

Final Economic Report

MHI Insular False Killer Whale
Critical Habitat Designation

Contract AB-133F-14-CQ-0019
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Acronyms

| | |
|--------|--|
| ACL | Annual catch limit |
| AHW | AW Hawaii Wind, LLC |
| APPS | Act to Prevent Pollution from Ships |
| BCA | Benefit-Cost Analysis |
| BOEM | Bureau of Ocean Energy Management |
| BRT | Biological Review Team |
| CHRT | critical habitat review team |
| CV | Contingent Valuation |
| CWA | Clean Water Act |
| dB | decibel(s) |
| DoD | Department of Defense |
| DPS | distinct population segment |
| EEZ | exclusive economic zone |
| EIS | Environmental Impact Statement |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| ESA | Endangered Species Act |
| FADs | fish aggregating devices |
| FR | Federal Register |
| FRFA | Final Regulatory Flexibility Analysis |
| HACP | Hawaiiia Area Contingency Plan |
| HCP | Habitat Conservation Plan |
| HRC | Hawaii Range Complex |
| IFKW | insular false killer whale (<i>Pseudorca crassidens</i>) |
| IRFA | Initial Regulatory Flexibility Analysis |
| km | kilometer |
| kWh | kilowatt-hour |
| m | meter(s) |
| MHI | Main Hawaiian Islands |
| MMPA | Marine Mammal Protection Act |
| MPPRCA | Marine Plastic Pollution Research and Control Act |
| MPRSA | Marine Protection Research and Sanctuaries Act |
| MSA | Magnuson-Stevens Fishery Conservation and Management Act |
| MW | megawatts |

| | |
|-------------|---|
| NELHA | Natural Energy Laboratory of Hawaii Authority |
| NEPA | National Environmental Policy Act |
| NMFS | National Marine Fisheries Service |
| NMFS-SFD | National Marine Fisheries Service – Sustainable Fisheries Division |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| OMB | Office of Management and Budget |
| OTEC | ocean thermal energy conversion |
| Pac-SLOPES | Standard Local Operating Procedure for Endangered Species in the Central and Western Pacific Region |
| PEIS | Programmatic Environmental Impact Statement |
| PIRO/PRD | Pacific Islands Regional Office’s Protected Resources Division |
| PMRF | Pacific Missile Range Facility |
| Progression | Progression Hawaii Offshore Wind Inc. |
| RFA | Regulatory Flexibility Act |
| RHA | Rivers and Harbors Act |
| SBA | Small Business Administration |
| SBREFA | Small Business Regulatory Enforcement Fairness Act |
| Secretary | Secretary of Commerce |
| SMMP | Site Monitoring and Management Plan |
| TRP | Take Reduction Plan |
| TRT | Take Reduction Team |
| USACE | U.S. Army Corps of Engineers |
| U.S.C. | U.S. Code |
| USCG | U.S. Coast Guard |
| USFWS | U.S. Fish and Wildlife Service |
| USN | U.S. Navy |
| WEC | wave energy conversion |
| WETS | Wave Energy Test Site |
| WTP | Willingness to Pay |

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Executive Summary

Overview

This Final Economic Report identifies and analyzes the potential economic impacts resulting from critical habitat designation for the Main Hawaiian Islands (MHI) insular false killer whales (IFKW) (*Pseudorca crassidens*) distinct population segment (DPS). The National Marine Fisheries Service (NMFS) was petitioned to list the MHI IFKW as a DPS under the Endangered Species Act (ESA) in 2009 in light of characteristics that distinguish this population from other false killer whales in Hawaiian waters, and due to declining population numbers. The DPS was listed as endangered in 2012 based on the high extinction risk of the population and insufficient conservation efforts in place to reduce that risk.¹

Under the ESA, NMFS is required to designate critical habitat for the MHI IFKW DPS.² Section 4(b)(2) of the ESA requires NMFS to consider the economic impact, impact on national security, and any other relevant impact of specifying a particular area as critical habitat. NMFS has the discretion to exclude any particular area from a critical habitat designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and exclusion will not result in extinction of the species.

When critical habitat is designated, Section 7 requires federal agencies to ensure that their actions are not likely to result in the destruction or adverse modification of critical habitat (in addition to, and separate from, ensuring the actions are not likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation.

This report analyzes the economic impact of designating critical habitat for the MHI IFKW DPS. This report assists NMFS in determining if the benefits of excluding any particular area for economic reasons outweigh the benefits of including that area in the critical habitat designation.

