ENVIRONMENTAL ASSESSMENT
for
Approach Regulations for Humpback Whales within 200 Nautical Miles of the Islands of Hawaii

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COVER SHEET

Title of Environmental Review: ENVIRONMENTAL ASSESSMENT for
Approach Regulations for Humpback Whales within 200 Nautical Miles of the Islands of Hawaii

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Location of Proposed Action:
Within 200 Nautical Miles of the Islands of Hawaii

Proposed Action:
To implement approach regulations under the Marine Mammal Protection Act that will protect humpback whales, *Megaptera novaeangliae*, within 200 nautical miles of the islands of Hawaii

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LIST OF ACRONYMS

AP	Associated Press
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
DBEDT	Department of Business, Economic Development, and Tourism
DCCA	Department of Commerce and Consumer Affairs
DOBOR	Division of Boating and Ocean Recreation
DPS	Distinct Population Segment
EA	Environmental Assessment
EFH	Essential Fish Habitat
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
HAB	Harmful Algal Bloom
HAR	Hawaii Administrative Rule
HI DAR	Hawaii Division of Aquatic Resources
HI DLNR	Hawaii Department of Land and Natural Resources
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
HTA	Hawaii Tourism Authority
IRFA	Initial Regulatory Flexibility Analysis
IWC	International Whaling Commission
MHI	Main Hawaiian Islands
MMPA	Marine Mammal Protection Act
MPA	Marine Protected Area
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOAA	National Oceanic and Atmospheric Administration
NWHI	Northwest Hawaiian Islands
OLE	NOAA Office of Law Enforcement
ONMS	Office of National Marine Sanctuaries
PIFSC PDS	Pacific Islands Fishery Science Center, Protected Species Division
PIRO PRD	Pacific Islands Regional Office, Protected Resources Division
PRIA	Pacific Remote Island Areas
RIR	Regulatory Impact Review
SOC	Species of Concern
SPLASH	Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific
UAS	Unmanned Aircraft System
USCG	United States Coast Guard
WDC	Whale and Dolphin Conservation

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1.0 INTRODUCTION

The National Marine Fisheries Service (NMFS), a division of the National Oceanic and Atmospheric Administration (NOAA), has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA)(42 U.S.C. 4321 *et seq*.). Current approach regulations for humpback whales, *Megaptera novaeangliae*, in Hawaii were established under the authority of the Endangered Species Act (ESA)(16 U.S.C. 1531 *et. seq*.) in 1995. The proposed action analyzed in this EA would establish similar regulations under the authority of the Marine Mammal Protection Act (MMPA)(16 U.S.C. 1361 *et seq*.) because the protections of the ESA may no longer be applied to humpback whales in Hawaii in the near future. This document considers the environmental consequences of alternative actions to protect humpback whales from approach by aircraft, vessels, and humans in waters within 200 miles from shore of the islands of Hawaii under the MMPA. The analysis of alternatives and consequences will inform NMFS' decision on actions to minimize the impact of approach on protected humpback whales.

1.1 Background

Humpback whales occur throughout the world in both coastal and open ocean areas. They are a highly migratory species, moving between breeding grounds in tropical and subtropical latitudes and feeding grounds in temperate and polar latitudes. A large portion of the North Pacific population of humpback whales occupy waters surrounding Hawaii during winter months where many whales engage in breeding, calving, and nursing behaviors.

Prior to commercial whaling, the worldwide population of humpback whales is thought to have been in excess of 125,000 individuals (NMFS 1991). Based on whaling records, Rice (1978) estimated that abundance of humpback whales in the North Pacific was approximately 15,000 prior to 1905. Between 1905 and 1960, intense commercial whaling operations targeted humpback whales worldwide and depleted the North Pacific population to approximately 1,000 individuals (Rice 1978). Humpback whale abundance in the waters surrounding Hawaii was estimated to be as low as 895 individuals in 1977-1979 (Darling *et al.* 1983).

In 1966, treaties under the International Whaling Commission (IWC) protected humpback whales from further harvesting by issuing a moratorium on the whaling of the species in the North Pacific. The humpback whale was then listed as an endangered species in 1970 under the Endangered Species Conservation Act of 1969, which was later superseded by the Endangered Species Act of 1973. In 1972, humpback whales were considered to be a depleted species under the MMPA because of their ESA listing status. In 1992, Congress created the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) under the Hawaiian Islands Humpback Whale National Marine Sanctuary Act to protect humpback whales and their habitat in Hawaii.

On January 4, 1979, NMFS published a "Notice of Interpretation of 'Taking by Harassment' in Regard to Humpback Whales in the Hawaiian Islands Area" to inform the public of activities that could be interpreted as harassment of whales under the authority of the MMPA and ESA (44 FR 1113). The Notice of Interpretation contained guidelines for approaching whales and proper

conduct of vessel operators when following or watching whales. These guidelines were later deemed ineffective because vessel operators frequently approached nearer than the prescribed distance to view whales. Because of this, approach regulations for humpback whales in Hawaii were first implemented under the ESA (50 CFR 222.31) on November 23, 1987 as interim regulations (52 FR 44912), and then finalized on January 19, 1995 (60 FR 3775). Regulations under the ESA were then reorganized on March 23, 1999, and the section containing the approach regulations for humpback whales in Hawaii was changed from 50 CFR 222.31 to 50 CFR 224.103(a) (64 FR 14052).

Since implementing protections under the ESA, humpback whale abundance estimates in Hawaii increased over time to the most recent 2006 estimate of 10,103 humpback whales (Calambokidis *et al.* 2008). The Office of National Marine Sanctuaries (ONMS) estimates that the current population of humpback whales that use waters surrounding Hawaii is between 10,000 and 15,000 animals, although not all of these animals are in Hawaii at the same time during the season (ONMS 2015). Because they are a charismatic species, human encounters with humpback whales in Hawaii are on the rise.

The MMPA provides substantial protections to all marine mammals, although there are no regulations that specifically address humpback whales in Hawaii under the MMPA. The MMPA generally prohibits take of marine mammals. Section 3(13) (16 U.S.C. § 1362 (13)) of the MMPA defines the term "take" as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." Except with respect to military readiness activities and certain scientific research activities, the MMPA defines the term harassment as "any act of pursuit, torment, or annoyance which: (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]" (16 U.S.C. § 1362 (18)).

NMFS' regulations implementing the MMPA further describe the term "take" to include "the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal; and feeding or attempting to feed a marine mammal in the wild" (50 CFR § 216.3). The MMPA provides limited exceptions to the prohibition on take for activities such as scientific research, public display, and incidental take in commercial fisheries. Such activities require a permit or authorization, which may be issued only after a thorough agency review.

As of the writing of this EA, Federal approach regulations for humpback whales in Hawaii are promulgated under the ESA. However, on April 21, 2015, NMFS proposed to separate the humpback whale species into 14 Distinct Population Segments (DPSs), with humpback whales in Hawaii designated as the Hawaii DPS. In this proposed rule, the Hawaii DPS would not remain listed under the ESA (80 FR 22304). Because the current NMFS approach regulations are authorized only under the ESA, these approach regulations will no longer be in effect in all waters surrounding the islands of Hawaii if the listing revision is finalized as proposed. However, approach regulations for humpback whales continue to apply in the HIHWNMS under

the National Marine Sanctuaries Act (NMSA), but only inside the Sanctuary's borders (15 C.F.R. 922.184).

In considering whether there is a need to establish approach regulations to take the place of the regulations established under the ESA, we asked for comments in the proposed rule to revise the humpback whale listing (80 FR 22304). The solicitation for comment asked whether approach regulations need to be promulgated under the MMPA for the protection of humpback whales outside of the HIHWNMS, or whether current protections (which include approach regulations) within the HIHWNMS are sufficient for protection of the species in Hawaii (80 FR 22304; April 21, 2015). Of the seven commenters that provided comments related to this inquiry, one commenter stated that the approach regulations within the HIHWNMS boundaries would provide sufficient protection for humpback whales; seven others did not think approach regulations within the HIHWNMS boundaries were sufficient and supported promulgating humpback whale approach regulations under the MMPA throughout Hawaii. Three of the eight commenters also suggested including an additional provision that prohibits approaching humpback whales by interception (a.k.a. "leap-frogging"). The comments received did not raise any major issues or controversies.

After analyzing the best available information, NMFS believes that conditions exist in Hawaii that make it necessary and appropriate to continue to provide protections for humpback whales in Hawaii under the MMPA to prevent take or harassment. Factors considered in the evaluation included, but are not limited to: 1) humpback whales are a charismatic species that are sought out for encounters by the local community and tourists, 2) whale watch and other tour operators, as well as individuals, will likely get as close as possible to the whales and create safety concerns for both whales and humans, and 3) use of waters surrounding Hawaii by both whales and humans has increased in number over the last several years.

1.2 Purpose and Need for Action

The purpose of the action is to protect humpback whales from take in waters within 200 nautical miles (nm) (370.4 km) from shore of the islands of Hawaii[1] by minimizing interactions with humans that may result in take, including harassment and disturbance, from approach by any means (including by interception), pursuant to the MMPA and its implementing regulations.

The need for this action is to ensure that humpback whales are protected from take where protections do not exist or no longer apply.

[1] The islands of Hawaii consist of the entire Hawaii Archipelago, including the Main Hawaiian Islands (Hawaii, Maui, Kahoolawe, Lanai, Molokai, Oahu, Kauai, and Niihau) and the Northwest Hawaiian Islands.

2.0 ALTERNATIVES CONSIDERED

NMFS is presenting two "no action" alternatives, two action alternatives, and alternatives that were considered but not analyzed in detail.

2.1 Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

Under "No Action Alternative 1," the revision of the species-wide listing of humpback whales is not finalized as proposed and humpback whales are on the list of endangered and threatened species. Approach regulations for humpback whales in Hawaii under the ESA remain in effect. This alternative is the *status quo* or baseline for comparison of alternatives in this EA.

The following are the current regulations authorized by the ESA (50 CFR 224.103(a)):

> "*Approaching humpback whales in Hawaii.* Except as provided in part 222, subpart C, of this chapter (General Permit Procedures), it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed, within 200 nautical miles or 370.4 km of the islands of Hawaii, any of the following acts with respect to humpback whales (*Megaptera novaeangliae*):
>
> (1) Operate any aircraft within 1,000 feet (300 m) of any humpback whale;
> (2) Approach by any means, within 100 yard (90 m) of any humpback whale;
> (3) Cause a vessel or other object to approach within 100 yard (90 m) of a humpback whale; or
> (4) Disrupt the normal behavior or prior activity of a whale by any other act or omission. A disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities, attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movement; or the abandonment of a previously frequented area."

Exemptions to the regulations are specified in 50 CFR, Chapter II, part 222, subpart C. The regulations in this subpart "provide uniform rules and procedures for application, issuance, renewal, conditions, and general administration of permits issuable pursuant" to the section that contains this approach rule.

2.2 Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

Under "No Action Alternative 2," the revision of the listing of humpback whales under the ESA is finalized as proposed, and the Hawaii DPS of humpback whales is no longer on the list of endangered or threatened species. Existing Federal humpback whale approach regulations no longer apply to humpback whales in this region except those promulgated by the HIHWNMS, which apply only to humpback whales within the boundaries of the HIHWNMS.

2.3 Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

Under this alternative, humpback whale approach regulations are promulgated under the MMPA within 200 nm (370.4 km) from shore of the islands of Hawaii. This alternative is similar to the regulations currently authorized by the ESA (Alternative 1). The only differences are 1) the authority under which the regulations are promulgated (MMPA rather than ESA), 2) the exceptions to the regulations, 3) changes to the restricted approach distances in meters to represent a precise conversion of feet and yards to meters, 4) the addition of the word "person" to clarify that to "cause a vessel or other object to approach within 100 yards" includes a person, and 5) the addition of a provision that prohibits approaching a humpback whale by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within 1,000 ft (304.8 m) of the aircraft or 100 yards (91.4 m) of the vessel, person, or object).

Although we are considering approach regulations under the MMPA now because the protections of the ESA for these whales may soon no longer apply, protections under the MMPA are appropriate regardless because take of humpback whales under the MMPA is prohibited.

The regulations for the preferred alternative are proposed to be the following:

> Except as provided in section 2.5.4 of this document, *Exceptions*, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed within 200 nautical miles (370.4 km) from shore of the islands of Hawaii, any of the following with respect to humpback whales (*Megaptera novaeangliae*):
>
> (1) Operate any aircraft within 1,000 feet (304.8 m) of any humpback whale;
> (2) Approach, by any means, within 100 yards (91.4 m) of any humpback whale;
> (3) Cause a vessel, person, or other object to approach within 100 yards (91.4 m) of a humpback whale;
> (4) Approach a humpback whale by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within 1,000 feet (304.8 m) of the aircraft or 100 yards (91.4 m) of the vessel, person, or object);
> (5) Disrupt the normal behavior or prior activity of a whale by any other act or omission. A disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities; attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movements; or the abandonment of a previously frequented area.

2.4 Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

Under this alternative, humpback whale approach regulations are promulgated under the MMPA and are similar to the preferred alternative, with the exception that this alternative does not include a provision that prohibits approach by interception (item (4) of the above regulation).

This alternative is similar to the regulations currently authorized by the ESA (Alternative 1). The only differences are 1) the authority under which the regulations are promulgated (MMPA rather than ESA); 2) the exceptions to the regulations; and 3) changes to the restricted approach distances in meters to accurately represent the distances specified in feet and yards.

2.5 Scope of the Action Alternatives

2.5.1 Action Area for Regulations

The action area for this analysis is limited to the waters within 200 nautical miles (nm) (370.4 km) from shore of the islands of Hawaii. The islands of Hawaii consist of the entire Hawaiian Archipelago, including the Main Hawaiian Islands (MHI) (Hawaii, Maui, Kahoolawe, Lanai, Molokai, Oahu, Kauai, and Niihau) and the Northwestern Hawaiian Islands (NWHI).

2.5.2 Application to All Humpback Whales

Under the MMPA, the proposed regulations would apply to all humpback whales (*Megaptera novaeangliae)* found in the action area.

2.5.3 Application to All Forms of Approach

The regulations apply to all forms of approach in water and air. Forms of approaching humpback whales include, but are not limited to, operating a manned or unmanned motorized, non-motorized, self-propelled, human-powered, or submersible vessel; operating a manned aircraft; operating an unmanned aircraft system (UAS) or drone; and swimming at the water surface or underwater (i.e., SCUBA or free diving). With this rule, we are not changing our existing approach restrictions for aircraft or other objects, including UASs. UASs are, at minimum, objects, and therefore UASs are not to approach humpback whales within 100 yards without a permit. We recognize that for many other purposes, however, UASs are considered “aircraft,” and we anticipate providing further guidance on this in the future.

2.5.4 Exceptions

The following categories are proposed for exceptions in the action alternatives:

- Federal, State, or local government vessels or persons operating in the course of their official duties, such as law enforcement, search and rescue, or public safety;
- Vessel operations necessary to avoid an imminent and serious threat to a person, vessel, or the environment;
- Vessels restricted in their ability to maneuver, and because of this restriction are not able to comply with approach restrictions; or

- Vessels or persons authorized under permit or authorization issued by NMFS to conduct scientific research or response efforts that may result in taking of humpback whales.

2.6 Alternatives Considered but Not Analyzed in Detail

2.6.1 Increase Approach Distance from Status Quo

The distance in the current humpback whale approach regulations under the ESA is 100 yards (90 m) for any object except aircraft and 1,000 feet (300 m) for aircraft. There are very few studies that have examined humpback whale response to close human approach in Hawaii. However, humpback whales in other regions analogous to Hawaii have been observed changing their normal behavior, a sign of harassment, in response to vessels 300 m away in Australia (Corkeron 1995) and even as far as 4,000 m away in Alaska (Baker and Herman 1989). Stamation *et al.* (2010) observed a significant change in behavior of humpback whales in Australia in response to vessels approaching within 100 m. While we recognize that increasing restricted approach to greater than 100 yards may further reduce the likelihood of disturbance to humpback whales, we did not consider this alternative further for the following reasons: 1) Increasing the approach distance could make maneuvering vessels and aircraft in order to comply with the rule more problematic in enclosed areas that have a high concentration of whales, such as coastal bays and waters between the islands of Maui, Molokai, Lanai, and Kahoolawe, 2) a larger distance would diminish both the experience of whale watching and opportunities to participate in whale watching, which is an important industry contributing to Hawaii's economy and provides opportunities to educate the public about humpback whales and foster stewardship, 3) a 100-yard approach restriction serves to reduce behavioral disruption from approaches (see Bauer *et al.* 1993; Corkeron 1995; Baker and Herman 1989; Stamation *et al.* 2010), and 4) the approach distances in the current regulations are the same restricted distances in the HIHWNMS and are familiar to most vessel and aircraft operators and enforcement officials and, as such, would avoid confusion in compliance and enforcement.

For all of the above reasons, we did not consider this alternative further.

2.6.2 Decrease Approach Distance (to 50-Yards) from Status Quo

The distance in the current humpback whale approach regulations is 100 yards (90 m) for any object except aircraft and 1,000 feet (300 m) for aircraft. This is consistent with our recommendation in the *Hawaii Marine Wildlife Viewing Guidelines* to remain 100 yards away from humpback whales at all times (see section 3.3.3 for a summary of viewing guidelines). The purpose of these guidelines is to protect marine mammal and human safety from the dangers of close interactions, and they represent an absolute minimum distance from which marine mammals should be observed.

In considering decreasing the approach distance for humpback whales, we note that humpback whales in other regions have been observed changing their normal behavior, a sign of harassment, in response to vessels 100 m away (Stamation *et al.* 2010), 300 m away (Corkeron 1995) and even as far as 4,000 m away (Baker and Herman 1989). This suggests that a decrease in the approach distance would further disturb whales. Because humpback whales are much larger and typically less agile than the other marine mammals regularly observed in Hawaii (i.e.,

odontocetes and Hawaiian monk seals), decreasing the safe approach distance to 50 yards to be consistent with the viewing guidelines for other marine mammals in Hawaii could pose a danger to the animals and to human safety. We note that approach distance for humpback whales in Alaska is 100 yards (50 CFR 224.103(b)), and approach distance in regulations for North Atlantic right whales, another large whale species, is 500 yards (50 CFR 224.103(c)).

For all of the above reasons, we did not consider this alternative further.

2.6.3 300-Yard Approach Regulation for Vessels within Designated Cow/Calf Waters

The January 4, 1979, Notice of Interpretation to Prepare an EIS for Humpback Whale Harassment in the Hawaiian Islands Area, which preceded the interim rulemaking on approach regulations for humpback whales in Hawaii, interpreted "harassment" of humpback whales prohibited by the MMPA and ESA to include approaching within 300 yards of a humpback whale in specific calving and breeding grounds in Hawaii (44 FR 1113). This provision was adopted by the interim approach rule implemented in 1987 but it was not included in the current approach rule implemented in 1995.[2] There has been no new evidence suggesting this provision would mitigate the purpose and need of the proposed action.

For the above reason, we did not consider this alternative further.

2.6.4 Speed Restrictions in Proximity of Humpback Whales

This alternative would implement speed restrictions of vessels when operating in close proximity to humpback whales in Hawaii. Research suggests that mandating vessels to operate at slower speeds would reduce the risk of humpback whale vessel strikes (Conn and Silber 2013; Laist *et al.* 2001; Lammers *et al.* 2013; Vanderlaan and Taggart 2007; Wiley *et al.* 2011), and thus, would benefit whale and human safety (refer to section 3.2.8.5 for more information on vessel collisions with humpback whales). However, vessel speed restrictions would not prevent other forms of harassment by vessels towards humpback whales (e.g., approaching, hovering, pursuing, intercepting, etc.) and it is not always possible to know when you are in proximity to a humpback whale; thus, a speed restriction would not provide adequate benefit to fulfill the purpose and need for action.

Further, implementation of a specific speed limit throughout Hawaii is problematic from both practical and enforcement standpoints. Practical impediments to using specific speed limits include the fact that speeds at which vessels can operate safely varies depending on vessel type and size and prevailing conditions. For some vessels, this "safety speed" may be faster than the designated speed limit proposed in this alternative. Enforcement of a specific speed limit would require certain reliable equipment (e.g., radar) and training, and this would likely be burdensome for enforcement agencies.

Finally, a requirement that vessels operate at a slow, safe speed is already in place. Throughout U.S. waters, including all waters surrounding Hawaii, the U.S. Coast Guard (USCG) "Slow, Safe Speed" rule applies (33 CFR 83.06 Safe Speed Rule 6). This rule states that vessels "shall at all

[2] This provision is included in the State of Hawaii humpback whale approach regulations.

times proceed at a safe speed so that she can take proper and effective action to avoid collision and be stopped within a distance appropriate to the prevailing circumstances and conditions….” Boaters are familiar with the concept of slow, safe speed as described by this rule.

For all of the above reasons, we did not consider this alternative further.

2.6.5 Moratorium or Restrictions on All Vessel-based Whale Watching

A whale watching moratorium would be difficult to enforce for both commercial and recreational vessels, and would not necessarily reduce harassment of whales and possibility of vessel strikes, as other tour boats would continue to operate. Commercial operators could still conduct tours focused on other species, which would make it difficult to prove they were engaged in prohibited activity. Similarly, recreational boaters could be engaged in a variety of activities in the vicinity of humpback whales, making it difficult to determine at what point they are engaged in prohibited whale watching. Such a moratorium would also be overly broad, as there is information indicating that some vessel operations around humpback whales can occur without affecting the whales. This alternative could also have a substantial economic impact on commercial whale watch operators and the tourism industry.

For all of the above reasons, we did not consider this alternative further.

2.6.6 Whale Watch Certification or Permit Program

Under this alternative, NMFS would issue certificates or permits to commercial whale watch boats that meet certain requirements. Trained and permitted operators would be allowed to approach whales closer than non-permitted boaters. This would also allow NMFS to place a limit on the number of permitted vessels allowed to be within a certain range of the whales and have other vessels stand by at a greater distance until another vessel departs. This alternative is problematic for several reasons: 1) Recreational boaters often follow the example of commercial operators, and it would be confusing to have two sets of rules for different vessels; 2) infrastructure to administer, monitor, or enforce a certificate or permit program or stand-by zones for whale watching activities is not in place and would be extremely costly to put in place; and, 3) the MMPA does not provide exemptions to the take prohibition for viewing activities, and therefore permits could not be issued to whale watch operators if viewing activities result in take.

For all of the above reasons, we did not consider this alternative further.

2.7 Comparison of Alternatives

Table 2-1 compares the humpback whale federal protection statutes, approach rule authority, and approach restrictions of the No Action and action alternatives.

Table 2-1. Comparison of Alternatives.

Alternatives		Species Federal Protection Statute(s)	NMFS Approach Rule Authority	Restricted Approach Distance	"Disrupt Normal Behavior" Restriction	"No Interception" Provision
1	No Action I/Status Quo/ Baseline	ESA, MMPA, NMSA	ESA	1,000 ft by aircraft, 100 yards by vessel, person, or other object	Yes	No
2	No Action II/Approach Regulations are not Implemented	MMPA, NMSA	None	None	No	No
3a	Preferred Alternative/ Approach regulations with "No Interception"	MMPA, NMSA	MMPA	1,000 ft by aircraft, 100 yards by vessel, person, or other object	Yes	Yes
3b	Approach Regulations without "No Interception"	MMPA, NMSA	MMPA	1,000 ft by aircraft, 100 yards by vessel, person, or other object	Yes	No

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

This section describes the natural and human environment and resources potentially affected by the alternatives described in Chapter 2.0. The information presented in this section represents a general summary of the potentially affected environment that the impact analysis in section 4.0 will use as the environmental baseline.

3.2 Humpback Whales

In addition to the information below, detailed information about humpback whales, including the range, abundance, status, and threats, can be found in the resources listed below:

- Recovery Plan: http://www.nmfs.noaa.gov/pr/pdfs/recovery/whale_humpback.pdf
- Status Review: http://www.nmfs.noaa.gov/pr/species/Status%20Reviews/humpback_whale_sr_2015.pdf
- Proposed Revision of Species-Wide Listing: https://www.gpo.gov/fdsys/pkg/FR-2015-04-21/pdf/2015-09010.pdf
- NMFS Species Profile: http://www.nmfs.noaa.gov/pr/species/mammals/whales/humpback-whale.html
- HIHWNMS Species Profile: http://hawaiihumpbackwhale.noaa.gov/explore/humpback_whale.html

3.2.1 Physical Description

Humpback whales are baleen whales of the family Balaenopteridae. They are large, globally distributed whales with long pectoral flippers, distinct ventral fluke patterning, dark dorsal coloration, a highly varied acoustic call or "song," and a diverse repertoire of surface behavior. Their body coloration is primarily dark grey, but individuals have a variable amount of white on their pectoral fins, flukes, and belly. This variation is so distinctive that the pigmentation pattern on the undersides of their flukes is used to identify individual whales. Coloring of the ventral surface varies from white to marbled to fully black. Dorsal surfaces of humpback whale pectoral flippers are typically white in the North Atlantic and black in the North Pacific (Perrin *et al.* 2002), and the flippers are about one-third of the total body length. Similar to all baleen whales, body lengths differ between the sexes, with adult females being approximately 1– 1.5m longer than males. The humpback whale reaches a maximum of 16–17 m, although lengths of 14–15 m are more typical. Adult body weights in excess of 40 tons make them one of the largest mammals on earth (Ohsumi 1966).

3.2.2 Behavior

Humpback whales are globally distributed and generally are highly migratory, spending spring, summer, and fall feeding in temperate or high-latitude areas and migrating to the tropics in winter to breed and calve. In one of the more closely studied routes, whales have been observed

making the 3,000-mile (4,830 km) trip between Alaska and Hawaii in as little as 36 days (Gabriele *et al.* 1996).

