killer whales only after the genetic results of Chivers et al. (2007) became available. Thus, many previously published estimates refer to both the insular and pelagic populations combined. Separate estimates of abundance are now available for both populations, with the best estimate of the size of the insular population being the result of capture-recapture analysis of photo-identification data. The 2009 SAR for insular Hawaiian false killer whales (Carretta et al., 2010) gives this as 123 individuals (CV = 0.72) (Baird et al., 2005). Recent reanalysis of the photographic data using more recent sighting histories and open population models has yielded new estimates of population size, for two time periods, 2000–2004, and 2006–2009. The new abundance estimate for 2000-2004 period is 162 (CV=0.23) animals (Carretta et al. 2013b). Two estimates of population size were presented for the 2006–2009 period because two groups of whales photographed near Kauai have not been seen to associate into the social network of false killer whales seen at the other islands (Baird, 2009). The animals seen near Kauai have been associated with the NWHI stock and therefore not included in the most recent abundance estimate, which is 151 (CV=0.20) (Baird et al. 2013).The Hawaiian pelagic stock numbers 1,503 individuals (CV=0.66) outside of 40 km of the MHI and within the EEZ (Bradford et al. 2012). The population range for the Hawaii pelagic stock is known to extend into high-seas waters, though the boundaries of that population are unknown. The abundance estimate for the NWHI stock based on a 2010 line transact survey is estimated to be 522.

Mobley et al. (2000) estimated 121 false killer whales (CV = 0.47) obtained from aerial survey sightings pooled over 3 survey years (1993, 1995, 1997). That estimate was likely negatively biased because the survey aircraft did not allow detection of cetaceans directly below the plane, and no adjustment was made for availability bias (animals below the surface and unavailable for sighting as the aircraft passed overhead). Mobley et al. (2000) is considered outdated by NMFS standards (NMFS, 2005), although the results are similar to the 2000–2004 estimate referenced above.

In February 2009 a line-transect survey was conducted within 75 nmi of the main Hawaiian Islands where there were 6 sightings of false killer whales. Four on-effort sightings yielded a preliminary abundance estimate of 635 animals (CV = 0.77); however, not all groups could be

attributed to the insular population. Some sightings occurred in the overlap zone, such that they may be pelagic false killer whales. Visual and acoustic observations of false killer whale behavior during the survey and the shape of the detection function (based on all sightings of false killer whale on previous NMFS Southwest Fisheries Science Center surveys) indicate that the estimate of 635 animals is an overestimation of abundance, particularly due to likely attraction of false killer whales to the survey vessel. Vessel attraction in other species has resulted in overestimation by as much as 400% (Turnock and Quinn II, 1991). Without a correction factor, which is currently not available, the Pacific Scientific Review Group noted (PSRG 2010), and the Status Review of the MHI Insular False Killer Whale confirmed, that this is not a reliable estimate of population because of a substantial upward bias and the lack of a correction factor for this species.

Minimum Population Estimate

As identified in the draft 2013 SAR, the current minimum population estimate for the insular stock of false killer whales is the number of distinct individuals identified during 2008-2011 photo-identification studies, or 129 false killer whales (Baird, unpublished data). Recent mark-recapture estimates (Oleson et al. 2010) of abundance are known to have a positive bias of unknown magnitude due to missed matches, and therefore are not suitable for deriving a minimum abundance estimate.

Current Population Trend

Hawaiian insular false killer whales are believed to have declined markedly during the 1990s, although their current population trajectory is unknown (Oleson et al. 2010). Historical population size is unknown. A survey was conducted in June and July 1989 on the leeward sides of Hawaii, Lanai, and Oahu to determine the minimum population size of false killer whales in Hawaiian waters. False killer whales were observed on 14 occasions with 3 large groups (group sizes 470, 460, and 380) reported close to shore off the island of Hawaii on 3 different days (Reeves et al., 2009). The largest group seen in 1989 is more than 3 times larger than the current best estimate of the size of the insular population. Although the animals seen during the 1989 surveys are assumed to come from the insular population, based on their sighting location near the Big Island, it is possible that they represent a short-term influx of pelagic animals to waters closer to the islands. The average group size during the 1989 survey (195 animals) is larger than the typical average group size for the insular population (25 animals for encounters longer than 2 hours) during more recent surveys (Baird et al. 2005), and is larger than that observed for the pelagic population (41 animals) (Bradford et al 2014). However, because of the location of the sighting and lack of evidence of pelagic animals occurring that close to the islands, it is likely that this group did consist of insular animals. Five systematic aerial surveys were conducted between 1993 and 2003 covering both windward and leeward sides of all of the main Hawaiian Islands, including channels between the islands, out to a maximum distance of about 46 km from shore (Mobley et al., 2000; Mobley 2004). A regression of sighting rates (8 groups in 1993, 9 in 1995, 1 in 1998, and none seen in 2000 and 2003 (Mobley et al., 2000; Mobley, 2004)) from these surveys suggests a significant decline in the population size ($p = 0.028$, $r_2 = 0.8429$ (Baird, 2009). The large groups sizes observed in 1989, together with the declining encounter rates from 1993 to 2003 suggest that Hawaiian insular false killer whales have declined significantly in recent decades. Baird (2009) reviewed trends in sighting rates of false killer whales from aerial surveys conducted using consistent methodology around the main Hawaiian Islands between

1994 and 2003 (Mobley et al. 2000). Sighting rates during these surveys showed a statistically significant decline that could not be attributed to any weather or methodological changes.

The recent Status Review (Oleson et al. 2010) presented a quantitative analysis of extinction risk using a PVA. The modeling exercise was conducted to evaluate the probability of actual or near extinction, defined as a population reduced to fewer than 20 animals, given measured, estimated, or inferred information on population size and trends, and varying impacts of catastrophes, environmental stochasticity and Allee effects. The team chose to explore model structure uncertainty by using two separate types of models: the one rate-of-change model and the two-rate-of-change model. The team considered two hypothesis for population growth rate: 1) the decline apparent in the Mobley series (which occurred after the implementation of the long-line exclusion area) results from ongoing mortality likely resulting from nearshore fisheries interactions, and 2) the decline apparent in the Mobley series results from a reduction in prey availability within the range of the insular population. The reduction-in-prey hypothesis results in the observed decline through the Mobley series but has a second growth rate for current and future growth based on a stable (but lower) prey base. Since there were only two time periods being used, three different distributions were used. The third distribution, which was the most plausible, constrained growth to biologically plausible values but allowed declines to the levels indicated by the Mobley time series (from an annual 10% decline to an annual 4% increase), which has an expectation of -3% population decline (Oleson et al 2010). This model has a 19% probability of near extinction in 50 years, with the 1 growth-rate models ranging between 76% to 91% probability of near extinction (Oleson et al. 2010). No data are available on current or maximum net productivity rate for this species in Hawaiian waters.

Since the historical population size is unknown, the Biological Review Team (BRT) used density estimates from other areas together with the range inferred from telemetry data to suggest plausible ranges for historical abundance in the Population Viability Analysis (Appendix B). Using the estimated density of false killer whales around Palmyra Atoll, where the highest density of this species has been reported (Barlow and Rankin, 2007), and extrapolating that density to the 202,000 km2 area within 140 km of the main Hawaiian Islands (proposed as a stock boundary for Hawaiian insular false killer whales in the Draft 2010 SAR), a plausible historical abundance is around 769 animals. To allow for uncertainty in this estimate, higher potential abundances are also estimated as the mean plus one standard deviation (1392 animals), and the upper 95% lognormal confidence limit (2461 animals). There are several important caveats. Even though Palmyra has a density that is high relative to other areas, it is unlikely that this represented a pristine population during the 2005 survey on which the estimate is based. Given the depredation tendencies of false killer whales, known longlining in the Palmyra area, and the fact that false killer whales are known to become seriously injured or die as a result of interactions with longlines, the possibility that current densities are lower than historical densities cannot be discounted. Although Palmyra is situated in more productive waters than the Hawaiian Islands, we do not understand enough about the feeding ecology, behavior, and social system(s) of false killer whales to know how or whether productivity might be related to density of false killer whales.

Potential Biological Removal
The PBR level for the insular false killer whale stock is calculated as the minimum population estimate (129) times one half the default maximum net growth rate for cetaceans (½ of 4%) times a recovery factor of 0.1 (for a stock listed as Endangered under the ESA and with minimum population size less than 1500 individuals; Taylor et al. 2003) resulting in a PBR of 0.3 false killer whales per year (Carretta et al. 2013b).

7.3.2 Threats

Here we provide a brief summary of the threats to false killer whales as they are applicable to the negligible impact determination, but more detailed information can be found in the SARs (available at: http://www.nmfs.noaa.gov/pr/sars/species.htm), the status review, and in the final listing rule.

The BRT qualitatively assessed the severity, geographic scope, and level of certainty of 28 potential individual threats to Hawaiian insular false killer whales. Because the severity and scope of individual threats may change through time, each threat was evaluated based on its historic impact and its current or future potential for impact. The factors believed to have had the greatest potential for contributing to the decline of Hawaiian insular false killer whales historically are reduced prey biomass and prey size, ecological interactions (competition) with commercial fisheries, accumulation of natural and anthropogenic contaminants, live captures prior to 1990, operational interactions with nearshore fisheries (primarily within about 40 km) and offshore longline fisheries (leading to injuries or deaths), and reduced genetic diversity. Some of the possible causes of the historic decline have been eliminated in recent times (e.g., live captures), and others have been limited in their geographic scope (e.g., interactions with the commercial longline fishery following the implementation of the 25–75 nmi longline exclusion boundary in 1991). Overall, the BRT considered the effects of small population size, hooking, entanglement, and intentional harm by fishers to be the most substantial threats to Hawaiian insular false killer whales. Fisheries interactions were postulated to be a major threat because extensive unobserved troll, handline, and other hook-and-line fisheries target large pelagic fish and continue to operate at near-record levels in the Hawaiian insular false killer whale core area, and anecdotal information on these fisheries suggests false killer whale interactions do occur. No other fishery has been identified as a fishery known to take MHI IFKW. There is anecdotal information regarding interactions with “blackfish” in the shortline fishery, but no evidence that the fishery hooks or entangles MHI IFKW. Recently classified as a Category II fishery in the LOF, the shortline fishery has grown to 11 vessels as of 2014, and targets bigeye tuna (*Thunnus obesus*) and lustrous pomfret (*Eumegistus illustris*). Although there is no formal reporting system, anecdotal information suggests interactions have occurred off the north side of Maui and that the insular population may be impacted by deliberate shootings because of interactions with these small-scale fisheries (NMFS, 2009). There are also reports of false killer whale depredation in other fisheries, and in 2013 a FKW stranded with hooks of several different types in its stomach, suggesting there are interactions in other fisheries. The fish hooks have also not been linked to the cause of death at this time. Additionally the fisheries involved in this particular interaction have not been identified.

