NOAA FISHERIES

Pacific Islands Regional Office
Protected Resources

Recovery Outline

Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment

July 2016

DISCLAIMER

This annotated outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, for the Main Hawaiian Islands insular false killer whale (*Pseudorca crassidens*) distinct population segment (DPS), listed as endangered under the Endangered Species Act (ESA) (77 FR 70915; November 28, 2012), until a full recovery plan is developed and approved. A recovery outline is not subject to formal review and is not a regulatory document. This annotated outline is intended primarily for internal use by the National Marine Fisheries Service (NMFS) as a pre-planning document and the recommendations and statements found herein are non-binding and intended to guide actions. Nothing in this outline should be considered a requirement for any governmental agency or member of the public. Formal public participation will be invited upon the release of the draft Recovery Enhancement Vision for this DPS (see Recovery Plan Preparation for more detail). However, any new information or comments that members of the public may wish to offer as a result of this annotated recovery outline will be taken into consideration during the recovery planning process. Interested parties may contact Krista Graham at 808-725-5152, or via email at Krista.Graham@noaa.gov.

Cover photo by NMFS Southwest Fisheries Science Center of a Main Hawaiian Islands insular false killer whale, under NOAA Fisheries Research permit #14097.

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LIST OF ACRONYMS AND ABBREVIATIONS

DLNR	Department of Land and Natural Resources
DPS	Distinct Population Segment
ESA	Endangered Species Act
FKWTRT	False Killer Whale Take Reduction Team
LLEZ	Longline Exclusion Zone
MHI	Main Hawaiian Islands
MMPA	Marine Mammal Protection Act
NGO	Non-governmental Organization
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NWHI	Northwestern Hawaiian Islands
PBR	Potential Biological Removal
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
PMNM	Papahānaumokuākea Marine National Monument
REV	Recovery Enhancement Vision
RIS	Recovery Implementation Strategy
RPM	Reasonable and Prudent Measures
SAR	Stock Assessment Report
SSA	Species Status Assessment
TRP	Take Reduction Plan
US	United States

I. INTRODUCTION

Background

In November 2012, we, the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) listed the Main Hawaiian Islands (MHI) insular false killer whale (*Pseudorca crassidens*) as an endangered distinct population segment (DPS) under the Endangered Species Act (ESA) (77 FR 70915; November 28, 2012). In 2013, the NMFS' Pacific Islands Regional Office (PIRO) published a Notice of Intent (NOI) to prepare a recovery plan for the MHI insular false killer whale and solicited relevant information (78 FR 60850; October 2, 2013). We received relevant species and habitat information from seven commenters.

Recovery Outline Purpose

The ESA mandates that NMFS develop and implement recovery plans for the conservation and survival of ESA-listed species under NMFS' jurisdiction. We developed this annotated recovery outline to guide recovery actions for the MHI insular false killer whale DPS in a systematic, cohesive way until a recovery plan is completed. To develop this recovery outline, we used information from the final listing rule (77 FR 70915; November 28, 2012), the status review of the species (Oleson et al. 2010), the addendum to the status review (Oleson et al. 2012), information received from publication of the NOI (78 FR 60850; October 2, 2013), and the final 2015 NMFS marine mammal stock assessment report (SAR) (Carretta et al. 2016).

General Information

Common Name: Main Hawaiian Islands insular false killer whale DPS

Scientific Name: *Pseudorca crassidens*

Listing Status: Endangered

Date Listed: November 28, 2012 (77 FR 70915)

Critical Habitat: No critical habitat designated at this time, but it is under development.

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Available Information

Available information on the life history and status of the MHI insular false killer whale is summarized and described in detail in the 2010 status review (Oleson et al. 2010), the 2012 addendum to the status review (Oleson et al. 2012), the final listing rule (77 FR 70915; November 28, 2012), and in the final 2015 SAR (Carretta et al. 2016). Information is also available on our website at

www.fpir.noaa.gov/PRD/prd_false_killer_whale.html. Since the time of listing, research has provided new insight into the movements (including depth distribution), habitat use, social structure, and genetics of the DPS. Despite the breadth of information on the species, there is considerable uncertainty surrounding many aspects of the MHI insular false killer whale's biology, abundance, trends in abundance, and threats.

II. RECOVERY STATUS ASSESSMENT

In order to establish a recovery plan for a species, the current status of the species must be understood. The recovery status indicates how the species is doing at present and how much the species' status must improve to reach a point at which it no longer warrants the protections of the ESA. Three components were considered when determining recovery status: (1) the biological requirements of the species, (2) the threats that negatively impact the species, and (3) the conservation efforts that positively impact the species.

BIOLOGICAL ASSESSMENT

Recovery implications of the species' demographic and genetic status

False killer whales are found worldwide in tropical and warm-temperate waters (Stacey et al. 1994). They are long-lived social odontocetes (toothed whales) with maximum reported age estimated at 63 years for females and 58 years for males (Kasuya 1986). They are top predators and forage cooperatively to feed primarily on fish and squid. Their preference for large pelagic fish, especially fish that is also preferred by commercial and recreational fishermen, has made them particularly susceptible to interactions with fisheries. False killer whales have been reported to take fish and bait (i.e., depredate) from commercial longline fisheries (False Killer Whale Take Reduction Team (FKWTRT) 2010), as well as commercial and recreational troll and handline fisheries (Shallenberger 1981, Nitta and Henderson 1993, Boggs et al., 2015). Depredation behaviors may make false killer whales more vulnerable to accidental hooking or entanglement in fishing gear, and there is growing evidence that interactions are occurring (see Baird and Gorgone 2005, Baird et al. 2014, Carretta et al. 2016). Finally, false killer whales are considered sentinel species in the marine environment for contaminants because of their high trophic position, long life spans, and blubber that accumulates lipophilic contaminants (Foltz et al. 2014).

In the Hawaiian Archipelago, three populations of false killer whales have been identified based on genetic, photo-identification, and satellite tracking movement data (Chivers et al. 2007, 2010; Baird et al. 2008, 2010, 2013; Martien et al. 2014). These three populations (or stocks, as they are identified under the Marine Mammal Protection Act (MMPA)) of false killer whales are the MHI insular population, the pelagic population, and the Northwestern Hawaiian Islands (NWHI) population. The MHI insular population is the only population of false killer whales officially designated a DPS and listed under the ESA. The confined range, genetic isolation, social complexities, and small and declining abundance of the MHI insular DPS all limit its recovery potential.