During summer and fall, humpback whales spend much of their time feeding and building fat stores for winter. In their low-latitude wintering grounds, humpback whales congregate and are believed to engage in mating and other social activities. Humpback whales are not known to extensively feed in wintering grounds, although opportunistic feeding has been observed (Salden 1990). Humpback whales are generally polygynous, with males exhibiting competitive behavior on wintering grounds (Tyack 1981; Baker and Herman 1984; Clapham 1996). A complex behavioral repertoire exhibited in these areas can include aggressive and antagonistic behavior, such as chasing, vocal and bubble displays, horizontal tail thrashing, and rear body thrashing. Males within these groups also make physical contact, striking or surfacing on top of one another. Also on wintering grounds, males sing complex songs that can last up to 20 minutes and may be heard up to 20 miles (30 km) away (Clapham and Mattila 1990; Cato 1991). A male may sing for hours, repeating the song numerous times. All males in a population sing the same song, but that song continually evolves over time (Darling and Sousa-Lima 2005). Humpback whale singing has been studied for decades, but its function remains uncertain.

Humpback whales are a favorite of whale watchers, as the species frequently performs aerial displays, including breaching, lobtailing, and flipper slapping, the purposes of which are not well understood. Diving behavior varies by season, with average lengths of dives ranging from less than 5 minutes in summer to 10-15 minutes (and sometimes more than 30 minutes) in winter months (Clapham and Mead 1999). Typically, humpback whale groups are small (e.g., less than 10 individuals, although that can vary depending on social context and season), and associations between individuals do not last long, with the exception of the mother-calf pairs (Clapham and Mead, 1999). For more information about humpback whale breeding, calving, and nursing behavior in Hawaii, refer to section 3.2.8.1 of this document.

3.2.3 Reproduction

The mating system of humpback whales is generally thought to be male-dominance polygyny, also described as a ‘floating lek’ (Clapham 1996). In this system, multiple males compete for individual females and exhibit competitive behavior. Humpback song is a long, complex vocalization produced by males on the winter breeding grounds (Payne and McVay 1971), and also less commonly during migration (Clapham and Mattila 1990; Cato 1991) and on feeding grounds (Clark and Clapham 2004). The exact function has not been determined, but behavioral studies suggest that song is used to advertise for females, and/or to establish dominance among males (Tyack 1981; Darling and Bérubé 2001; Darling *et al.* 2006). It is widely believed that, while occasional mating may occur on feeding grounds or on migration, the great majority of mating and conceptions take place in winter breeding areas (Clapham 1996; Clark and Clapham 2004). Breeding in the Northern and Southern Hemisphere populations is out of phase by approximately six months, corresponding to their respective winter periods.

Sexual maturity of humpback whales in the Northern Hemisphere occurs at approximately 5-11 years of age, and appears to vary both within and among populations (Clapham 1992; Gabriele *et al.* 2007; Robbins 2007). In the Northern Hemisphere, calving intervals are between one and five years, though 2-3 years appears to be most common (Wiley and Clapham 1993; Steiger and

Calambokidis 2000). Estimated mean calving rates are between 0.38 and 0.50 calves per mature female per year (Clapham and Mayo 1990; Straley *et al.* 1994; Steiger and Calambokidis 2000) and reproduction is annually variable (Robbins 2007). Humpback whale gestation is 11-12 months and calves are born in tropical waters (Matthews 1937). Lactation lasts from 10.5-11 months (Chittleborough 1965), and weaning begins to occur at about age six months and calves attain maternal independence around the end of their first year (Clapham and Mayo 1990). Humpback whales exhibit maternally directed fidelity to specific feeding regions (Martin *et al.* 1984; Baker *et al.* 1990).

The average generation time for humpback whales (the average age of all reproductively active females at carrying capacity) is estimated at 21.5 years (Taylor *et al.* 2007). Empirically estimated annual rates of population increase for the North Pacific population range from a low of 0 percent to a maximum of 12.5 percent for different times and areas throughout the range (Baker *et al.* 1992; Barlow and Clapham 1997; Clapham *et al.* 2003; Steiger and Calambokidis 2000); however, Zerbini *et al.* (2010) recently concluded that any rate above 11.8 percent per year is biologically implausible for this species.

3.2.4 Population Status of Humpback Whales in Hawaii

The humpback whales that migrate to Hawaii during the breeding, calving, and nursing season are assigned to the Hawaii population of the North Pacific humpback whale metapopulation. The most recent comprehensive abundance estimate of humpback whales in the North Pacific population resulted from the "Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific" (SPLASH) project. This project was a cooperative, international research project conducted between 2004 and 2006, and involved 7 countries and more than 400 researchers in the entire North Pacific. Researchers from the SPLASH project estimated the entire North Pacific humpback whale population to be 18,307 individuals (Calambokidis *et al.* 2008). Barlow *et al.* (2011) adjusted the abundance to account for several biases in the SPLASH data and estimated an even higher population of 21,808 humpback whales in the entire North Pacific population. The Hawaii population of humpback whales is separated by the greatest geographic distance from neighboring breeding populations in the North Pacific and is genetically distinct (Baker *et al.* 2013). The SPLASH projected estimated the humpback whale population in Hawaii to be 10,103 individuals in 2006 (Calambokidis *et al.* 2008).

Research suggests that the current population of humpback whales in the North Pacific and Hawaii is higher than these estimates, due to a consistent increase in population estimates since the 1960s. For instance, in the entire North Pacific, abundance surveys estimated the number of humpback whales to be 1,400 individuals in 1966 (Rice 1978), 9,819 in 1993 (Calambokidis *et al.* 1997), and at least 18,307 in 2006 (Calambokidis *et al.* 2008), suggesting a 6.8 percent annual population increase since 1966 and 4.9 percent increase since 1993. In Hawaii, abundance surveys of humpback whales estimated an approximate 10 percent increase between 1979 and 1996 (Mizroch *et al.* 2004), 7 percent increase between 1993 and 2000 (Mobley *et al.* 2001), and a 5.5-6.0 percent increase between 1993 and 2006 (Barlow *et al.* 2011) (Figure 3-1).

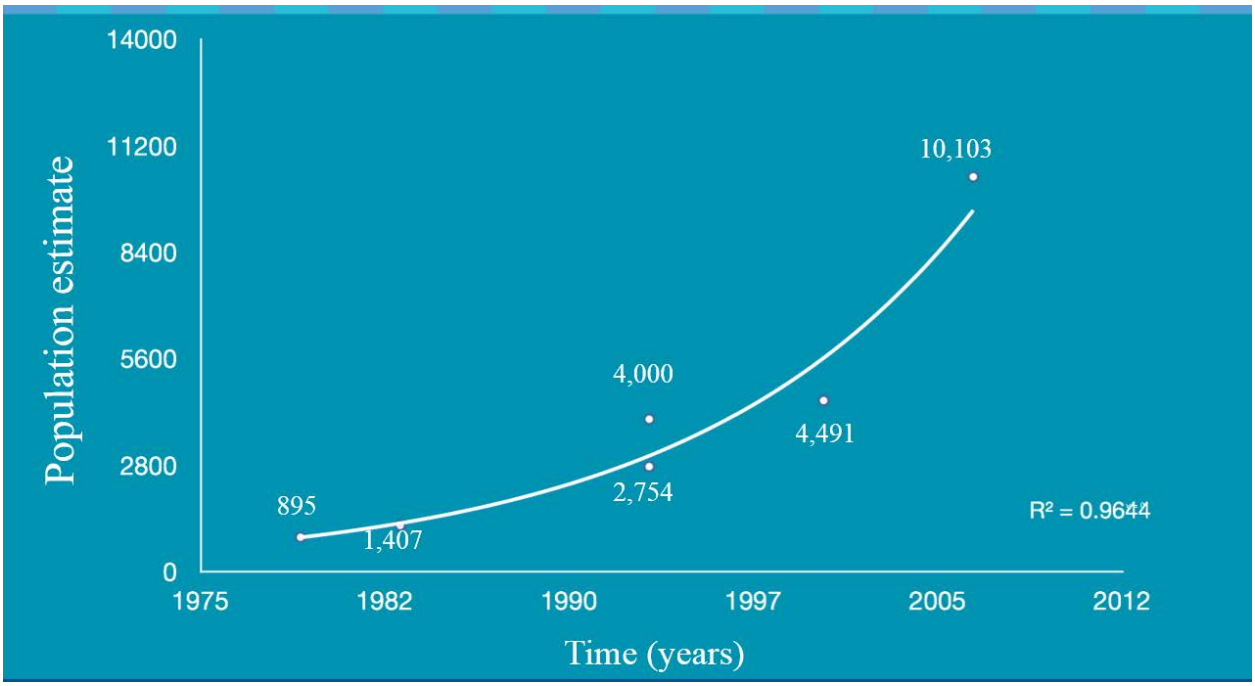

Figure 3-1. Estimated increase in humpback whale population in Hawaii from 1979 to 2006 (adapted by the HIHWNMS using data from Darling *et al.* 1983, Baker and Herman 1987, Cerchio 1998, Calambokidis *et al.* 1997, Mobley *et al.* 2001, and Calambokidis *et al.* 2008).

3.2.5 Distribution and Habitat Use in Hawaii

As stated above, humpback whales in the North Pacific migrate seasonally from northern latitude feeding areas in summer to low-latitude breeding areas in winter (Figure 3-2). Feeding areas are dispersed across the Pacific Rim from California, USA to Hokkaido, Japan. About half of the humpback whales in the North Pacific Ocean breed and calve in Hawaii (Calambokidis *et al.* 2008). They are commonly found in Hawaii between October and May, with the peak season with the highest concentration of whales in the region is January through March. However, there are confirmed sightings and several anecdotal reports of humpback whales arriving to the region as early as August and remaining in the area until as late as June. In addition to several anecdotal reports of early and late season sightings, confirmed sightings data collected by the HIHWNMS reported the earliest confirmed sighting of a humpback whale in the waters surrounding Hawaii was August 30, 2012, and there have been multiple confirmed sightings of distressed humpback whales in May and June (Ed Lyman, personal communication, April 7, 2016). Although the majority of humpback whales in Hawaii are typically sighted during the October to May season, it is likely there are still whales in the area outside of this time period.

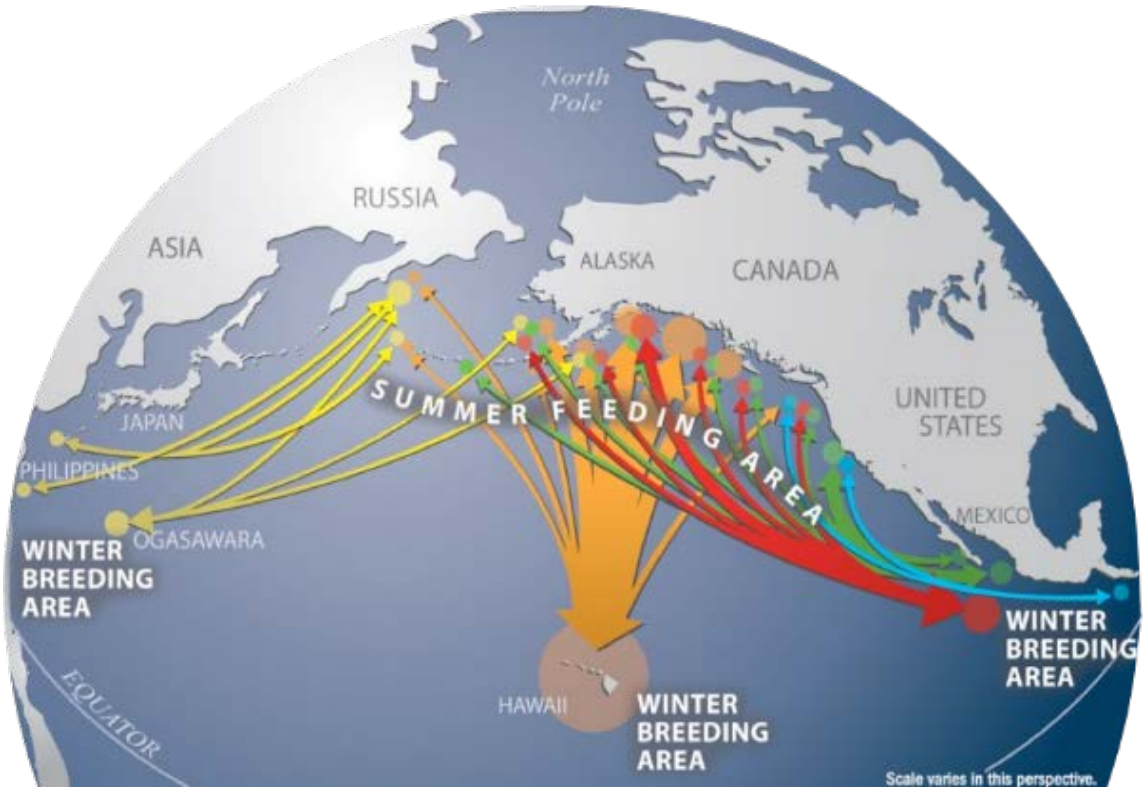

Figure 3-2. Migration patterns of North Pacific humpback whales (adapted by the HIHWNMS using migration data from the SPLASH project (Calambokidis *et al.* 2008).

Humpback whales in Hawaii tend to aggregate in leeward coastal waters out to about 600 ft deep; however, a high density of whales are also found near offshore shallow banks (NOAA 1997). Aerial surveys by Mobley *et al.* (2003) indicate that the most concentrated areas of humpback whale sightings during the winter months are the Maui Nui area (waters in between the islands of Maui, Molokai, Lanai, and Kahoolawe), the Penguin Bank (shallow bank extending southwesterly from Molokai), waters off the north and west coasts of Hawaii, Oahu, and Kauai, and the waters surrounding Niihau (Figure 3-3). As of the time of this study, much of the area containing a high density of humpback whales was located within the boundaries of the HIHWNMS. However, the data on which this is based are outdated, and the consistent increase in humpback whales in Hawaii in recent years could have significantly shifted to create more high density aggregations outside of the HIHWNMS. More recent surveys also indicate an increase in use of waters surrounding the NWHI by humpback whales (Johnston *et al.* 2007).

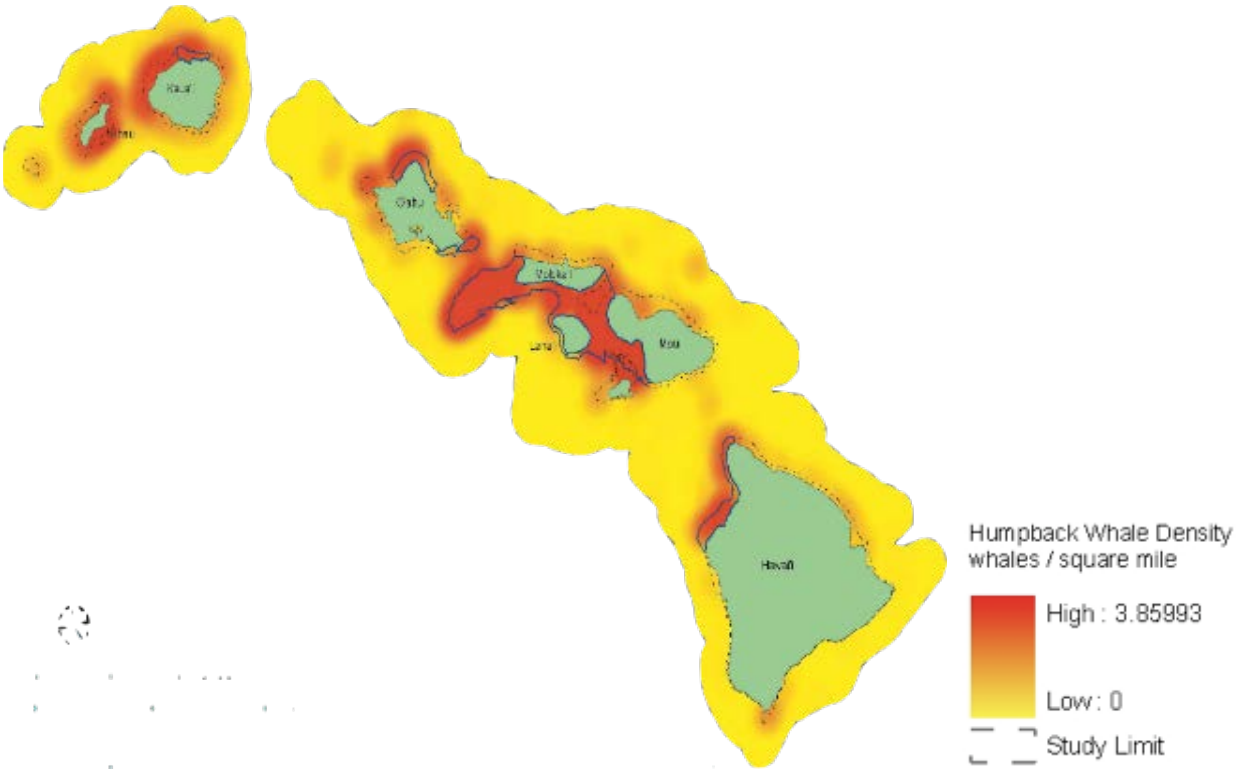

Figure 3-3. Humpback whale density per square mile in coastal waters surrounding Hawaii. Solid lines off the coast designate the boundaries of the HIHWNMS. Colored areas indicate the extent of the study (adapted by the HIHWNMS using aerial survey data from Mobley *et al.* 2003).

3.2.6 Natural Threats

Natural threats to humpback whales in Hawaii are considered to have a relatively low impact on the health status of the species. There is a moderate of amount of predation on smaller humpback whales by killer whales (Steiger *et al.* 2008), and it is likely that shark predation also occurs on weak and unhealthy whales. Mortality caused by biotoxins from dinoflagellates has not been documented in humpback whales that breed in Hawaii in any part of their range; however, there have been reported mortalities attributed to this in other humpback whale feeding grounds. The occurrence of harmful algal blooms (HABs) is expected to increase with the growth of human-related activities that cause higher water temperatures and increased nutrient loading. However, the future impact of HABs on humpback whales is currently unknown, and HABs are rare in waters surrounding Hawaii. There are no reports of unusual disease or mass mortality events of humpback whales in Hawaii or in their feeding grounds in Alaska. However, cetacean morbillivirus, a disease that is known to have caused mass strandings of other cetaceans around the world, was detected in the liver of a humpback whale calf that stranded on Lanai in 1998 (Jacob *et al.* 2016). Approximately 2/3 of humpback whales in Hawaii exhibit some evidence of permanent, raised skin lesions that may be a reaction from an unknown parasite (Mattila and Robbins 2008). There currently is no evidence suggesting these lesions have deleterious health effects on these animals. For a more comprehensive threat analysis for humpback whales in Hawaii, refer to the March 2015 Status Review of the Humpback Whale (*Megaptera novaeangliae*) under the Endangered Species Act (Bettridge *et al.* 2015).

3.2.7 Anthropogenic Threats other than Approach

Anthropogenic impacts are considered more of a threat to Hawaii humpback whales than those that occur naturally. In addition to the threats from approach (see next section), expanding coastal development, particularly in Hawaii, can intensify potential anthropogenic threats in the form of manufacturing, coastal runoff and continued human population growth (refer to section 3.4.1 of this document for more information on population growth in Hawaii).

Manufacturing and coastal runoff can cause harmful chemicals and debris to wash into the oceans. High concentrations of persistent organic pollutants have been linked to negative health effects in cetaceans, but only minimal concentrations of persistent organic pollutants have been detected in humpback whales in Hawaii. Low levels of DDTs, PCBs, PBDEs, HCHs, and chlordanes were measured in blubber biopsy samples of live humpback whales in Hawaii and Alaska (Elfes *et al.* 2010) and stranded humpback whales in Hawaii (Bachman *et al.* 2015). Low to undetected levels of perfluorinated compound congeners were also measured in stranded humpback whales in Hawaii (Kurtz *et al.* 2014).

Commercial activities on the waters surrounding Hawaii can pose threats to humpback whales. Although offshore drilling was removed from consideration in much of the feeding grounds of humpback whales that breed in Hawaii in 2010, these activities could become a threat if they resume in the future. There are no commercial whaling activities in the range of humpbacks whales that breed in Hawaii, but modest aboriginal hunting was proposed in British Columbia (Reeves 2002). There is suspected humpback whale competition for food sources with herring and krill fisheries in British Columbia; however, current impacts from competition with these fisheries are considered minimal.

A significant threat to humpback whales that breed in Hawaii is entanglement in commercial fishing gear, particularly in their feeding grounds, although it also occurs in Hawaii. Recent studies of characteristic wounds and scarring indicate that these humpback whales experience a high rate of interaction with fishing gear (20-71 percent), with the highest rates recorded in Southeast Alaska and Northern British Columbia (Neilson *et al.* 2009). However, these rates represent only survivors of such interactions. Fatal entanglements of humpback whales in fishing gear have been reported in all areas; however, given the isolated nature of much of their range, observed fatalities are almost certainly under-reported and should be considered minimum estimates. Recent studies in another humpback whale feeding ground in Alaska, which has similar levels of scarring, estimate that the actual annual mortality rate from entanglement may be as high as 3.7 percent (Angliss and Outlaw 2008). The HIHWNMS also monitors entanglements in waters surrounding Hawaii, and confirmed reports of entangled whales have notably increased since 2002 (Figure 3-4).

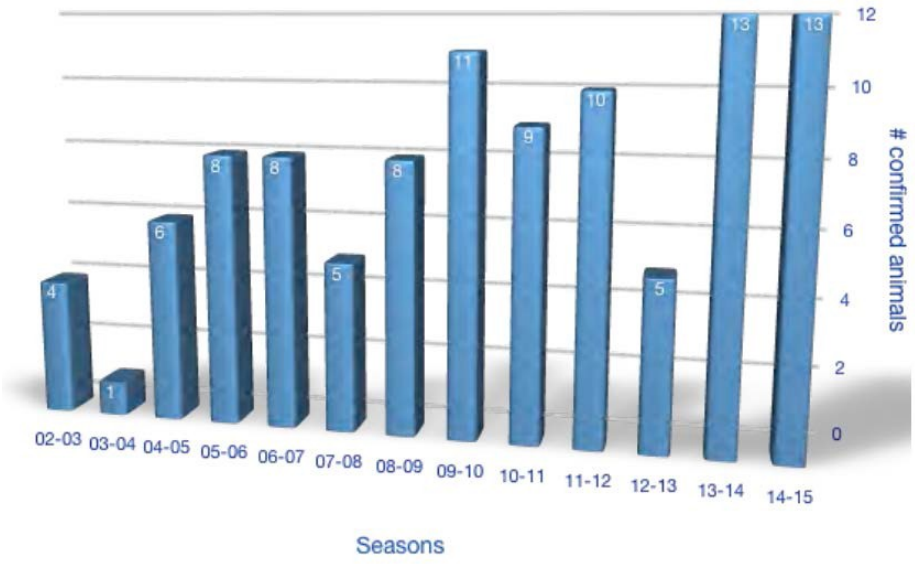

Figure 3-4. Number of confirmed whales reported entangled in Hawaii between 2002 and 2015 seasons (Lyman, 2015).

3.2.8 Threats from Human Interaction

Human interaction poses a significant risk to the health and social structure of humpback whales. Because they are a large, charismatic species, humpback whales are often approached and observed by whale watchers and wildlife enthusiasts who are on vessels (boats), aircraft, or in the water. The interactions that ensue can disrupt the normal behavior or prior actions of whales and can often result in behavioral harassment. Behavioral harassment refers to human activities that can affect the behavior of wildlife, thereby potentially affecting energy budgets and habitat use patterns, cause displacement from preferred habitats, and affect individual and population health and fitness (ONMS 2015).

There are few studies that have directly examined the effects of approach of humpback whales in Hawaii. This may be due to lack of prioritization of examining the effects of approach on whales in Hawaii because protections from approach have been implemented in the region for many years, or because longstanding approach restrictions have resulted in fewer cases of humpback whale harassment in Hawaii from approach than other areas that do not have approach restrictions in place. However, there is a large amount of research on adverse effects of human interaction and approach in other regions throughout the world on humpback whales and similar species. Below, we use this analogous evidence to analyze management options for minimizing harassment of understudied humpback whales in Hawaii from approach. Also, research from other regions that do not have approach restrictions can provide beneficial insight on future potential effects on humpback whales in Hawaii if approach regulations are no longer in effect.

Threats to humpback whales from human interaction can result from close vessel interactions, close aircraft interactions, increased risk of vessel collisions, and increased noise. Many humpback whales in Hawaii may be even more susceptible to harmful effects from human interaction than other regions because disruption of breeding, nursing and calving activities could potentially impede healthy reproduction and development of the species. Furthermore, we

expect an increase in human-whale interactions as both human and whale populations continue to increase. Understanding these threats is important to properly analyze the impacts of the proposed action and no-action alternatives on humpback whales in Hawaii, which are described in section 4.2.

3.2.8.1 Impacts during Breeding, Nursing, and Calving Activities

Humpback whales migrate to Hawaii from their feeding grounds in the North Pacific during the winter months for reproductive activities including breeding, calving and nursing. Cows with newborn calves are typically sighted in Hawaii as early as December, and sightings peak in February and March (Darling 2001). The warm, calm waters around Hawaii provide protective environments required for such activities and are essential to the life history of humpback whales. Cow/calf pairs are more likely to be found in shallow, inshore water than other whales, presumably to avoid harassment from males, turbulent offshore conditions, and predators (Darling 2001). A large portion of the behavior of cow/calf pairs is resting (Cartwright 1999). Also, calves have been observed imitating the behaviors of mothers and male escorts (Glockner-Ferrari and Ferrari 1985; Cartwright 1999), a phenomenon that appears to indicate adults teaching calves typical whale behavior. These activities suggest that the relationship between adults, particularly mothers, and calves early in the calves' lives is an integral stage in the social development of the species.