7.3.3 Summary of Status

As previously stated it is believed that the population declined in the 1990s but there is uncertainty in both the level and current trajectory of the decline. Some potential causes of decline have been reduced in severity or geographic scope, and this should have reduced the overall threat level to MHI insular false killer whales, such as reducing the threat from the longline fleet with the establishment of the 25-75 nmi longline exclusion boundary. This seasonal boundary was recently changed to be year round following the implementation of the FKWTRP in late 2012, further reducing the potential for interactions with the longline fleet over the MHI IFKW's core range.

8.0 Interaction with Category I and II Fisheries in Hawaii and Alaska

This section evaluates the available information to determine the likelihood of humpback whales, sperm whales, or MHI IKFW interacting with various commercial fisheries off Alaska and Hawaii. Of all the Category I and II fisheries currently listed in the 2014 List of Fisheries (79 FR 14418, March 14, 2014), ESA-listed sperm and humpback whales under NMFS jurisdiction have been observed taken in the following federally-managed fisheries: the Hawaii deep-set and shallow-set longline fisheries, and the BSAI pollock and flatfish trawl fisheries.

Information available for this analysis includes reports of interactions between the fisheries and CNP humpback, HI sperm whales, and MHI IFKW derived from observer programs, logbooks, and reports (e.g., reported entanglements, fisher self-reports, etc.). Additional serious injury and mortality have been documented through stranding reports. In cases where the specific fishery that caused the M&SI cannot be definitively identified, the M&SI has been attributed to "unknown fishery." Unknown M&SI is not used to categorize fisheries under the annual LOF but is included in this analysis to determine whether all commercial U.S. fisheries collectively have a negligible impact on the stocks.

Impacts of the Hawaii-based Longline Fisheries

Deep-Set Longline Fishery

Observed humpback whale interactions in the Hawaii-based longline fisheries are sporadic events. From 1995 through 2012,[6] there were six total observed interactions between the stock and the entire Hawaii-based longline fleet. One interaction per year with adult humpback whales was observed in the deep-set longline fishery in 2001, 2002, and 2004 (Table 5). Observer coverage was above 22% for each of those years. The total for 2004 was estimated to be 5.5 interactions with M&SI at 0.75 (McCracken 2009). The 2001 interaction occurred within the U.S. EEZ, and the other two interactions occurred outside of the U.S. EEZ. In each instance, efforts were taken to disentangle the whale, and all three whales were either released or able to break free from the gear without noticeable impairment to the animals' ability to swim or feed. Further analyses of these interactions by NMFS using the NMFS policy for distinguishing serious from non-serious injuries (NMFS 2012a) determined that these events resulted in non-serious injuries (Forney 2010). Humpback whales occur in the Hawaii portion of the action area

[6] The timeframe for the data used in this analysis is the five-year period from 2007 through 2011 (see infra section 8.1). Information outside of this time period is solely provided for reference purposes.

only in the winter months, and the stock does not uniformly occur across the spatial distribution of the longline fisheries. Such interactions may be considered extremely rare events when viewed in relation to the steadily increasing abundance of CNP humpback whales and the amount of fishing effort that has occurred in the longline fisheries during this period of time.

One interaction with a sperm whale has been observed in the deep-set longline fishery (Table 6), which resulted in an estimated three sperm whale interactions in 2011 (Carretta et al. 2013b). The 2011 interaction occurred within the U.S. EEZ. The observer was not able to determine the nature of the entanglement/hooking due to the mainline parting. Approximately 25-30 feet of mainline, the branchline, leader and hook remained attached to the animal after the mainline parted. Further analyses of these interactions by NMFS using the serious injury policy (NMFS 2012a) could not be determined and were therefore prorated to be 0.75 serious injury using the L10 criteria because there was evidence of an entanglement (Bradford and Forney 2013). The prorating of serious injury is based on the proportion of known outcomes for whales with similar fisheries interactions in other regions.

False killer whales may become hooked or entangled by longline gear, especially while depredating on bait or catch. NMFS considers pelagic, MHI insular, and NWHI insular animals at risk of interacting with deep-set longline gear. From 2004[7]-2012 observers recorded three false killer whale interactions in the deep-set longline fishery within the MHI insular/pelagic stock overlap zone (within 140 km from shore)(Figure 4). They also recorded three interactions with unidentified blackfish, which are unidentified cetaceans known to be either a false killer whale or a short-finned pilot whale. Genetic sampling and photo identification are currently the only ways to distinguish pelagic from MHI insular false killer whales, and these data were not collected from the animals involved in these interactions.

Shallow-Set Longline Fishery

There have been three interactions with CNP humpback whales in the shallow-set longline fishery, which has 100% observer coverage (Table 5). One interaction with a humpback whale was observed in the shallow-set longline fishery in 2006 outside the U.S. EEZ. According to NMFS observer characterizations of the event, the whale was entangled several times in the mainline and branchline, around the body and flukes. The mainline was cut on either side of the whale to release it. This interaction was later determined to be a serious injury (Forney 2010). One interaction was observed in the shallow-set longline fishery in 2007 outside the U.S. EEZ. Further analysis of this interaction by NMFS using the serious injury policy determined that this event was a non-serious injury. In 2011 there was an interaction with a humpback whale in the shallow-set longline fishery outside of the U.S. EEZ, which was prorated to be 0.75 serious injury (Bradford & Forney 2013). The observer reported that there was an undetermined amount of gear that remained attached to the whale around its tail stock, which was wrapped once or twice around. There were no branchlines attached to the whale.

There has not been an interaction with a Hawaii sperm whale in the shallow-set longline fishery since the deep-set and shallow-set longline fisheries were split in 2004 for management

[7] This year was chosen as the start because it is when the deep-set and shallow-set fishery were split into two separately managed fisheries.

purposes. Prior to the separation of the fisheries there was an interaction in 1999 with a vessel that was targeting swordfish, and one in 2002 with an experimental fishery that was testing sea turtle mitigation gear similar to what is used in the shallow-set longline fishery now (Table 6). The interaction occurred on a control set and the sperm whale was entangled in the mainline; the mainline was cut and the animal escaped with no line attached (Boggs 2002).

There have been no interactions between the MHI insular stock of false killer whales and the shallow-set longline fishery.

Table 5. Summary of observed interactions between CNP humpback whales and the Hawaii-based longline fisheries from 1995-2012.

Hawaii Longline Fishery	Date	Location	Injury Determination
Deep Set	2/11/2001	Hawaii EEZ	Not serious
Deep Set	10/12/2002	High seas	Not serious
Deep Set	2/16/2004	High seas	Not serious
Shallow Set	2/19/2006	High seas	Serious
Shallow Set	12/29/2007	High seas	Not serious
Shallow Set	11/13/2011	High seas	Serious (prorated to 0.75, L10 criteria)

Table 6. Summary of observed interactions between Hawaii sperm whales and the Hawaii-based longline fisheries from 1995-2012.

Hawaii Longline Fishery	Date	Location	Injury Determination
Mixed	5/22/1999	Hawaii EEZ	Not serious
Experimental	4/21/2002	High seas	Not serious
Deep Set	5/27/2011	Hawaii EEZ	Serious (prorated to 0.75, L10 criteria)

Table 7. Observed false killer whale and unidentified blackfish interactions and total estimated (fleet-wide) MHI insular false killer whale interactions inside the 140-km overlap zone in the deep-set longline fishery from 2004-2012.

Year	Observed Interactions FKW/Blackfish	Total estimated MHI insular false killer whale interactions[a]
2004	0/0	0
2005	0/1	0.7065
2006	1/1	2.7222
2007	0/0	0
2008	0/0	0
2009	0/0	0
2010	0/0	0
2011[b]	0/1	0.4027
2012[b]	2/0	4.8940
Total	**3/3**	**8.73**

[a] MHI insular false killer whale includes unidentified blackfish prorated to a proportion of false killer whales and short-finned pilot whales, and false killer whales prorated to a proportion of MHI insular and pelagic stocks using McCracken 2010. Interactions are pro-rated based on population densities of the Pelagic and MHI insular false killer whales, and does not include the newly recognized NWHI stock of false killer whales that also occur in a very small portion of the overlap zone. For years prior to 2011 the estimates were made using the older abundance estimates for pelagic and insular false killer whales.

[b] An updated 2011 estimate and the 2012 estimate have been prepared by NMFS PIFSC for review by the Pacific Scientific Review Group, but have not yet been incorporated into a Draft SAR.

Obtaining genetic samples from marine mammals hooked or entangled in longline fishing gear at sea presents high risks to the safety of observers, fishermen, and the animals, and is only occasionally successful. Observers have not been able to obtain genetic samples from any false killer whale or unidentified blackfish that has been caught in the 140 km overlap zone. Likewise, obtaining reliable photos to compare to the photo-identification catalog of known animals has also been unsuccessful, mainly because most of the interactions occur at night, which is not optimal for obtaining necessary high quality photos.

When the stock identity of a false killer whale hooked or entangled by the longline fisheries within the overlap zone cannot be determined, NMFS prorates the interaction to either the pelagic or MHI insular stock based on stock densities. Specifically, the model assumes densities of MHI insular stock animals decline and pelagic stock densities increase with increasing distance from shore (McCracken 2010). When this model was developed, the NWHI stock was not recognized as a separate stock and therefore was not included in the model, but will be incorporated into future models. For interactions with unidentified blackfish, NMFS prorates the

animals to each species (false killer whale or short-finned pilot whale) based on a separate distance-from-shore model (McCracken 2010, Carretta et al. 2013b).