It is difficult to discuss the ecology of the MHI insular population of false killer whales without also discussing some aspects of the ecology of the pelagic and NWHI populations, primarily because all three populations have partially overlapping ranges and share some similar biological needs and threats. Satellite tracking data have revealed new information about the distribution and habitat use of these populations, particularly the insular population. Most recently, the range and boundaries of all three populations were refined following a reevaluation of significant and new information on the occurrence and movements of each population (see Figure 1); this is reviewed in detail in Bradford et al. (2015) and

summarized in the final 2015 SAR (Carretta et al. 2016). For the MHI insular false killer whales, telemetry data shows less offshore movement on the windward sides of the islands (maximum distance from shore 51.4 km) than on the leeward sides of the islands (maximum distance from shore 115 km), making the previously described range of 140 km from the islands largely inaccurate on the windward sides of the islands (Bradford et al. 2015). Based on this new information, the MHI insular population range (stock boundary) is now defined using a minimum convex polygon of a 72 km radius (~39 nautical miles) extending around the Main Hawaiian Islands, with the offshore extent of the radii connected on the leeward sides of Hawaii Island and Niihau to encompass the offshore movements within that region (Bradford et al. 2015, Carretta et al. 2016) (see Figure 2). The MHI insular population overlaps with the pelagic population in waters from 11 km from shore out to the outer edges of their range (red line in Figures 1 and 2). Overlap with the NWHI population occurs in waters surrounding Niihau and Kauai (see Figures 1 and 2).

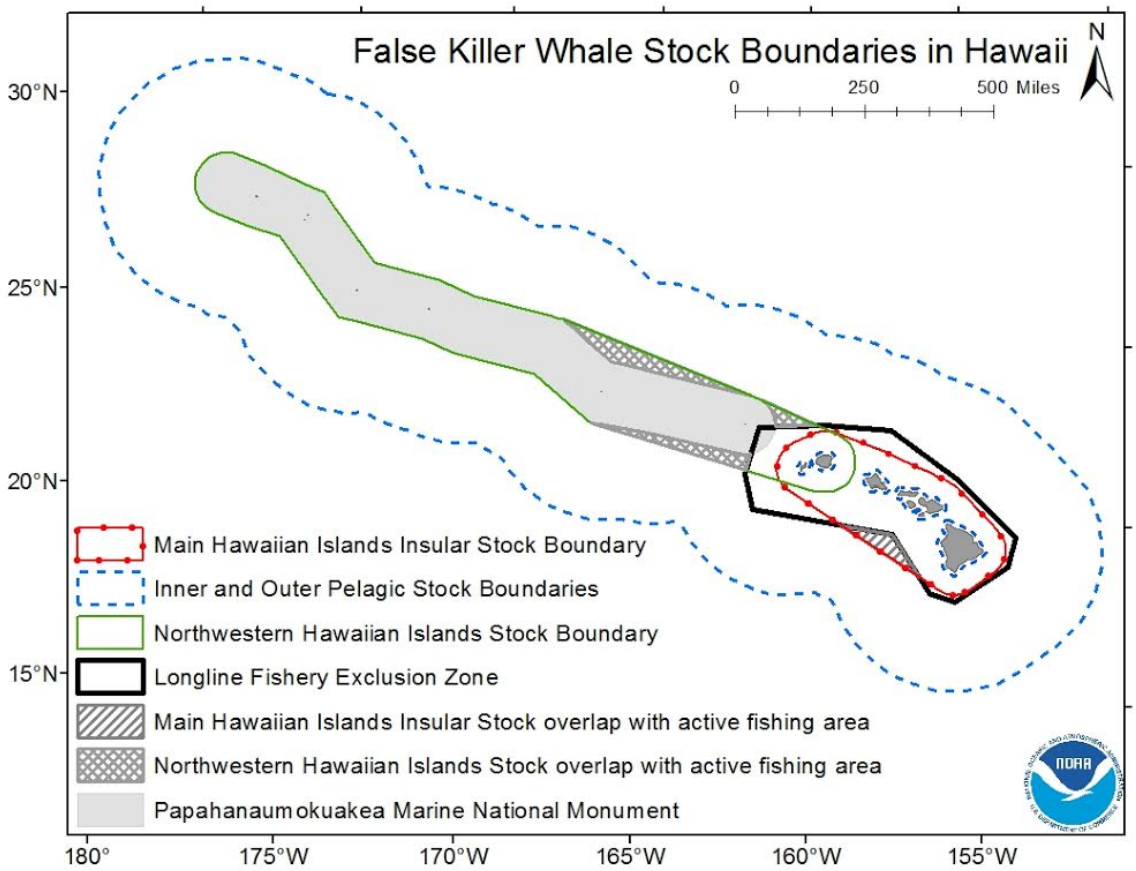

Figure 1: Revised false killer whale population boundaries and areas of population overlap. Revised MHI insular, pelagic, and NWHI population boundaries are shown in red, blue, and green, respectively. The black line represents the commercial longline fishing exclusion zone. The grey lines represent MHI insular-pelagic population overlap zones where commercial longline fishing occurs; grey hash lines represent the pelagic-NWHI population overlap where commercial longline fishing occurs. The Papahānaumokuākea Marine National Monument (PMNM) (closed to fishing) is shown in grey. (Source: NMFS unpublished 2016 (modified from Bradford et al. 2015))