Frequent close interactions with humans can potentially disrupt the mother-calf relationship and, thus, hinder the behavioral development of humpback whale calves. Also, increased interaction with humans can potentially condition calves to approach vessels more frequently (Watkins 1986). Habituation to vessel interaction increases the likelihood of whales being in close proximity to vessels and, thus, making conditioned whales more susceptible to vessel strikes. This may be occurring in Hawaii, where 63.5 percent of vessel collisions between 1975 and 2011 involved calves and juveniles (Lammers *et al.* 2013).

Aggressive behavior on the part of male whales and lack of awareness by both males and avoiding females potentially make whales more susceptible to vessel strikes. Male humpback whales often display aggressive behavior during courting activities in the Hawaii breeding grounds (Darling *et al.* 1983; Tyack and Whitehead 1983; Baker and Herman 1984; Glockner-Ferrari and Ferrari 1985; Clapham *et al.* 1992). This aggressive behavior is frequently observed in Hawaii. Although aggressive behavior by humpback whales towards humans is not common, more close interactions with humans could potentially create more stress for animals that are already in a combative state (Baker and Herman 1984; Bauer and Herman 1986). Furthermore, males engaging in competitive behaviors and females avoiding aggressive advances from one or more males may not be fully cognizant of approaching vessels. Female whales have even been observed leading pursuing males closely to vessels in order to thwart their advances to mate (Glockner-Ferrari and Ferrari 1985). Females protecting newborn calves and male escorts maintaining mating status with post-partum females with calves have also been observed displaying aggressive behaviors towards intruders, including humans (Darling 2001).

The waters surrounding Hawaii are an integral breeding, calving, and nursing habitat for the largest humpback whale DPS in the North Pacific. Exposing cow/calf pairs to excessive human interaction can disrupt the development process and become detrimental to the health of the calf.

Also, aggressive courting and mating behaviors by both male and female humpback whales can increase the risk of vessel strikes. Restrictions are currently in place to prevent humans approaching whales while in this vulnerable state. Terminating approach restrictions has the potential to create a more hazardous environment for both humpback whales and humans.

3.2.8.2 Impacts from Close Vessel Interactions

Vessel approach and interactions with humpback whales can lead to behavioral changes or physical injury to the whale, which may affect energy budgets and habitat use patterns, cause displacement from preferred habitats, and affect individual and population health and fitness. Humpback whales have been found to exhibit predictable changes in behavior in response to vessels in close proximity to the animals. Behavioral responses in humpback whales, such as changes in swimming speed, respiration, diving, and social behaviors were linked to vessel numbers, speed, and proximity in waters around Maui (Bauer and Herman 1986; Bauer *et al.* 1993). In other parts of the world, Baker and Herman (1989) found that humpback whales in Alaska responded to vessels within 4,000 m with changes in respiratory behavior (decreasing blow intervals and increasing dive times) and orientation (moving away from approaching vessels' path). They concluded that vessels repeatedly approaching humpback whales could result in dislocation from their preferred feeding areas. A study examining approach to humpback whales in Hervey Bay, Australia concluded that whales were more likely to dive when vessels were within 300 m than farther away from that distance, implying that vessels in close proximity to humpback whales can elicit evasive behavior (Corkeron 1995). Another study off of New South Wales, Australia observed a response from humpback whales when approached by a whale watch vessel 40 percent of the time, with 23 percent having approached the vessel and 17 percent having avoided the vessel (Stamation *et al.* 2010). Most humpback whales observed in this study that approached the whale watch vessels elicited behaviors attributed to disruption (e.g., trumpet blows and fluke swishes), and whales that avoided the vessels were reported to have longer dive times and time submerged. Vessels that approached humpback whales within 100 m were significantly more likely to elicit an avoidance response, particularly with regard to pods with a calf. Overall, humpback whales that were approached by whale watch vessels had a higher dive time, higher time submerged, and fewer surface activity behaviors than whales that were observed from the shore without vessels present, and pods with calves were more sensitive to vessel approach than pods without calves (Stamation *et al.* 2010).

In yet other situations, humpback whales became quickly habituated to human activity when repeatedly exposed to vessel traffic in the North Atlantic (Watkins 1986). Habituation to human activity can lead to an increase in close encounters between humans and whales, making whales more susceptible to physical injury from vessel strikes. Regardless of whether humpback whales are eliciting evasive or incautious behavior, it is evident that behavioral harassment of whales can occur with vessel approach.

Because humpback whales annually migrate over extremely long distances, energy budgeting is crucial for the health and propagation of the species. A recent study by Braithwaite *et al.* (2015) measured the effects of vessel disturbance on energy use of humpback whales during migration. They concluded that overall energy use in migrating humpback whales increases when disturbed by close encounters with approaching vessels. It is rare that humpback whales feed in waters surrounding Hawaii, so these animals are reliant on limited fat stores to provide energy for their

breeding, calving, and nursing activities in the region. Any deficiency in the conservation of energy can potentially be detrimental to these essential reproductive behaviors. Excessive energy use can be particularly taxing on pregnant and postpartum humpback whale females and their calves. An exorbitant amount of energy is needed to give birth to and nurse newborn calves. An increase in energy use because of vessel disruptions in waters surrounding Hawaii can have negative implications for the health of mothers and the growth potential of calves (Braithwaite *et al.* 2015).

Reports of humpback whale harassment are common in Hawaii. NOAA Office of Law Enforcement (OLE) documented hundreds of complaints concerning harassment of humpback whales around Hawaii between 2007 and 2014 (Figure 3-5). Although the location of reported harassments to NOAA-OLE were not always precise, there were numerous complaints in areas outside of the HIHWNMS.

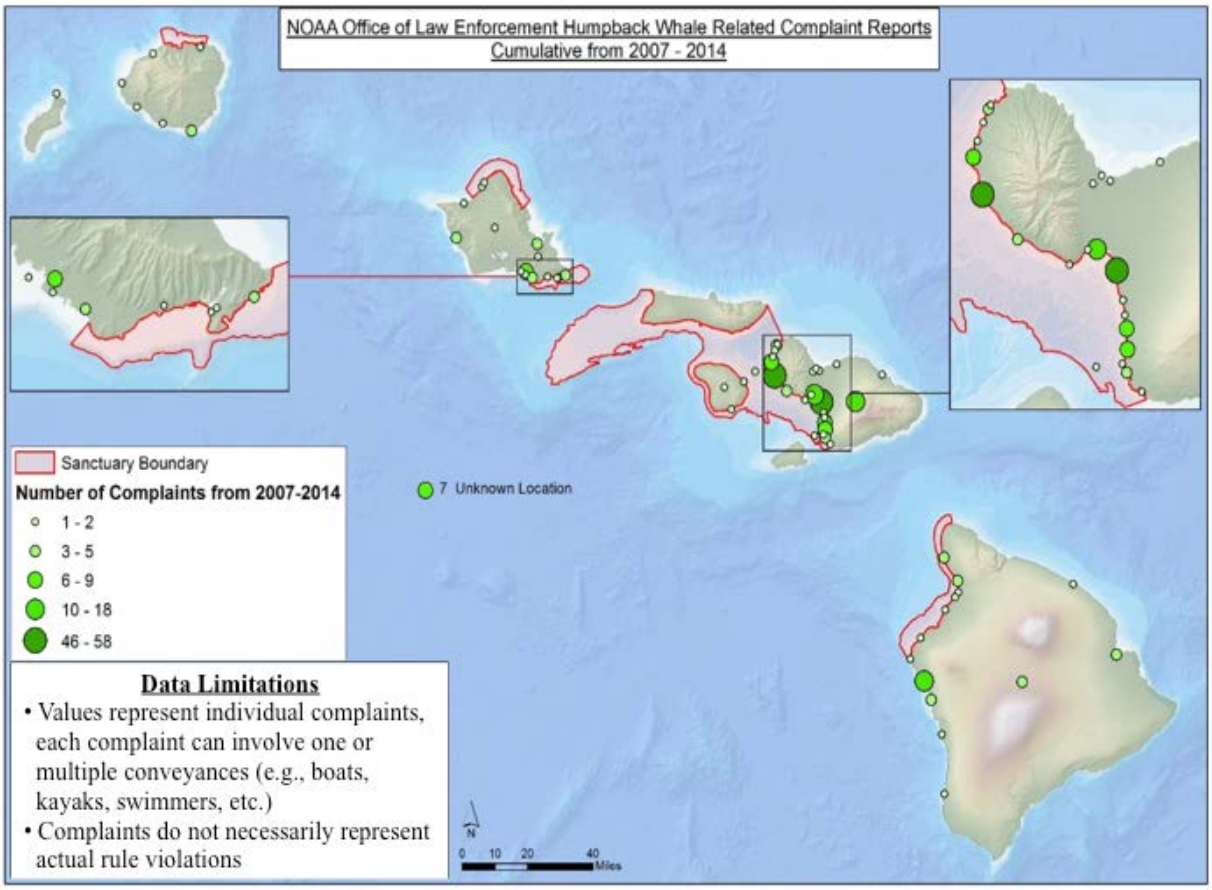

Figure 3-5. Humpback whale-related complaint reports in the Main Hawaiian Islands from 2007 to 2014 (circles represent the estimated location of a harassment or the location from which the harassment was sighted) (adapted from a figure by Take Tomson NOAA-OLE, 2014).

3.2.8.3 Impacts from Close Aircraft Interactions

Aircraft in proximity to humpback whales in Hawaii have been shown to elicit a behavioral response. Smultea *et al.* (1995) reported that humpback whales near Kauai, particularly pods with calves, responded to low flying planes by increasing swim speeds and changing direction.

General accounts of disturbance of humpback whales in Hawaii and other regions caused by a range of sources, including helicopter tours, were highlighted in a workshop that reviewed and evaluated whale watching programs (Atkins and Swartz 1989). Other reports have also discussed cases of disturbance of humpback whales in Hawaii resulting from helicopters and other aircraft (Shallenberger 1978; Tinney 1988).

Several studies targeting other species and/or other regions also provide evidence that aircraft can disrupt large whales. In their review on the effects of man-made noise on whales, Richardson and Würsig (1997) claim aircraft overflights with altitudes as high as 400 m can elicit specific reactions (e.g., sudden dives or turns and occasional tail or flipper slaps) from both baleen and toothed whales; however behaviors can vary depending on species, animal activity, and water depth. Various behavioral responses from sperm whales were observed in response to aircraft throughout different parts of the world, including in waters near Kauai, where they reacted to aircraft at about 250 m in altitude and 360 m in horizontal distance (Smultea *et al.* 2008). Short-term behavioral responses (e.g., short surfaces, immediate dives or turns, changes in behavior state, vigorous swimming, and breaching) were observed in both bowhead and beluga whales when approached by helicopters and fixed-wing aircraft. Most reactions occurred within 150 m altitude and 250 m lateral distance of helicopters and 182 m altitude and 250 m (but up to 460 m) lateral distance of fixed-wing aircraft (Patenaude *et al.* 2002). Aircraft that hover or repeatedly pass over whales at a low altitude are thought to cause significantly more disruption than aircraft that briefly pass directly over or to the side of whales (Richardson and Würsig 1997).

Aircraft are explicitly cited by NMFS as a potential instrument of take under the MMPA in regulations that state that take can include “the negligent or intentional operation of an aircraft or vessel, or the doing of any other negligent or intentional act which results in disturbing or molesting a marine mammal” (50 CFR 216.3). Other regulations and notices have interpreted approach to humpback whales by aircraft in Hawaii as a form of harassment. Current approach regulations promulgated under the ESA (50 CFR 224.103) and in the HIHWNMS (15 CFR 922.184) restrict operating aircraft within 1,000 feet of humpback whales in Hawaii and Sanctuary waters. A response to a comment in the November 23, 1987, interim rule “Approaching Humpback Whales in Hawaiian Waters” further clarified the restricted area around the whale to aircraft as “a 1,000 foot aerial dome over a whale” (52 FR 44912). This 1,000 foot perimeter was implemented in the final rule humpback whale approach rule on January 19, 1995 (60 FR 3775).

Regions outside of Hawaii have also implemented aircraft operations near whales and or marine mammals, supporting the widely-accepted need to protect whales from this type of disturbance. Approach regulations for North Atlantic right whales published on February 13, 1997, restricts approach by aircraft conducting whale watching activities within 500 yards of a whale, and must take a course away from the whale and immediately leave the area at a constant airspeed if within 500 yards (50 CFR 224.103(c)). It is also prohibited to fly motorized aircraft at less than 1,000 feet over marine mammals in the Channel Islands National Marine Sanctuary (15 CFR 922.71) and the Greater Farallones National Marine Sanctuary (15 CFR 922.82) or in specified regions of the Monterey Bay National Marine Sanctuary (15 CFR 922.132). Approach regulations for all cetaceans in Australia require that helicopters do not approach within 500 m

and all other aircraft do not approach within 300 m (National Parks and Wildlife Amendment (Marine Mammals) Regulation 2006 (Cth) No 271 (57)). New Zealand has similar rules for approaching wildlife, in that it is unlawful to operate aircraft from a horizontal distance of 150 m from any marine mammal, 200 m of any baleen or sperm whale mother-calf pair, and 300 m from any marine mammal if three or more vessels or aircraft are already positioned to enable passengers to watch the animals (Marine Mammals Protections Regulations 1992 s 18(g,h) and s 19(d)).

3.2.8.4 Impacts from UAS Interactions

The use of non-military small Unmanned Aircraft Systems (UAS) has increased throughout the world in recent years (Choi-Fitzpatrick *et al.* 2016). UAS can offer a new method for scientific researchers and emergency responders to obtain important information about marine mammals (Chabot and Bird 2015; Christie *et al.* 2016), and can allow photographers and videographers to capture the beauty of marine mammals. Despite these benefits, UAS have the potential to be disruptive to marine mammals if not used safely, appropriately, or responsibly.

3.2.8.5 Risks of Vessel Collisions

Collisions between vessels and whales often result in life-threatening trauma or death for the cetacean. The impact is frequently caused by forceful contact with the bow or propeller of the vessel. Vessel strikes of humpback whales are typically identified by evidence of massive blunt trauma (fractures of heavy bones and/or hemorrhaging) in stranded whales, propeller wounds (deep slashes or cuts) and fluke/fin amputations on stranded or live whales (Wiley and Asmutis 1995).

Collisions between ships and large whales (baleen whales and sperm whales) have been documented and compiled worldwide (Laist *et al.* 2001, Jensen and Silber 2003, Vanderlaan and Taggart 2007, VanWaerebeek and Leaper 2008). Humpback whales were the second-most commonly reported victims of vessel strikes, following fin whales (Jensen and Silber 2003; Laist *et al.* 2001). Of 292 recorded strikes contained in the Jensen and Silber (2003) database, 44 were of humpback whales. As of 2008, there were more than 143 recorded ship strikes involving humpback whales worldwide (Van Waerebeek and Leaper 2008); however, the reported number is likely not a full representation of the actual number (particularly in the Southern Hemisphere) as many likely go undetected or unreported (Williams *et al.* 2011).

There is substantial evidence indicating vessels strikes with whales are increasing both globally and in Hawaii (Carrillo and Ritter 2010; De Stephanis and Urquiola 2006; Douglas *et al.* 2008; Laist *et al.* 2001; Lammers *et al.* 2013; Panigada *et al.* 2006; Lammers *et al.* 2013). Lammers *et al.* (2013) estimated that vessel collisions (i.e., any physical contact between a humpback whale and a vessel) increased 20-fold between 1976 and 2011 in the waters surrounding Hawaii, particularly between 2000 and 2011. There were 68 confirmed reports of vessel collisions during this timeframe, and 63 percent of the collisions involved calves and subadults (Lammers *et al.* 2013). Between 2007 and 2012, there were 39 confirmed reports of vessel collisions with humpback whales near Hawaii; 11 of these collisions were determined as serious injuries and another 11 were proportionally prorated serious injuries as per the NMFS process for distinguishing serious from non-serious injury of marine mammals (NMFS 2012; Bradford and

Lyman 2015). According to a database managed by the HIHWNMS, there have been 76 reports of whale-vessel contacts in waters surrounding the MHI between 2002 and 2015, with a large majority of them occurring in the four islands region between Maui, Molokai, Lanai, and Kahoolawe (Figure 3-6). Of the vessel collisions where the status of the vessel's movement could be determined (i.e., either normal transiting or more directly approaching humpback whales), 17 percent of reports (11 of 66, 10 undetermined) indicated that the vessel was operating in a more directed approach of a humpback whale (Ed Lyman, personal communication, April 29, 2016).

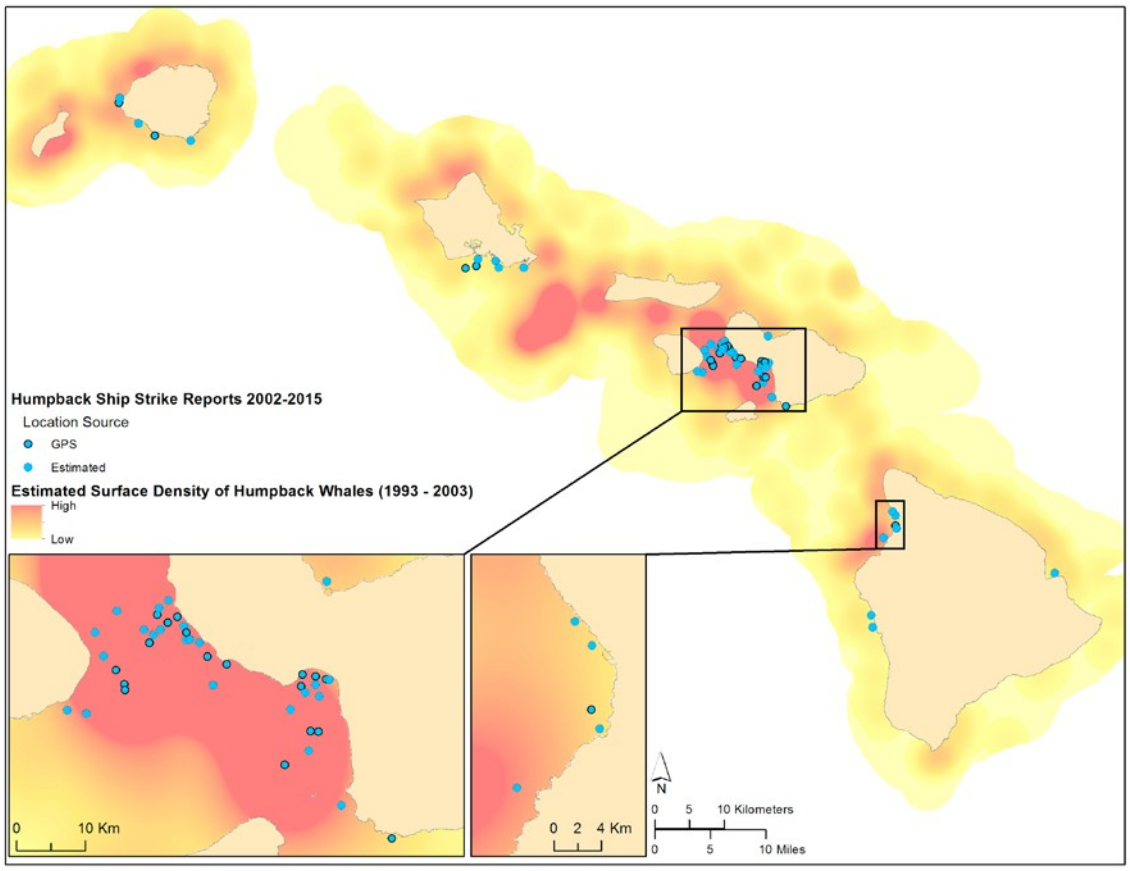

Figure 3-6. Contact between humpback whales and vessels from 2003 to 2015 (adapted by the HIHWNMS using aerial survey data from Mobley *et al.* 2003 and the North Pacific Large Whale Entanglement Response Network database).

There are multiple factors that are likely attributed to the increase in reported vessel strikes with humpback whales in Hawaii in recent years. An extensive awareness campaign and Hotline number were initiated in 2003 and likely contribute to the increased number of reports. However, Lammers *et al.* (2013) compiled a summary of all reported vessel collisions in Hawaii between 1975 and 2011 and concluded that increasing numbers of humpback whales in Hawaii was an important contributor to the trend. They also suggest that an increase in the number of vessels of a specific size and changes in behavior of vessels around humpback whales could affect the rate of vessel collisions. Although the total number of registered vessels in Hawaii has not significantly increased in recent years, registered vessels sized between 7.9 m and 19.8 m has significantly increased. Approximately two thirds of reported collisions involved vessels that

were within the 7.9 m to 19.8 m length range (Lammers *et al.* 2013). Tour vessels (e.g. whale watching, diving, snorkeling boats, etc.) comprised 61 percent of vessel collisions with humpback whales. Because the behavior of these vessels typically place them in close proximity to humpback whales, vessel collisions may have increased over time as the industry comparably expanded. It is important to note that tour vessels typically have a high number of passengers, and this may increase the likelihood of reporting a vessel collision.

Although more than half of reported vessel collisions with humpback whales in Hawaii in recent years occurred within the boundaries of the HIHWNMS, there has been a substantial number of vessel collisions outside of Sanctuary waters. According to a database on reports of animals in distress managed by the HIHWNMS, 37 percent (28 of 76) of reported vessel collisions between 2002 and 2015 occurred outside the boundaries of the HIHWNMS (Ed Lyman, personal communication, April 7, 2016). Many of the collisions outside of the HIHWNMS occurred in concentrated boat traffic and popular whale watching areas, such as the south shore of Oahu near Honolulu Harbor and the leeward side of Kauai. If legal protections from approaching humpback whales are not implemented outside the HIHWNMS, vessel collisions could significantly increase, especially with an increasing humpback whale population and increasing human-based use of the ocean in Hawaii (see section 3.2.8.7).

Vessel collisions with humpback whales can also cause significant damage to vessels and result in serious harm or death of passengers (e.g., Laist *et al.* 2001; Neilson *et al.* 2012). Many serious injuries caused by collisions or sudden movements to avoid collisions with large whales have been reported throughout the world, including a young child dying from head trauma sustained after a close interaction with a humpback whale in Hawaii (DePledge 2003). Details about the effects of the proposed action on human health and safety are analyzed in sections 3.5 and 4.4 of this document.

3.2.8.6 Impacts from Human-Related Noise

Humans introduce sound intentionally and unintentionally into the marine environment for navigation, oil and gas exploration and acquisition, research, military activities, and many other reasons. Noise exposure can result in a range of impacts to whales, from little or none to severe, depending on the source, level, distance between the source and the receptor, characteristics of the animal (e.g., hearing sensitivity, behavioral context, age, sex, and previous experience with sound source), time of day or season, and various other factors. In marine mammal populations, noise can seriously disrupt communication, navigational ability, and social patterns. Humpback whales use sound to communicate, navigate, locate prey, and sense their environment. Both anthropogenic and natural sounds may cause interference with these functions.

Understanding the specific impacts of sounds on baleen whales is difficult. However, it is clear that the geographic scope of potential impacts is vast as low-frequency sounds can travel great distances under water, and these sounds have the potential to reduce the space that whales utilize for communication (i.e., communication space). For example, shipping was predicted to reduce communication space of singing humpback whales in the northeast U.S. by 8 percent (Clark *et al.* 2009). Other detrimental effects of anthropogenic noise include masking and possible temporary threshold shifts. Masking results when noise interferes with cetacean social communication, which may range greatly in intensity and frequency. Some adjustment in

acoustic behavior is thought to occur in response to masking. For instance, humpback whale songs were found to lengthen during LFA sonar activities (Miller *et al.* 2000). This altered song length persisted 2 hours after the sonar activities stopped (Fristrup *et al.* 2003). Researchers have also observed diminished song vocalizations in humpback whales during remote sensing experiments 200 km away from the whales' location in the Stellwagen Banks National Marine Sanctuary (Risch *et al.* 2012). Hearing loss can also be permanent if the sound is intense enough, although effects vary greatly across individuals. This and other factors make it difficult to determine a standardized threshold. Humpback whales do not appear to be frequently involved in strandings related to noise events. However, there is one record of two whales found dead with extensive damage to the temporal bones near the site of a 5,000 kg explosion which likely produced shock waves that were responsible for the injuries (Ketten *et al.* 1993; Weilgart 2007).

Humpback whales in Hawaii are likely exposed to moderate levels of underwater noise resulting from human activities, which include commercial and recreational vessel traffic, pile driving from coastal construction, and activities in Naval test ranges. Boat noise might affect humpback whale singing behavior by altering the rhythm or increasing the tempo of songs (Norris 1994). Noise is also the likely major contributor of reported behavioral changes of humpback whales in Hawaii with regard to aircraft disturbance (Atkins and Swartz 1989; Shallenberger 1978; Smultea *et al.* 1995; Tinney 1988). Overall population-level effects of exposure to underwater noise are not well established, but exposure is likely chronic. As vessel traffic and other activities are expected to increase, the level of this threat is expected to increase.

3.2.8.7 Increase in Human-Whale Interactions as Both Populations Increase

The humpback whale population in Hawaii is increasing (Darling *et al.* 1983; Baker and Herman 1987; Cerchio 1998; Calambokidis *et al.* 1997; Mobley *et al.* 2001; Calambokidis *et al.* 2008). The human population is also increasing (see section 3.4.1. for a description of human population growth in Hawaii). As both populations increase, the probability of humans interacting with humpback whales in Hawaii will likely increase. Increasing numbers of humpback whales in Hawaii also increases the likelihood of encountering whales outside of the HIHWNMS, where they will remain protected regardless of whether they remain listed under the ESA. Current approach restrictions limit opportunities to lawfully approach humpback whales, thus establishing a safe perimeter around whales. If whales are not protected by approach restrictions, this would erase this perimeter and increase the danger attributed to being in close proximity to whales. With an increasing humpback whale population in Hawaii, eliminating approach regulations is a cause for concern in regard to both human and whale safety.