Proration of false killer whales and unidentified blackfish takes within the overlap zone introduces additional uncertainty into the bycatch estimates. However, until methods of determining stock identity for animals observed taken within the overlap zone are available, and all animals taken can be identified to a population (e.g., from photos, tissue samples), this approach ensures that potential impacts to all populations are assessed (Carretta et al. 2013b).

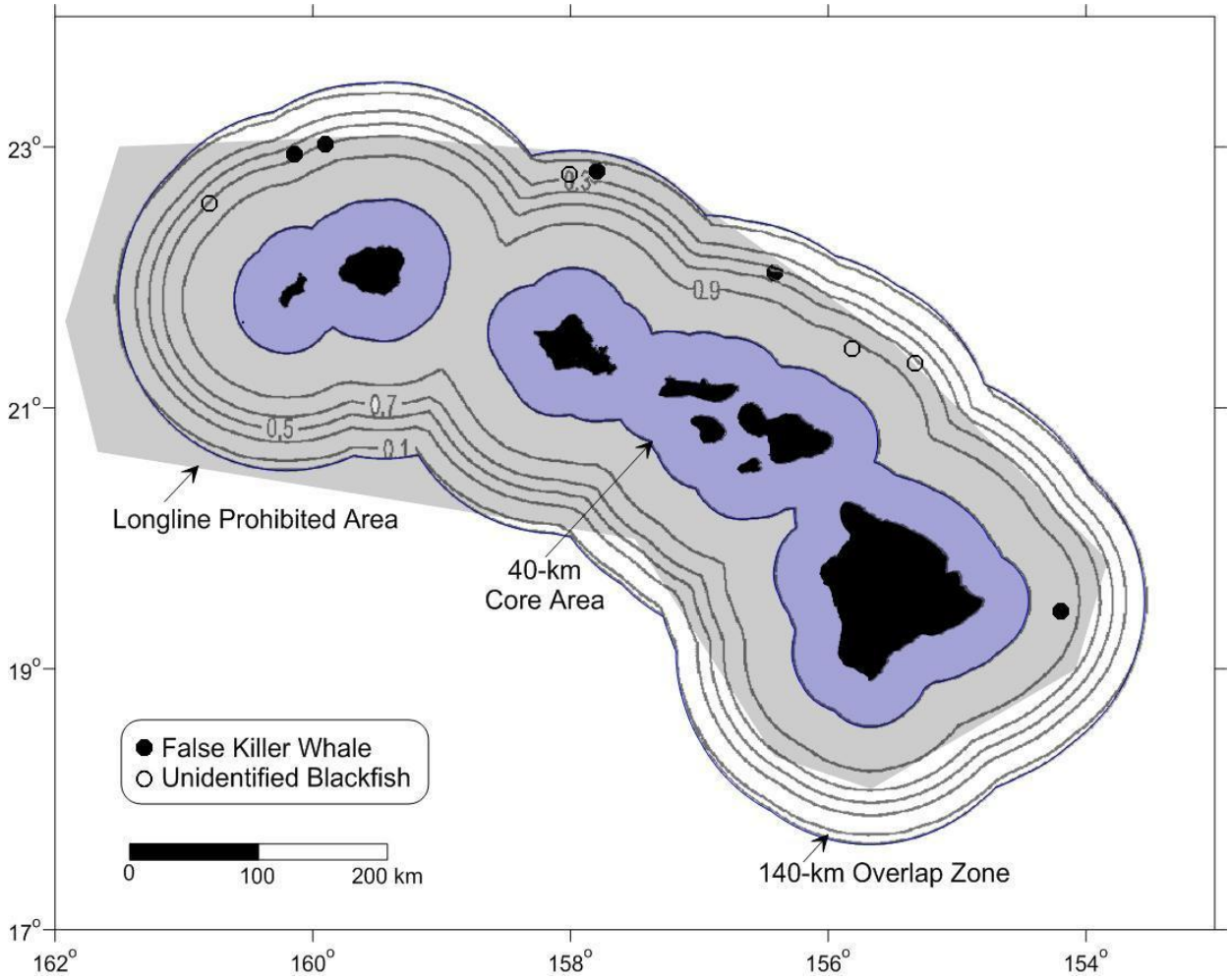

Figure 4. Observed interactions with false killer whales and unidentified blackfish in the overlap zone around the MHI, 2003-2012. The MHI Longline Fishing Prohibited Area is shaded in gray. Prior to implementation of the FKWTRP regulations in late 2012, the boundary contracted seasonally, allowing longline effort (and marine mammal interactions) to occur closer to the islands.

Based on the proration model described above and observed interactions and the expansion from observed interactions to an estimate of fleet-wide interactions based on the fishery's total effort and proration of blackfish and false killer whales of unknown stock identity (MHI insular versus pelagic), NMFS estimates that a total of 8.73 interactions occurred with MHI IFKW in the deep-set longline fishery from 2004-2012, which included both serious and non-serious injuries (Table

7). This is a conservative estimate that potentially overestimates the fishery's actual impact on MHI IFKW because the proration model does not account for the NWHI stock which was identified in 2011. For example, in 2012 two observed false killer whale interactions occurred in the area where the NWHI stock is known to occur (i.e., within the area where all three Hawaiian false killer whales stocks overlap), but at this time they can only be attributed (prorated) to a pelagic or MHI insular false killer whale. In addition, earlier interaction estimates are based on a much smaller abundance estimate for the pelagic false killer whale stock.

The observed interactions and estimated annual and 5-year average M&SI estimates for marine mammals taken in the deep-set longline fishery are reported by McCracken (2010, 2011, and 2014a), Carretta et al. (2013a &b), and in Table 11. Injury determinations are made for all observed interactions. All estimated takes of false killer whales, and observed takes for which an injury severity determination could not be made, are prorated to deaths, serious injuries, and non-serious injuries based on the observed proportions of each outcome (Carretta et al. 2013 a & b).

Table 8. Comparison of M&SI in the deep-set longline fishery and PBR of insular false killer whales for several time periods starting in 2005. There have been no mortalities or serious injuries of insular false killer whales in the shallow-set longline fishery during any of these time periods.

Publication	Data Years	Average Annual Estimate of MHI insular M&SI in Deep-set Longline Fishery	PBR	M&SI > PBR?
2011 SAR	2005-2009	0.6	0.2	Yes
2012 SAR	2006-2010	0.5	0.3	Yes
2013 Draft SAR	2007-2011	0.1	0.3	No
McCracken 2014[a]	2008-2012	0.9741	0.3	Yes

[a] The Draft 2014 SAR has not yet been published, but the 5-year average annual estimate of M&SI was prepared for the SRG and is available in McCracken (2014a). The unrounded estimate in this table was provided by McCracken (personal communication). The rest of the information in this row was prepared in the SRG draft of the draft 2014 SAR.

We also evaluated data from 2008-2012 for this Negligible Impact Determination (McCracken 2014a). Because of the different timelines for this analysis and the SAR review and publication, these data have not yet been included in a draft SAR, but they have been reviewed internally by the NMFS Pacific Islands Fisheries Science Center and prepared for review by the Pacific Scientific Review Group (McCracken 2014a). Additionally, the analysis uses a proration model that does not address the NWHI stock. Despite these limitations, we consider this analysis to be important and sufficient to support our determination. McCracken estimated the five-year (2008-2012) average annual M&SI of MHI insular false killer whale as 0.9741 (McCracken 2014a; Table 8). For false killer whales, this was calculated using the same method described in McCracken (2013) for the 2007-2011 estimate (McCracken 2013), though the prorating model was updated to incorporate the updated abundance estimates for both the MHI insular and pelagic false killer whale stocks. The 2008-2012 time frame had a greater number of interactions, including two interactions observed in 2012, leading to a higher M&SI estimate than the previous five-year timeframes. Notably, both of the 2012 observed false killer whale interactions occurred in the area where all three stocks overlap, though they were only prorated to MHI insular and pelagic. In addition, these interactions occurred prior to the implementation of the

FKWTRP regulations, which are intended to reduce both the frequency and severity of pelagic and insular false killer whale interactions with the longline fisheries.

Impacts of the Alaska Fisheries
The primary impacts of the Alaska-based fisheries on CNP humpback whales likely result from direct interactions with the fishing gear. Known fishery effects on humpback whales result from entanglement and subsequent injury or death of individuals that interact with the fishing gear. Humpback whales are present in the action area as they migrate to and from and occur in Alaskan waters during the summer feeding months.

Since 2007, there have been at least 22.5 known M&SI (Table 9) on the CNP humpback whale stock from commercial fishing operations in Alaska (Allen and Angliss 2013). This M&SI estimate includes the federal commercial fisheries that have observer coverage at 100% and 82% coverage levels and also from opportunistic reports of entangled animals from unknown fisheries. During this same time period the CNP stock of humpback whales has been steadily increasing in abundance. These interactions have been primarily with the state-managed coastal fisheries, but a number of entanglements have been recorded with gear that could not be positively identified to a specific fishery's region (*e.g.,* drift gillnet gear that could not be linked to a specific regional fishery such as the Southeast Alaska drift gillnet fishery). Only interactions that resulted in M&SI are applied against the PBR for this analysis (*see* Table 9 for details).

9.0 Negligible Impact Analysis

9.1 Incidental Takes in Commercial Fisheries

Evaluation Methods
Individual M&SI of the CNP stock of humpback whales incidental to commercial fisheries in Hawaii and Alaska are summarized in Table 9. Mortalities and serious injuries to the Hawaii stock of sperm whales incidental to commercial fisheries in Hawaii are summarized in Table 10, and to the MHI IFKW stock in Table 11. While there have been additional documented non-serious injuries to these stocks by commercial fisheries, only M&SI are considered when making the negligible impact determination.

Data for M&SI incidental to commercial fishing operations include observer data and stranded or entangled whales reported to NMFS through various sources. Seriousness of injuries was assessed using the NMFS policy developed for marine mammal stock assessments under the MMPA (NMFS 2012a). This estimate is considered a minimum because not all dead animals are found, reported, or cause of death determined.