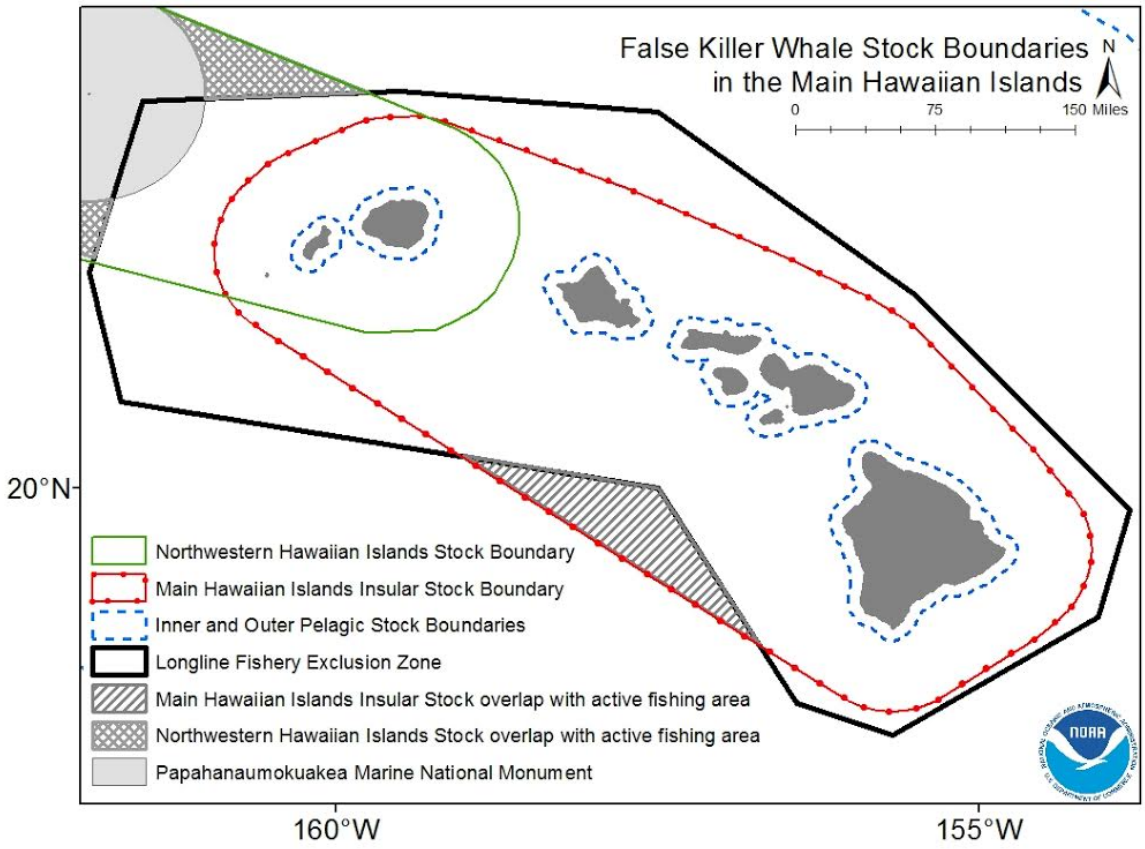

Figure 2: Close up of revised MHI insular false killer whale stock boundary. Revised MHI insular, pelagic, and NWHI stock boundaries are shown in red, blue (inner and partial outer boundaries), and green, respectively. The black line represents the commercial longline fishing exclusion zone. Grey lines represent MHI insular-pelagic stock overlap zone where commercial longline fishing occurs. (Source: NMFS unpublished 2016 (modified from Bradford et al. 2015))

Despite having partially overlapping ranges, genetic analyses indicate that gene flow among all three false killer whale populations is restricted (Chivers et al. 2010; Martien et al. 2011, 2014). Photographic-identification and social network analyses indicate that the MHI insular population consists of a tight social network that is socially unconnected with pelagic and NWHI false killer whales (Baird et al. 2010, 2012). Furthermore, within the MHI insular social network, it is suggested that there exist three separate social clusters (Martien et al. 2011, Baird et al. 2012), and mating occurs primarily, though not exclusively, within clusters (Martien et al. 2011). This may further constrict the already limited gene flow within the insular population.

The estimated total abundance of the MHI insular population is 151 individuals (CV=0.20) (Oleson et al. 2010, Carretta et al. 2016). However, it should be noted that this estimate may be positively-biased, because missed photo-identification matches were discovered after the analyses were complete (discussed in Oleson et al. 2010). The minimum population estimate (the number of distinctive individuals identified during 2011 to 2014 photo-identification studies) for the MHI insular population of false killer whales is 92 individuals (Baird et al. 2015).

As for current population trend, the MHI insular population appears to have declined during the past two decades at an average rate of 9% per year (95% probability intervals = 5% to 12.5%) (Baird 2009, Reeves et al. 2009, Oleson et al. 2010). Although historical population size is unknown, a plausible historical abundance of 769 insular animals was estimated and discussed in detail, with known caveats, in the 2010 status review (Oleson et al. 2010).

A comparison between the three false killer whale population sizes is not straightforward because the ranges of the pelagic and NWHI populations are different than that of the MHI insular population, and because of the complexity in deriving the numbers. Nonetheless, for context with regard to the size of the MHI insular population, the estimated total pelagic population is 1,540 individuals (CV=0.66) (Bradford et al. 2014, 2015) with a minimum population size of 928 individuals (Carretta et al. 2016), and an unknown current population trend. The estimated abundance of the NWHI population is 617 individuals (CV=1.11) (Bradford et al. 2014, 2015), with a minimum population estimate of 290 individuals (Carretta et al. 2016), and an unknown current population trend.

Similar to many imperiled species, the MHI insular false killer whale DPS faces many obstacles that may slow or even impede recovery. According to the 2010 status review (Oleson et al. 2010), there is an estimated effective population size (number of adults contributing offspring to the next generation) of approximately 46 insular adults. Because MHI insulars do not breed with the pelagic or NWHI populations, and breed primarily (though not exclusively) within their social cluster (Martien et al. 2011), the potential for inbreeding depression and loss of social integrity is troubling. Considering these aspects of the MHI insular population – confined range, genetic isolation, social complexities, and limited and declining abundance – the recovery potential of the MHI insular false killer whale is concerning.

THREATS ASSESSMENT

Refinement of the originally-described threats facing the species

In the MHI insular false killer whale final listing rule (77 FR 70915; November 28, 2012), a total of 29 threats were identified under the five ESA section 4(a)(1) listing factors. Each threat was also attributed to a key limiting factor (i.e., the most significant natural and anthropogenic factors that are currently impeding the ability of the population to recover) as having either a historical, current, or future impact on the MHI insular DPS. Each of these 29 threats were discussed in greater detail in the status review (Oleson et al. 2010) and final listing rule (77 FR 70915; November 28, 2012). In the final listing rule, 16 threats were deemed medium or high threats to the MHI insular false killer whales. (In actuality, 15 threats were identified, with one threat – short-and long-term climate change – subdivided into two threats.