Methods

This analysis examines the state of the world with and without the designation of critical habitat for MHI IFKW. The “without designation of critical habitat” scenario represents the baseline for the analysis, considering habitat protections already extended to MHI IFKW under its ESA federal listing or under other federal, state, and local regulations, including collateral protections resulting from protections afforded other listed species, such as the Hawaiian monk seal. The “with designation of critical habitat” scenario attempts to describe the incremental effects associated specifically with, and unique to, the critical habitat designation for the MHI IFKW.³ This scenario also provides an overview of costs and benefits that may be considered co-extensive with the listing of MHI IFKW and other baseline protections. The focus of the

¹ National Oceanic and Atmospheric Administration. 50 CFR Part 224 [Docket No. 0912161432–2630–04] RIN 0648–XT37. Endangered and Threatened Wildlife and Plants; Endangered Status for the Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment. Federal Register 77(229)/Wednesday, November 28, 2012/Rules and Regulations (77 Federal Register 70915).

² See reference for more detail regarding this determination - NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

³ We note that although the focus of this analysis is on the incremental effects of the rule, due to uncertainties regarding future management actions associated with MHI IFKW critical habitat designation, it was difficult in some cases to exclude potential impacts that may already occur under the baseline. Thus, the analysis may include some costs that would have occurred under the baseline, regardless of this rule (i.e., co-extensive costs). An effort to explicitly identify co-extensive cost estimates and distinguish them from uniquely incremental critical habitat costs, whenever possible, has been made herein.

analysis, however, is determining the incremental effects that can be uniquely attributed to critical habitat designation, to the fullest extent practicable.

Section 7 of the ESA requires federal agencies to ensure any actions they authorize, fund, or carry out are not likely to result in the destruction or adverse modification of designated critical habitat and ensure that any actions are not likely to jeopardize the continued existence of listed species. Section 7 requires these federal agencies to consult with NMFS. Through the Section 7 consultation process, NMFS may require modifications to these federal projects (“activities with a federal nexus”) in an effort to avoid adverse impacts on critical habitat. The additional costs of Section 7 consultations and resulting project modifications are the economic costs of critical habitat designation.

Table ES-1 presents generalized per-event administrative costs of consultations. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

- > Incremental consultation resulting entirely from critical habitat designation (e.g., for an activity that may affect critical habitat but not the listed species);
- > Reinitiation of a consultation to address adverse modification; or
- > Additional effort to address adverse modification in a new consultation.

Section 7 consultation considering critical habitat may also result in additional project modification recommendations specifically addressing potential destruction or adverse modification of critical habitat. For consultations considering jeopardy and adverse modification, as well as reinitiations of past jeopardy consultations to consider critical habitat concerns, the economic costs of project modifications, undertaken specifically to avoid destruction or adverse modification of critical habitat, are attributable as incremental costs of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), costs of all associated project modifications are assumed to be attributable to critical habitat designation.

Additionally, there are indirect costs that may result under actions that do not have a federal nexus and are not subject to the provisions of Section 7. These can include trigger effects, stigma effects, time delays, and regulatory uncertainty.

Table ES-1 Example Range of Attributable Costs per Consultation (by Administrative Cost Type in 2016 dollars)

| Consultation Area | Incremental Administrative Costs of Consultation* | | | | |
|--|---|----------------------------|------------------|------------------------------|------------|
| | NMFS Cost | Federal Action Agency Cost | Third-Party Cost | Biological Assessment Cost** | Total Cost |
| Incremental Consultation Resulting Entirely from Critical Habitat Designation | | | | | |
| Technical Assistance | \$620 | \$1,170 | N/A | N/A | \$1,790 |
| Informal Consultation | \$2,680 | \$5,590 | N/A | \$2,240 | \$10,510 |
| Formal Consultation | \$5,930 | \$6,710 | \$3,920 | \$5,370 | \$21,930 |
| Programmatic Consultation | \$17,900 | \$14,880 | N/A | \$6,260 | \$39,040 |
| Reinitiation of Consultation to Address Adverse Modification | | | | | |
| Technical Assistance | \$310 | \$585 | N/A | N/A | \$895 |
| Informal Consultation | \$1,340 | \$2,795 | N/A | \$1,120 | \$5,255 |

Table ES-1 Example Range of Attributable Costs per Consultation (by Administrative Cost Type in 2016 dollars)

| Consultation Area | Incremental Administrative Costs of Consultation* | | | | |
|--|---|----------------------------|------------------|------------------------------|------------|
| | NMFS Cost | Federal Action Agency Cost | Third-Party Cost | Biological Assessment Cost** | Total Cost |
| Formal Consultation | \$2,965 | \$3,355 | \$1,960 | \$2,685 | \$10,965 |
| Programmatic Consultation | \$8,950 | \$7,440 | N/A | \$3,130 | \$19,520 |
| Additional Effort to Address Adverse Modification in a New Consultation | | | | | |
| Technical Assistance | \$155 | \$293 | N/A | N/A | \$448 |
| Informal Consultation | \$670 | \$1,398 | N/A | \$560 | \$2,628 |
| Formal Consultation | \$1,483 | \$1,678 | \$980 | \$1,343 | \$5,483 |
| Programmatic Consultation | \$4,475 | \$3,720 | N/A | \$1,565 | \$9,760 |