M&SI sometimes occurs in an area of known overlap with the Western North Pacific stock of humpback whales[8]. Where there is considerable uncertainty regarding to which humpback stock an individual M&SI should be assigned, NMFS exercises a conservative approach by considering the possible effects of such M&SI under separate scenarios for each possible source

[8] The Alaska Regional office is conducting a NID for this stock.

stock. For each such assessment, M&SI that occurred in the overlap area are assessed against each stock that occurs in the overlap area, and the total M&SI from that stock (those within the overlap area plus those outside the overlap area, but within the range of that stock), are assessed against the PBR for that stock. This conservative approach ensures that NMFS considers the maximum level of possible M&SI that may have been taken from each stock, based on known M&SI and, therefore, that NMFS takes into account the maximum possible impact to the population from the known incidents. This assessment is completed for each of the humpback whale stocks that occur in the overlap area. This approach does not cause any individual M&SI to be counted twice in assessing the impact of the M&SI, because the assessments for each stock are conducted independently and are not added together. Where information is available regarding the location of the take, genetics of the animal taken, or other information that would conclusively link mortality to a specific stock, NMFS uses that information to assign the take to a specific stock and does not assess that M&SI to other stocks in the overlap area.

Fishery Mortality and Serious Injury

CNP Humpback whale

The total of all known M&SI to the CNP stock of humpback whales as a result of fishing operations in Hawaii and Alaska for the time period from 2007 through 2011 is 46.75, resulting in an 5-year annual average take of 9.35 animals (Allen and Angliss 2013). This represents a summary of opportunistic reports of CNP humpback whale M&SI caused by entanglement from commercial and recreational fisheries and from onboard fisheries observers (Allen and Angliss 2013). The opportunistic reports come from a variety of ocean users who report the incident to the NMFS Alaska or Hawaii Regional Office Marine Mammal stranding center. In most cases these incidents cannot be attributed to a specific fishery because the interaction was not observed as it occurred but at some point later in time when the animal is spotted with gear attached. Therefore these M&SI for CNP humpbacks represent minimum counts because they cannot be assigned to any one fishery and extrapolated out for total effort as is the case for observed interactions onboard federal commercial fisheries. During this time period, one humpback was observed in the shallow-set longline fishery in Hawaii, which has 100% observer coverage; therefore, the one interaction represents the total number of interactions for that fishery. There were no interactions with CNP humpback whales in the deep-set longline fishery during this time period. The current PBR for CNP humpback whales is 61.2 animals. Therefore, the total annual average incidental take in all commercial fisheries for CNP humpback whales for this timeframe is 15.28% of the PBR.

Hawaii Sperm whale

The estimated total of all known M&SI to the Hawaii stock of sperm whales as a result of commercial fishing operations for the time period from 2007 through 2011 is three (estimated based on one observed interaction in the deep-set longline fishery), resulting in an annual average of 0.7 M&SI (Table 10). There were no interactions with Hawaii sperm whales in the shallow-set longline fishery during this time period. The current PBR for this stock is 10.2 animals. Therefore, the total annual average incidental M&SI in commercial fisheries for Hawaii sperm whales for this timeframe is 6.86% of the PBR.

MHI insular false killer whale stock

The 5-year average of all known M&SI to the MHI insular stock incidental to commercial fishing operations for 2007-2011 is 0.1 (estimated based on one observed interaction of a

blackfish in the overlap area) whales per year. All interactions were from the Hawaii deep-set longline fishery (Table 11). There were no other sources of M&SI reported during this time period. The current PBR for MHI insular false killer whales is 0.3 animals. Therefore, the total average annual M&SI in commercial fisheries for MHI insular false killer whales for 2007-2011 is 33.3% of the PBR.

9.2 Ship Strike M&SI

The total number of mortalities attributed to ship strikes for the time period from 2007 through 2011 for CNP humpback whales is 21.24 with an annual average M&SI level of 4.25 animals/year attributed ship strikes (Table 9). This represents 6.94% of the stock's PBR level.

There are no reported ship strikes for the Hawaii stock of sperm whales during this time period or for any other time frame.

There are no M&SI of MHI insular false killer whales attributed to ship strikes during this time period.

9.3 Marine Debris M&SI

The total number of mortalities attributed to marine debris for the time period from 2007 through 2011 for CNP humpback whales is 11.25 with an annual average M&SI level of 2.25 animals/year attributed ship strikes (Table 9). This represents 3.68% of the stock's PBR level. There are no other known sources of human caused mortality.

There are no M&SI of Hawaii sperm whales attributed to marine debris for the same five-year period.

There are no M&SI of MHI insular false killer whales attributed to marine debris for the same five-year period.

9.4 Total Human-Caused M&SI

An estimated annual total human-caused M&SI rate for the entire CNP stock of humpback whales for the 2007-2011 time-period is 16.20% of PBR (9.35 commercial fishery related + 0.35 recreational fishery related + 4.25 from vessel strikes + 2.25 from marine debris). Accordingly, total human-caused M&SI is well below the PBR (61.2) of this stock and is 26.47% of PBR.

An estimated annual total human-caused M&SI rate from fisheries for the Hawaii stock of sperm whales for the 2007-2011 time period is 0.7. There was no other human caused mortality reported during this time frame. Accordingly, total human-caused M&SI is well below the PBR (10.2) of this stock and is 6.86% of PBR.

The estimated annual total human-caused M&SI rate for the MHI insular stock of false killer whales for the 2007-2011 time- period is 0.1. Accordingly, total human-caused M&SI is below the PBR (0.3) of this stock and is 33.33% of PBR.

Table 9. Mortalities and serious injuries incidental to commercial fisheries, recreational fisheries, and ship strikes for CNP humpback whales from 2007-2011 in Hawaii and Alaska.

Year	Fishery/ Gear type	M&SI*	Commercial Fishery M&SI	Recreational Fishery M&SI	Ship Strike M&SI	Unknown Marine Debris	Total M&SI
2007	AK – unknown gillnet AK – gear entanglement HI – gear entanglement	1.5 1.5 5.0	8		AK – 0.96 HI – 2.0	1.5	12.46
2008	AK – gear entanglement HI – gear entanglement	3.0 1.75	4.75		AK – 1.0 HI – 5.04	3	13.79
2009	AK – unknown gillnet AK – gear entanglement HI – gear entanglement	0.75 1.5 6.5	8.75	AK – 1.75	AK –1.12 HI – 1.4	1.5	14.52
2010	AK – unknown gillnet AK – unspecified pot AK – gear entanglement AK – BSAI Pollock trawl AK – BSAI flatfish trawl HI - Entanglement	3 1.5 2.25 1.0 1.0 5.0	13.75		AK – 4.0 HI – 2.0	2.25	22
2011	AK – unknown gillnet AK – Unspecified crab AK – Unspecified longline AK – gear entanglement HI- Shallow-set longline HI - Entanglement	0.75 0.75 0.75 3.0 0.75 5.5	11.5		AK – 2 HI – 1.72	3	18.22
Total M&SI 2007-2011			46.75	1.75	21.24	11.25	80.99
Average Annual M&SI			9.35	0.35	4.25	2.25	16.20
M&SI % of PBR (PBR=61.2)			**15.28%**	**0.57%**	**6.94%**	**3.68%**	**26.47%**

*Represents total M&SI for federal commercial fisheries with observers since the fisheries observed to have interactions during this time period have 82% and 100% coverage levels. The opportunistic unspecified fisheries M&SI represent only those that were observed and reported to the stranding center.

Table 10. Mortalities and Serious Injuries Incidental to Commercial Fisheries for the Hawaii stock of sperm whales from 2007-2011 in Hawaii.

Fishery	Year	Data Type	**Hawaii Stock** Observed total interactions (T) and mortality events, and serious injuries, and total estimated mortality and serious injury (M&SI).		**Ship Strike M&SI**
			Observed T/MSI	Estimated M&SI (CV)	
Hawaii-based deep-set fishery	2007	Observer data	0/0	0 (-)	0
	2008		0/0	0 (-)	0
	2009		0/0	0 (-)	0
	2010		0/0	0 (-)	0
	2011		1/1*	3 (0.2)	0
Mean Estimated Annual Takes (CV)				**0.7 (0.5)**	**0**
Hawaii-based shallow-set fishery	2007	Observer data	0/0	0	0
	2008		0/0	0	0
	2009		0/0	0	0
	2010		0/0	0	0
	2011		0/0	0	0
Mean annual takes (100% coverage)				0	
Average Annual M& SI				**0.7 (0.5)**	**0**
M&SI % of PBR (PBR=10.2)				**6.86%**	**0**

*This injury was prorated 75% probability of being a serious injury based on known outcomes from other whales with this injury type (NMFS 2012).

Table 11. Mortalities and Serious Injuries of MHI IFKW incidental to commercial fisheries. Table is adapted from Carretta et al., 2013b.

	Year	Data Type	Percent observer Coverage	**Hawaii Insular Stock** Observed total interactions (T) and mortality events, and serious injuries (MSI), and total estimated mortality and serious injury (M&SI).		
				Observed FKW T/MSI	Observed UB T/MSI	Estimated M&SI (CV)
Hawaii-based deep-set fishery	2007	Observer data	20%	0/0	0/0	0 (-)
	2008		22%	0/0	0/0	0 (-)
	2009		20%	0/0	0/0	0 (-)
	2010		21%	0/0	0/0	0 (-)
	2011		20%	0/0	1/1	1 ( )
Mean Estimated Annual Takes (CV)						**0.1 (0.3)**

Table 12. Percentages representing the ratio of average annual human-caused mortality and serious injury relative to PBR levels in the draft 2013 SARs.