In this recovery outline, there are a total of 27 current and/or future threats now instead of 29 (see Table 1). This is because we removed two threats as they related to Factor D: The inadequacy of existing regulatory mechanisms. For the threat of “lack of reporting/observing of nearshore fisheries interactions,” we determined that this is not a threat per se, but rather is a barrier to understanding the threat of interactions with nearshore fisheries. For the threat of “longline fishing prohibited area,” we determined that it, too, is not actually a threat itself; the actual threat is interactions with commercial longline fisheries, and this threat is already listed/considered. Thus, there are now 27 current and/or future threats to the species instead of the original 29 threats.

We have also clarified the way the threats and their key limiting factors have been described under a number of the section 4(a)(1) listing factors. For example, the key limiting factor of “hooking, entanglement, or intentional harm” was originally under Factor E: Other natural and manmade factors. However, we determined that this key limiting factor is more appropriately associated with Factor D: Inadequacy of existing regulatory mechanisms. We then teased apart this key limiting factor into “incidental (or unintentional) take” and “directed take.” Under “incidental take,” we more appropriately refined the individual threats as “incidental take in commercial longline fisheries (i.e., deep-set and shallow-set),” “incidental take in commercial and recreational non-longline fisheries (i.e., troll, handline, shortline, kaka line),” and “interactions with aquaculture facilities.” The threat for the key limiting factor

of “directed take” is also now refined as “intentional harm (e.g., shooting, poisoning, and explosives) from commercial and recreational fisheries.”

We have also refined the threat of “short and long-term climate change” and associated it with Factor A: The present or threatened destruction, modification, or curtailment of its habitat or range, and with Factor C: Disease or predation (instead of Factor C and Factor E: Other natural or manmade factors affecting its continued existence). More specifically and as mentioned above, this threat was originally split in two in the final listing rule – in Factor C as it pertains to an increase in disease vectors, and in Factor E as it relates to changes in sea level, ocean temperature, ocean pH, and expansion of low-productivity areas. While we are keeping the threat of short- and long-term climate change with Factor C and the key limiting factor of “disease,” we have decided to more appropriately associate the secondary threat of short- and long-term climate change with Factor A (and the key limiting factor of “reduced food quality and quantity”), since changes in sea level, ocean temperature, ocean pH, and expansion of low-productivity areas will affect the quality and quantity of prey for insular false killer whales.

Recovery implications of the current threats facing the species

As of 2016, a total of 27 current and/or future threats are identified as impeding the recovery of MHI insular false killer whales. Twelve threats are now deemed “medium” or “high” threats to the MHI insular false killer whale. See Table 1 for identification of these threats. The most significant threats to the MHI insular DPS relate to section 4(a)(1) Factor D: Inadequacy of existing regulatory mechanisms, and Factor E: Other natural or manmade factors. For Factor D, the key limiting factor that is currently impeding the ability of the insular DPS to recover is “incidental take (hooking or entanglement in fisheries),” with the most significant threat being incidental take in commercial and recreational non-longline fisheries (i.e., troll, handline, shortline, and kaka line). For Factor E, the most significant key limiting factor is “small population size.” The three threats that relate to this key limiting factor (reduced genetic diversity, inbreeding depression, and other Allee effects) are individually rated a medium threat level; however, it is the synergy of these three threats that are currently and significantly impeding the ability of the insular DPS to recover (see Table 1). These high threats are briefly discussed below.

Other “medium” threats, such as environmental contaminants, competition with fisheries for food (i.e., reduced prey size and biomass), effects from climate change (i.e., changes in ocean temperatures and pH, expansion of low productivity areas affecting prey and competitor species, and increase in disease vectors), intentional harm (e.g., shooting, poisoning, explosives) from commercial and recreational fisheries, and sonars and seismic exploration (including military, oceanographic, and fishing sonars) may also play a role. Medium threats, due to the number of them, are listed in Table 1 but are not discussed in this recovery outline. Low, medium, and high threats will all be discussed in detail in the Recovery Enhancement Vision document (see Recovery Plan Preparation for more detail).

Current and/or Future Threats to MHI Insular False Killer Whales					
ESA Factor for Decline	**Key Limiting Factor**	**Threat**	**Key Ecological Attributes Affected**	**Overall Threat Level**	**Overall Ranking of Key Limiting Factor**
(A) Present or threatened destruction, modification, or curtailment of its habitat or range	Reduced food quality and quantity	Reduced total prey biomass	Mortality, Foraging success	Medium	Medium
		Reduced prey size	Mortality, Foraging success	Medium	
		Competition with commercial deep-set and shallow-set longline fisheries	Mortality, Foraging success	Medium	
		Competition with commercial non-longline fisheries (i.e., troll, handline, shortline, and kaka line)	Mortality, Foraging success	Medium	
		Competition with recreational fisheries	Mortality, Foraging success	Low	
		Ocean warming increasing low-productivity zones	Mortality, Foraging success	Low	
		Ocean acidification	Mortality, Foraging success	Low-Medium	
		Natural and anthropogenic contaminants	Mortality, Reproductive potential	Low	
(B) Overutilization for commercial, recreational, scientific, or educational purposes	Low density	Live capture	Reproductive potential	None (primarily historic threat)	No current threat
(C) Disease or predation	Disease	Harmful algal blooms	Mortality, Reproductive potential	Low	Medium
		Environmental contaminants	Mortality, Reproductive potential	Medium	
		Short and long-term climate change (increase in disease vectors)	Mortality, Reproductive potential	Medium	
		Parasitism	Mortality, Reproductive potential, Foraging success	Low	
	Predation	Killer whales	Mortality	Low	Low
		Sharks (i.e., cookie-cutters)	Mortality	Low	
	Competition	Marlin, sharks, etc.	Foraging success, Behavior	Low	Low
(D) Inadequacy of existing regulatory mechanisms	Incidental take (hooking or entanglement in fisheries)	Incidental take in commercial longline fisheries (i.e., deep-set and shallow-set)	Mortality, Behavior	Low	High
		Incidental take in commercial and recreational non-longline fisheries (i.e., troll, handline, shortline and kaka line)	Mortality, Behavior	High	
		Interactions with aquaculture facilities	Mortality, Behavior	Low	
	Directed take	Intentional harm (e.g., shooting, poisoning, explosives) from commercial and recreational fisheries	Mortality, Behavior	Medium	