As a result of human population growth and demand for new products and tourist destinations, ocean recreation in Hawaii is increasing. The value of the tour boat industry has increased by 300 percent from 1984 to 2003 (Markrich 2004). Whale watching has also increased in recent years from 52 operators in 1999 to an estimated 117 companies currently offering tours specific to whale watching (Hoyt, 2002; Internet search, February 2016).

As the number of people, tourism, and ocean-based activities increases in Hawaii, the number of interactions between humans and humpback whales will also likely increase. If humpback whales are not protected by approach regulations in Hawaii, unrestricted access to whales outside of the HIHWNMS would likely result in more close encounters with commercial whale watching

and recreational vessels, thus resulting in increased take of whales, while placing the safety of both humans and whales in jeopardy.

3.3 Other Protected Wildlife

The waters surrounding the Hawaii provide habitat to a diversity of aquatic wildlife. In addition to being the breeding, calving, and nursing grounds for humpback whales, this region provides habitat to other protected species such as cetaceans, Hawaiian monk seals, sea turtles, and seabird species.

3.3.1 Marine Mammals

3.3.1.1 Cetaceans

Approximately 26 species of cetaceans have been observed, or may occur, in waters around Hawaii (19 odontocete species and seven mysticete species) (Table 3-1). Most cetacean species are observed in offshore waters, but some species besides humpback whales are commonly observed in waters close to shore. These species include spinner dolphins, Pantropical spotted dolphins, bottlenose dolphins, false killer whales, short-finned pilot whales, and melon-headed whales. Spinner dolphins, in particular, are observed daily in shallow waters and are often reported in the same areas as humpback whales. Spinner dolphins are also the focus of the dolphin watch industry in Hawaii, whereas other cetaceans are observed opportunistically on dolphin watch cruises. More information on Hawaiian spinner dolphins and their interactions with humans can be found at http://www.fpir.noaa.gov/PRD/prd_spinner_EIS.html.

Table 3-1. Cetacean species within waters surrounding Hawaii.

Suborder	Common Name	Scientific Name	ESA Listing Status
Mysticeti	Blue whale	*Balaenoptera musculus*	Endangered
	Bryde's whale	*Balaenoptera edeni*	No
	Fin whale	*Balaenoptera physalus*	Endangered
	Humpback whale	*Megaptera novaeangliae*	Endangered
	North Pacific right whale	*Eubalaena japonica*	Endangered
	Minke whale	*Balaenoptera acutorostrata*	No
	Sei whale	*Balaenoptera borealis*	Endangered
Odontoceti	Blainville's beaked whale	*Mesoplodon densirostris*	No
	Bottlenose dolphin	*Tursiops truncatus*	No
	Common dolphin	*Delphinus delphis*	No
	Cuvier's beaked whale	*Ziphius cavirostris*	No
	Dwarf sperm whale	*Kogia sima*	No
	False killer whale	*Pseudorca crassidens*	Endangered[a]
	Fraser's dolphin	*Lagenodelphis hosei*	No
	Killer whale	*Orcinus orca*	No[b]
	Longman's beaked whale	*Indopacetus pacificus*	No
	Melon-headed whale	*Peponocephala electra*	No
	Pantropical spotted dolphin	*Stenella attenuata*	No
	Pygmy killer whale	*Feresa attenuata*	No
	Pygmy sperm whale	*Kogia breviceps*	No
	Risso's dolphin	*Grampus griseus*	No
	Rough-toothed dolphin	*Steno bredanensis*	No
	Short-finned pilot whale	*Globicephala macrorhynchus*	No
	Sperm whale	*Physeter macrocephalus*	Endangered
	Spinner dolphin	*Stenella longirostris longirostris*	No
	Striped dolphin	*Stenella coeruleoalba*	No

[a] Only the Main Hawaiian Islands Insular population is listed as endangered.
[b] The Southern Resident population is listed as endangered but individuals from this population are not known to occur in waters surrounding Hawaii.
Source: **http://www.fpir.noaa.gov/Library/PRD/ESA%20Consultation/Hawaii_Species_List_Jan-2015.pdf**

Detailed information on these species' geographic ranges, abundance, bycatch estimates, and status can be found in the most recent Stock Assessment Reports, available online at: http://www.nmfs.noaa.gov/pr/sars/.

3.3.1.2 Pinnipeds

The most common pinniped found in Hawaii is the Hawaiian monk seal (*Neomonachus schauinslandi*), an endangered species. The majority of Hawaiian monk seals reside in the NWHI, but there is an increasing of number seals being observed in the MHI. Monk seals are primarily a coastal species, but they have been known to swim long distances and between

islands. Detailed information, including the range, abundance, status, and threats, can be found in the recovery plan for Hawaiian monk seals at: http://www.nmfs.noaa.gov/pr/pdfs/recovery/hawaiianmonkseal.pdf.

Northern elephant seals (*Mirounga angustirostris*) have also been observed in Hawaii, however reports of these animals are extremely rare.

3.3.2 Other Protected Species

3.3.2.1 Sea Turtles

Five of the six species of sea turtles found in U.S. waters have been observed in waters surrounding Hawaii (Table 3-2).

Table 3-2. Sea turtle species within waters surrounding Hawaii.

Common Name	Scientific Name	ESA Listing Status
Green turtle, Central North Pacific DPS	*Chelonia mydas*	Threatened
Hawksbill turtle	*Eretmochelys*	Endangered
Leatherback turtle	*Dermochelys coriacea*	Endangered
Loggerhead turtle, North Pacific DPS	*Caretta caretta*	Endangered
Olive ridley turtle	*Lepidochelys olivacea*	Endangered – Mexico nesting population Threatened – All other stocks

Source: http://www.fpir.noaa.gov/Library/PRD/ESA%20Consultation/Hawaii_Species_List_Jan-2015.pdf

Detailed information, including the range, abundance, status, and threats, can be found in the recovery plans for each species, available in the NMFS website, and is herein incorporated by reference:
Olive ridley: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_oliveridley.pdf
Leatherback: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_leatherback_pacific.pdf
Loggerhead: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_loggerhead_pacific.pdf
Hawksbill: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_hawksbill_pacific.pdf
Green turtle: http://www.nmfs.noaa.gov/pr/pdfs/recovery/turtle_green_pacific.pdf

3.3.2.2 Seabirds

Migratory seabirds and shorebirds are protected under the Migratory Bird Treaty Act under the jurisdiction of the U.S. Fish and Wildlife Service. Several species are further protected under the ESA. The short-tailed albatross (*Phoebastria albatrus)* and Hawaiian dark-rumped petrel (*Pterodroma sandwichensis)* are listed as endangered under the ESA, and Newell's shearwater (*Puffinus newelli*) is listed as threatened. All have ranges that overlap waters surrounding Hawaii. A comprehensive description of the species' distribution, population status, threats, and recovery strategy can be found in the species' recovery plans (available online at: http://ecos.fws.gov/tess_public/pub/speciesRecovery.jsp?sort=1) and also in the U.S. Fish &

Wildlife Service Seabird Conservation Plan for the Pacific Region (available online at: http://www.fws.gov/pacific/migratorybirds/PDF/Seabird%20Conservation%20Plan%20Complete.pdf).

3.3.2.3 Species of Concern

A Species of Concern (SOC) is a species or vertebrate population for which there is concern or great uncertainty about its status. SOC are not listed and are not protected by the ESA. As resources permit, NMFS conducts a review of the status of each SOC to determine if it warrants listing as an endangered or threatened species under the ESA. There are currently four SOC in the Pacific Islands Region: humphead wrasse, bumphead parrotfish, Hawaiian reef coral, and inarticulated brachiopod. More information about the SOC can be found at http://www.fpir.noaa.gov/PRD/prd_species_of_concern.html.

3.3.3 Protected Wildlife Viewing Guidelines

NMFS provides general guidance on how to conduct wildlife viewing that does not cause take under the ESA and MMPA. Generally, the philosophy of responsible wildlife viewing is to unobtrusively observe the natural behavior of wild animals in their habitats without causing disturbance. This is consistent with many other agencies and national advocacy groups. Each of the six NMFS Regions has developed recommended viewing guidelines to inform the general public on how to responsibly view marine mammals in the wild and avoid causing a take. These guidelines are available online at http://www.nmfs.noaa.gov/prot_res/MMWatch/MMViewing.html.

NMFS created wildlife viewing guidelines specific to marine mammals in Hawaii: http://www.nmfs.noaa.gov/pr/education/hawaii/. The following is a summary of the *Hawaii Marine Wildlife Viewing Guidelines*:

- **Keep a safe distance**: Do not chase, closely approach, surround, swim with, or attempt to touch marine wildlife. View humpback whales from a distances of at least 100 yards (State and Federal law) and all other marine mammals from a distance of at least 150 feet (50 yards). Use extra caution in the vicinity of mothers and young and in other sensitive wildlife habitats such as feeding, nursing, and resting areas. Do not encircle or trap marine mammals between boats or shore and limit observing time to 30 minutes.
- **Be careful not to surprise marine wildlife**: Loud noises and abrupt movements can startle and stress wildlife, which can react unpredictably and put the animals and humans in danger. Disturbing wildlife interrupts their ability to perform critical functions such as feeding, breeding, nursing, resting, or socializing.
- **Never feed or attempt to feed marine wildlife**: Feeding marine wildlife is prohibited under Federal law and can alter their natural behaviors, make them dependent on humans, deprive young animals from learning important survival skills, cause them to become sick or die from ingesting unnatural or contaminated food items, habituate them to humans and vessels, and place them at risk of injury.
- **Dispose of trash properly**: Marine debris can be harmful to wildlife and can be mistaken by animals for food. Monofilament fishing lines and other plastic items can entangle and kill marine wildlife.

The following are links to other government and non-government resources for responsible wildlife viewing in Hawaii:

- The Pacific Islands Regional Office, Protected Resources Division (PIRO PRD) and the Pacific Islands Fisheries Science Center, Protected Species Division (PIFSC PDS); *Marine Wildlife Viewing Guidelines* for Hawaii brochure; published in October, 2012 http://www.fpir.noaa.gov/Library/PRD/Marine%20Mammals/Marine_wildlife_viewing_brochure_2012_FNL_PUBLIC.pdf
- HIHWNMS; *Guidelines for Whale Protection and Human Safety*; http://hawaiihumpbackwhale.noaa.gov/explore/whale_guidelines.html
- State of Hawaii Division of Aquatic Resources (HI DAR); *Marine Mammals*; http://dlnr.hawaii.gov/dar/species/marine-mammals/
- Respect Ocean and Aquatic Resources (ROAR); *Responsible Viewing*; http://roarhawaii.org/responsible-viewing/

3.4 Socioeconomics

3.4.1 Demographic Overview of Hawaii

The estimated 2015 resident population of the State of Hawaii is 1,431,603 (U.S. Census 2015a). Demographic data for the State of Hawaii is based on the 2010 U.S. Census population when the state population was estimated to be 1,360,301. According to the 2010 U.S. Census, Oahu is the most populated island in the Hawaii with estimated 953,207 residents, followed by Hawaii Island (185,079), and Maui (144,444). Niihau has the smallest resident population of the populated Hawaiian Islands with only 170 residents. By county, approximately seven out of every ten residents in the state live in the City and County of Honolulu. Kauai County has the smallest population with only 69,512 residents (5.0 percent of the population of the State of Hawaii).

The population in Hawaii has significantly grown since the beginning of the 20th century. In 1900, the population of the State of Hawaii was approximately 154,000 (DBEDT 2014). According to the U.S. Bureau of the Census, the Hawaii population consistently grew to 964,691 in 1980 and 1,431,603 in 2015 (U.S. Census 2015a). Between 2010 and 2015, the state experienced an estimated population increase of 71,302 residents or 5.2 percent (U.S. Census 2015b). The majority of new residents between 2010 and 2014 were in the City and County of Honolulu (38,581), although this county had the lowest estimated population growth rate of the four major counties in the state during this time period (4.0 percent). Maui County (consisting of inhabited islands Maui, Molokai, and Lanai) experienced the largest estimated increase in population rate between 2010 and 2014 (5.3 percent or 8,184 new residents), followed by Kauai County (5.0 percent or 3,385 new residents), and Hawaii County (4.9 percent or 9,111 new residents) (U.S. Census 2015c).

3.4.2 Economic Overview

The economy of Hawaii and its counties is described in this section based on the following characteristics: employment by industry, income, and the unemployment rate. Data in this section are presented at the state and county levels, the levels for which consistent data for economic indicators are available from reliable and published sources. To the extent that sufficient island-level information/data are relevant and available, these are also presented.

3.4.2.1 Employment

Industry-specific employment indicates the structure of an economy in terms of the relative importance of different industries to the regional economy. Dominant industries in the State of Hawaii include tourism, government (military and civilian), and health care (Table 3-3).

Between 2005 and 2014, employment in Hawaii increased by 7.6 percent (Table 3-3). The highest gains for the state were in the mining industry at approximately 77 percent, followed by company management (23 percent), educational services (23 percent), and health care (22 percent). Besides healthcare (77,516 employees), these growing industries do not represent a significant portion of the economy in Hawaii (<3.4 percent of employment). Only five sectors experienced job losses at the state level during this 10-year period include farm employment, construction, manufacturing, information, and military. Although there was a 12 percent decrease in construction jobs during this time period, recent figures indicate an increase of nearly 12 percent between 2011 and 2014 with another 1,800 jobs added in 2015 (BEA 2016a, DBEDT 2016).

Table 3-3. State of Hawaii employment figures by industry in 2014 and growth change since 2005.

Industry Description	Employees	% of Total Employment	% Change Employment Growth
Total employment	**890,346**	**100**	**7.6**
Farm employment	13,061	1.5	-0.4
Nonfarm employment	877,285	99	7.6
Private nonfarm employment	**693,785**	**78**	**8.8**
Accommodation and food services	106,037	12	14
Retail trade	88,501	9.9	0.1
Health care and social assistance	77,516	8.7	22
Admin. and support and waste mgmt. and remediation services	63,655	7.1	12
Real estate and rental and leasing	47,823	5.4	14
Professional, scientific, and technical services	45,827	5.1	16
Construction	43,415	4.9	-12
Transportation and warehousing	31,603	3.5	11
Finance and insurance	28,917	3.2	19
Arts, entertainment, and recreation	22,720	2.6	18
Wholesale trade	21,665	2.4	1.8
Educational services	20,123	2.3	23
Manufacturing	18,934	2.1	-12
Information	10,424	1.2	-7.4
Management of companies and enterprises	8,815	1.0	23
Forestry, fishing, and related activities	4,327	0.5	13
Utilities	4,165	0.5	2.1
Mining, quarrying, and oil and gas extraction	1,285	0.1	77
Other services (except public administration)	48,033	5.4	10
Government and government enterprises	**183,500**	**21**	**0.7**
Federal, civilian	33,132	3.7	0.3
Military	57,346	6.4	-2.2
State and local	93,022	10	1.1
State government	73,839	8.3	3.1
Local government	19,183	2.2	0.5

Source: BEA 2016a.

3.4.2.2 Income

As of 2014, Hawaii had a slightly lower per capita personal income than the national average, at $46,034, with the annualized growth rate of 2.9 percent between 2005 and 2014 (BEA 2016b) (Table 3-4). Honolulu County had the highest per capita personal income in 2014 of $49,722, followed by Kauai County, Maui and Kalawao County, and Hawaii County. Of all the counties in Hawaii, only Honolulu County had a higher per capita personal income than the national figure, however both Honolulu County and Kauai County experienced a higher growth rate than the nation during that decade.

Table 3-4. Hawaii personal income by state and county in 2005 and 2014.

Region	Per Capita Personal Income		
	2005	2014	% Compound Annual Growth Rate
Honolulu County	38,084	49,722	3.0
Kauai County	30,744	40,163	3.0
Maui & Kalawao County	31,446	39,439	2.5
Hawaii County	27,931	34,870	2.5
Hawaii	35,669	46,034	2.9
United States	35,904	46,049	2.8

Source: BEA 2016b.

3.4.2.3 Unemployment

The unemployment rate is a key economic indicator providing important insight into the economic health of a region. High unemployment is a sign of an unhealthy economy, which can lead to reduced spending, a decreased tax base, and more unemployment. In the recent recession, Hawaii experienced high unemployment, peaking at 7.3 percent from May 2009 through October 2009 (BLS 2016). The unemployment rate in Hawaii has steadily declined since 2012, and the figure at the end of 2015 (3.2 percent) closely matches the figure at the beginning of 2005 (3.1 percent). The unemployment rate in Hawaii has been consistently lower than the national rate since 2005 (Figure 3-7).

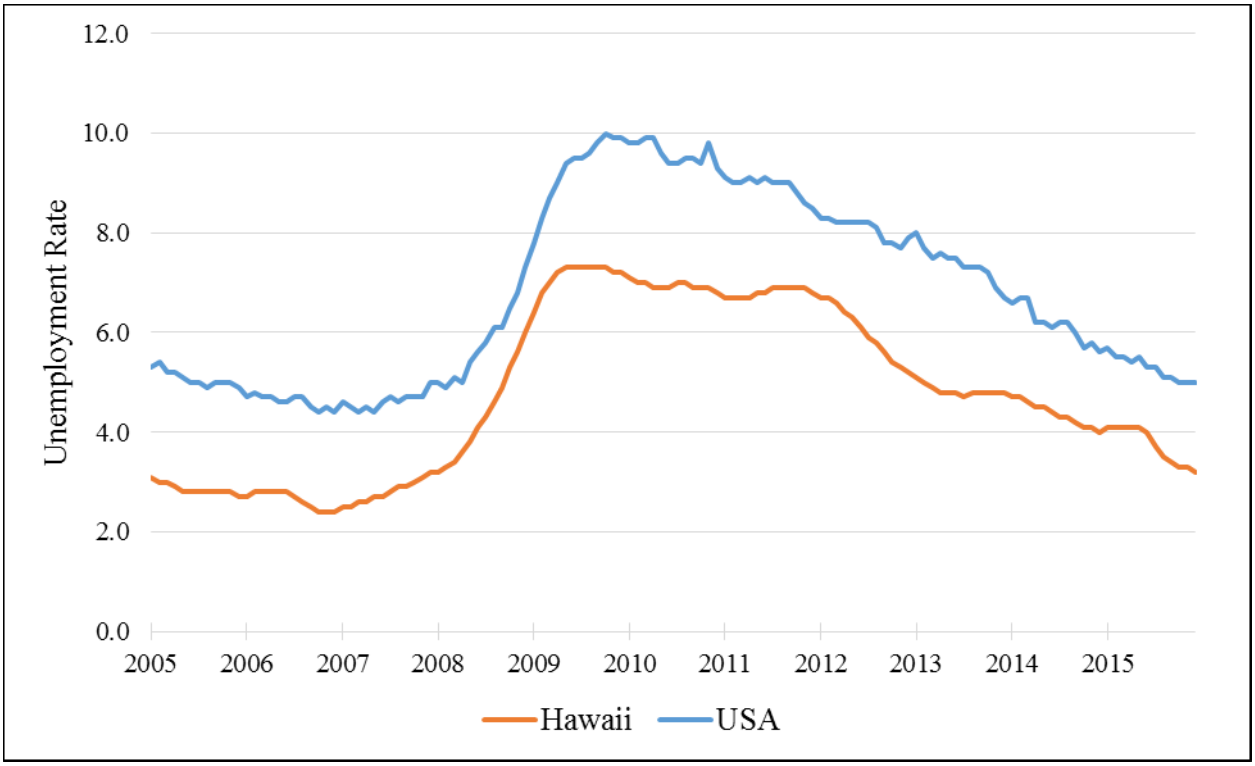

Figure 3-7. Historic unemployment rates in the State of Hawaii and the United States, January from 2005 to December 2015 (BLS 2016).

3.4.3 Hawaii Tourism General Information

The economy of Hawaii has been dependent on tourism and tourism-related activities since statehood in 1959. In 2014, the tourism industry supported nearly 19 percent of jobs (approximately 165,000) in the state. Hawaii is a popular destination for both national and international tourists, with Japanese and Canadian tourists being the top two international tourist groups. It is estimated that on a given day there are over 200,000 tourists in the Hawaii with 1,052 flights a week that service 49 cities throughout the world. The tourism industry contributed $1.6 billion in state tax revenue in 2014 and continues to increase consistently every year (HTA 2016a, HTA 2016b).

The downturn in the national and international economies from 2008 to 2010 did influence a decrease in tourism in the state. However, the industry has steadily increased with record numbers of visitors and visitor expenditures every year since 2012. Total number of visitors to Hawaii in 2015 was 8,649,357, an increase of 4.1 percent from 2014. Total spending by visitors in 2015 was $15.3 billion, an increase of 2.3 percent from 2014. Among the islands, Oahu received over half of the state's total visitors by air (5,321,436) and nearly half the visitor expenditure ($7.3 billion), followed by Maui, Hawaii Island, and Kauai (Table 3-5). Also in 2015, the island with the highest percent increase of visitors by air was in Molokai with 7.6 percent, while Kauai topped the list in terms of increased spending at 13.8 percent.

Table 3-5. Hawaii tourism preliminary figures for visitor arrivals, visitor expenditure, and spending per person per day (PPPD) for visitors arriving by air in 2015.

Island	Visitor Arrivals	% Change from 2014	Visitor Expenditure ($ million)	% Change from 2014	Spending PPPD ($)
Oahu	5,321,436	2.8	7,270.6	-1.0	209.6
Maui	2,527,204	4.9	4289.2	5.9	203.9
Molokai	64,156	7.6	28.7	-14.2	120.9
Lanai	58,105	-14.5	44.0	-38.8	318.9
Kauai	1,166,043	4.3	1603.8	13.8	163.7
Hawaii Island	1,503,547	3.8	1882.5	0.8	170.5
State Total	**8,533,978**	**4.3**	**15118.9**	**2.3**	**197.1**

Source: HTA 2016b

3.4.4 Whale Watching

The whale watching industry in Hawaii plays an important role in the tour boat industry in Hawaii. Although current economic figures for the whale watch industry are not available, it is projected that this industry is substantially growing in Hawaii. There were 52 whale watch vessels operating in Hawaii in 1999 (Utech 2002), whereas there are now at least 118 tour companies on six islands currently offering cruises specifically designated for whale watching (Table 3-6). The vessels utilized for these whale watch cruises range from large, high occupancy ships (up to 1,500 passengers) to tours operating with small non-motorized or self-propelled vessels, such as kayaks, outrigger canoes, and stand-up paddleboards (SUPs). Because whale watching is seasonal, essentially all of the companies offer other services that can generate revenue in the offseason or all year round. Most of the companies focus primarily on wildlife

tourism for revenues (i.e., snorkel tours, dolphin or turtle watching, SCUBA diving, and charter fishing), but there are a large number of vessels that typically concentrate on lunch, dinner, or sunset cruises and also boats that are available for private charter and offer trips dedicated to whale watching.

Table 3-6. Estimated total number of companies in Hawaii advertising designated whale watch tours using motorized and non-motorized vessels.

Island	Total # of Companies	Vessel Type	
		Motorized	Non-motorized
Maui	48	42	6
Hawaii	39	39	0
Kauai	14	13	1
Oahu	13	13	0
Molokai	3	3	0
Lanai	1	1	0
State Total	**118**	**111**	**7**

Source: Internet search on February 19, 2016.

A large majority of the whale watch cruises operate out of ports on Maui and Hawaii (Table 3-6; Table 3-7). The area surrounding Kailua-Kona on Hawaii has the most companies offering whale watch cruises; however, many of these companies operate smaller private charter vessels that do not carry a high volume of passengers. Lahaina and Maalaea on Maui are also popular locations for the whale watch industry. These areas, along with Wailea-Makena, Kihei, Kaanapali, and Olowalu on Maui, operate in the Maui Nui waters where the concentration of humpback whales are the highest in the region. The economies of areas with the most whale watch activity, Kailua-Kona and Lahaina, are considered to be strongly influenced by the tourism industry. Whale watching is likely responsible for a financial impact on local businesses that support the tourism industry (e.g., restaurants, hotels, retail shops, transportation services, etc.). This may be especially apparent in Lahaina because of the strong influence humpback whales have on the appeal of tourists to visit the town and the tourism marketing in the region. A 1999 survey conducted on boat tours in Maui claimed that about 50 percent of the passengers claimed that observing humpback whales factored into their decision to come to Hawaii. Maalaea also has a large amount of whale watching activity, but this area does not have nearly as many tourism-related businesses. Although there are only seven companies operating whale watch tours in Honolulu, it is important to note that two of these companies use large ships with high occupancy potential (approximately 1500 and 400 passengers) and run two cruises each per day during the season. Despite these large operations, it is not likely that the whale watch industry significantly affects the local businesses due to the magnitude of the economy in Honolulu.

Table 3-7. Estimated number of companies advertising designated whale watch tours in different areas throughout Hawaii.

Island	City	# of Companies
Maui	Lahaina	23
	Maalaea	14
	Wailea-Makena	6
	Kihei	4
	Kaanapali	3
	Olowalu	3
Hawaii	Kailua-Kona	32
	Waikaloa	5
	Hilo	1
	Pahoa	1
Oahu	Honolulu	7
	Koolina	3
	Waianae	3
	Hawaii Kai	1
Kauai	Poipu	5
	Eleele	3
	Hanalei	2
	Waimea	2
	Kekaha	1
	Kilauea	1
	Lihue	1
Molokai	Kaunakakai	3
Lanai	Lanai City	1

Source: Internet search in February 2016.