CNP HUMPBACK WHALE (PBR=61.2)	
Commercial FISHING: 5-year for humpback whale from 2007-2011 = 15.28%	5-year fishing, ship strikes, and marine debris Total=26.47% of PBR
Recreational FISHING: 5-year for humpback whale From 2007-2011 = 0.57%	
SHIP STRIKE: 5-year for humpback whale from 2007-2011 =6.94%	
Marine Debris: 5-year for humpback whale from 2007-2011 =3.68%	
HI SPERM WHALE (PBR=10.2)	
FISHING: 5-year for Hawaii sperm whale from 2007-2011 = 6.86%	5-year fishing and ship strikes Total= 6.86% of PBR
SHIP STRIKE: 5-year for Hawaii sperm whale from 2007-2011 = 0	
MHI INSULAR FLASE KILLER WHALE (PBR=0.3)	
FISHING: 5-year for MHI IFKW from 2007-2011 = 33.3%	5-year fishing and ship strikes Total= 33.3% of PBR
SHIP STRIKE: 5-year for MHI IFKW from 2007-2011 = 0	

10.0 Application of Negligible Impact Determination Criteria

In applying the 1999 criteria (64 FR 28800, May 27, 1999; see Section 2.0 for a description of these criteria) to determine whether M&SI incidental to commercial fisheries will have a negligible impact on a stock, Criterion 1 (total human-related serious injury and mortality are less than 10% PBR) is the starting point for analyses. If this criterion is satisfied, the analysis would be concluded. If Criterion 1 is not satisfied, NMFS may use one of the other criteria as appropriate.

Humpback whales
In the case of the CNP stock of humpback whales, Criterion 1 was not satisfied because the total human-related serious injuries are not less than 10% PBR. The overall PBR calculated for this stock is 61.2 animals (Allen and Angliss 2013). The annual average M&SI to the CNP stock of humpback whales from all human-caused sources is 16.20 animals, which is 26.74% of this stock's PBR [above the 10% PBR (6.1 animals) threshold]. As a result, the other criteria must be examined. Criterion 2 was also not satisfied, because fisheries-related mortality alone exceeds 10% PBR. The estimate of fisheries-related mortality is 9.35, which is 15.28% of the PBR.

Criterion 3 provides that if total fisheries-related M&SI are greater than 10% PBR and less than PBR, and the population is stable or increasing, vessels that operate in those fisheries may be

permitted subject to individual review and certainty of data. Specifically, NMFS must consider any increases in permitted M&SI, and, as it approaches the PBR level, NMFS must consider the importance of uncertainties in elements such as population size, reproductive rates, and fisheries-related mortalities.

The CNP stock of humpback whales meets the initial conditions of Criterion 3. Total commercial fisheries-related M&SI (9.35 animals per year) is greater than 0.1 PBR (6.1 animals) and less than PBR (61.2 animals) (Table 7). The population is increasing at an estimated rate of up to 7% per year (Allen and Angliss 2013; Calambokidis et al. 2008). Therefore, U.S. vessels that operate in commercial fisheries within the range of CNP humpback whales may be permitted subject to their individual review and the certainty of relevant data, and provided that the other provisions of section 101(a)(5)(E) are met.

Although there are some uncertainties in information regarding CNP humpback whales, such as abundance and M&SI estimates, the best available information indicates that estimated levels of all human-caused M&SI as well as fisheries-related M&SI are both well below the stock's PBR level. For the Hawaii longline fisheries considered in this analysis, since the NMFS Hawaii longline observer program began in 1995, no humpback deaths and only one serious injury and one injury that was prorated to 0.75 serious injury (both in the shallow-set longline fishery) have been observed. There have been four other observed interactions with humpback whales in the deep-set and shallow-set longline fisheries since 1995, but they have all been determined to be non-serious (Table 5). Based on this low likelihood of interactions, along with reliable rates of observer coverage in both the shallow and deep-set longline fisheries, considered together with other human-caused impacts and an increasing abundance trend in this stock, NMFS concludes that Criterion 3 has been met. Therefore, NMFS determines that M&SI incidental to commercial fisheries will have a negligible impact on the CNP stock of humpback whales.

Hawaii Sperm whales

The 5-year annual average M&SI to the Hawaii stock of sperm whales from all human-caused sources is 0.7 animals, which is 6.89% of this stock's PBR (below the 10% PBR threshold). Based on the above, the conditions have been met for applying Criterion 1 to the analysis of impacts to Hawaii sperm whales.

Since the beginning of the NMFS observer program in 1995, no deaths of Hawaii sperm whales have been attributed to the Hawaii deep-set or shallow-set longline fishery. However, in 2011 a Hawaii sperm whale was reported seriously injured (prorate 0.75 serious injury) after interacting with the Hawaii deep-set longline fishery. Two other interactions occurred with sperm whales in 1999 and 2002 and both were considered non-serious (Table 6). Based on this low likelihood of interactions, considered together with impacts of commercial fisheries and other human-caused impacts, Criterion 1 has been met. Therefore, NMFS determines that M&SI incidental to commercial fisheries will have a negligible impact on the Hawaii stock of sperm whales.

MHI Insular False Killer Whale Stock

In the case of MHI IFKW, Criterion 1 was not satisfied because the total human-caused serious injuries exceed 10% PBR. The PBR for this stock is 0.3 animals (Carretta et al., 2013b), so 10% of PBR is 0.03 animals. The average annual M&SI of the MHI IFKW stock from all human-caused sources is estimated to be 0.1 animals per year, which is 33.3% of this stock's PBR (above the 10% PBR threshold). As a result, the other criteria must be examined. Criterion 2 was also not satisfied, because the fisheries-related mortality alone exceeds 10% PBR. The estimate of fisheries-related mortality is the same as the estimate of total human-caused mortalities, which is 33.3% of PBR.

Criterion 3 provides that if total fisheries-related M&SI are greater than 10% PBR and less than PBR, and the population is stable or increasing, vessels that operate in those fisheries may be permitted subject to individual review and certainty of data. Specifically, NMFS must consider any increases in permitted M&SI, and, as M&SI approach the PBR level, NMFS must consider the importance of uncertainties in elements such as population size, reproductive rates, and fisheries-related mortalities.

The MHI IFKW meets the initial conditions of Criterion 3. Total fisheries-related M&SI (0.1 animals per year) is greater than 10% PBR (0.03 animals) and less than PBR (0.3 animals) for the 2007-2011 time frame. Hawaiian insular false killer whales are believed to have declined markedly during the 1990s, although their current population trajectory is unknown (Oleson et al. 2010). However, it is anticipated that the longline fishery impacts, which were a historical threat to this population, have been or will be further reduced through the recently implemented FKWTRP measures (Carretta et al. 2013b, NMFS 2012). NMFS published the FKWTRP on November 29, 2012 (77 FR 71260) to reduce the M&SI of Hawaii pelagic and MHI insular false killer whales in Hawaii's longline fisheries. Most of the Plan's regulations went into effect on December 31, 2012, but gear requirements for the deep-set longline fishery went into effect on February 27, 2013.

The most significant measure in the plan for the protection of the MHI IFKW is a greater prohibited area closure for the longline fisheries. The longline prohibited area maintains the previous February-September boundary year-round. NMFS removed the seasonal boundary change from October 1 through January 31 that allowed longline fishing closer to the MHI. Longline fishing is prohibited within the entire core range of the MHI IFKW stock, and, since the implementation of the FKWTRP, year-round within over 74% of the MHI insular/pelagic overlap zone. From 2002-2012, before the implementation of the FKWTRP and the change to the MHI Longline Fishing Prohibited Area, eight of nine observed false killer whale or unidentified blackfish interactions occurred within the seasonally-open area close to the MHI (open October through January) (Figure 4). Longline fishing is now prohibited within that area year-round (50 CFR 229.37(d)(1) and 50 CFR 665.806(a)(2)), per the requirements of the FKWTRP. The remaining unidentified blackfish interaction occurred 0.84 nm outside the area now closed to longline fishing. Recent telemetry data on a greater proportion of the MHI IFKW shows that they are not traveling much beyond the core area on the windward sides of the islands (Oleson et al 2014), making it less likely that they will interact with the longline fisheries now that they operate even further offshore year round.

Other measures for the deep-set longline fishery include a requirement for all vessels to use only circle hooks with a maximum wire diameter (thickness) of 4.5 mm and a maximum offset of 10 degrees; monofilament leaders and branch lines with a minimum 2.0 mm diameter, and a minimum breaking strength of 400 lb for any other material used in the construction of a leader or branch line; and a revision to the existing MHI longline fishing prohibited area around the MHI. The FKWTRP also includes additional training on marine mammal mitigation techniques at protected species workshops, requirements to post placards on marine mammal handling and release information on all Hawaii-based longline vessels, and a requirement that the captain of the longline vessel supervise the handling and release of any hooked or entangled marine mammal. In addition, the regulations establish a Southern Exclusion Zone (SEZ) that will be closed to the deep-set longline fishery for varying periods if NMFS observes specific levels of M&SI of Hawaii pelagic false killer whales on a deep-set trip within the EEZ around Hawaii (NMFS 2012c).

NMFS cannot accurately predict the number of false killer whale interactions that may occur in the fishery managed under the FKWTRP, and because the plan was only recently implemented, cannot assess the immediate impact on interaction rates. However, to support this Negligible Impact Determination, we conducted several analyses to estimate future interaction (take) levels utilizing historical data from the most recent 5-year time period immediately prior to the implementation of the FKWTRP.

To estimate a future take rate, NMFS developed a Bayesian model; which uses observed data from past years and assumes that the conditions will be the same in the future (McCracken 2014b) The model uses the false killer whale takes that were observed within 140 km from the MHI from 2008-2012, which had the most consistent systematic sampling at 15% for each quarter. This time period included three interactions: two takes that were identified as false killer whales, and one that was identified only as a blackfish but that was estimated to have a 0.97 probability of being a false killer whale based on its location (McCracken 2010, 2014b). Additionally, a subsequent comparison of the model to a variety of other models that considered takes over a longer period and/or wider areas (e.g., the Hawaii EEZ, or the entire fishery) showed that the selected model (using takes and effort inside 140 km from 2008-2012) better predicted past observed takes inside the 140 km boundary (McCracken 2014b).

The model was used to predict the annual number of takes of false killer whale (all populations combined) that might occur in the portion of the MHI insular/pelagic overlap zone that is currently open to longline fishing if the effort in future years remained similar to reported effort from 2008-2012 (McCracken 2014b). The take prediction for the portion of the MHI insular/pelagic overlap zone that is currently open to longline fishing is an average of 0.3 (rounded from 0.2953) insular false killer whale (MHI insular false killer whale) takes per year, of which 0.3 (rounded from 0.2698) per year are mortalities or serious injuries (McCracken 2014b).