(E) Other natural or manmade factors affects its continued existence	Environmental pollutants/toxins	Oil spills	Mortality, Reproductive potential, Foraging success, Behavior	Low	Low
		Plastic ingestion	Mortality, Foraging success	Low	
	Small population size	Reduced genetic diversity	Reproductive potential	Medium	High
		Inbreeding depression	Reproductive potential	Medium	
		Other Allee effects	Reproductive potential, Mortality	Medium	
	Other	Sonars and seismic exploration (including military, oceanographic, and fishing sonars)	Mortality, Reproductive potential, Behavior, Foraging success	Medium	Medium
		Vessel strikes	Mortality	Low	Low
		Whale/dolphin watching	Behavior, Reproductive potential	Low	Low

Table 1: Threats identified as low, medium (colored peach), and high (colored pink) that are identified to contribute to the current and/or future status of MHI insular false killer whales. (Modified slightly from MHI insular false killer whale final listing rule (77 FR 70915; November 28, 2012) and the 2010 status review (Oleson et al. 2010))

INCIDENTAL TAKE (HOOKING OR ENTANGLEMENT): COMMERCIAL AND RECREATIONAL NON-LONGLINE FISHERIES

"Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. "Incidental take" is defined as take that is incidental to an action, and not the purpose of an action.

In the final listing rule, the "lack of reporting/observing of nearshore fisheries interactions" was originally rated as a medium threat. (As a reminder, we have deleted this threat as is not a threat per se, but is a barrier to understanding incidental fisheries interactions. However, here we discuss the threat of incidental take in non-longline fisheries and the fact that these fisheries are unobserved/unmonitored.) This medium level was based only on the scale and distribution of the troll and handline fisheries, since anecdotal reports of depredation specific to false killer whales were known only for the troll fishery at the time. However, there is growing evidence that false killer whale interactions (i.e., depredations) with unidentified hook-and-line fisheries are occurring. This is based on information such as scarring and dorsal fin disfigurements (Baird and Gorgone 2005, Baird et al. 2014). For example, a recent analysis of insular false killer whales revealed that 22% of the population has mouth-line injuries consistent with fisheries interactions, with interaction rates likely negatively biased due to only 58% of individuals with ≥50% of mouthline visible (Beach et al. unpublished data). There are also self-reports of false killer whale depredation in commercial troll and handline fisheries (Boggs et al. 2015), and a video of a depredation event while trolling from a jet ski (Jouppi 2015). Additionally, in October 2013, examination of a stranded MHI insular false killer whale's stomach revealed five fishing hooks and fishing line that likely came from a non-longline fishery because many of the hooks were not consistent with commercial longline fishery specifications (NMFS PIR Marine Mammal Response Network, West et al. submitted). Although the fishing gear is not believed to have caused the death of the whale, the finding confirms that MHI insular false killer whales are interacting with hook-and-line fisheries in the Main Hawaiian Islands.

In addition to the growing evidence of incidental interactions between false killer whales and nearshore fisheries, a recent report evaluating false killer whale dorsal fin injuries suggested that the rate of these

incidental interactions from various forms of hook-and-line gear may vary by population, social cluster, and gender (Baird et al. 2014). These researchers suggest that the MHI insular population shows the highest rate of dorsal fin disfigurements, two of the three social clusters from the insular population show a higher proportion of fishing line injuries, and, when gender was known, interactions were with females.

It is unknown whether animals get hooked or entangled in commercial or recreational non-longline fishery gear (as they do in commercial longline gear) because interactions with marine mammals from these fisheries are not reported to NMFS. Under the MMPA's Marine Mammal Authorization Program, commercial fisheries that are categorized under the Federal List of a Fisheries – an annual list that classifies commercial fisheries into categories according to the level of interactions that result in incidental mortality and injury – are authorized to lawfully incidentally take a marine mammal, though these interactions must be reported. However, non-categorized fisheries (such as these nearshore fisheries) are not required to report incidental interactions. Addressing this will require obtaining information on which specific fisheries are involved, detailed characterizations of these fisheries (e.g., fishing method, gear configurations, and other factors that might inform an understanding of their risk to false killer whales and development of mitigation measures), the rate of interactions, and the severity of any resulting injuries. Getting this information may be possible via an anonymous reporting system, or placing observers or video monitoring surveillance cameras aboard non-longline fishing vessels, and are recovery actions to consider.

SMALL POPULATION SIZE: REDUCED GENETIC DIVERSITY, INBREEDING DEPRESSION, AND OTHER ALLEE AFFECTS

As previously mentioned, the key limiting factor of small population size and the corresponding threats of reduced genetic diversity, inbreeding depression, and other Allee effects present a recovery challenge for the insular DPS. Individually these three threats were rated a medium threat level; however, these threats act synergistically with one another and therefore they are collectively rated a high overall threat (see Table 1). The MHI insular DPS has an estimated abundance of approximately 151 individuals, though this may be positively-biased as discussed above, and the current estimated number of breeding adults (≤50) is approaching levels at which population growth can be negatively affected. Moreover, reduced social factors (such as efficiency in group foraging and potential loss of knowledge needed to deal with unusual environmental events) and increased vulnerability to other threats, such as environmental contaminants and climate change, may further compromise the ability of the insular DPS to recover to healthy levels (Oleson et al. 2010). Unfortunately, there is likely no direct way to address these threats. Other medium to high threats need to be reduced or ameliorated before the MHI insular population can recover to a healthier population size.

Summary of threats

As of 2016, 27 current and/or future threats to MHI insular false killer whales have been identified, including 12 that are considered to be either medium or high in level, with the most significant threats and their corresponding key limiting factor related to incidental take (hooking or entanglement in fisheries) and small population size, as discussed above. The threats from small population size (i.e., reduced genetic diversity, inbreeding depression, and other Allee effects) are extremely difficult to address through directed recovery actions. Incidental take from interactions with commercial and recreational non-longline fisheries may be more likely to be reduced and possibly eliminated over time through direct and indirect research and recovery actions. All threats (see Table 1) will be discussed in the Recovery Enhancement Vision document.