The available economic data on the whale watch industry in Hawaii is not current, but previous studies indicated that whale watching is an important source of revenue for the tourism industry. In a comprehensive study by Utech (2002), the author estimated that there were 52 whale watch vessels operating in Hawaii with an average of 87 cruises and 3,100 passengers per day in 1999, and a total of about 370,000 passengers for the entire 1999 season. The estimated revenues for the industry in 1999 was $11 million from designated whale watch cruises and $16 million when other boat tours that are attributed to whale watching (i.e. snorkel, dinner, and sunset cruises) are included. The estimated total economic impact (direct, indirect, and induced revenues) of whale watching on the economy in 1999 was $19 million and the equivalent of 280 full-time jobs (whale watch cruises only) and $27 million and 390 jobs (other boat tours included). Maui had the highest whale watch revenue ($6.1 million) and total economic impact ($10.5 million) in 1999, followed by Oahu, Hawaii, and Kauai (Table 3-8).

Table 3-8. Summary of economic impacts of selected components of Hawaii's ocean tour boat industry during the 1999 calendar year (revenues and impact in $ millions).

Island	Tour Type	Direct Revenues ($ millions)	Total Economic Impact ($ millions)	Jobs Supported
Hawaii	Whale Watching	1.6	2.8	40
	Snorkeling	10.1	17.2	247
	Dinner Cruise	2.1	3.6	52
	Sunset Cruise	1.5	2.5	36
	Total	**15.3**	**26.1**	**375**
Kauai	Whale Watching	0.9	1.6	23
	Snorkeling	17.1	29.3	420
	Dinner Cruise	N/A	N/A	N/A
	Sunset Cruise	3.7	6.4	92
	Total	**21.8**	**37.3**	**535**
Maui	Whale Watching	6.1	10.5	151
	Snorkeling	39.5	67.5	969
	Dinner Cruise	5.1	8.7	125
	Sunset Cruise	1.8	3.1	45
	Total	**52.5**	**89.8**	**1,290**
Oahu	Whale Watching	2.6	4.4	63
	Snorkeling	N/A	N/A	N/A
	Dinner Cruise [a]	39.5	67.5	969
	Sunset Cruise	N/A	N/A	N/A
	Total	**42.0**	**71.9**	**1,032**
State Total	Whale Watching	11.3	19.3	277
	Snorkeling	66.6	114.0	1,636
	Dinner Cruise	46.7	79.8	1,146
	Sunset Cruise	7.0	12.1	173
	Total	**131.6**	**225.1**	**3,232**

[a] The Oahu dinner cruise market figures were calculated from an estimate in 1990 and adjusted for inflation, as specified in Utech 2002.
Source: Utech 2002.

3.4.5 Other Ocean-Based Tours

3.4.5.1 Tour Boat Industry

The tour boat industry is a growing segment of Hawaii's economy. The total economic impact of the tour boat industry in Hawaii is approximately $350 million (ONMS 2016a). This industry includes whale watching, dolphin watching, snorkeling, scuba diving, charter fishing, day cruises, and dinner and sunset cruises. Multiple estimates indicate a substantial increase in the

tour boat industry in the last few decades, including a 25 percent increase in revenues in Maui, Hawaii, and Kauai between 1990 and 1999 (Utech 2002), and the value of the industry increased 300 percent from about $50 million in 1984 to over $183 million in 2003 (Markrich 2004). In 1999, the total revenue from the tour boat industry in the state was about $132 million, with the largest share of the revenue from snorkeling tours (approximately $67 million) and dinner cruises (approximately $47 million) (Utech 2002; Table 3-8). Tours in Maui brought in the highest revenue ($52.5 millions) followed by those in Oahu, Kauai, and Hawaii. The total economic impact in 1999, including direct, indirect, and induced revenues, was estimated to be $225 million for the state, and the industry supported 3,232 jobs.

A more recent study by Markrich (2004) suggested that the tour boat industry (including charter fishing) grossed over $183 million on approximately 419 tour boats in 2003 (Table 3-9). The boats carried over 2.7 million passengers in 2003, or approximately 43 percent of the visitors who came to Hawaii in that year. Although the number of people participating in boat tours is high, only about 3 percent of the boat using harbors and boat ramps in 2003 were commercial tour boats (Markrich 2004).

Table 3-9. Hawaii tour boat industry economic figures in 2003, including whale watching and fishing charter boats.

Island	Gross Revenues ($)	# of Passengers	# of Employees	# of Companies
Maui	70,751,816	1,114,822	795	114
Oahu	64,806,600	854,350	795	85
Hawaii	25,639,000	313,924	395	109
Kauai	22,443,000	427,450	210	51
State Total	**183,640,416**	**2,710,546**	**2,195**	**359**

Source: Adapted from Markrich 2004.

Approximately 41 commercial cruise ships owned by 22 different companies are projected to operate in Hawaii in the next two years. Many cruise ships transit to and from North America and Asia and dock in harbors on multiple islands, mainly Oahu, Maui, Kauai, and Hawaii. In 2015, 115,378 visitors came to the Hawaii by way of cruise ship, which is a 7.3 percent decrease from 2014 (HTA 2016b).

There are about 125 active fishing charter boats operating out of 10 ports in Hawaii, and these charters average about one trip every two days. The most recent figures suggest that about 70,000 people participate in charter fishing in Hawaii annually. The economic value of the charter fishing industry in Hawaii may be as high as $20 million, much of this in marlin fishing alone (SFD website, retrieved February 12, 2016).

3.4.5.2 Aircraft Tours

There are approximately 20 companies offering 30 helicopter tours and 28 companies offering 29 airplane or glider tours on Oahu, Maui, Kauai, and Hawaii (Table 3-10). Although these companies do not offer designated whale watching tours, whale watching is often performed opportunistically. Many companies advertise whale watching as a potential activity on their tours during the whale season. Most interactions with humpback whales are reported to be brief as

aircraft pass through the areas where whales are sighted. However some aircraft, particularly helicopter tours, have been reported hovering in close proximity to humpback whales for the purpose of whale watching.

Table 3-10. Helicopter and airplane/glider tours offered in Hawaii.

Island	# Helicopter Tours [a]	# Airplane/Glider Tours [b]	Total
Oahu	7	15	22
Kauai	10	4	14
Hawaii	8	4	12
Maui	5	6	11
State Total	**30**	**29**	**59**

[a] Three companies offered tours on multiple islands.
[b] One company offered tours on Oahu and Maui.
Source: Internet search in March 2016.

Skydiving is also a popular activity that involves use of an aircraft. Several companies offer skydiving services on Oahu, Kauai, Hawaii, Maui, and Lanai. Like aircraft tours, some companies use whale watching as a marketing tool to promote their product. However, these aircraft are not likely to interact with humpback whales at a close distance and are only at low altitudes during takeoffs and landings.

3.4.6 Recreation

Many recreation activities in Hawaii primarily involve the ocean. Ocean based recreation includes whale-watching, boating (e.g., powerboats, sailboats, jet skis, etc.), fishing, swimming, snorkeling, surfing, paddling, kayaking, SCUBA and free diving, kite-boarding, and spending time on the beach, among others. These activities are commonly performed by both tourists and residents of Hawaii in all of the MHI. All of the beaches in Hawaii are public, with Hawaii state law requiring public access to “the land below the high water mark on any coastal shoreline” (HAR §46-6.5).

There are three types of general recreational activities that could be affected by the proposed action: recreational whale watching (via motorized vessels, non-motorized vessels, self-propelled vessels, or shore-based), recreational activities that whale watch opportunistically, and recreational activities that could be in close proximity to humpback whales but do not involve whale watching.

Recreational whale watching is a common activity for tourists and local community members. Residents and their guests will often whale watch from their motorized, non-motorized, and self-propelled vessels, and tourists will often rent or buy self-propelled vessels for the intention of whale watching. Shore-based whale watching is also a common activity in Hawaii. There are several areas on all of the islands that are frequented for the purpose of whale watching from shore (Table 3-11).

Table 3-11. Top ten shore-based whale watching sites in Hawaii, according to the HIHWNMS.

Island	Whale Watching Site	Approx. Elevation (feet)
Oahu	Makapuu Lighthouse	400
	Halona Blowhole	70
	Hanauma Bay	120
	Diamond Head Lookout	120
Maui	Papawai Point	200
	HIHWNMS Education Center	25
Hawaii	Lapakahi State Historical Park	100
	Kapaa Beach Park	20
Kauai	Kilauea Point National Wildlife Refuge	180

Source: ONMS 2016b.

A large majority of the boats in Hawaii are operated recreationally. In 2003, 97 percent (13,807) of all boats that used boat ramps and harbors in Hawaii were recreational boats (Markrick 2004). There are approximately 19 small boat harbors and 23 boat ramps that can be accessed by the public in the state (Table 3-12).

Table 3-12. Public small boat harbors and boat ramps in Hawaii.

Island	Small Boat Harbors	Boat Ramps
Hawaii	5	7
Kauai	3	7
Lanai	1	0
Maui	3	5
Molokai	2	0
Oahu	5	4
State Total	**19**	**23**

Source: DOBOR 2016.

There are several regattas that take place in waters surrounding Hawaii. The Waikiki Yacht Club and the Lahaina Yacht Club both have multiple regattas registered in the US Sailing Regatta Network, several of which occur during humpback whale season (US Sailing Regatta Network 2016). The Waikiki Yacht club also holds an unofficial regatta every Friday night on the south shore of Oahu. The Pacific Cup is a sailboat race from San Francisco, CA to Kaneohe Bay on Oahu that is held every year since 1979; however this race typically occurs in the summer months during the humpback whale offseason.

Boat-based recreational fishermen are thought to typically land between 10 and 15 million pounds of fish annually in Hawaii. The most recent National Survey of Fishing, Hunting, and Wildlife-Associated Recreation estimated that over 150,000 total saltwater anglers fished in the state in 2006. The number of boats that participate in recreational fishing in Hawaii is likely to number 5,000-6,000 and an additional 1,900 non-commercial bottomfish vessels were registered with the state in 2007. Recreational fishing is a substantial economic contributor to the State of Hawaii. Direct annual expenditures on recreational fishing are estimated to be approximately

$450 million. Marlin, tuna, wahoo, and mahimahi are popular target species among boat anglers (SFD 2016).

Surfing, paddling, kayaking, and snorkeling are common in all the residential islands of Hawaii. These activities are performed year round, mostly in nearshore waters on all shorelines, and efforts are typically more concentrated in urban areas. There are approximately 350 businesses in Hawaii that allow residents and tourists to buy or rent equipment to perform these activities (Table 3-13). SCUBA diving is also popular in Hawaii, where there are approximately 143 SCUBA businesses in the state (DCCA 2016). There are also a large number of businesses that supply tours, lessons, and certifications to perform these activities and rely heavily on tourism for revenue.

Table 3-13. Estimated number of watersports businesses (surf, SUP, kayak, paddling, snorkeling, etc.) in Hawaii for purchase or rental of equipment.

Island	# of businesses
Oahu	152
Maui	117
Kauai	48
Hawaii	41
Molokai	2
Lanai	1

Source: Internet search in February 2016.

Hawaii hosts several surfing, paddling, and swimming competitions throughout the year. Many of these competitions have a strong financial component (in the form of corporate sponsorship) and are highly regarded in the local community. Although many of these competitions occur during the offseason, there are some events that can occur during the winter months when humpback whales are in Hawaii. Humpback whales can reside in areas where these competitions take place, but close interactions between whales and competitors are rare.

UAS or “drones” are remotely flown without the use of an airborne pilot. UAS can be used for several commercial, recreational, and research purposes. The most popular uses of UAS include mounting cameras to them to take photographs or record videos for a variety of reasons. This practice is commonly performed to take photographs and video of wildlife from vantage points that are typically inaccessible. There are no available statistics of UAS use in Hawaii with regard to humpback whales, but they are used recreationally, commercially (e.g., photos and video for marketing, investigative, and surveying purposes), and for scientific research.

3.4.7 Commercial Fisheries

Commercial fisheries are included in the affected environment for this assessment because fishery vessels are operated within 200 nm of Hawaii. The majority of Hawaii commercial fishing activities are conducted by the Hawaii deep-set (tuna) and shallow-set (swordfish) longline fisheries (Table 3-14). There are other fisheries, such as the troll, handline, and bottomfish fisheries, that conduct activities outside the affected area (i.e., within 200 nm from shore of the islands of Hawaii) for the proposed action but may transit through the area to access

Hawaiian harbors. The incidental take of humpback whales or other marine mammals from interactions during fishery activities (i.e., incidental hooking or entanglement) are addressed in permitting documents and will not be considered in the analysis in this EA.

Table 3-14. NMFS permitted commercial fishing vessels that conduct fishing activities in or potentially transit through the affected area (i.e., within 200 nm from shore of the islands of Hawaii).

Fishery Type	# of Current Permits	Vessel Length Range (feet)	Fishing Location
Fishing Activities within Affected Area			
Hawaii Longline	144	45.4 - 98.0	Inside & Outside Affected Area
Receiving Vessel	23	49.8 – 91.4	Inside & Outside Affected Area
Crustacean (Shrimp)	4	22.7 – 84.3	MHI
Crustacean (Lobster)	1	84.3	MHI
Precious Coral	1	28.5	Auau Channel (Maui)
Potentially Transit through Affected Area			
Troll & Handline	5	62.1 - 224	PRIA
Pacific Bottomfish	1	224	PRIA

MHI = Main Hawaiian Islands
PRIA = Pacific Remote Island Areas
Source: http://www.fpir.noaa.gov/SFD/SFD_permits_index.html (accessed February 2016)

There are other commercial fisheries in the affected area that do not require a permit by NMFS, including some troll, handline, bottomfish, crustacean, coral reef ecosystem, and precious coral fisheries. A description of these fisheries can found in the regional fishery ecosystem plans (FEPs), available online at:
FEP for the Hawaii Archipelago:
http://www.wpcouncil.org/fep/WPRFMC%20Hawaii%20FEP%20(2009-09-21).pdf
FEP for Pacific Pelagic Fisheries of the Western Pacific Region:
http://www.wpcouncil.org/fep/WPRFMC%20Pelagic%20FEP%20(2009-09-21).pdf

Details about the charter boat fishing industry and recreational fishing in Hawaii are summarized in this document in section 3.4.5.1 (Tour Boat Industry) and section 3.4.6 (Recreation), respectively.

3.4.8 Commercial Shipping

Commercial shipping operations occur on six of the eight MHI (Table 3-15). There are three major vessel shipping companies: Matson, Horizon Lines, and Pasha Hawaii. There are other smaller companies that operate barge services between islands or to North America. The Merchant Marine Act of 1920 (a.k.a. the Jones Act) requires all goods that are transported between U.S. ports to be shipped on U.S.-flagged vessels that are built in the U.S. and are owned and operated by U.S. citizens or permanent residents (46 U.S.C. 861 *et seq.*). This law limits the number of companies that own commercial shipping vessels operating out of Hawaiian harbors.

Table 3-15. Commercial vessel harbors in Hawaii.

Island	Harbor
Oahu	Honolulu Harbor
	Kalaeloa Barbers Point Harbor
Maui	Hana Harbor
	Kahului Harbor
Molokai	Kaunakakai Harbor
Lanai	Kaumalapau Harbor
Hawaii	Hilo Harbor
	Kawaihae Harbor
Kauai	Nawiliwili Harbor
	Port Allen Harbor

Source: http://hidot.hawaii.gov/harbors/

3.4.9 Transportation

3.4.9.1 Aircraft Transportation

There are 32 airports and airstrips in Hawaii and 16 heliports (FAA 2016). Of the 32 airports, 15 are publicly owned, 12 are privately owned, and 5 are operated by the military. Of the 16 heliports, 2 are publicly owned, 13 are privately owned, and 1 is operated by the military. Oahu, Kauai, Maui, Molokai, and Hawaii have multiple public airports and Lanai has one public airport (Table 3-16). The use of each airport varies depending on size and location.

Table 3-16. Public airports located in the MHI.

Island	Airport Name	Airport Code	Aircraft Usage
Oahu	Honolulu Int'l Airport	HNL	23 domestic overseas and international airlines, 4 interisland airlines, commuter/air taxi, air cargo
	Dillingham Airfield	HDH	Commercial glider and sky diving, U.S. Army air-land operations and helicopter night-vision training
	Kalaeloa Airport	JRF	USCG, Hawaii Community College Flight Program, Hawaii National Guard, general aviation
Kauai	Lihue Airport	LIH	6 domestic overseas and international airlines, 3 interisland airlines, air cargo, heliport (tour operators), general aviation
	Port Allen Airport	PAK	Commuter, unscheduled air taxi, general aviation
Maui	Hana Airport	HNM	Commuter, unscheduled air taxi, general aviation
	Kahului Airport	OGG	8 domestic overseas and international airlines, 5 interisland airlines, commuter/air taxi, air cargo, scenic tour operators, helicopter operations, general aviation
	Kapalua Aiport	JHM	Commercial propeller air carriers, commuter/air taxi
Molokai	Kalaupapa Airport	LUP	Commuter/air taxi, air cargo
	Molokai Airport	MKK	Commuter/air taxi, air cargo, general aviation, military flights
Lanai	Lanai Airport	LNY	Commuter/air taxi, unscheduled charter, air cargo, general aviation
Hawaii	Hilo Int'l Airport	ITO	2 domestic overseas airlines, 2 interisland airlines, air cargo, military flights, general aviation
	Kona Int'l Airport	KOA	6 domestic overseas and international airlines, 3 interisland airlines, commuter/air taxi, air cargo, general aviation
	Upolu Airport	UPP	General aviation
	Waimea-Kohala Aiport	MUE	Commuter/air taxi, military flights, general aviation

Source: http://hidot.hawaii.gov/airports/

3.4.9.2 Vessel Transportation

There are currently two private ferry companies that provide interisland transportation in the MHI. *Sea Link of Hawaii* provides transport between the islands of Maui and Molokai one trip each way four days a week. The harbors used for this ferry are Lahaina in Maui and Kaunakakai in Molokai. *Expeditions* provides transport between the islands of Maui and Lanai five trips each way seven days a week. The harbors used for this ferry are Lahaina in Maui and Manele in Lanai.

3.5 Human Health and Safety

Vessel collision and other interactions with large whales have resulted in several serious human injuries and deaths throughout the world. Collisions with these large animals can cause a vessel

to move suddenly and potentially knock passengers and crew members off balance or even thrown into the water. Similar injuries can also occur when vessel operators quickly change direction to avoid striking large whales.

In their analysis of large whale vessel strikes, Laist *et al.* (2001) claim that small, fast moving vessels, such as whale watching boats and ferries, are more likely to experience human injury when colliding or closely interacting with large whales. Human injury and death have occurred on several incidents of vessel collisions with these types of boats in Hawaii. According to a database of human interactions managed by the HIHWNMS, 9.2 percent (7 of 76) of humpback whale vessel collisions between 2002 and 2015 involved injuries to passengers or crew; this figure does not include injuries sustained when vessels moved suddenly to avoid collisions (Ed Lyman, personal communication, April 7, 2016). A young boy died on a whale watch vessel off of Honolulu after stumbling and suffering severe trauma when the vessel operator quickly changed direction to avoid striking a humpback whale (DePledge 2003). In Kauai, a collision between a whale watch boat and a humpback whale in 2001 resulted in a women breaking her knee, and a similar incident in 2015 caused another women to go to the hospital for a broken rib (DePledge 2003; D'Angelo 2015).

There are several reports throughout the world of human injury and death caused by close interaction with large whales. In a comprehensive review of large whale vessel collisions in Alaskan waters, Neilson *et al.* (2012) claimed that 33 percent of reported collisions, most of them with humpback whales, resulted in human injury or property damage between 1978 and 2011. In these reported cases, there were 19 incidents in which passengers were knocked down, 10 of passengers being injured, 9 of passengers getting thrown into the water, 20 of significant property damage, and 3 of vessels sinking. Off the coast of Cabo San Lucas, Mexico in 2015, a Canadian tourist was thrown into the water and died and two other passengers suffered considerable injuries when a tour boat collided with a humpback whale (AP 2015). In a similar incident near Baja, CA in 2014, a humpback whale collided with a boat and injured four passengers (AP 2015). A 27-foot vessel collided with a gray whale off the coast of Santa Barbara, CA in 2006, injuring one passenger and inflicting severe damage to the boat (AP 2006). A vessel operator in Vancouver, Canada was severely injured when he was thrown through the windshield after a breaching humpback whale collided with the boat (Lavoie 2013).

High speed passenger ferries are also susceptible to human injury from whale vessel strikes. A passenger on a high speed jetfoil ferry died in 1999 after the vessel collided with a sperm whale in the Canary Islands (De Stephanis and Urquiola 2006). A high speed Japanese passenger ship presumably struck a whale off South Korea in 2016, injuring 7 passengers and 1 crew member (Petrov 2016). Multiple incidents of human injury and vessel damage resulting from high speed jetfoil ferry collisions with whales have been reported in in the Sea of Japan (Honma *et al.* 1997).

There are also several reported incidents of whales accidentally or intentionally initiating contact with vessels that are in close proximity to the animal. A tourist captured video in 2015 of a female humpback whale with a calf ramming into a 27-foot inflatable whale watch boat that was close to the pair while slapping its pectoral fins on the surface of the water (Lorenz 2015). In another incident off Maui in 2002, a humpback whale surfaced below a 65-foot whale watch

catamaran and lifted the stern of the vessel out of the water (Kubota 2002). In a similar occurrence, a humpback whale near Point Adolphus, AK struck a floating whale watch vessel and lifted the boat several feet out of the water (Helker *et al.* 2015). A southern right whale breached on top of a whale watching sailboat and broke its mast off the coast of Cape Town, South Africa in 2010 (BBC 2010). Also, a kayak tour company in Monterey Bay, CA suspended whale watch tours after a humpback whale breached and nearly landed on two kayakers (Enchassi 2015).

Commercial tours in Hawaii do not typically advertise swimming with humpbacks whales, although recreational swimmers and commercial snorkel tours are often in close proximity to humpback whales opportunistically. Commercial tour operators likely do not offer tours specifically designated as swimming with whales because of the current approach regulations in Hawaii. However, there are some areas in the world where companies offer tours that allow customers to swim closely to humpback whales. “Swim with humpback whales” tours are currently offered in Tonga, Dominican Republic, and, more recently, near Brisbane, Australia. Even though reports of injuries during these tours are rare, there was at least one report of serious injuries sustained during a human and humpback whale interaction in the water. A humpback whale mother struck and seriously injured three tourists with her fluke in the Dominican Republic when a strong current swept the snorkelers close to her calf (WDC 2007). Also, there have been reports of minke whales in northern Australia displaying aggressive behaviors around tour groups that swim in close proximity to the whales, including fast and aggressive swimming, bubble blasts, bubble trails, jaw gape, and engulfment behaviors (Birtles *et al.* 2002). Although no known reports of human injuries from swimming with humpback whales have been reported in Hawaii, aggressive behavior from whales in response to human interaction has been documented in Hawaii.

Interactions with large whales can be a risk to human health and safety. There are several reports throughout the world of humans getting seriously injured or killed as a result of vessel strikes or vessel operators moving suddenly to avoid a vessel strike. Aggressive behavior by whales can also jeopardize the safety of vessel passengers and swimmers. As vessel collisions and ocean-based activities continue to increase in Hawaii, the potential for human injury from adverse interactions with humpback whales will also increase. For more information about vessel collisions and ocean-based activities in Hawaii, see section 3.2.8.5 and section 3.2.8.2 of this document, respectively.

3.6 Cultural Resources

The core of Hawaiian culture, philosophy, religion, and worldview is founded by an inseparable relationship among the *ʻāina* (land), the *kai* (sea), and humans. In a traditional Hawaiian context, there is no division between nature and culture; they are considered one and the same (Maly 2001). The wealth and limitations of the land and ocean resources gave birth to and shaped the Hawaiian world view. Land, water, ocean, and sky were the foundation of life and the source of the spiritual relationship between people and their environs. Every aspect of life, whether in the sky, on land, or in the waters was believed to have been the physical body-forms assumed by the creative forces of nature, and the greater and lesser gods and goddesses of the Hawaiian people (Maly 2001). Respect and care for nature, in turn, meant that nature would care for the people.

3.6.1 Hawaiian Culture and the *Koholā*

Marine mammals have cultural and spiritual importance for the many Native Hawaiians and other residents of Hawaii. The Hawaiian word for whale is *palaoa*, and the Hawaiian word for humpback whale specifically is *koholā*. The *koholā* are considered by many as *`aumākua*, or family deities that are the embodiment of deceased ancestors that took the animal form and provide protection, healing, and guidance to their families (ONMS 2003).

Hawaii's oral and written history acknowledge the existence of humpback whales, mainly in the form of petroglyphs, stories and legends, legendary place names, and ancient artifacts (ONMS 2003). However, evidence of cultural importance of humpback whales to ancient Hawaiians is limited. Many theorize that either the population of humpbacks in coastal waters near Hawaii was much smaller, and, thus, less conspicuous during everyday life. Others theorized that the humpback whales were held in such high regard that information was reserved for only a chosen few people. Regardless, there is no evidence that indicates ancient Hawaiians hunting or eating humpback whales, which many speculate to be a sign great respect for the animals (ONMS 2003).

More information about the cultural significance of the *koholā* is summarized on a brochure from the HIHWNMS, available online at http://hawaiihumpbackwhale.noaa.gov/documents/pdfs_brochures/cultural_brochure.pdf.

3.6.2 Hawaiian Culture and the *Kai*

Much of the culture in Hawaii revolves around the *kai*, or sea. There are several ocean activities or artifacts ingrained into Hawaii's current culture that are a historical representation of ancient Hawaiians. These entities have persisted over time and continue to symbolize the relationship that Native Hawaiians and other Hawaiian residents have with ocean that surrounds them.