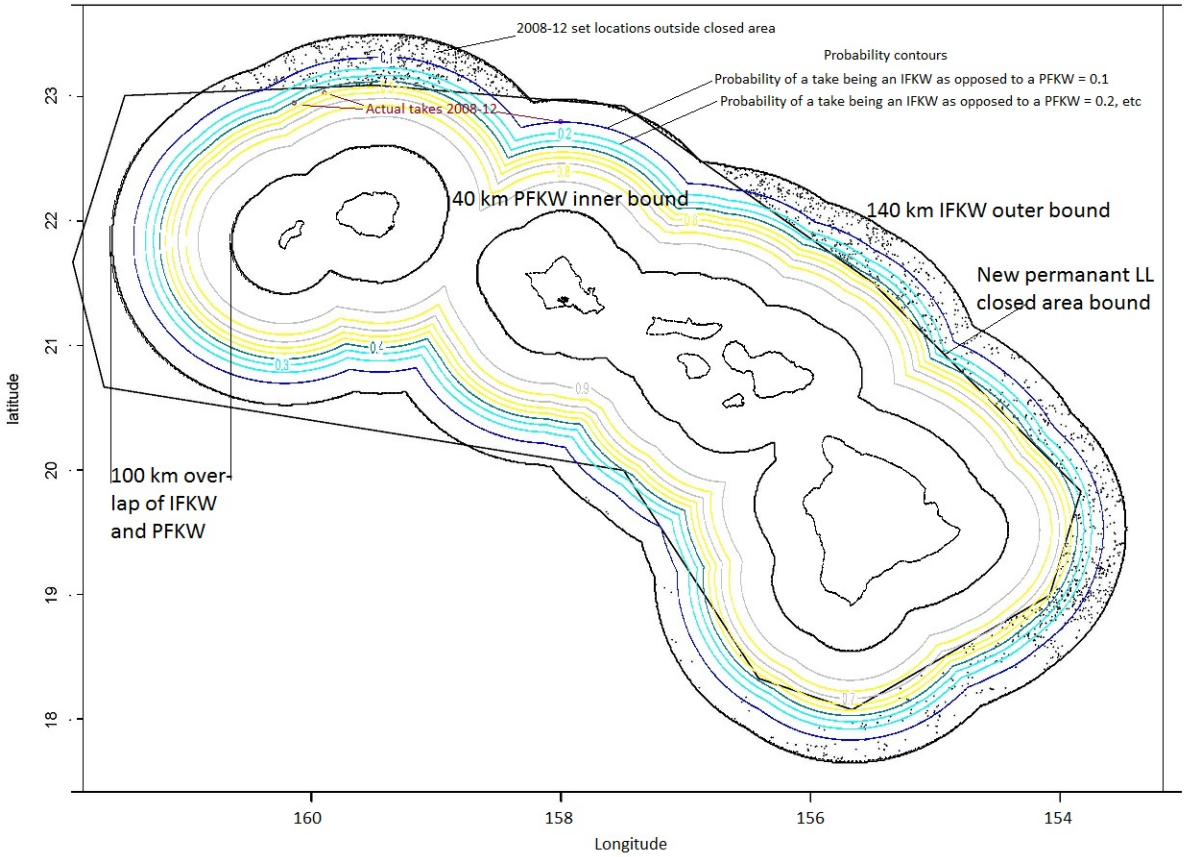

Figure 5. Map showing the MHI Longline Fishing Prohibited Area (closed year-round as of December 2012), the portion of the MHI insular and pelagic stock overlap zone that extends beyond the fishing prohibited area, and the location of takes that occurred between 2008-2012 (McCracken 2014b).

Although the McCracken (2014b) stock proration model does not yet incorporate the NWHI stock, we evaluated how that stock area would affect the take prediction, since the portion of the stock overlap zone that extends beyond the MHI Longline Fishing Prohibited Area boundary includes a small area that is inside the NWHI false killer whale stock boundary. About 3% of the longline effort that we evaluated occurs in this NWHI false killer whale area, based on observer data. The remaining 97% of the effort within the open area inside 140 km would remain attributed to the MHI insular stock and pelagic stock, unless these stock boundaries were redefined. Using the McCracken (2014b) model, the predictions of the MHI insular stock take by the 3% of effort within this NWHI stock area is a yearly average of 0.1 (rounded from 0.0096) takes, with 0.1 (rounded from 0.0081) takes having an M&SI classification. The predictions for the MHI insular stock in the remaining 97% of the open area that is only within the MHI stock and pelagic stock overlap area (excludes the NWHI stock area) is a yearly average of 0.2868 takes, with 0.2617 (Table 13) takes having a classification of M&SI. These predictions do not consider that 2 of the 3 takes inside 140 km in 2008-20012 were in the NWHI stock area, and if excluded or prorated from the insular takes used in the prediction model, this would reduce somewhat the MHI insular false killer whale take predictions. Including these takes

provides a more conservative estimate (i.e., likely an overestimate) of what the future take level would be because the density of the NWHI stock is not factored into the model.

Although MHI insular false killer whales would largely be protected from incidental interactions with the longline fisheries due to the MHI Longline Fishing Prohibited Area, some risk remains. NMFS expects other measures in the FKWTRP, including the required use of circle hooks in the deep-set longline fishery, to further mitigate the risk to the MHI insular false killer whales (NMFS 2012c). Prior to implementation of the FKWTRP, over half the deep-set longline fishery used circle hooks, sizes 15/0 and 16/0. Analysis of observer data and predictive simulations indicate that the exclusive use of circle hooks in the deep-set longline fishery would likely reduce the number of false killer whale incidental takes by approximately six percent, and may reduce the severity of injuries following interactions, since the circle hooks are generally weaker and may straighten more easily allowing the whale to pull free (Forney et al., 2011). Accordingly, NMFS expects the mandatory use of weak circle hooks will benefit false killer whales by reducing M&SI. Since the FKWTRP has been implemented and the gear regulations have gone into effect (February 27, 2013), there has been one, non-serious interaction[9] with a false killer whale in the deep-set longline fishery on the high seas (beyond the range of the MHI insular population). There were three other Hawaii pelagic false killer whale interactions that were observed in the deep-set longline fishery in early 2013 after most of the requirements of the FKWTRP went into effect (December 31, 2012) but they occurred before the gear requirements became effective, and in each instance the vessel was using a mixture of gear so the exact gear that caught the animal is not determinable. Therefore, the sample size of false killer whale interactions involving the newly required gear is limited to one whale, but in that case, the gear performed as expected and reduced the severity of the whale's injury.

NMFS anticipates that continued implementation of the FKWTRP regulations, including the changes to gear requirements and the MHI Longline Fishing Prohibited Area, will ensure that required reductions in fisheries-related M&SI of MHI IFKW (i.e., M&SI below PBR [0.3] annually) are achieved in the deep-set longline fishery (Table 12). In addition, monitoring and reporting requirements under the FKWTRP will provide NMFS the information necessary to prevent and correct any unexpected adverse impacts to MHI IFKW.

Table 13. Future anticipated take and fishery-related M&SI estimates.

	Annual Interactions	Annual M&SI
Future predicted from model	.3 (0.2953)	.3 (0.2698)
Exclusion of 3% for NWHI stock	.3 (0.2868)	.3 (0.2617)
6% reduction with new gear.	.3 (0.2696)	.2 (0.2460)

[9] On April 20, 2013, an observer reported an interaction with a false killer whale on gear that included a 15/0 circle hook with 4.3 wire diameter, wire leader with 1.5 mm diameter, and monofilament branch line with 2.0 diameter (i.e., gear that complied with the FKWTRP regulations). While the crew was trying to bring the animal in closer, the hook straightened and released the animal, which resulted in a non-serious injury (NMFS 2013).

Although there are uncertainties in information regarding MHI insular false killer whales, such as abundance and M&SI estimates (particularly relative to prorating within stock overlap zones and prorating blackfish), the best available information indicates that estimated level of human-caused M&SI is currently (2007-2011) below the stock's PBR level and is predicted to be so in the future. As previously discussed, the preliminary data show that the M&SI estimate for 2008-2012 exceeds PBR, mainly because of based on two interactions in the overlap area in 2012. However, the estimate is for a time period before the current FKWTRP measures were in place. We used the 2008-2012 data in the prediction model to estimate the level of future interactions and M&SI that would be expected given the implementation of the FKWTRP measures. These predictions compute slightly below the MHI IFKW's PBR of 0.3 but are rounded to 0.3 to be consistent with GAMMS policy.[10] (Table 13).

NMFS believes that the expected level of interactions in this prediction model (Table 13) likely overestimates the fishery's impacts, as described above. Moreover, new telemetry data suggests that the IFKW remains closer to shore on the windward side of the MHI, which is within the range protected by the MHI Prohibited Area. The current boundaries of the insular/ pelagic stock overlap area of 140 km are based on the maximum distance from shore that animals traveled on the leeward side of the MHI, which was applied evenly around each side of the islands due to insufficient data at the time to distinguish differences between the windward and leeward sides (Forney et al 2010). More recent data shows different usage of different sides of the islands by MHI IFKW. The maximum distance from shore traveled by a MHI IFKW on the windward side of the islands is 51.4 km. The maximum distance traveled on the leeward side is 114.9km (Oleson et al 2014). This data is based on recent tag data of MHI IFKW from two of the three identified social clusters of MHI IFKW; movement from one of the social clusters is unknown. The interactions that have all been attributed in the past to the MHI IFKW have occurred on the windward side of the island.

Finally, NMFS notes that new FKWTRP measures include monitoring and reporting requirements, and if it is determined that the anticipated reductions in M&SI are not being met, or that the FKWTRP is otherwise not meeting its objectives, NMFS, in consultation with the False Killer Whale Team, will utilize its authority to amend the FKWTRP regulations as necessary to ensure that the requirements of the MMPA are met.

After considering the low likelihood of MHI insular false killer whale interactions in the deep-set longline fishery based on the known ranges of tagged MHI IFKW, the recently implemented take reduction measures as described above, and no other known sources of fishery- or other human-caused impacts to this stock, NMFS concludes that Criterion 3 has been met. Therefore, NMFS determines that M&SI incidental to commercial fisheries will have a negligible impact on the MHI IFKW stock. Vessels that operate in U.S. commercial fisheries within the range of MHI insular false killer whales may be permitted subject to their individual review and the certainty of relevant data and provided that the other provisions of section 101 (a)(5)(E) are met.