CONSERVATION ASSESSMENT

Steps taken to address the species' recovery needs

Current conservation efforts in place for MHI insular false killer whales include the following: (1) Take prohibitions, and authorization and control of incidental take under the ESA and MMPA; (2) measures taken under the False Killer Whale Take Reduction Plan (TRP), including gear modifications, time-area closures, measures to improve captain and crew response to de-hook and disentangle animals; (3) active research programs that are filling data gaps; (4) protection under other statutory authorities (i.e., the Clean Water Act and Marine Pollution Protocol for the International Convention for the Prevention of Pollution From Ships; and (5) Watchable Wildlife Viewing Guidelines. In addition, conservation efforts are being initiated by the State of Hawaii under their ESA section 6 Cooperative Agreement. Some of these efforts are described in greater detail below and in the proposed rule for listing the MHI insular false killer whale (75 FR 70169; November 17, 2010).

Under section 7(a)(2) of the ESA, Federal agencies must consult with NMFS on all activities that may affect a listed species. These interagency consultations, or section 7 consultations, are designed to assist Federal agencies in fulfilling their duty to ensure Federal actions do not jeopardize the continued existence of a species or destroy or adversely modify critical habitat. As part of these consultations, NMFS may specify Reasonable and Prudent Measures (RPMs) and terms and conditions to implement those measures necessary to minimize impacts to listed species from a proposed action by a Federal agency. Examples of RPMs recently specified in section 7 biological opinions that pertain to MHI insular false killer whales include, but are not limited to: collect data on the capture, injury, and mortality caused by the commercial longline fishery; collect basic life-history information, as available; require that all Hawaii commercial longline vessels comply with all gear requirements and handling protocols for marine mammals implemented through the false killer whale TRP and any future changes implemented by the TRP; continue to monitor TRP effectiveness in reducing mortality and serious injury to false killer whales; and convene the FKWTRT to provide recommendations on additional management measures that may be necessary and appropriate to avoid significant adverse impacts to MHI insular false killer whales (NMFS September 2014 biological opinion on continued operation of the Hawaii-based deep-set pelagic longline fishery on ESA listed species).

The NMFS finalized a TRP to reduce incidental false killer whale mortality and serious injury in Hawaii-based longline commercial fisheries on November 29, 2012 (77 FR 71260). Incidental take reduction measures included gear requirements (i.e., hook and branch line requirements), time-area closures, and measures to improve captain and crew response to hooked and entangled false killer whales. Importantly, the plan established a year-round commercial longline fishing closure within the Longline Exclusion Zone (LLEZ) around the Main Hawaiian Islands; this closure encompasses a majority of the MHI insular false killer whale DPS' range (see Figures 1 and 2). The plan became effective on December 31, 2012, with gear requirements effective February 27, 2013 (77 FR 71260; November 29, 2012). Prior to the implementation of the TRP, the five-year (2008-2012) average estimated mortality and serious injury from commercial longline fisheries to MHI insular false killer whales (0.21 animals per year) exceeded the potential biological removal (PBR), defined as maximum number of animals, not including natural mortalities, that may be removed while allowing that population to reach or maintain its optimum sustainable population. Per the final 2015 SAR (Carretta et al. 2016), the PBR of MHI insular false killer whales is 0.18 animals per year, or approximately one animal every 5.5 years. Following implementation of the TRP in early 2013, the estimate of mortality and serious injury to MHI insular false killer whales for 2009-2013 (0.15 animals per year) is less than PBR (0.18 animals per year). The total incidental commercial longline fisheries mortality and serious injury to the MHI insular population is now less than PBR and is achieving the short-term goal of the TRP. However, incidental human-caused mortality and serious injury is still greater than 10% of PBR, so it cannot be considered to be insignificant and

approaching zero, which is the long-term goal of the TRP. This reduction in incidental mortality and serious injury to insulars from commercial longline fisheries may be partially attributable to the expanded year-round LLEZ around the MHI (see Figures 1 and 2), providing significant protection for insulars from commercial longline fishing. Prior to that time, a seasonal contraction of the LLEZ potentially exposed a significant portion of the offshore range of the MHI insular population to commercial longline fishing. The reduction in incidental mortality and serious injury to the MHI insular population from commercial longline fisheries may also be attributable to the TRP measures of gear modifications and improved responses by the captain and the crew to de-hook or disentangle animals. However, the TRP only addresses threats from commercial longline fisheries (e.g., deep-set and shallow-set longline fisheries) and does not address threats from commercial and recreational non-longline fisheries (e.g., troll, handline, shortline, and kaka line fisheries). Additionally, a portion, albeit small, of the insulars' range is still exposed to commercial longline fishing.

Through implementation of the TRP, the threat of incidental interactions of hooking or entanglement with commercial longline fisheries appears reduced at this time (though not eliminated since some commercial longline fishing still occurs in a small portion of the insulars' range – see Figures 1 and 2). Additional monitoring of commercial longline bycatch rates for the DPS will be required before assessing whether the expansion of the LLEZ and other incidental take-reduction measures have officially reduced commercial longline fisheries takes below PBR. Moreover, further recovery actions may be necessary to reduce incidental mortality and serious injury of the MHI insular DPS to below 10% of PBR where it can be considered insignificant and approaching zero, as per the TRP and mandated under the MMPA.

Lastly, we anticipate future conservation efforts through the State of Hawaii's section 6 Cooperative Agreement. Objectives of the grant include: fill in data gaps in the spatial use patterns of MHI insulars including both temporal (seasonal and inter-annual) and group-specific spatial use patterns; assess fisheries-related injuries to determine the percent of false killer whales that are likely interacting with fisheries; obtain photo-identification data to contribute to mark-recapture abundance estimates; obtain biopsy samples for examination of reproductive and stress hormone levels as well as trends in persistent organic pollutants; assess the spatial and temporal overlap between insular false killer whales and state fisheries effort; identify and evaluate threats by conducting stranding investigations that include screening for infectious diseases and examination of anthropogenic impacts; and target outreach and awareness to specific fishers, boaters, and tour operators to effectively mitigate or reduce interactions with false killer whales (State of Hawaii DLNR 2016). Efforts are underway to advance these objectives and progress will be discussed in the Recovery Enhancement Vision document (see Recovery Plan Preparation for more detail).