Hawaiian fishpond systems, *loko iʻa*, are some of Hawaii's most significant traditional cultural resources. They are biocultural articulations of Hawaiian innovation in the areas of engineering, education, hydrology, aquaculture and biology. Further, they demonstrate traditional Hawaii's excellence in sustainability, food sovereignty, and natural resource management (ONMS 2015). An inventory in the early 1900s found 360 *loko iʻa* in the islands and identified 99 active ponds with an estimated annual production total of about 680,000 pounds of fish. Increasing immigration and western influences during the nineteenth and twentieth centuries, coupled with industrialization and urbanization, had a devastating impact on the traditional Hawaiian resource management systems in Hawaii (ONMS 2015). In the past decade, there has been a renewed interest in the repair and operation of traditional Hawaiian fishponds for their cultural, economic and ecological value. Fish ponds can contain fresh or salt water and are typically located adjacent to the shoreline, or partially or completely onshore separated from the ocean. Although it is possible humpback whales could swim close to fish ponds, this scenario is likely rare because of the structures' shallow and nearshore location.

Surfing is a common tradition that has been performed by both men and women in Hawaii for centuries. Hawaiians practiced six different traditional types of surfing: *heʻe nalu*, or board surfing; *pākākā nalu*, or outrigger canoe surfing; *kaha nalu*, or body-surfing; *pae poʻo*, or

bodyboarding; *he‘e one*, or sand sliding; and *he‘e pu‘e wai*, or river surfing (Clark 2011). There are numerous traditional sites on all of the MHI, where Hawaiians traditionally surfed (Table 3-17). Surfing continues to be one of the most popular recreational activities throughout Hawaii (see section 3.4.6 of this document for more information about surfing in Hawaii).

Table 3-17. Traditional surf sites in the Main Hawaiian Islands.

Island	# Traditional Surf Sites
Hawaii	85
Oahu	46
Maui	29
Niihau	21
Kauai	12
Molokai	3
Lanai	1
Kahoolawe	Unknown [a]

[a] No specific traditional surfing sites were determined but surfing by ancient residents likely occurred.
Source: Clark 2011.

Outrigger canoe paddling is an important tradition that represents the establishment of Hawaiian culture. It is estimated that *kanaka maoli*, or Native Hawaiians, began migrating to Hawaii in the year 450 A.D. on 80-100 foot outrigger canoes called *wa‘a*. Once inhabited on the islands, large and small *wa‘a* were commonly used for necessary activities like transportation and fishing. In 1970, the Pacific Voyaging Society constructed a replica *wa‘a* called the *Hokule‘a*, or Star of Gladness, to demonstrate traditional Hawaiian navigation techniques (Handy *et al.* 1999). The *Hokule‘a* navigates throughout the Pacific Ocean without the use modern-day instruments to simulate the long voyages of ancient Hawaiians. Today, smaller outrigger canoe paddling is common recreationally and competitively throughout all the islands by both residents and tourists. Paddle races and events of varying distances are frequently held in waters close to shore and between islands.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

The following analyses address the four resources identified as having a potential to be affected by the alternatives: Protected Wildlife (Humpback Whales and Other Protected Wildlife), Socioeconomics, Human Health and Safety, and Cultural Resources. The analyses describe expected conditions under the various alternatives when compared to the existing conditions described in Chapter 3.0, Affected Environment. Elements that would be affected most are assessed in individual sections for each alternative, whereas those that are minimally affected by each alternative are grouped together.

The terms "effect" and "impact" are used synonymously under NEPA, consequently both terms may be used in the following analyses. Impacts include effects on the environment that are direct, indirect, or cumulative. Direct effects are caused by the action itself and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts are those impacts on the environment that result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative effects are analyzed in Chapter 5.0.

4.2 Protected Wildlife

4.2.1 Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

4.2.1.1 Humpback Whales

There would be no impact to humpback whales described in section 3.2 of this document because Alternative 1 would continue the current condition. Humpback whales have been globally listed as endangered under the ESA since 1970 and would continue to be so. Approach regulations for humpback whales in Hawaii have been implemented under the ESA since 1987 in order to protect these animals from the risks associated with close interactions with humans.

4.2.1.2 Other Marine Mammals

There would be no impact to the other marine mammals described in section 3.3.1 of this document because Alternative 1 would continue the current condition. There are currently no approach regulations implemented for any marine mammals aside from humpback whales, and human interactions with other species are managed by voluntary NMFS Wildlife Viewing Guidelines (see section 3.3.3 of this document for more information).

4.2.1.3 Other Protected Species

There would be no impact to the other protected species described in section 3.3.2 of this document because Alternative 1 would continue the current condition. All sea turtle species and some species of seabirds that reside in the Hawaii are protected under the ESA. Some of these species are commonly observed in waters close to shore in areas where humpback whales reside. There are currently no approach regulations implemented for other protected species in waters surrounding Hawaii, and human interactions with these species are managed by voluntary NMFS Wildlife Viewing Guidelines (see section 3.3.3 of this document).

4.2.2 Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

4.2.2.1 Humpback Whales

Alternative 2 would have an adverse impact on humpback whales. Approach regulations are currently implemented to protect humpback whales from adverse interactions with humans that result in a take, as defined by the MMPA. In Hawaii, the humpback whale population is increasing as is the human population. If this trend persists, as expected, interactions between humans and humpback whales are going to be more frequent inside and outside the HIHWNMS. Eliminating approach regulations outside the HIHWNMS would not provide adequate protection for humpback whales from take and would result in noncompliance with the MMPA.

Specific impacts of implementing Alternative 2 would likely include the following:

1) Disruption of important bonding behavior between adults and calves, and potentially hindering humpback whale reproduction and leading to a detrimental decrease in the Hawaii population.
2) Habituation of adults and calves to vessels, causing them to be more susceptible to vessel strikes.
3) Increased occurrences of behavioral harassment of humpback whales, potentially affecting energy budgets and habitat use patterns, causing displacement from preferred habitats, and affecting individual and population health and fitness. Because humpback whales migrate over long distances and typically fast during the breeding season, high stress levels could be particularly hazardous because energy budgeting is crucial for reproductive behaviors and overall survival (Braithwaite *et al.* 2015).
4) Increased probability of vessel strikes due to increased vessel traffic in close proximity to whales. Traffic from tour boats would likely increase the most out of all types of vessels because they typically benefit the most from close interactions with humpback whales.
5) Increased noise exposure due to increased traffic in close proximity to the animals, potentially causing behavioral changes and interfering with their ability to communicate, navigate, and sense their environment.

Exacerbating all of the effects above is the fact that the humpback whale population in Hawaii is increasing as is the human population. If this trend persists, interactions between humans and humpback whales are going to be more frequent inside and outside the HIHWNMS. As stated

above, eliminating approach regulations outside of the HIHWNMS, as proposed by this alternative, would not provide adequate protection for humpback whales.

4.2.2.2 Other Marine Mammals

Alternative 2 could have a minor adverse impact on other marine mammals. Other marine mammals, particularly island-associated cetaceans, are commonly observed in close proximity to humpback whales. It is possible that vessel operators, in attempts to approach humpback whales, could inadvertently come into close contact with other marine mammals and, by doing so, disrupt, injure, or kill individuals of these species. Close interactions may also disrupt the normal behavior or make them more susceptible to vessel strikes, which can lead to unhealthy stress or serious harm.

This alternative could also indirectly affect marine mammals. Eliminating approach regulations for humpback whales outside the HIHWNMS may encourage unsafe behavior by the general public when viewing other marine mammals. Marine mammals are charismatic megafauna that strongly appeal to many wildlife observers. It is common for wildlife viewers to want close interactions with marine mammals for a more “enjoyable” experience. If approach rules for humpback whales are eliminated outside the HIHWNMS, approach to marine mammals could become “commonplace” and increase harassment of these animals.

4.2.2.3 Other Protected Species

Alternative 2 could have a minor adverse impact on the protected species described in section 3.3.2. Eliminating humpback whale approach regulations outside the HIHWNMS would not typically have a direct impact on other protected species; however, it is possible that vessel operators, in attempts to approach humpback whales, could inadvertently come into close contact with these protected species and, by doing so, could disrupt, injure, or kill individuals of these species, as previously described for other marine mammals in section 4.2.2.2. Although this behavior could adversely impact these protected species, this scenario would likely be rare.

Alternative 2 could also indirectly affect other protected species. Eliminating approach regulations for humpback whales outside the HIHWNMS may encourage unsafe behavior by the general public when viewing protected wildlife, as previously described in section 4.2.2.2.

4.2.3 Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

4.2.3.1 Humpback Whales

Alternative 3a would have no adverse impact on humpback whales in Hawaii, and would have beneficial effects on the species. The current regulations do not specifically address approach by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within a restricted distance). Interception is a means for vessels to get close to humpback whales in situations where the whales would not, during normal

behavior, approach these vessels. Because interception is not addressed in the current regulation, some whale watchers may believe that they are "legally" permitted to approach humpback whales in this way.

Approaching humpback whales, including by interception, can disrupt their normal behavior and cause physical harm to the animal. Approach can cause stress to humpback whales, especially while they conduct important reproductive behaviors common in waters surrounding Hawaii (i.e., breeding, calving, and nursing) (Baker and Herman 1989; Bauer and Herman 1986; Bauer *et al.* 1993). It could also result in physical harm caused by vessel collisions, particularly when motorized vessels are underway with active propellers. Prohibiting interception would decrease the occurrence of vessels being in close contact with whales and disrupting behavior or causing physical harm.

Alternative 3a would provide protection for humpback whales in Hawaii from human interaction, including protection from approach by interception, and therefore would have beneficial effects on the species and fulfill the purpose and need for the action. It is the only alternative that addresses the effects of interception on humpback whales.

4.2.3.2 Other Marine Mammals

Alternative 3a would have no adverse impact on other marine mammals in Hawaii, and may have indirect beneficial effects on the species. The current regulations do not specifically address approach by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within a restricted distance). Interception is a means for vessels to get close to humpback whales in situations where the whales would not, during normal behavior, approach these vessels. Adding a "no interception" provision to the current rule could indirectly benefit other marine mammals by educating the public (i.e., encouraging more responsible wildlife viewing behavior). Interception of marine mammals is a common activity performed by both commercial and recreational vessel operators in attempt to closely view these animals. This is particularly true for Hawaiian spinner dolphins because of their tendency to frequent shallow, onshore waters and their social nature around humans. Prohibiting interception of humpback whales would set a precedent to minimize the behavior and could provide insight to vessel operators about the dangers of intercepting marine resources in general. This could encourage some vessel operators to avoid interception of all marine mammals whenever possible. This alternative is expected to have a beneficial impact on marine mammals.

4.2.3.3 Other Protected Species

Alternative 3a would have no adverse impact on the other protected species described in section 3.3.2, and may have indirect beneficial effects on the species as described in section 4.2.3.2. Prohibiting the physical act of interception of humpback whales does not negatively affect sea turtles, seabirds, corals, or SOC. Adding a "no interception" provision to the current rule could indirectly benefit these protected species by educating the public (i.e., encouraging more responsible wildlife viewing behavior).

4.2.4 Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

There would be no impact to humpback whales described in section 3.2 of this document because Alternative 3b would continue the current condition. Alternative 3b would implement approach regulations that are virtually identical to the regulations assessed in Alternative 1, except that the approach regulations for this alternative would be promulgated under the MMPA instead of the ESA. For the assessment of this action alternative, the environmental consequences are the same as Alternative 1. Neither the current approach regulations for humpback whales nor the regulations proposed in Alternative 3b address interception of humpback whales by of aircraft, vessels, or other objects.

Table 4-1. Summary of impacts on protected wildlife from the alternatives considered; impacts were analyzed in comparison to the baseline (Alternative 1). Beneficial impact = +2; Minor beneficial impact = +1; No impact =0; Minor adverse impact = -1; Adverse impact = -2.

Alternatives		Humpback Whales	Other Marine Mammals	Other Protected Species
1	**No Action I/ Status quo/ Baseline**	(0) No impact	(0) No impact	(0) No impact
2	**No Action II/ No approach regulations**	(-2) Increase in take from approach by vessels, aircraft, and swimmers; increase disruption of energy budgeting and behaviors important for reproduction and development; more susceptible to vessel strikes; increase in behavioral harassment from noise	(-1) Potential for inadvertent injury or disruption from whale watchers not able to safely maneuver close to whales; increase in disruption because of irresponsible habits developing due to absence of approach regulations for any marine mammal	(-1) Same as Other Marine Mammals
3a	**Preferred Alternative/ Approach regulations with "No Interception"**	(+1) Decrease disruption resulting from approach by interception; decrease potential for vessel strikes	(+1) Decrease in disruption because vessel operators become more aware of dangers of intercepting wildlife	(+1) Same as Other Marine Mammals
3b	**Approach regulations without "No Interception"**	(0) No impact	(0) No impact	(0) No impact

4.3 Socioeconomics

4.3.1 Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

4.3.1.1 Whale Watching

Alternative 1 would have no impact to the whale watching industry described in section 3.4.4 of this document because this alternative would continue the current condition. The whale watching industry in Hawaii has increased since the current humpback whale approach regulations were implemented in 1995, more than doubling since 1999, and whale watching continues to be an important industry to the economies in areas such as Lahaina and Kailua-Kona. Whale watch vessels, like all vessels in Hawaii, are prohibited from approaching humpback whales within 100

yards. Whale watch companies should have operational protocols instilled into their business plans to ensure compliance with this rule.

4.3.1.2 Other Ocean-Based Tours

Alternative 1 would have no impact to the other ocean-based tours described in section 3.4.5 of this document because this alternative would continue the current condition. Ocean-based tour companies are major contributors to the successful tourism industry in Hawaii, with a total annual economic impact of about $350 million (ONMS 2016a). In addition to whale watching, the tour boat industry includes dolphin watching, snorkeling, scuba diving, charter fishing, day cruises, and dinner and sunset cruises. This industry has experienced massive growth in the last few decades, with the value of the industry growing an estimated 300 percent between 1984 and 2003 (Markrich 2004). Whale watching is considered to be a part of the tour boat industry, but the environmental consequences for the whale watch industry is analyzed separately in section 4.3.1.1 of this assessment. Ocean-based tour vessels, like all vessels in Hawaii, are prohibited from approaching humpback whales within 100 yards, and aircraft used in tours, like all aircraft in Hawaii, are prohibited from approaching humpback whales within 1,000 feet. Tour companies should have operational protocols instilled into their business plans to ensure compliance with this rule.

4.3.1.3 Recreation

Alternative 1 would have no impact to the recreation described in section 3.4.6 of this document because this alternative would continue the current condition.

4.3.1.4 Other Socioeconomic Affected Environment

Alternative 1 would have no impacts to commercial fisheries, commercial fishing and transportation within 200 nm of Hawaii because this alternative would continue the current condition.

4.3.2 Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

4.3.2.1 Whale Watching

There will likely be impacts on the whale watching industry if Alternative 2 is implemented, although it is not clear if it would be beneficial or negative. Because there would no longer be approach regulations for humpback whales outside of the HIHWNMS, many whale watch boats would likely approach humpback whales at a much closer distance in an attempt to provide a more enjoyable experience for their passengers. Companies may also try to advertise close interactions with humpback whales, including swimming, snorkeling, and SCUBA diving with humpback whales. These close-interaction tours could be more appealing to customers and potentially increase revenues and job opportunities for whale watch companies and other businesses (e.g. other tour boats, restaurants, hotels, retail shops, and transportation services) that benefit from the whale watch industry, especially those that are in popular whale watch areas like Lahaina and Kailua-Kona.

Alternative 2 could also negatively impact the whale watching industry. Other companies in the tour boat industry or new companies could view the absence of humpback whale approach regulations outside the HIHWNMS as an opportunity to initiate whale watch tours if the demand for tours offering close interactions increases. This would create more competition and potentially oversaturate a stable industry, and established whale watch companies could experience a decrease in revenues.

This alternative would almost certainly increase the number of vessels in close proximity to the whales. One result could be that one or multiple vessels that are close to the whale could obstruct the line of sight of passengers on whale watch boats that are attempting to view the whales at a safe distance. Furthermore, commercial and recreational whale watching vessels and swimmers crowding around the whale would diminish safe maneuverability and increase the potential for vessel damage or human injury. If this occurs, whale watch companies could be liable for damages and be vulnerable to increased lawsuits and/or insurance premiums.

Close interactions with humpback whales would likely increase the number of interactions with humpback whales resulting in MMPA-defined Level B harassment and could result in substantial fines to whale watch companies under the authority of the MMPA. This behavior could also negatively impact the reputation of all whale watch companies by attracting animosity from environmental groups and members of the local community, and could even extend to companies that operate in a responsible manner around the whales. Because humpback whale approach regulations would not be consistent between waters inside and outside of the HIHWNMS, vessel operators could potentially cross the Sanctuary's borders and inadvertently violate the HIHWNMS approach regulations.

4.3.2.2 Other Ocean-Based Tours

Alternative 2 would have an impact on the tour boat and aircraft tour industries that do not focus specifically on whale watching but tend to partake in the activity opportunistically, sometimes advertising that whales can be observed on their tours during the season. While whale watching, these other tour boat companies would be affected in the same way as the whale watch companies described in section 4.3.2.1, above. For instance, close-interaction tours could be more appealing to customers and potentially increase revenues and job opportunities for both the tour companies and other businesses (e.g. restaurants, hotels, retail shops, and transportation services), especially those that are in popular whale watch areas like Lahaina and Kailua-Kona. Alternatively, a potential increase in number of vessels in close proximity to whales (i.e., crowding around the whales) could lead to a decrease in the quality of whale watching and higher vulnerability to lawsuits, negatively impacted reputations in the community, and MMPA violations. This alternative could also create a similar crowding effect for aircraft tours, resulting in a potential risk for injury or property damage.

4.3.2.3 Recreation

Alternative 2 would have minor impacts on recreational activities in Hawaii that may be in the vicinity of humpback whales. Eliminating approach regulations would likely result in an increase of vessels and swimmers being in close proximity to whales. Recreational whale watchers (e.g.,

vessel and aircraft operators and swimmers) might try to approach humpback whales at a close distance in an attempt to have a more enjoyable whale watching experience. Although in many cases this could be true, there are also potential adverse consequences of approaching humpback whales for viewing purposes. Approach leads to a greater risk to human safety (summarized in section 3.5). It could also block the line of sight of whale watchers at a less auspicious vantage point, including shore-based whale watchers, resulting in a less enjoyable experience. Furthermore, individuals who recreationally whale watch at a close distance from humpback whales could act in a way that constitutes Level B harassment, as defined by MMPA, and be susceptible to fines under the MMPA.

Recreational activities in proximity to humpback whales that do not involve whale watching would be minimally affected by this alternative. There may be situations in which, under current approach regulations, these recreational activities are impeded in order for individuals involved to be compliance with the rule. Eliminating the humpback whale approach rules would likely benefit individuals in these situations, in that they can continue with their recreational activity without concern about keeping a legal distance away from humpback whales. However, these situations are rare, and the benefits of this alternative do not outweigh the adverse environmental consequences discussed in this EA.

4.3.2.4 Other Socioeconomic Affected Environment

Alternative 2 would have a minor impact on commercial fishing, commercial shipping, or transportation activities. There may be situations in which, under current approach regulations, these activities are impeded in order for vessels or aircraft to be compliance with the rule (e.g., changing course or temporarily halting operations). Eliminating the humpback whale approach rules would likely benefit vessels or aircraft in these situations because they can continue on their course without concern about keeping a legal distance away from humpback whales. However, these situations are rare, and the benefits of this alternative do not outweigh the adverse environmental consequences discussed in this EA.

4.3.3 Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

4.3.3.1 Whale Watching

Alternative 3a would have a minor impact on the whale watch industry in Hawaii. The current approach regulations for humpback whales and the regulations proposed in Alternative 3b do not account for the interception of humpback whales by of aircraft, vessels, or other objects. In section 2.3 of this document, interception is defined as “placing an aircraft, vessel, or other object in the path of a humpback whale so that the whale approaches within 1,000 ft (300 m) of the aircraft or 100 yards (90 m) of the vessel or object.” This behavior is typically conducted in order for vessels to get close to humpback whales (i.e., <100 yards) by circumventing the approach rule for the purpose of viewing the animals at a closer distance. Reports of this practice

most commonly involve commercial and recreational whale watchers who are attempting to provide a more “enjoyable” experience for their passengers.

The no interception provision proposed in this alternative would disallow a maneuver that is commonly used to position whale watchers closer than what is specified in the approach regulations. Although patrons of whale watch companies may not be able to view the whales at a close distance, this experience is not likely to discourage passenger satisfaction and deter future customers from purchasing whale watch tours. There are many other factors involved in whale watching that can influence customer satisfaction. In a study that surveyed whale watch passengers in Australia, Orams (2000) suggested that viewing whales at a close distance was not a significant element of passenger satisfaction. In comparison, the number of whales, behavior of whales, number of fellow passengers, duration of the cruise, construction of the ship, and sea-sickness significantly influenced customer satisfaction. Furthermore, implementing this alternative would clarify the interpretation of the humpback whale approach regulations for whale watch boat operators. Approaching humpback whales by interception is not viewed as a restricted form of approach by all whale watchers. There are currently whale watch boat operators who, in an attempt to properly comply with the approach regulations, get into a position where their passengers’ line of sight is obstructed by another vessel that is intercepting humpback whales. Enacting a “no interception” provision provides a fair competitive environment for all whale watch companies, and boats that partake in interception of humpback whales would not be unjustly rewarded with a more advantageous position for viewing the whales.

4.3.3.2 Other Ocean-Based Tours

Alternative 3a would have a minor impact on the tour boat and aircraft tour industries that do not focus specifically on whale watching but tend to partake in the activity opportunistically. The no interception provision proposed in this alternative would have the same impact on the tour boat and aircraft tour companies that opportunistically whale watch as the whale watch industry companies described in section 4.3.3.1. This alternative would have no impact on tour boat and aircraft tour companies operating normal activities when not opportunistically whale watching.

4.3.3.3 Recreation

Alternative 3a would have a minor impact on recreational activities in Hawaii that may be in the vicinity of humpback whales. Although interception to get close to humpback whales is thought to be more common with commercial whale watchers, this behavior has also been reported for recreational whale watchers. In comparison to the baseline, the environmental consequences of this alternative would be the same as sections 4.3.3.1 and 4.3.3.2 for recreational whale watchers who are viewing the whales intentionally or opportunistically. Additionally, this alternative would benefit shore-based whale watchers by limiting intercepting vessels from being in close proximity to humpback whales and blocking the line of sight from the onshore area. This alternative would not impact recreational activities in close proximity to humpback whales that do not involve whale watching because these activities would not include the interception of humpback whales under normal circumstances.

4.3.3.4 Other Socioeconomic Affected Environment

Alternative 3a would have a minor impact on the economy or tourism industry in general in Hawaii. All negative impacts to the economy and general tourism industry would directly involve the whale watching and tour boat industries and these impacts would be minor, as highlighted in sections 4.3.3.1 and 4.3.3.2 respectively. Under normal operating activities, commercial fishing vessels, commercial shipping vessels, or aircraft and vessels involved in transportation would not intercept humpback whales. Therefore, the environmental consequences for this alternative are the same as Alternatives 1 and 3b and are described in sections 4.3.1 and 4.3.4.

4.3.4 Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

The proposed action for this alternative would implement approach regulations that are nearly identical to the regulations assessed in Alternative 1 except that the approach regulations for this alternative would be promulgated under the MMPA instead of the ESA. For the assessment of this action alternative, the environmental consequences are the same as Alternative 1 and are described in section 4.3.1.

Table 4-2. Summary of impacts on socioeconomics from the alternatives considered; impacts were analyzed in comparison to the baseline (Alternative 1). Beneficial impact = +2; Minor beneficial impact = +1; Negligible or No impact =0; Minor adverse impact = -1; Adverse impact = -2.

Alternatives		Whale Watching	Other Tours	Recreation	Other Socio-economics
1	**No Action I/ Status quo/ Baseline**	(0) No impact	(0) No impact	(0) No impact	(0) No impact
2	**No Action II/ No approach regulations**	(+1) More enjoyable viewing experience with approach could lead to increase in revenues and employment opportunities. (-1) Increase in competition could lead to decreased revenues; more boats close to whales could obstruct line of sight; crowding around whales can restrict vessel maneuverability and lead to collisions with whales, vessels, and swimmers; increase in potential MMPA violations and consequent fines.	Tours that whale watch opportunistically would have same impacts as Whale Watching. (+1) Adding whale watch tours could increase revenues and employment opportunities. (-1) Adding whale watch tours could draw consumers away from other tours	Recreational whale watchers would have same impacts as Whale Watching. (0) Other recreational activities would be negligibly affected.	Impact to tourism described in Whale Watching and Other Tours section. (0) Impacts to other industries would be negligible
3a	**Preferred Alternative/ Approach regulations with "No Interception"**	(+1) Clarifies the interpretation of approach regulations; Prevents intercepting vessels from blocking the line of sight of other whale watchers. (-1) Prevents whale watchers from getting close to whales to provide a more enjoyable experience for passengers	Impacts for opportunistic whale watching tours the same as Whale Watching. (0) No impact on tours that do not opportunistically whale watch	Impacts for recreational whale watching the same as Whale Watching. (0) No impact on non-whale watching recreational activities	(0) No impact
3b	**Approach regulations without "No Interception"**	(0) No impact	(0) No impact	(0) No impact	(0) No impact

4.4 Human Health and Safety

4.4.1 Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

Alternative 1 would have no impact to human health and safety described in section 3.5 of this document because this alternative would continue the current condition. Interactions with

humpback whales can affect human health and safety in the form of vessel collisions, sudden movements to avoid vessel collisions, and aggressive behavior from whales. It is also possible that humans that are close to whales could get injured by other vessels in close proximity. Current approach regulations prohibit approaching whales, but humans can still be in close proximity if they are approached by whales.