[10] Gamms requires that PBR be rounded to the nearest 0.1. The unrounded PBR for MHI IFKW is 0.258.

11.0 Negligible Impact Determination

Based on the review of the available data and applying the 1999 criteria for making a negligible impact determination under MMPA Section 101(a)(5)(E), all conditions of Criterion 3 are met for the CNP stock of humpback whales and MHI insular false killer whale stock, and all conditions of Criterion 1 are met by the available data for the Hawaii stock of sperm whales. NMFS has determined that the M&SI incidental to commercial fisheries in Hawaii and Alaska will have a negligible impact for purposes of issuing a permit under section 101(a)(5)(E) of the MMPA for the CNP stock of humpback whales, the Hawaii stock of sperm whales, and the MHI IFKW stock.

12.0 Literature Cited

Allen, B.M. and R.P. Angliss. 2013. Draft Alaska Marine Mammal Stock Assessments.

Andersen, M. S., K. A. Forney, T. V. N. Cole, T. Eagle, R. Angliss, K. Long, L. Barre, L. Van Atta, D. Borggaard, T. Rowles, B. Norberg, J. Whaley, and L. Engleby. 2008. Differentiating Serious and Non-Serious Injury of Marine Mammals: Report of the Serious Injury Technical Workshop, 10-13 September 2007, Seattle, Washington. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-39. 94 p.

Angliss, R. P., and D. P. DeMaster. 1998. Differentiating serious and non-serious injury of marine mammals taken incidental to commercial fishing operations: report of the serious injury workshop 1-2 April 1997, Silver Spring, Maryland. U.S. Dep. Commerce., NOAA Tech Memo. NMFS-OPR-13, 48 pp.

Au, W.W.L. and M. Green. 2000. Acoustic interaction of humpback whales and whale-watching boats. Mar. Env. Res. 49:469-481.

Baird, R. W., A. M. Gorgone, D. L. Webster, D. J. McSweeney, J. W. Durban, A.D. Ligon, D. R. Salden, and M. H. Deakos. 2005. False killer whales around the main Hawaiian Islands: an assessment of inter-island movements and population size using individual photo-identification. Report to Pacific Islands Fisheries Science Center National Marine Fisheries Center.

Baird, R.W., and A.M. Gorgone. 2005. False killer whale dorsal fin disfigurements as a possible indicator of long -line fishery interactions in Hawaiian waters. Pacific Science 59:593-601.

Baird, R.W. 2009. A review of false killer whales in Hawaiian waters: biology, status, and risk factors. Report prepared for the U.S. Marine Mammal Commission under Order No. E40475499, December 23, 2009. 40p.

Baird, R.W, G.S. Schorr, D.L. Webster, D.J. McSweeney, M.B. Hanson, and R.D. Andrews. 2010. Movements and habitat use of satellite-tagged false killer whales around the main Hawaiian Islands. Endangered Species Research 10:107-121.

Baird, R.W., E.M. Oleson, J. Barlow, A.D. Ligon, A.M. Gorgone, and S.D. Mahaffy. 2013 Photo-identification and satellite-tagging of false killer whales during HICEAS 2010: evidence of an island-associated population within the Papahanaumokuakea Marine National Monument. Pacific Science.

Barlow, J., S.L. Swartz, T.C. Eagle, and P.R. Wade. 1995. U.S. Marine Mammal Stock Assessments: Guidelines for Preparation, Background, and a Summary of the 1995 Assessments. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-6, 73 p.

Barlow, J and B. Taylor. 2005. Estimates of sperm whale abundance in the northeast temperate Pacific from a combined visual and acoustic survey. Mar. Mamm. Sci. 21(3):429-445.

Barlow, J. 2006. Cetacean abundance in Hawaiian waters estimated from a summer/fall survey in 2002. Marine Mammal Science 22: 446–464.

Barlow, J. and S. Rankin. 2007. False killer whale abundance and density: Preliminary estimates for the PICEAS study area south of Hawaii and new estimates for the US EEZ around Hawaii. Administrative Report LJ- 07-02. Southwest Fisheries Science Center, National Marine Fisheries Service, 8604 La Jolla Shores Drive,La Jolla, CA 92037.

Bradford, A.L. and K. Forney. 2013. Injury determinations for cetaceans observed interacting with Hawaii and American Samoa longline fisheries during 2007-2011. PIFSC Working Paper WP-13-002.

Bradford. A.L., K.A. Forney, E.M. Oleson, and J. Barlow. 2013. Line-transect abundance estimates of cetaceans in the Hawaiian EEZ. PIFSC Working Paper WP-13-004.

Bradford, A.L., K.A. Forney, E.M. Oleson, and J. Barlow. 2012. Line-transect abundance estimates of false killer whales (Pseudorca crassidens) in the pelagic region of the Hawaiian Exclusive Economic Zone and in the insular waters of the Northwestern Hawaiian Islands. Pacific Islands Fish. Sci. Cent., Natl. Mar. Fish. Serv.,NOAA, Honolulu, HI 96822. Pacific Islands Fish. Sci. Cent. Admin. Rep. H-12-02, 23 p.

Bradford, A.L. and E. Lyman. 2013. Injury determinations for humpback whales and other cetaceans reported to the Pacific Islands Region Marine Mammal Response Network during 2007-2011. PIFSC Working Paper WP-13-005.

Bradford, A.L., K.A. Forney, E.O. Oleson, and J. Barlow. 2014. Accounting for subgroup structure in line-transect abundance estimates of false killer whales (*Pesudorca crassidens*) in Hawaiian Waters. PLOS One. Volume 9, issue 2.

Boggs C. 2002. Annual Report on the Hawaii longline fishing experiments to reduce sea turtle bycatch under ESA Section 10 Permit 1303 (November 30, 2002).

Calambokidis, J. E.A. Falcone, T.J. Quinn, A.M. Burdin, P.J. Clapham, J.K.B. Ford, C.M. Gabriele, R. LeDuc, D. Mattila, L. Rojas-Bracho, J.M. Straley, B.L. Taylor, J. Urbán R., D. Weller, B.H. Witteveen, M. Yamaguchi, A. Bendlin, D. Camacho, K. Flynn, A. Havron, J. Huggins, and N. Maloney. 2008. SPLASH: Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific. Final report for Contract AB133F-03-RP-00078 U.S. Dept of Commerce Western Administrative Center, Seattle, Washington. (available at http://www.cascadiaresearch.org/SPLASH/SPLASH-contract-Report-May08.pdf)

Carretta, J.V., K.A. Forney, E. Oleson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, J. Baker, B. Hanson, D.Lynch, L. Carswell, R.L. Brownell Jr., J. Robbins, D.K. Mattila, K. Ralls, and Marie C. Hill. 2011. U.S. Pacific Marine Mammal Stock Assessments: 2010. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SWFSC-476, 352 p.

Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, B. Hanson, K. Martien, M.M. Muto, M.S. Lowry, J. Barlow, D. Lynch, L. Carswell, R. L. Brownell Jr., D. K. Mattila, and M.C. Hill. 2013a. U.S. Pacific Marine Mammal Stock Assessments: 2012. U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SWFSC-504. 378 p.

Carretta, J.V., E. Oleson, D.W. Weller, A.R. Lang, K.A. Forney, J. Baker, B. Hanson, K. Martien, M.M. Muto, T. Orr, H. Huber, M.S. Lowry, J. Barlow, D. Lynch, L. Carswell, R.L. Brownell Jr., and D.K. Mattila. 2013b. U.S. Pacific Marine Mammal Stock Assessments: 2013 (DRAFT). U.S. Department of Commerce, NOAA Technical Memorandum, NMFS-SWFSC-XXX, 311 p.

Chivers, S. J., R. W. Baird, D. J. McSweeney, D. L. Webster, N. M. Hedrick, and J. C. Salinas. 2007. Genetic variation and evidence for population structure in eastern North Pacific false killer whales (*Pseudorca crassidens*). Can. J. Zool. 85: 783-794.

Dollar, R. A. Summary of swordfish longline observations in Hawaii, July 1990 - March 1991. National Marine Fisheries Service, Southwest Fisheries Science Center Administrative Report HI-91-09. 1991. Honolulu, HI, Honolulu Laboratory. Ref Type: Report

Forney, K. A. 2010. Serious Injury Determinations for Cetaceans caught in Hawaii longline fisheries during 1994-2008. NOAA-TM-NMFS-SWFSC-462.

Forney, K. A., R.W. Baird, and E.M. Oleson. 2010. Rationale for the 2010 revision of stock boundaries for the Hawaii insular and pelagic stocks of false killer whales. U.S. dept of comer. , NOAA Tech. Memo. NMFS-SWFSC-471. 7p.

Forney, K.A., D.R. Kobayashi, D.W. Johnston, J.A. Marchetti, and M.G. Marsik. 2011. What's the catch? Patterns of cetacean bycatch and depredation in Hawaii-based pelagic longline fisheries. Marine Ecology.

Gosho, M. E., D. W. Rice, and J. M. Breiwick. 1984. The sperm whale Physeter macrocephalus. Mar. Fish. Rev.46 (4):54-64.

Lammers, M. O., Pack, A. A., and Davis, L. Historical Evidence of Whale/Vessel Collisions in Hawaiian Waters (1975-Present). Prepared for NOAA Hawaiian Island Humpback Whale National Marine Sanctuary. OSI Technical Report 2003-01, -25 pp. 2003. Ref Type: Report

Lyman, E. 2013. 2012-2013 Hawaii Large Whale Entanglements and Response Efforts around the Main Hawaiian Islands. Hawaiian Islands Humpback Whale National Marine Sanctuary. May 22, 2013.

Martien, K, R.W. Baird, B.L. Taylor, E.M. Oleson, S.J. Chivers. 2011. Population structure and mechanisms of gene flow within island-associated false killer whales (Pseudorca crassidens) around the Hawaiian Archipelago. PSRG-11-14, 19pp.