SUMMARY STATEMENT OF RECOVERY NEEDS

Many potentially moderate to significant threats to this DPS exist, even with the protections afforded by the listing designation. The foremost threats are incidental take (i.e., incidental interactions with commercial and recreational non-longline fisheries such as troll, handline, shortline, and kaka line fisheries) and small population size (i.e., reduced genetic diversity, inbreeding depression, and other Allee effects). Other more moderate threats, and even low threats, identified in the status review and the final listing rule need to be addressed as well.

III. PRELIMINARY RECOVERY STRATEGY

The preliminary recovery strategy describes initial decisions, where available, that have been made about how to recover MHI insular false killer whales. It includes (1) a priority number to rank its priority for recovery plan development and implementation; (2) a recovery vision statement, to clearly define the

overall goal of recovery; (3) preliminary recovery criteria; (4) a preliminary action plan that briefly describes both short- and long-term actions and needs; and (5) estimates of time and costs to recover the DPS. The preliminary recovery strategy also outlines potential coordination efforts within and among divisions in NMFS, and with other entities involved in MHI insular false killer whale management and recovery. This is a starting point from which the full recovery strategy for MHI insular false killer whales will be developed.

Recovery Priority Number with Rationale

On a scale of 1-12 (with 1 the highest priority and 12 the lowest priority), the recovery priority number assigned to MHI insular false killer whales is 3. This recovery number indicates that the MHI insular false killer whale has a high magnitude of threat, a moderate recovery potential, and is in conflict with economic activities. The most significant threats to the species relate to its extremely small population size and incidental take in commercial and recreational non-longline fisheries. The species is in conflict with economic activities, namely fishing.

Recovery Vision Statement

The goal for the recovery plan is to conserve and protect the MHI insular false killer whale and its habitat so that its long-term survival is secured and it can be considered for removal from the ESA list of threatened and endangered species (i.e., delisted).

The following statement is what a recovered DPS of MHI insular false killer whales should look like in the future:

> Healthy, self-sustained, biologically viable population of MHI insular false killer whales exist throughout their historic range, and are sufficiently abundant, genetically diverse, and productive to provide ecological and public benefits.

Preliminary Recovery Criteria

The ESA specifies that a recovery plan include objective, measurable criteria which, when met, would result in the species being removed from the list. While we have not yet developed these criteria, valuable information to aid this development was provided in public comments on the NOI (78 FR 60850; October 2, 2013). We will build on this information during a threats-based workshop that we will hold October 25-28, 2016 (discussed in the Recovery Plan Preparation section) and include objective, measurable criteria in the recovery plan.

Preliminary Action Plan

The following preliminary site-specific management and research actions will help NMFS and recovery-planning partners improve the potential for MHI insular false killer whale recovery. These include, but are not limited to, the following:

Short-term actions/needs

- Continue to collect data on the capture, injury, and mortality caused by the commercial deep-set and shallow-set longline fishery via fishery observers, and collect basic life-history information, as available. Analyze data in a prompt manner.
- Continue implementation and adaptive management of the TRP for the Hawaii-based commercial longline fisheries. This includes monitoring commercial bycatch rates for insulars to assess whether the expansion of the LLEZ and other take-reduction measures (i.e., gear modifications, measures to improve captain and crew response to hooked and entangled false killer whales) have officially reduced incidental commercial longline fishery takes below PBR.
- Work with the State of Hawaii DLNR to conduct research and monitoring of nearshore fisheries interactions with MHI insular false killer whales. This includes identification of fishing method, gear configurations, and other factors that might inform an understanding of the risk of nearshore fisheries to false killer whales in order to develop mitigation measures.
- Hold a workshop to identify what threats have decreased in size and geographic scope, what threats have increased, and how we can abate and/or ameliorate these threats. In addition, identify what health and habitat effects may be a result of climate change and what recovery actions can address these threats.
- Continue requirement of RPMs under section 7(b)(4) under the ESA to minimize impacts of proposed actions with a Federal nexus that may take insular false killer whales. This includes the requirement that all Hawaii commercial longline vessels comply with gear requirements and handling protocols for marine mammals implemented through the false killer whale TRP and any future changes implemented by the TRP; continued monitoring of TRP effectiveness in reducing mortality and serious injury to false killer whales; and continued convening of the FKWTRT to provide recommendations on additional management measures that may be necessary and appropriate to avoid significant adverse impacts to MHI insular false killer whales.
- Continue necropsies of deceased insular false killer whales to better understand cause of death. Analyze results in a prompt manner.
- Publish proposed and final rules to designate critical habitat for MHI insular false killer whales.
- Continue to foster collaborative partnerships with other entities whose decisions affect this species (i.e., United States (U.S.) Navy, U.S. Coast Guard, Western Pacific Regional Fishery Management Council, and State of Hawaii DLNR).
- Continue providing outreach to Federal action agencies regarding their obligations under ESA section 4(a)(1) to implement actions that conserve and recover MHI insular false killer whales.

Longer-term actions/needs

- Continue adaptive management to reduce incidental mortality and serious injuries from commercial longline fisheries to <10% of PBR.
- Conduct research to better understand the extent and severity of interactions with commercial and/or recreational non-longline fisheries.
- Determine how to estimate incidental human-caused mortality or serious injury from nearshore commercial and recreational fisheries in Hawaii despite these fisheries not observed or monitored for protected species bycatch.
- Obtain more accurate estimates of abundance, minimum population size, effective population size, and current abundance trends.
- Monitor habitat use, current distribution, and movements, including depth distribution, of the insular population and each of the three social clusters.
- Research life history parameters such as breeding intervals, age at first maturity, age of reproductive senescence, etc.

- Continue satellite tagging and analysis to better understand the social structure of the insular population and each of the three social clusters.
- Obtain and analyze biopsy samples to better understand genetic diversity of insulars, including to what extent breeding occurs within and among social clusters.
- Determine direct and indirect health effects to MHI insular false killer whales from the high concentrations of environmental contaminants.