4.4.2 Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

Alternative 2 could have an adverse impact on human health and safety. If humpback whale approach regulations are eliminated outside of the HIHWNMS, close interactions between whales and humans will likely increase. Humpback whales would likely become more crowded by whale watching vessels, aircraft, and swimmers that are attempting to get near the whales for a more enjoyable experience. This congestion around the whales may limit maneuverability of both the whale watchers and the whales, and increase the potential of vessels colliding with whales, other vessels, or swimmers. Recreational whale watch vessels may be particularly at risk because operators are typically less experienced in operating in close proximity to humpback whales. Also, crowding around humpback whales, particularly whales with calves, could elicit aggressive or frightened behavior from the whale. An aggressive, oblivious, or distracted humpback whale could collide with a vessel or swimmer and cause serious harm. Inexperienced recreational swimmers, snorkelers, paddlers, or kayakers may get injured or killed attempting to swim with humpback whales without the safety measures typically provided during commercial tours.

No benefits would be provided to human health and safety under this alternative. The potential for collisions with humpback whales would be elevated and risky behaviors by vessels and swimmers would be encouraged. Therefore, this alternative would have a negative impact on human health and safety.

4.4.3 Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

Alternative 3a could have a positive impact on human health and safety. When vessels are intercepting humpback whales, they are actively mobilized in close proximity to the whale and the exact location of the whale under the surface is typically not known. Therefore, interception makes both humpback whales and vessels more susceptible to vessel collisions and creates an added risk to whale and human safety. Prohibiting interception, as proposed by this alternative, would have a positive impact on human health and safety.

4.4.4 Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

Alternative 3b would have no impact to human health and safety described in section 3.5 of this document because this alternative would continue the current condition. The proposed action for

this alternative would implement approach regulations that are nearly identical to the regulations assessed in Alternative 1, except that the approach regulations for this alternative would be promulgated under the MMPA instead of the ESA.

Table 4-3. Summary of impacts on human health and safety from the alternatives considered; impacts were analyzed in comparison to the baseline (Alternative 1). Beneficial impact = +2; Minor beneficial impact = +1; No impact =0; Minor adverse impact = -1; Adverse impact = -2.

Alternatives		Human Health and Safety
1	**No Action I/ Status quo/ Baseline**	(0) No impact
2	**No Action II/ No approach regulations**	(-2) Increase in crowding around whales would limit safe maneuverability of vessels and increase chance of collisions between vessels, whales, and swimmers, leading to injury; crowding whales can elicit aggressive or frightened behavior from whales that may injury swimmers or passengers; recreational vessel operators or swimmers can be inexperienced in operating around whales, leading to more accidents
3a	**Preferred Alternative/ Approach regulations with "No Interception"**	(+1) Decrease in vessel collisions with humpback whales that can normally occur from interception attempts
3b	**Approach regulations without "No Interception"**	(0) No impact

4.5 Cultural Resources

4.5.1 Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

Under Alternative 1, there would be no impact to cultural resources described in section 3.6 of this document because this alternative would continue the current condition. Humpback whales are considered an important cultural resource to the residents of Hawaii, and protection of these animals in the form of approach regulations has traditionally been supported by the local community.

4.5.2 Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

Alternative 2 would have an adverse impact on cultural resources in Hawaii. Humpback whales are considered an important cultural resource to the residents of Hawaii, and protection of these animals in the form of approach regulations has traditionally been supported by the local community. Removing this protection outside of the HIHWNMS would put this important cultural resource at risk for reasons mentioned in section 4.2.2.1 of this EA.

This alternative could affect cultural activities, such as surfing and paddling, but the impact would be minor. Under current conditions, these activities may need to be paused or diverted if they come within close contact with humpback whales. Alternative 2 would make this change in behavior unnecessary, but this situation is rare. Also, interactions with humpback whales while performing these activities can be considered a culturally enjoyable experience, but there are adverse effects associated with approach. The effects of this alternative to these activities are described in section 4.3.2.3 of this EA.

4.5.3 Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

Alternative 3a would have a minor impact on cultural resources in Hawaii. Humpback whales are considered an important cultural resource to the residents of Hawaii, and protection for these animals in the form of approach regulations has traditionally been supported by the local community. Prohibiting interception would enhance the protections of humpback whales and beneficially affect this cultural resource.

4.5.4 Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

Under Alternative 3b, there would be no impact to cultural resources described in section 3.6 of this document because this alternative would continue the current condition. This alternative would implement approach regulations that are nearly identical to the regulations assessed in Alternative 1, except that the approach regulations for this alternative would be promulgated under the MMPA instead of the ESA. For the assessment of this action alternative, the environmental consequences are the same as Alternative 1 and are described in section 4.5.1.

Table 4-4. Summary of impacts on cultural resources from the alternatives considered; impacts were analyzed in comparison to the baseline (Alternative 1). Beneficial impact = +2; Minor beneficial impact = +1; No impact =0; Minor adverse impact = -1; Adverse impact = -2.

Alternatives		Cultural Resources
1	**No Action I/ Status quo/ Baseline**	(0) No impact
2	**No Action II/ No approach regulations**	(+1) More enjoyable viewing experience with approach while conducting cultural activities (e.g., surfing, paddling) (-2) Increase in harassment of humpback whales as a cultural resource; increase in potential collisions with cultural artifacts with limited maneuverability while close to whales
3a	**Preferred Alternative/ Approach regulations with "No Interception"**	(+1) Decrease harassment of humpback whales as a cultural resource resulting from approach by interception
3b	**Approach regulations without "No Interception"**	(0) No impact

4.5.5 Summary of Environmental Consequences

Table 4-5. Summary of impact numerical values for all affected environment; impacts were analyzed in comparison to the baseline (Alternative 1). Beneficial impact = +2; Minor beneficial impact = +1; No impact =0; Minor adverse impact = -1; Adverse impact = -2.

Alternatives		Protected Wildlife	Socio-economics	Human Health and Safety	Cultural Resources
1	**No Action I/ Status quo/ Baseline**	0	0	0	0
2	**No Action II/ No approach regulations**	Humpback Whales -2 Other Marine Mammals -1 Other Protected Species -1	Whale Watching +1,-1 Other Tours +1,-1 Recreation +1,-1 Other Socio-economic +1,-1	-2	+1,-2
3a	**Preferred Alternative/ Approach regulations with "No Interception"**	Humpback Whales +1 Other Marine Mammals +1 Other Protected Species +1	Whale Watching +1,-1 Other Tours +1,-1 Recreation +1,-1 Other Socio-economic 0	+1	+1
3b	**Approach regulations without "No Interception"**	0	0	0	0

5.0 CUMULATIVE EFFECTS

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Chapter 3.0, Affected Environment, described the current status of each resource, which reflects the effects of past and current actions. Chapter 4.0, Environmental Consequences, evaluated the effects of no action and action alternatives on the current status of each resource. This section now considers the cumulative effects of the alternatives on the resources, where such effects might occur, in the context of the effects of past actions, current conditions, and reasonably foreseeable future actions and conditions.

5.1 Humpback Whales

5.1.1 Increase in Human Interactions with Humpback Whales

An important action that could have a cumulative effect on humpback whales in Hawaii is the proposal by NMFS to designate the population as a DPS under the ESA and remove their endangered status. If finalized as proposed, humpback whales in Hawaii would no longer have protection under the ESA, and approach regulations promulgated under the ESA will no longer be in effect. Humpback whales would continue to have approach regulations inside the boundaries of the HIHWNMS, but all areas outside of the Sanctuary will not have federally implemented approach restrictions. Alternative 2 proposes this scenario and the direct effects of this action on humpback whales are described in section 4.2.2.1 of this assessment.

This proposal to revise the ESA listing could have a greater effect on humpback whales in Hawaii if the humpback whale population continues to increase. As analyzed under Alternative 2 in the Environmental Consequences section, eliminating approach regulations outside the HIHWNMS would not provide adequate protection for humpback whales from take and would almost assuredly result in noncompliance of the MMPA (see section 4.2.2.1 of this document). In Hawaii, the humpback whale population is increasing as the human population is increasing. If this trend persists, interactions between humans and humpback whales are going to be more frequent inside and outside the HIHWNMS. Eliminating approach regulations outside of the HIHWNMS would not provide adequate protection for humpback whales, with humpback whales likely being subject to more cases of harassment, which can adversely impact the health of the species, and an increased risk of serious injury from vessel strikes.

If humpback whale and human populations continue to increase in Hawaii, the preferred alternative for the proposed action (Alternative 3a) would provide the protections necessary to limit harassment of humpback whales. This alternative and Alternative 3b would not have an adverse cumulative effect on humpback whales resulting from past, present, or future actions.

5.1.2 Humpback Whales and Climate Change

Over the period of 1880 to 2012, the global mean temperature has increased by approximately 0.85°C (1.5°F) (IPCC 2013). Climate change affects all of Earth's ecosystems, both terrestrial and marine. There is widespread scientific agreement that the primary cause of climate change is

the rapid increase in emissions of carbon dioxide (CO_2) and other greenhouse gases (GHG) into the atmosphere since the beginning of the industrial era (IPCC 2013). Greenhouse gases in the atmosphere trap heat, which raises air and water temperatures, causing ecological consequences. Increases in air and sea surface temperatures have led to increases in the rate of melting of polar ice caps and resulting increases in sea level. The oceans are also affected as they absorb increasing concentrations of CO_2; the ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide (IPCC 2013). As the CO_2 level in the ocean increases, oxygen levels decrease, leading to ocean anoxia (Draper 2010). An additional consequence of increasing CO_2 in the ocean is increased ocean acidity. Acidification of ocean waters can affect various species by inhibiting exoskeleton and shell growth. All of these effects of climate change are projected to continue and increase into the future. Many species may not be able to acclimate or adapt quickly enough to survive these changing conditions. However, consequences are difficult to predict in many cases because, in general, there are several major sources of uncertainty associated with the most recent projections of global climate change, including the projected rate of increase for GHG concentrations, the strength of the climate's response to GHG concentrations, large natural variations, and ecosystem responses to changes in the climate.

The effects climate change will have specifically on humpback whales in Hawaii are unclear. There have not yet been any scientific studies directed at answering this question. Based on existing information, however, NMFS anticipates that climate change is most likely to adversely affect humpback whales by:

1. Altering their habitat availability: increase in ocean temperatures, melting sea ice and ocean anoxia and acidification can make currently used breeding and feeding grounds unsuitable or undesirable for humpback whales (Learmonth *et al.* 2006);
2. Changing the abundance and distribution of their prey: variations in oceanographic processes caused by climate change can lead to decreased productivity and altered distribution patterns of prey for humpback whales, which can result in longer migrations, modified energy budgeting, and a shift in the location of breeding grounds (Simmonds 2009); and
3. Increasing their susceptibility to disease: climate change could potentially expose humpback whales to new or resurging diseases, as some scientists speculate increases in diseases may be associated with effects from climate change (IWC 2007).

Many of these impacts are likely to affect humpback whales more in their feeding grounds than in Hawaii. However these impacts may, in turn, affect the reproductive success and survival of individual humpback whales, which has larger consequences for the success of the population that uses Hawaii as their breeding, calving, and nursing grounds. Therefore, if Federal approach regulations for humpback whales are not implemented outside the HIHWNMS (i.e., Alternative 2), cumulative impacts of climate change on humpback whales would likely be greater than if the proposed action is implemented. The proposed action is intended to provide protections for humpback whales that encourage the success of the population in Hawaii. Therefore, implementation of the proposed action (i.e., Alternatives 3a and 3b) would result in fewer cumulative effects on humpback whales in Hawaii in light of climate change.

The proposed action will also not influence the rate or overall intensity of climate change. There are no anticipated measurable impacts on global climate change from any of the action alternatives analyzed in this document. The action alternatives propose to implement approach restrictions for humpback whales, and NMFS does not expect them to have measurable impacts on climate change due to changes in aircraft, vehicle, or vessel usage. The nature of these regulations do not include any harmful impacts to the environment, and NMFS does not expect CO_2 and other greenhouse gas emissions to measurably increase.

5.2 Other Protected Wildlife

Any cumulative effects from the proposed action that might occur with regard to protected wildlife other than humpback whales would likely be negligible and will not be discussed further in this analysis.

5.3 Socioeconomics

5.3.1 Whale Watching and Other Affected Tourism Industry Businesses

The preferred alternative proposed in this assessment will have a minor adverse cumulative effect on the tourism industry resulting from past, present, or future actions. The tourism industry plays an integral role in the Hawaiian economy. The last few years have experienced record numbers of tourists visiting the state and record revenue generated by the industry. Whale watching in Hawaii is a popular activity that has become a key element in generating revenue for the industry. The popularity of whale watching in certain areas of Hawaii has led to the establishment of businesses in other industries that utilize the success of whale watching as a way to attract customers. Businesses such as restaurants, hotels, transportation services, and retail stores rely somewhat on the tourists that the whale watching industry attracts in areas where whale watching is popular, including Lahaina on Maui and Kailua-Kona on Hawaii. Section 4.3 outlines the adverse and beneficial impacts that each alternative of the proposed action will have on the whale watching industry in Hawaii. Many of these impacts include an increase or decrease in the quality of whale watching, which can ultimately affect the quality of cruises that companies offer. Depending on how whale watch cruises are affected in this way, the number of customers could increase or decrease over time. As a consequence, this could also affect the businesses that rely on the whale watch industry for drawing in customers. A noticeable change in the number of customers in the whale watch industry alone would not likely cause a major effect on the tourism industry as a whole. However, a concurrent change to these other businesses could create a cumulative effect that might influence the tourism industry in the areas where whale watching is currently a strong influence on the economy.

The preferred alternative for the proposed action would not substantially decrease the number of customers for the whale watch industry or other tourism businesses that rely on the whale watch industry. The added provision to this alternative will likely have both positive and negative effects on the quality of whale watching when compared to the status quo (see section 4.3.3.1 of this document), but none of the effects will be influential.

5.3.2 Tour Companies and Hawaiian Spinner Dolphin Disturbance Protections

NMFS is currently developing a proposed rule to enhance protections for Hawaiian spinner dolphins from various forms of take from human activities that cause harassment or disturbance and to reduce the impact of increased viewing and interaction pressures on these animals. In an Advance Notice of Proposed Rulemaking (70 FR 73426, December 12, 2005), NMFS identified a range of management options that are under consideration to enhance protections for spinner dolphins. These options include, but are not limited to, establishing a minimum approach rule, restricting individual activities of concern (e.g., swimming with, touching, or otherwise acting on or with a spinner dolphin), restricting vessel activities of concern (e.g., intercepting, herding, surrounding, or preventing a reasonable means of escape for dolphins), establishing time-area closures in spinner dolphin resting bays, or a combination of any or all of these protections.

The cumulative impact of the proposed action coupled with implementing protections for Hawaiian spinner dolphins is uncertain. The proposed action (i.e., implementing approach regulations for humpback whales under the MMPA) would not create a substantial change to the *status quo* or baseline because approach regulations for humpback whales have been implemented under the ESA since 1987. If NMFS issues a final rule with new Hawaiian spinner dolphin restrictions, tour operators that conduct wildlife viewing for both humpback whales and spinner dolphins may experience some effects depending on the type of management action that is taken. However, the scope and manner of protections that may be implemented for Hawaiian spinner dolphins is still unknown; therefore, the full effects to tour companies in the future are still not known.

5.3.3 Other Socioeconomic Affected Environment

Any cumulative effects from the proposed action that might occur with regard to Socioeconomics in Hawaii other than the entities discussed above would likely be negligible and will not be discussed further in this analysis.

5.4 Human Health and Safety

The scenario discussed in section 5.1.1, i.e., a likely increase in human and humpback whale interactions as both populations increase in Hawaii, would have a cumulative effect on human health and safety. Consistent with the effects on humpback whales, an increase in human-humpback whale interactions would also adversely affect human safety. Section 3.5 outlines the potential for serious human injury from close interactions with whales in the form of vessel collisions and aggressive whale behavior. If Federal approach regulations for humpback whales are not implemented outside the HIHWNMS (i.e., Alternative 2), these types of accidents would likely increase, and the adverse impacts of this alternative would be substantial. The proposed action would likely decrease the occurrence of close interactions that can result in human injury. Therefore, the proposed action (i.e., Alternatives 3a and 3b) would not have an adverse cumulative effect on human health and safety.

5.5 Cultural Resources

Since humpback whales are considered an important cultural resource for the Hawaiian community (see section 3.6.1), the cumulative effects of the proposed action on humpback whales as a cultural resource would be the same as those discussed in section 5.1.

Any cumulative effects from the proposed action that might occur with regard to other cultural resources in Hawaii besides humpback whales would likely be negligible and will not be discussed further in this analysis.

6.0 REGULATORY IMPACT REVIEW

6.1 Introduction and Background

The RIR is developed, in part, to comply with the requirements of Executive Order (E.O.) 12866. The regulatory philosophy of E.O. 12866 is summarized in the following statement from the order:

> Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, and public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

This RIR summarizes the effects of a preferred action and other alternative actions that NMFS is considering to protect humpback whales in waters surrounding Hawaii by implementing approach regulations under the MMPA to minimize adverse interactions with humans that result in a take, as defined by the MMPA.

6.2 Statement of Problem and Management Goals

This RIR summarizes the effects of a proposed action and other alternative actions that NMFS is considering to protect humpback whales in waters surrounding Hawaii by implementing approach regulations under the MMPA to minimize adverse interactions with humans that result in a take, as defined by the MMPA.

6.3 Description of Alternatives Considered

Chapter 3 of the EA describes each management alternative/scenario in detail. The alternatives are as follows:

> Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.
>
> Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.
>
> Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other

means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

The two action alternatives, Alternatives 3a and 3b, as well as Alternative 1 (no action under ESA), are applicable to waters within 200 nm of the islands of Hawaii (Main Hawaiian Islands and Northwestern Hawaiian Islands).

6.4 Benefits and Impacts of Management Alternatives

6.4.1 Description of Affected Parties and Types of Impacts

The businesses that are most likely to be affected by the implementation of any of the action alternatives would be the whale watching businesses and other wildlife viewing businesses. These would include viewing by boats, but could also include viewing by helicopters, SUP tours/rentals, SCUBA tours/rentals, and kayak tours/rentals. Non-commercial entities that could also be directly affected include personal watercraft users, swimmers, and recreational boaters. The measures contained in the action alternatives would apply to aircraft, vessels, persons, or other objects. Activities that do not focus on viewing or interacting with humpback whales would be affected minimally, if at all. Examples include ferries, non-commercial and commercial fishing vessels, passenger planes used for general travel and recreational activities not focused on humpback whales.

Section 3.4 of the EA developed in support of this action provides more detail on the general economic and demographic information as well as information on the tourism industry statewide (which factors heavily in the whale watching industry). In terms of specific entities to which the alternatives would apply, Section 3.4.4 provides information on the whale watching industry by watercraft (e.g., boats, kayak, stand-up paddleboards). Section 3.4.5 provides background on scenic wildlife tours that do not necessarily seek out whales, but may choose to view whales as the opportunity arises (e.g., generalized tour boat operations, dinner cruises, sunset cruises, and helicopter tours). Section 3.4.6 describes non-commercial recreational activities, some of which may involve participants encountering or seeking out whales. Sections 3.4.7 through 3.4.9 provide information on various watercraft or aircraft that could encounter humpback whales in Hawaii during the course of normal operations (e.g., passenger ferries, commercial shipping, fishing vessels, and passenger airplanes).

6.4.2 Economic Benefits

Without approach restrictions that offer protection to humpback whales in Hawaii under the status quo (Alternative 1), as well as under Alternatives 3a and 3b, these whales may suffer frequent disturbances from watercraft and aircraft users seeking to view whales at close proximity (Bauer *et al.* 1993; Braithwaite *et al.* 2015; Smultea *et al.* 1995; Atkins and Swartz 1989). NMFS anticipates that either action alternative will maintain protection on the whale population currently afforded under Alternative 1, and help maintain their population-level

fitness over time. Alternative 3a offers a slightly improved level of protection than Alternative 1, by banning interception or "leap-frogging" activities, whereas Alternative 3b essentially provides the same level of protection as Alternative 1. Alternative 2 offers no protection from approach of watercraft, aircraft or other objects outside of the HIHWNMS, and would likely negatively impact individual humpback whales in Hawaii as well as the population as a whole.

The economic benefits of protecting humpback whales in their natural habitat in Hawaii include the value associated with the non-consumptive use, such as watching whales from boats, kayaks, and the shore. The action alternatives would maintain the non-consumptive "use" value for the many vast majority of whale watchers or general wildlife viewers who are happy to view whales from a distance exceeding 100 yards by watercraft or 1,000 feet by aircraft, relative to status quo. Taking measures to maintain the protection of whale populations also provides other non-market economic benefits, such as option value (value of having the option of viewing whales in the future), bequest value (value of being able to protect whale populations as a resource for future generations) and existence value (value people gain from simply knowing that whales exist, even if they never intend to visit Hawaii to view humpback whales). The protection afforded by restrictions on approach would help maintain or slightly enhance non-market benefits (under Alternative 3a) of protecting humpback whales in Hawaii, through enhancing the fitness of the population and maintaining viewing opportunities in the near and distant future, along with the other non-market benefits mentioned above. The action alternatives (and status quo) would provide economic benefits that would accrue to Hawaii residents and to citizens throughout the United States compared with Alternative 2. A recent paper by Wallmo and Lew (2015) demonstrates that people across the United States value humpback whales in general. They estimate that the average annual willingness to pay for the recovery of humpback whales across a national sample of survey respondents to be $60.98 per person. This suggests that even those who do not live in Hawaii or other coastal areas still value the protection of humpback whales.

6.4.3 Economic Impacts of Each of the Alternatives

NMFS assesses the potential economic impacts for each of the alternatives qualitatively because NMFS does not have data that would allow a quantitative analysis. NMFS believes each of the two action alternatives provides the same (Alternative 3b) or slightly improved (Alternative 3a) degree of protection to humpback whales in Hawaii relative to the Alternative 1, in which humpback whales in Hawaii receive protection from approach under the ESA. Alternative 2 offers no protection to humpback whales in Hawaii outside of the HIHWNMS.

Alternative 1: No Action/Status Quo/Baseline—Humpback whales are listed under the ESA and the current approach regulations remain in effect.

Alternative 1 represents the status quo, as humpback whales are globally listed as endangered under the ESA as of the writing of this EA. Approach regulations for humpback whales in waters surrounding Hawaii have been implemented under the ESA for decades.

Under the current status quo, the humpback whale approach restriction is 1,000 feet for aircraft and 100 yards for any other means aside from aircraft.

Because this is the current protection, Alternative 1 serves as the baseline for analysis.

Alternative 2: No Action/The Hawaii DPS of humpback whales is not protected by Federal approach regulations except in the HIHWNMS.

Under Alternative 2, humpback whales are no longer listed under the ESA and, as a result, would not receive Federal protection outside the HIHWNMS with regard to approach by aircraft, vessels or any other means. Section 4.3.2 provides more detail on economic impacts of Alternative 2.

Without restrictions on approach, boats, non-motorized vessels, swimmers, aircraft, among others would be able to approach humpback whales as closely as desired outside the HIHWNMS. For many activities that encounter humpback whales only by happenstance, rather than seeking them out, this would likely yield minimal impact, except that under Alternative 2, they would no longer be compelled to halt operations or change course when in close proximity to humpback whales in order to comply with regulations.

Businesses that offer activities that focus on viewing humpback whales in Hawaii, at least to some degree, would realize some impact. For example, operators of whale watch tour vessels would be able to bring clientele closer than 100 yards of humpback whales outside of the HIHWNMS, if the captain or tour operators see that clientele would like to have that experience. In the short term, this might bring greater revenue for those operators advertising a close encounter with humpback whales, through attracting customers who specifically seek those types of encounters and perhaps even through increased tips from customers by bringing tours closer to whales. In certain areas where multiple companies offer whale watch tours, the increased competition between companies may lead to increased numbers of boats offering close encounters with whales. Boat operators that choose to view responsibly to minimize impacts on whales could find that customers would be unhappy with the obstruction of viewing due to other vessels coming in closer for viewing. Other companies that offer whale watching tours by other means (e.g., kayaks, SUP rentals) would also be similarly affected. Helicopters or other aircraft that specifically seek to bring in clientele to view humpback whales may be less likely to face issues with other aircraft obstructing the view, because of the relatively few number of aircraft involved in wildlife viewing, but the potential still exists. In the longer term, if frequent approach and crowding results in the reduction in fitness for humpback whales in Hawaii, those operators that rely on viewing humpback whales as their revenue base could find fewer viewings of and encounters with humpback whales from any distance. This may, in turn, result in reduced revenues across all entities engaged in those specific whale encounter activities over the long term, either from disappointed customers not returning or potential customers deciding not to take the chance to spend money on a whale watching trip with a low chance of seeing whales. Operating costs in the longer term could increase as well if operators find they need to travel further in order to locate whale pods.

Alternative 2 could have adverse impact on human safety with increased congestion among watercraft, ocean users, and aircraft as well as close interactions with whales as described in Section 3.5 in the EA.

Alternative 2 could have an impact on the greater community in locations that depend on the seasonal whale watching industry, such as restaurants and hotels. If consumers would visit based solely on the opportunity to interact closely with humpback whales, this might result in an expanded consumer base for the local community, at least in the short term. On the other hand,

over the long term, if the repeated approach result in reduced fitness of the Hawaii humpback whale population, or modification in their behavior, this could drive away visitors, who seek opportunities to view multiple whales on a trip, no matter how far away.