McCracken, M.L. 2009. Preliminary Assessment of Incidental Interactions with Marine Mammals in the Hawaii longline Deep and Shallow Set Fisheries. NMFS, Pacific Islands Fisheries Science Center Working Paper WP-09-007. Issued October 20, 2009. 17 p.

McCracken, M. L. and K.A. Forney. 2010. Preliminary assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow set fisheries. NMFS, Pacific Islands Fisheries Science Center Working Paper WP-10-001. 27p.

McCracken, M.L. 2010. Adjustments to False Killer Whale and Short-finned Pilot Whale Bycatch Estimates. NMFS, Pacific Islands Fisheries Science Center Working Paper WP-10-007. Issued December 7, 2010. 23p.

McCracken, M.L. 2011. Assessment of Incidental Interactions with Marine Mammals in the Hawaii Longline Deep and Shallow Set Fisheries from 2006 through 2010. NMFS, Pacific Islands Fisheries Science Center Working Paper WP-11-012. Issued September 23, 2011. 30 pp.

McCracken, M.L. 2013. Assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow set fisheries from 2007 to 2011. NMFS, Pacific Islands Fisheries Science Center Internal Report IR-13-009. Issued February 27, 2013. 2 p. + Excel Workbook.

McCracken, M.L. 2014a. Assessment of incidental interactions with marine mammals in the Hawaii longline deep and shallow set fisheries from 2008 through 2012. NMFS, Pacific Islands Fisheries Science Center Internal Report IR-14-006. Issued February 21, 2014. 1 p. + Excel Workbook.

McCracken, M.L. 2014b. Prediction of future bycatch of sea turtles and certain cetaceans in the Hawaii deep-set longline fishery. NMFS, Pacific Island Fisheries Science Center Internal report IR-13-029. Issued 01 May, 2014. 48 p.

Mobley, J.R., Jr, S. S. Spitz, K. A. Forney, R. A. Grotefendt, and P. H. Forestall. 2000. Distribution and abundance of odontocete species in Hawaiian waters: preliminary results of 1993-98 aerial surveys Admin. Rep. LJ-00-14C. Southwest Fisheries Science Center, National Marine Fisheries Service, P.O. Box 271, La Jolla, CA 92038. 26 pp.

Mobley, J. R. 2004. Results of marine mammal surveys on US Navy underwater ranges in Hawaii and Bahamas. Final report submitted to Office of Naval Research, Marine Mammal Program.

National Marine Fisheries Service. 1991. Final recovery plan for the humpback whale, *Megaptera novaeangliae*. Prepared by the Humpback Whale Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 105pp.

National Marine Fisheries Service. 2005. Revisions to Guidelines for Assessing Marine Mammal Stocks. 24 pp. Available at:http://www.nmfs.noaa.gov/pr/pdfs/sars/gamms2005.pdf

National Marine Fisheries Service. 2009. "Fed, Researchers and Industry Tackle Pacific False Killer Whale Issue."

National Marine Fisheries Service. 2012a. NOAA Fisheries Policy Directive 02-238-01: Process for distinguishing serious from non-serious injury of marine mammals. 42pp. Available at <http://www.nmfs.noaa.gov/op/pds/documents/02/238/02-238-01.pdf>

National Marine Fisheries Service. 2012b. Biological Opinion for the Continued Operation of the Hawaii-based Shallow-set Longline Swordfish Fishery – Under Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. Pacific Islands Regional Office, Protected Resources Division. January 30, 2012. 162 pp.

National Marine Fisheries Service. 2012c. Main Hawaiian Island Insular False killer Whale Take Reduction Plan: Final Rule.

National Marine Fisheries Service. 2012d. Final Environmental Assessment, Regulatory Impact Review, and Final Regulatory Flexibility Analysis For the False Killer Whale Take Reduction Plan. Pacific Islands Regional Office, Protected Resources Division, Honolulu, Hawaii. November 2012. 375 pp.

National Marine Fisheries Service. 2012e. Final Rule to list the MHI FKW endangered.

National Marine Fisheries Service. 2013. Overview of Recently Observed False Killer Whale Interactions. May 29, 2013

National Marine Fisheries Service. 2014. Final List of Fisheries for 2014.

Oleson, E.M., C.H. Boggs, K.A. Forney, M.B. Hanson, D.R. Kobayashi, B.L. Taylor, P.R. Wade, and G.M. Ylitalo. 2010. Status Review of Hawaiian Insular False Killer Whales (Pseudorca crassidens) under the Endangered Species Act. U.S Dep. Commerc. NOAA Tech Memo., NOAA-TM-NMFS-PIFSC-22. 140 p.+ Appendices.

Oleson, E.M., A. Bradford, R. Baird,K.A. Forney. 2014. Hawaii False Killer Whales: New Data for evaluating boundaries and bycatch proration. Presentation to PSRG April 2014.

Reeves, R.R., S. Leatherwood, and R.W. Baird. 2009. Evidence of a possible decline since 1989 in false killer whales (Pseudorca crassidens) around the main Hawaiian Islands. Pacific Science 63(2): 253–261.

Rice, D. W. 1989. Sperm whale (*Physeter macrocephalus*) Linneaus, 1758. In: S. H. Ridgway and R. Harrison (eds.), Handbook of Marine Mammals, Vol. 4: The River Dolphins and Larger Toothed Whales, pp. 177 - 233. Academic Press, 442 pp.

Stacey, P. J., S. Leatherwood, and R. W. Baird. 1994. Pseudorca crassidens. Mamm. Spec. 456:1-6.

Taylor, B.L., M. Scott, J. Heyning, and J. Barlow. 2003. Suggested guidelines for recovery factors for endangered marine mammals. U.S. Dep. Commerce, NOAA Tech. Memo., NMFS-TM-NMFS-SWFSC-354. 6 p.

Turnock, B. J. and T. J. Quinn II. 1991. The effect of responsive movement on abundance estimation using line-transect sampling. *Biometrics* **47**: 701-715.

Wade, P. R. and R. P. Angliss. 1997. Guidelines for Assessing Marine Mammal Stocks: Report of the GAMMS Workshop April 3-5, 1996, Seattle, Washington. U. S. Dep. Commer., NOAA Tech. Memo. NMFS-OPR-12. 93 pp.

Western Pacific Regional Fishery Management Council (WPFMC), 2009. Management Modifications for the Hawaii-based Shallow-set Longline Swordfish Fishery: Proposal to Remove Effort Limit, Eliminate Set Certificate Program, and Implement New Sea Turtle Interaction Caps. Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region Including a Final Supplemental Environmental Impact Statement. March 10, 2009.

Zenkovich B. A. 1954. Vokrug sveta za kitami, Vol. Gosudarstvennoe Izdatel'stvo Geograficheskoi Literatury, Moscow.

Zerbini, A. N., J. M. Waite, J. L. Laake and P. R. Wade. 2006. Abundance, trends and distribution of baleen whales off western Alaska and the central Aleutian Islands. Deep Sea Res. Part I:1772-1790.

13.0 Appendix

Marine Mammal Stock Assessment Terminology

Under section 117 of the MMPA, NMFS and the U.S. Fish and Wildlife Service are required to publish stock assessment reports for all stocks of marine mammals within U.S. waters, to review new information every year for strategic stocks and every three years for non-strategic stocks, and to update the stock assessment reports when significant new information becomes available. A strategic stock is defined as a marine mammal stock:

a. which is listed as endangered or threatened under the ESA, or is designated as depleted under [the MMPA];
b. for which the human-caused mortality exceeds the potential biological removal (PBR) level; or
c. which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the [ESA] within the foreseeable future.

Under MMPA Section 3, the PBR level means the maximum number of animals, not including natural mortality, that may be annually removed from a marine mammal stock while allowing that stock to reach or maintain its optimal sustainable population level (OSP). Optimum sustainable population means the number of animals which will result in the maximum productivity of the population or the species keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element. The PBR level is the product of the following factors: 1) The minimum population estimate of the stock (NMIN); 2) One-half the maximum theoretical or estimated net productivity rate of the stock at a small population size, where net productivity is the annual per capita rate of increase in a stock resulting from additions due to reproduction, less losses due to mortality (½ RMAX); and 3) A recovery factor (RF) or "safety factor" of between 0.1 and 1.0 to hasten the recovery of depleted populations and to account for additional uncertainties. The use of PBR as a management scheme is a conservative approach that will allow populations to recover to or remain above OSP. Wade (1998), using simulation models, demonstrated that a PBR calculated with a recovery factor of 0.1 would meet two performance goals: 1) 95% of simulations would equilibrate within 95% of carrying capacity (K), and 2) there would be no more than a 10% delay in recovery. Mortality limits were evaluated based on whether at least 95% of the simulated populations met two criteria: 1) the populations starting at the maximum net productivity levels (MNPL) stayed there or above after 20 years, and 2) that populations starting at 30% of K recovered to at least MNPL after 100 years (Wade 1998).

When calculating PBRs, NMFS chose to use a value of 0.1 for the safety factor for species listed as endangered under the ESA, based partly on the rationale that this would not cause more than a 10% increase in the time to recovery (Barlow et al. 1995). Using 0.1 as a safety factor in the PBR equation would allow a large fraction of the net production of the population to contribute to population increase and eventual recovery, and thus, have a relatively insignificant negative impact upon the population (Wade 1998). For depleted and threatened stocks and stocks of unknown status, a recovery factor of 0.5 is used, and for stocks thought to be within OSP, a recovery factor of 1.0 is used (Barlow et al. 1995). However, before the recovery factor is set as high as 1.0, reasonable scientific justification needs to be provided that the estimates of abundance and mortality are not severely biased and have estimated coefficients of variation (CVs) less than or equal to 0.8 for the abundance estimate and 0.3 for the mortality estimates (Barlow et al. 1995).

Literature Cited

Barlow, J., S., Swartz, T. Eagle and P. Wade. 1995. U.S. marine mammal stock assessments: guidelines for preparation, background, and a summary of the 1995 assessments. U.S. Dept. Commerce, NOAA-TM-NMFS-SWFSC-219.

Wade, P. R. 1998. Calculating limits to the allowable human-caused mortality of cetaceans and pinnipeds. Mar. Mamm. Sci., 14(1): 1-37.