Estimates of Time and Costs

The ESA specifies that recovery plans include estimates of the time and costs required to achieve the plan's goal of delisting the species and the intermediate steps towards that goal. While we have not yet developed estimates of the time and costs of recovering the MHI insular false killer whale, they will be considered during our threats-based workshop held October 25-28, 2016 (discussed in the Recovery Plan Preparation section) and included in the recovery plan.

IV. PRE-PLANNING DECISIONS

Product

NMFS will develop a recovery plan for the MHI insular false killer whale DPS in the form of a Species Status Assessment (SSA), a Recovery Enhancement Vision (REV), and a Recovery Implementation Strategy (RIS) (see below).

Scope of Recovery Plan

The recovery plan will be a single-species plan. The plan will include site-specific measures that will lead to recovery of the DPS, measurable criteria that will enable NMFS to evaluate progress toward recovery and delisting, and estimates of time and costs of recovery.

Recovery Plan Preparation

The NMFS PIRO Protected Resources Division will initiate the preparation of a draft recovery plan for MHI insular false killer whales. We will use the most recent NMFS Interim Recovery Planning Guidance from June 2010. In addition, for this specific recovery plan we intend to use a new approach that has recently been developed by the U.S. Fish and Wildlife Service. The intent of this strategy, briefly described below, is to make recovery planning more efficient and effective and to create a more dynamic and flexible plan, presented in independent parts so it can more easily be updated. These parts are the Species Status Assessment, Recovery Enhancement Vision and, if necessary, a Recovery Implementation Strategy.

Species Status Assessment (SSA)

Using the 2010 status review (Oleson et al. 2010) for the MHI insular false killer whale as a foundation, we will develop an up-to-date SSA in the summer of 2016. An SSA is a stand-alone document that summarizes the status of the species and can be updated as necessary with new information and used for various purposes, including 5-year reviews, critical habitat designations (if it hasn't already been designated), and the background for ESA recovery plans, section 7

analyses and section 10 conservation plans. Traditionally this information was included in the background of a recovery plan and became outdated quickly. As a stand-alone living document, information can be kept more relevant.

Recovery Enhancement Vision (REV)

In the fall of 2016, we will begin development of a REV. The three statutory elements required in a recovery plan will be contained in this second stand-alone document: (1) objective, measurable recovery criteria; (2) a description of site-specific management actions necessary to conserve the species; and (3) estimates of the time and costs required to achieve the plan's goals. In addition, a brief introduction to the plan will provide the vision (what the recovered species looks like) and strategy (the rationale for, and how we plan to get to a recovered state). This will provide the trail of logic for recovery and reference the SSA.

As a start to developing the REV, NMFS will convene a workshop on October 25-28, 2016, with several targeted, threats-specific working groups to update the threats analysis from the final listing rule and status review, and identify potential research and recovery actions to address the threats. These working groups will consist of experts from Federal and state agencies, scientific experts, conservation partners and non-governmental organizations (NGOs), and commercial and recreational fishermen. We are looking for information and facts; we will not be asking for a consensus recommendation on how to recover the insular DPS. This workshop will be publicly noticed and open to the public. A draft REV document will go out for public review and comment before being finalized and posted on the web.

Recovery Implementation Strategy (RIS)

If necessary, the detailed activities for implementing the recovery actions in the REV may be outlined in a third, "living" document – the RIS. This document may focus on the near-term, strategic implementation of the REV and will likely reflect what comes out of our collaboration from the threats workshop. The RIS generally includes items such as the potentially multiple activities that contribute to each recovery plan action, priorities for implementation, timing, and partner affiliations. Keeping the more detailed implementation activities in a separate document that does not need formal public review and comment (unless there is a change in recovery strategy or direction) will afford the opportunity for more frequent updating and allow for adjustment according to new information and changing circumstances. However, it is not yet clear in the case of this DPS, where the key stakeholders will have already been intimately involved in the REV, if a separate RIS will be necessary; the detailed activities for implementing the recovery actions may simply be a part of the REV. If a separate RIS is developed, it will be posted on the web.

Administrative Record

All information sources and the administrative record will be housed at the NMFS PIRO located at the Inouye Regional Center on Ford Island in Honolulu, Hawaii.

Schedule and Responsibility for Recovery Plan

Primary authorship of this three-tiered recovery plan for the MHI insular false killer whale will be the responsibility of NMFS PIRO staff.

Tentative schedule:

2016
Finalize recovery outline; post to PIRO web page
Draft SSA
Initiate development of REV/RIS
Hold threats workshop

2017
Continue development of REV/RIS with input of key stakeholders
Issue draft SSA and REV/RIS for peer review
Issue draft REV/RIS for public review; post to PIRO web page

2018 and thereafter
Finalize REV/RIS; post to PIRO web page
Update SSA as new information becomes available, where necessary
Update RIS, where necessary

Stakeholder Involvement

While NMFS is ultimately responsible for developing and implementing this recovery plan, the plan will have a greater likelihood of success if it is developed in partnership with stakeholders, including others who have the responsibility and authority to implement specific recovery actions. As such, we intend to involve stakeholders in the recovery planning and implementation efforts for the MHI insular false killer whale. Most specifically, and as previously mentioned, key stakeholders will be invited to participate in threats-specific working groups to update the threats analysis from the listing rule, and identify potential actions to address the threats. Identified key stakeholders include, but are not limited to, the following:

- Federal and state agencies (NMFS PIRO, NMFS Science Centers, State of Hawaii DLNR);
- Scientific experts (NMFS PIRO, NMFS Science Centers, State of Hawaii DLNR, Hawaii Pacific University, Cascadia Research Collective);
- Conservation partners and NGOs (Natural Resources Defense Council, Center for Biological Diversity); and
- Commercial and recreational fishermen.

In addition, the threats-specific workshop will be publicly noticed and interested members of the public are encouraged to attend. The public will also be asked to review and comment on the REV during the public comment period.

NMFS will also initiate outreach efforts, where possible, to ensure high levels of communication and interaction with the public, stakeholders, and agencies throughout the development, finalization, and implementation of the recovery plan. NMFS will focus on linking and coordinating other ESA programs to the MHI insular false killer whale recovery planning, and develop stronger, more collaborative partnerships with other entities whose decisions affect this species. This will include providing outreach to Federal action agencies regarding their obligations under ESA section 7(a)(1) to implement actions that conserve and recover MHI insular false killer whales.

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