Alternative 3a: Approach regulations are implemented under the MMPA—These include restricted approach distance within 1,000 feet by aircraft or 100 yards by any other means, no interception of whales, and no disrupting of normal behavior or prior activity of humpback whales (Preferred Alternative).

Alternative 3a is similar to Alternatives 1 and 3b with additional prohibitions which are primarily intended to prohibit the action of "leapfrogging," or interception of whales by vessels, aircraft, or other objects. This additional restriction would remove the loophole which otherwise enables the practice of placing any object, specifically an aircraft or vessel, in the path of a humpback whale so that the whale would surface within 1,000 feet of the aircraft or 100 yards of the vessel. The additional restriction on interception would affect commercial tours and recreational whale watchers who wish to view whales at a closer distance, but are prohibited from directly approaching them under Alternative 3b, as well as Alternative 1. Sections 3.4.7 through 3.4.9 describe impacts to other commercial and non-commercial categories. The impacts of implementing Alternative 3a is not expected to affect the regional economy relative to Alternative 1.

Alternative 3b: Approach regulations implemented under the MMPA are the same as Alternative 3a except that there is no provision prohibiting interception of humpback whales.

Alternative 3a is essentially the same as Alternative 1. Compared with Alternative 3a, Alternative 3b lacks the provision prohibiting approach of humpback whales by interception.

6.4.4 Distributional Changes in Net Benefits

NMFS expects the preferred alternative (Alternative 3a) to have negligible effects on whale watching businesses, compared with Alternative 1 (status quo). Whale watching businesses that currently exploit a loophole under the status quo, in hopes of having whales surface closer to the vessel, would no longer be able to do so. Banning the practice of interception would primarily adversely affect businesses in Hawaii whose revenues would rely on interacting with humpback whales in close proximity.

6.4.5 Changes in Income and Employment

NMFS expects the preferred alternative to have minimal impacts on the income and no impacts to regional employment for those in the tourism sector, with the possible exception of those that currently practice interception, who might see some impact due to the explicit prohibition on this practice compared to the baseline.

6.4.6 Impacts to Government

NMFS expects the preferred alternative to incur minimal incremental impacts to the Federal government in terms of costs and staff resources. The approach regulations under Alternative 3a

are similar to those implemented under the ESA, aside from 1) the authority under which the regulations are promulgated (MMPA vs ESA), 2) a clarification of the restricted distance in meters to match the actual distance in feet and yards (300 m to 304.8 m and 90 m to 91.4 m), and 3) the additional prohibition on interception by watercraft, aircraft, or any other means. The new prohibition on interception of whales should not require additional monitoring resources, although the incidence of either providing a warning or fines to those violating the restriction might increase, at least initially, compared with the status quo/no action captured in Alternative 1, which does not have this prohibition.

6.5 Impacts to Small Entities

As the categories most directly affected by the proposed action, whale watching vessels and aircraft are considered to be a small business entities if annual revenue is less than $7.5 million (Scenic and Sightseeing Transportation, NAICS Code: 487110, 487210, 487990). NMFS does not have revenue information for any of these businesses to make a determination as to which, if any, would be considered large entities. The proposed regulation is not expected to have a significant economic impact on any entity, large or small, relative to the status quo, as the proposed alternative is essentially the same, except with the additional restriction on interception (which might help generate more monetary tips for captain and crew on a trip-by-trip basis, but would not necessarily translate to higher revenues or lower operating costs). Furthermore, NMFS does not believe that there would be a disproportionate impact between small and large entities, as the rule applies to both equally. There would be no additional reporting requirements. NMFS believes the number of small entities to which the proposed rule would apply, to be substantial, i.e., more than a few in number, but the economic impact would not be substantial, relative to the status quo.

6.6 Summary of the Significance Criteria

E.O. 12866 requires that the Office of Management and Budget review regulatory programs that are considered to be "significant." The RIR also serves as a basis for determining whether a proposed action is a "significant regulatory action" under the criteria provided in E.O. 12866. A "significant regulatory action" is one that is likely to:

- Have an annual effect on the economy of $100 million or more, or adversely affect, in a material way, the economy or a sector of the economy; productivity; competition; jobs; the environment; public health or safety; or State, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this E.O.

A regulatory program is "economically significant" if it is likely to result in any of the effects described above. In part, the RIR is designed to provide information to determine whether the regulation is likely to be economically significant. Based on the information provided in this

RIR, NMFS concludes that this proposed action would not result in a significant economic impact.

7.0 FEDERAL LAWS APPLICABLE TO THIS ACTION

The following sections describe the Federal laws that are applicable to the proposed action and alternatives.

7.1 National Environmental Policy Act

NEPA (42 U.S.C. 4321 *et seq*.) requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. NEPA is applicable to "major" Federal actions affecting the quality of the human environment. A major Federal action is an activity that is fully or partially funded, regulated, conducted or approved by a Federal agency. NMFS is considering the environmental impacts of the proposed Federal action and reasonable alternatives under NEPA in this EA.

7.2 Marine Mammal Protection Act

The MMPA enacts policy and provisions to protect and preserve marine mammals as functioning parts of the marine ecosystem. In doing so, the MMPA acknowledges the importance of protecting species and populations' stocks, as well as their essential habitats, from the adverse effects of human actions (16 U.S.C. 1361). Under the MMPA, NOAA, operating under the Secretary of Commerce, is given the responsibility, authority, funding, and duties for the order Cetacea, which includes humpback whales.

Adherence to prohibitions on take is intended to protect marine mammals from human activities; however, these prohibitions do not prohibit specified actions. Instead, the MMPA confers the responsibility to the Secretary of Commerce to prescribe regulatory measures deemed "necessary and appropriate" regarding the taking of marine mammals to insure that species and population stocks are protected in accordance with the MMPA (16 U.S.C. 1373 (a)). In doing so, the Secretary is to conduct appropriate analyses on the basis of the "best scientific evidence available" and in consultation with the Marine Mammal Commission (16 U.S.C. 1373 (a)).

The preferred alternative would establish regulatory measures that NMFS believes will enhance protections of humpback whales and human safety through approach regulations in Hawaii. This regulatory action will accomplish the requirements of the MMPA.

7.3 Endangered Species Act

The ESA (16 U.S.C. 1531 *et seq*.) was established to conserve and protect threatened and endangered species. It is the policy of the ESA that all Federal agencies must seek to conserve threatened and endangered species and use their authorities to further the purposes of the ESA. Section 7 of the ESA requires Federal agencies to ensure that their actions do not jeopardize the continued existence of any species listed as threatened or endangered, or result in the destruction or adverse modification of the critical habitat of listed species. It further requires the "action" agency to consult with an "expert" agency to evaluate the effects a proposed agency action may have on a listed species if it's determined by the action agency that the action "may effect" listed species.

Pursuant to ESA section 7, NMFS has determined that the preferred action in this EA will cause "no effect" on species listed under the ESA. Species in the geographic areas of the rule (within 200 nm from shore of the islands of Hawaii) include the blue whale, *Balaenoptera musculus;* fin whale, *B. physalus;* North Pacific right whale, *Eubalaena japonica;* sei whale, *B. borealis;* Main Hawaiian Islands insular false killer whale, *Pseudorca crassidens;* sperm whale, *Physeter microcephalus;* green turtle, *Chelonia mydas;* hawksbill turtle, *Eretmochelys imbricate;* leatherback turtle, *Dermochelys coriacea;* loggerhead turtle, *Caretta caretta;* and olive ridley turtle, *Lepidochelys olivacea*. The only substantive change of the preferred action to the existing regulatory framework is the prohibition on intercepting humpback whales, and the physical act of intercepting, or not intercepting, humpback whales does not affect other species. Although prohibiting interception of humpback whales could indirectly benefit ESA-listed species by encouraging more responsible wildlife viewing behavior, this is speculative. Therefore, we determined that there will be "no effect" on species listed under the ESA.

7.4 Magnuson-Stevens Fishery Conservation and Management Act

The essential fish habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) require NMFS to provide recommendations to Federal and state agencies for conserving and enhancing EFH if a determination is made that an action may adversely impact EFH. NMFS policy regarding the preparation of NEPA documents recommends incorporating EFH assessments into NEPA analyses; therefore, this EA will also serve as an EFH assessment.

The proposed action is a regulatory prohibition that would not physically modify any part of the marine environment or lead to any such modification. Therefore, the proposed action would not adversely impact EFH and is in compliance with EFH provisions of the MSA.

7.5 Information Quality Act

Section 515 of Public Law 106-554, the Information Quality Act, directs that all information products released to the public must first undergo a Pre-Dissemination Review to ensure and maximize the quality, objectivity, utility, and integrity of the information (including statistical information) disseminated by or for federal agencies.

The final rule package that is accompanying this EA has undergone a pre-dissemination review by NMFS. The signed Pre-dissemination Review and Documentation Form is on file with the NMFS Pacific Islands Regional Office.

7.6 Coastal Zone Management Act

Section 307 of the Federal Coastal Zone Management Act of 1972 requires that all Federal activities that affect any land or water use or natural resource of the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. NMFS has determined that this rule will be implemented in a manner consistent, to the maximum extent practicable, with the enforceable policies of the approved coastal zone management program of the State of Hawaii. The consistency determination was submitted for review to the responsible State agency under section 307(c)(1) of the Federal Coastal Zone

Management Act of 1972. NMFS received the Hawaii Coastal Zone Management Program's letter of concurrence on May 13, 2016.

7.7 Regulatory Flexibility Act

Under the Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq*.), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996), whenever an agency publishes a notice of rulemaking for any proposed rule, it must prepare and make available for public comment a regulatory flexibility analysis describing the effects of the rule on small entities — that is, small businesses, small organizations, and small government jurisdictions. However, this rulemaking is exempt from the requirements of the Regulatory Flexibility Act because NMFS has determined that notice and public comment would be impracticable and against the public interest.

7.8 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize the paperwork burden for individuals, small businesses, educational and nonprofit institutions, and other persons resulting from the collection of information by or for the Federal government. The proposed action includes no new collection of information, so further analysis is not required.

7.9 Executive Orders

An Executive Order (EO) is an order having the force of law issued by the President of the United States to the Executive branch of the Government. An EO directs Federal agencies in the execution of congressionally established laws or Executive policies. The following Presidential EOs are relevant to this analysis.

7.9.1 EO 12630 - Takings

Under EO 12630, Federal agencies must consider the effects of their actions on constitutionally protected private property rights and avoid unnecessary takings of property. A taking of property includes actions that result in physical invasion or occupancy of private property, and regulations imposed on private property that substantially affect its value or use.

In accordance with EO 12630, the approach regulations for humpback whales in Hawaii do not pose significant takings implications.

7.9.2 EO 12866 - Regulatory Planning and Review

EO 12866 requires agencies to provide to the Office of Management and Budget significant regulatory actions for review. "Significant regulatory action" is defined as those actions that do the following:

- Have an annual effect on the economy of $100 million or more, or adversely affect, in a material way, the economy or a sector of the economy: productivity, competition, jobs, the environment, public health or safety, or State, local or tribal governments or communities;

- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees or loan programs, or the rights and obligations of recipients thereof;
- Raise novel legal or policy issues arising out of legal mandates, the President's priorities or the principles set forth in this EO.

Chapter 6.0 of this EA includes the RIR, which includes an assessment of the costs and benefits of the Proposed Action, in accordance with the guidelines established by EO 12866. This rule has been determined not significant for purposes of EO 12866.

7.9.3 EO 12898 – Environmental Justice

EO 12898 requires Federal agencies to consider the impacts of their actions on minority and low-income populations with the goal of achieving environmental protection for all communities. The EO directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The EO also directs each agency to develop a strategy for implementing environmental justice. The EO is intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities' access to public information and public participation.

- The EO defines these groups as 1) **Minority** — all people who are of African American, Asian, American Indian and Alaskan Native, Native Hawaiian, Other Pacific Islander, or Hispanic origin; and **Low Income** — persons whose household income is at or below the U.S. Department of Health and Human Services poverty guidelines.

NMFS has determined, through the analysis of the impacts of this action, that there are no disproportionately high and adverse health or environmental effects on minority or low-income populations.

7.9.4 EO 13132 - Federalism

EO 13132 requires agencies to take into account any federalism impacts of regulations under development. It includes specific directives for consultation in situations in which a regulation will preempt state law or impose substantial direct compliance costs on state and local governments (unless required by statute). Neither of those circumstances is applicable to this action; therefore this action does not have federalism implications as that term is defined in EO 13132.

7.9.5 EO 13158 – Marine Protected Areas

EO 13158 requires Federal agencies to identify actions that affect natural or cultural resources that are within a Marine Protected Area (MPA). It further requires Federal agencies, in taking such actions, to avoid harm to the natural and cultural resources that are protected by an MPA. An MPA is defined under this EO as any area of the marine environment that has been reserved

by Federal, State, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.

NMFS does not anticipate any harm to the natural and cultural resources at MPAs in Hawaii as a result of the rulemaking contemplated in this EA.

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Finding of No Significant Impact to Implement Approach Regulations under the MMPA for Humpback Whales within 200 Nautical Miles of the Islands of Hawaii

National Marine Fisheries Service

This Finding of No Significant Impact (FONSI) was prepared according to the guidelines established in National Marine Fisheries Service (NMFS) Instruction 30-124-1 (July 22, 2005) and the requirements of National Oceanic and Atmospheric Administration (NOAA) Administrative Order 216-6 (NAO 216-6, May 20, 1999), concerning compliance with the National Environmental Policy Act (NEPA, 42 U.S.C. 4321, *et seq.*). This FONSI is supported by the Environmental Assessment (EA) and Regulatory Impact Review (RIR) prepared to implement approach regulations under the Marine Mammal Protection Act (MMPA) for humpback whales within 200 nautical miles (nm) of the islands of Hawaii.

After considering a range of alternatives, NMFS will take the following action:

Promulgate approach regulations under the authority of the MMPA for humpback whales, *Megaptera novaeangliae,* within 200 nm from shore of the islands of Hawaii to protect humpback whales from take as defined by the MMPA by minimizing interactions with humans. This action is intended to meet the objective of the MMPA to protect humpback whales from take where protections do not exist or no longer apply. The action will implement the following regulation:

> Except as provided in section 2.5.4 of the EA, Exceptions, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or to cause to be committed within 200 nautical miles (370.4 km) from shore of the islands of Hawaii, any of the following with respect to humpback whales (*Megaptera novaeangliae*):
>
> (1) Operate any aircraft within 1,000 feet (304.8 m) of any humpback whale;
> (2) Approach, by any means, within 100 yards (91.4 m) of any humpback whale;
> (3) Cause a vessel, person, or other object to approach within 100 yards (91.4 m) of a humpback whale;
> (4) Approach a humpback whale by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within 1,000 feet (304.8 m) of the aircraft or 100 yards (91.4 m) of the vessel, person, or object);
> (5) Disrupt the normal behavior or prior activity of a whale by any other act or omission. A disruption of normal behavior may be manifested by, among other actions on the part of the whale, a rapid change in direction or speed; escape tactics such as prolonged diving, underwater course changes, underwater exhalation, or evasive swimming patterns; interruptions of breeding, nursing, or resting activities; attempts by a whale to shield a calf from a vessel or human observer by tail swishing or by other protective movements; or the abandonment of a previously frequented area.

Analyses of action and no-action alternatives considered are included in the EA.

Significance Analysis

NOAA Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 CFR 1508.27 provide that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria.

1) Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in FMPs?

Response:

No, the action is not expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson-Stevens Act and identified in FMPs. The action is intended to regulate human behavior with regard to interactions with whales, and will not in any way adversely affect ocean and coastal habitats or any EFH as defined under the Magnuson-Stevens Act. Implementation of the action does not involve physical modification of any natural environments or habitats; however, it will provide a safer ocean and coastal habitat for humpback whales.

2) Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the action area (e.g., benthic productivity, predator-prey relationships, etc.)?

Response:

No, the action is not expected to have a substantial impact on biodiversity and/or ecosystem function within the action area. The action is intended to regulate human behavior with regard to interactions with whales, and does not have a direct impact on biodiversity and/or ecosystem function. The action will provide incremental additional protections to humpback whales, which are indigenous to Hawaii and thus play a role in ecosystem function. However, because humpback whales are in Hawaii seasonally and do not eat extensively while in these waters, and because the added protections are minor in comparison to the status quo, the action will not have a substantial impact on biodiversity and ecosystem function.

An overview of the status of humpback whales in Hawaii and the North Pacific is in section 3.2.4, and an analysis of the impacts of the proposed action (Alternative 3a) on humpback whales is in section 4.2.3.1 of the EA.

3) Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

Response:
No, the action is not expected to have a substantial adverse effect on public health or safety. In fact, the action alternatives would have a positive impact on public health and safety. Approach regulations not only ensure continued protection of humpback whales in Hawaii from close interactions, they also ensure public health and safety by limiting dangerous interactions between humans and whales. The action (Alternative 3a in the EA) is similar to the humpback whale approach regulations that are represented in the baseline (Alternative 1 in the EA). The interception provision and exceptions are the substantive changes. When vessels are intercepting humpback whales, they are actively mobilized in close proximity to the whale and the exact location of the whale under the surface is typically not known. Therefore, interception makes both humpback whales and vessels more susceptible to vessel collisions and creates an added risk to whale and human safety. Prohibiting interception, as proposed in the action, would have a positive impact on public health and safety.

A description of the risks to human health and safety with regard to humpback whale approach can be found in section 3.5, and the impact of the action (Alternative 3a) is analyzed in section 4.4.3 of the EA.

4) Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

Response:
No, the action is not expected to adversely affect endangered or threatened species, their critical habitat, marine mammals or other non-target species. The action will have beneficially effect on humpback whales, the target species, by restricting close approach and prohibiting the act of interception, i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale approaches within a restricted distance. The interception prohibition provides an incremental increase in protection from current regulations.

The action may have minor beneficial effects on other protected species. It is possible that vessel operators, in attempts to intercept humpback whales, could inadvertently come into close contact with endangered or threatened species and, by doing so, could disrupt, injure, or kill these individuals. Although prohibiting interception of humpback whales would minimize this type of interaction and ultimately benefit the health of these species, occurrences of this activity are likely rare.

The action could also indirectly benefit other species by encouraging more responsible wildlife viewing behavior. For example, interception of marine species is performed by both commercial and recreational vessel operators in attempt to closely view these animals. Because there are currently no approach regulations for other species besides humpback whales, behavior around

these animals (e.g., interception) could potentially disrupt or physically harm the species. Prohibiting interception of humpback whales could provide insight to vessel operators about the dangers of intercepting in general. This would likely encourage some vessel operators to avoid interception of all marine species whenever possible.

Because the action is a regulatory prohibition intended to restrict human interactions with humpback whales, it will not have an effect on critical habitat of any protected species.

A description of humpback whales and other protected wildlife in the action area can be found in sections 3.1 and 3.2, and the impact of the proposed action (Alternative 3a) on other marine mammals and protected species is analyzed in section 4.2.3 of the EA.

5) Are significant social or economic impacts interrelated with natural or physical environmental effects?

Response:
No, significant social or economic impacts are not interrelated with natural or physical environmental effects of this action. Social and economic factors pertaining to the action interrelate with the natural and physical environment in the form of recreational and commercial whale watching. Because prohibiting interception of humpback whales and the exceptions are the substantive difference between the action and the baseline, minor positive and negative social and economic impacts of the proposed action are expected on commercial and recreational whale watching. Positive impacts that could result from prohibiting interception include clearer application of the approach regulations (i.e., interception is clearly restricted for all vessels) and potentially a more enjoyable experience for whale watch passengers because there is less crowding in close proximity to whales, and thus a clear line of sight. In contrast, some commercial and recreational whale watchers intercept humpback whales in an attempt to provide a closer, "more enjoyable" experience for their passengers. Prohibiting interception would prevent whale watchers from getting close to the whales. However, this experience is not expected to discourage passenger satisfaction and deter future customers from purchasing whale watch tours. There are many other factors involved in whale watching that can influence customer satisfaction. In a study that surveyed whale watch passengers in Australia, Orams (2000) suggested that viewing whales at a close distance was not a significant element of passenger satisfaction. In comparison, the number of whales, behavior of whales, number of fellow passengers, duration of the cruise, construction of the ship, and sea-sickness significantly influenced customer satisfaction.

Socioeconomic data on Hawaii are described in section 3.3, and the potential social and economic impacts of the action are analyzed in section 4.3 of this EA and the RIR (Chapter 6.0).

6) Are the effects on the quality of the human environment likely to be highly controversial?

Response:
No, the effects of the proposed action on the quality of the human environment are not likely to be highly controversial. Approach regulations for humpback whales in waters surrounding the islands of Hawaii have been implemented under the Endangered Species Act (ESA) since 1987. Moreover, on April 15, 2016, NMFS published a proposed rule to revise the listing of humpback whales that would remove the Hawaii DPS humpback whales from the ESA endangered or threatened list and requested comments regarding promulgation of approach rules for the Hawaii DPS under the MMPA. Of the eight comments we received in response to this question, only one commenter did not support an approach rule under the MMPA. All other comments supported approach rules for the Hawaii DPS and some suggested adding the interception provision, which we did add. On the basis of the comments, NMFS anticipates that MMPA regulations would not be controversial.

The environmental consequences of the action (Alternative 3a) on the affected human environment are analyzed in sections 4.3.3 (Socioeconomics), 4.4.3 (Human Health and Safety), and 4.5.3 (Cultural Resources) of the EA.

7) Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

Response:
No, the action is not expected to result in significant impacts to unique areas because there are no known historic or cultural resources, park land, prime farmlands, wetlands, etc.

8) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response:
No, the effects on the human environment are not likely to be highly uncertain or involve unique or unknown risks. Approach regulations for humpback whales in waters surrounding the islands of Hawaii have been implemented since 1987. Because these measures are comparable to the existing ESA protections, we are unaware of any uncertainties or risks involved in this action. The action includes an additional provision (i.e., a prohibition on the interception of humpback whales) and exceptions, which impact a small section of the affected human environment. The EA analyzes the impacts of the action on this portion of the affected human environment, and no significant uncertainty or unique risks were identified.

The environmental consequences of the action (Alternative 3a) on the affected human environment are analyzed in sections 4.3.3 (Socioeconomics), 4.4.3 (Human Health and Safety), and 4.5.3 (Cultural Resources) of the EA.

9) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Response:
No, the action is not related to other actions with individually insignificant, but cumulatively significant impacts. The only possible anticipated impact of this rule is to the tourism industry due to the interception provision (see response to #5 above). Because the action is not expected to significantly change the number of whale watchers, businesses would not be adversely affected and cumulative impacts of this action would not be significant.

The only other related action is a proposed rule to enhance protections for Hawaiian spinner dolphins from human interactions that NMFS is currently developing. If we issue a final rule with new Hawaiian spinner dolphin restrictions, tour operators that conduct wildlife viewing for both humpback whales and spinner dolphins may experience some effects depending on the type of management action that is taken. However, the scope and manner of protections that may be implemented for Hawaiian spinner dolphins are still unknown; therefore, the full effects to tour companies in the future cannot be considered at this time.

Cumulative effects of the action and alternative actions are analyzed in Chapter 5.0 of the EA.

10) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

Response:
No, the action is not likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources. There are no known historic properties that would be affected.

The cultural resources of the action area are described in section 3.6, and the impacts of the action (Alternative 3a) on cultural resources are analyzed in section 4.5.3 of the EA.

11) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response:
No, the action cannot reasonably be expected to result in the introduction or spread of a nonindigenous species. The action regulates human behavior in proximity to humpback whales, an indigenous species, and does not in any way affect the introduction or spread of a nonindigenous species.

Humpback whales and other protected wildlife in the action area are described in sections 3.1 and 3.2, and the impacts of the action (Alternative 3a) on protected wildlife are analyzed in section 4.2.3 of the EA.

12) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response:
No, the action is not likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration. This action effectively continues prohibitions that have existed in Hawaii under the authority of the ESA (50 CFR 224.103(a)) for 29 years. Moreover, previous regulations existed for humpback whales in Alaska (50 CFR 224.103(b)) and in the east coast of the U.S. for North Atlantic right whales (50 CFR 224.103(c)), and therefore we do not believe this regulation is precedent setting. It is also unlikely to represent a decision in principle about any future consideration.

13) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response:
No, the action is not expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment. The purpose of the action is to provide adequate protection of humpback whales from close human interaction that results in take, as defined by the MMPA. The Federal government has sole jurisdiction for the protection of marine mammals, and there are no applicable State or local laws that would be violated, overlapped, or contradicted by this authority. NMFS has also determined that the proposed action is consistent to the maximum practicable with the enforceable policies of the approved Coastal Zone Management Program of the State of Hawaii.

14) Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

Response:
No, the action is not expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species. The action will have beneficial effects on the target species (i.e., humpback whales). The action (Alternative 3a) would implement approach regulations outside the Humpback Whale Sanctuary that would minimize these cumulative adverse effects on the target species.

The only other related action is a proposed rule to enhance protections for Hawaiian spinner dolphins from human interactions that NMFS is currently developing. If we issue a final rule with new Hawaiian spinner dolphin restrictions, tour operators that conduct wildlife viewing for both humpback whales and spinner dolphins may experience some effects depending on the type

of management action that is taken. However, the scope and manner of protections that may be implemented for Hawaiian spinner dolphins is still unknown; therefore, the full effects to tour companies in the future cannot be considered at this time.

Cumulative effects of the action and alternative actions are analyzed in Chapter 5.0 of the EA.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting EA and RIR prepared to implement approach regulations under the MMPA for humpback whales within 200 nm of the islands of Hawaii, it is hereby determined that the proposed action will not significantly impact the quality of the human environment as described above and in the EA. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impact. Accordingly, preparation of an environmental impact statement for this action is not necessary.

6/17/16

Date

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