Source: Industrial Economics, Inc. 2008 (analysis of full administrative costs based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2008; a review of consultation records from several U.S. Fish and Wildlife Service field offices across the country, conducted in 2002; and modifications by National Marine Fisheries Service).

Notes:

* Estimates reflect average hourly time required by staff. Totals may not sum due to rounding. Note that these costs only reflect the incremental administrative costs associated with Section 7 consultations, and do not include any potential incremental costs resulting from project modifications due to the critical habitat designation.

** This cost is primarily borne by NMFS, but some can be shared with relevant federal action agency and/or any third party involved.

Acronym: N/A – not applicable.

This report relies on 11 years of NMFS consultation records (since 2006), as well as discussions with representatives of relevant entities, to determine the estimated administrative costs of this designation. The consultation records include those consultations that have occurred for activities (with a federal nexus) in waters that surround the MHI. Although this record includes consultations that predate the listing of the MHI IFKW (in 2012), it is assumed that any consultations occurring in these waters under the titled activities would require consultation to ensure protections for MHI IFKW critical habitat in the future.

To quantify the total economic costs of critical habitat designation, the following process is followed:

1. Identify baseline economic activity in critical habitat areas, in addition to existing statutes and regulations constraining economic activity in the absence of the critical habitat designation.
2. Identify the activities that could potentially be affected by the designation of critical habitat.
3. Through interviews with key affected entities, estimate the costs of modifications to comply with the critical habitat designation (considered an incremental cost).
4. Estimate the likelihood of such occurrences and the frequencies of such occurrences over the next 10 years in the project area.⁴

The primary sources of information for this report are communications with, and data provided by, personnel from NMFS, other federal action agencies, non-governmental organizations, potentially

⁴ This interval of 10 years, widely employed in the policy analysis arena, allows sufficient scope over which longer-cycle trends may be observed (e.g., progress toward population recovery for the MHI IFKW), yet is short enough to allow “reasonable” projections of changes in “use patterns” in an area, as well as exogenous factors (e.g., world supply and demand for petroleum, U.S. inflation rate trends) that may be influential.

affected private parties, and state and municipal agencies. Through interviews with these entities, the following potentially impacted activities in and near areas of critical habitat designation were identified:

- > In-water construction
- > Activities that contribute to water pollution
- > Military activities
- > Energy
- > Aquaculture/mariculture
- > Environmental response activities (e.g., oil spill response, marine debris cleanup)
- > Fisheries

These potentially impacted activities were reviewed to determine:

1. If there is a federal nexus, meaning that a federal agency funds, authorizes, or carries out the action,
2. For projects that have a federal nexus, how these would be affected by the critical habitat designation,
3. What species conservation measures have already been taken/identified for the projects through the Marine Mammal Protection Act (MMPA) and ESA consultations and National Environmental Policy Act (NEPA) processes, among others (regulatory baseline),
4. What kind of incremental economic impacts are anticipated related to these activities and the designation of critical habitat, and
5. How these impacts can be quantified, qualified, monetized, or discussed qualitatively.

MHI IFKW DPS Habitat Requirements

Based on the best available scientific information, NMFS has identified the following feature as essential for the conservation of the MHI IFKW DPS, with four characteristics that support this feature⁵:

Island-associated marine habitat for MHI IFKW:

- > Adequate space for movement and use within shelf and slope habitat;
- > Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth;
- > Waters free of pollutants of a type and amount harmful to MHI IFKW; and
- > Sound levels that would not significantly impair false killer whales' use or occupancy.

The geographic areas identified as having the essential feature and associated characteristics for the MHI IFKW DPS range in depth from 45 meters (m) to 3,200 m. The area meeting this depth requirement in waters that surround the MHI from Niihau east to Hawaii is shown in Figure ES-1. Both the inshore (45-m depth) and the outer boundary (3,200-m depth) were selected based on information gained from MHI

⁵ NMFS has restructured the features for MHI IFKW critical habitat described in the proposed rule to a single feature with four habitat characteristics. This restructuring does not alter the boundaries of the proposed designation and is described further in Section 2.2 as well as in NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50

IFKW tracking data. These areas are under consideration for designation as critical habitat for the species.

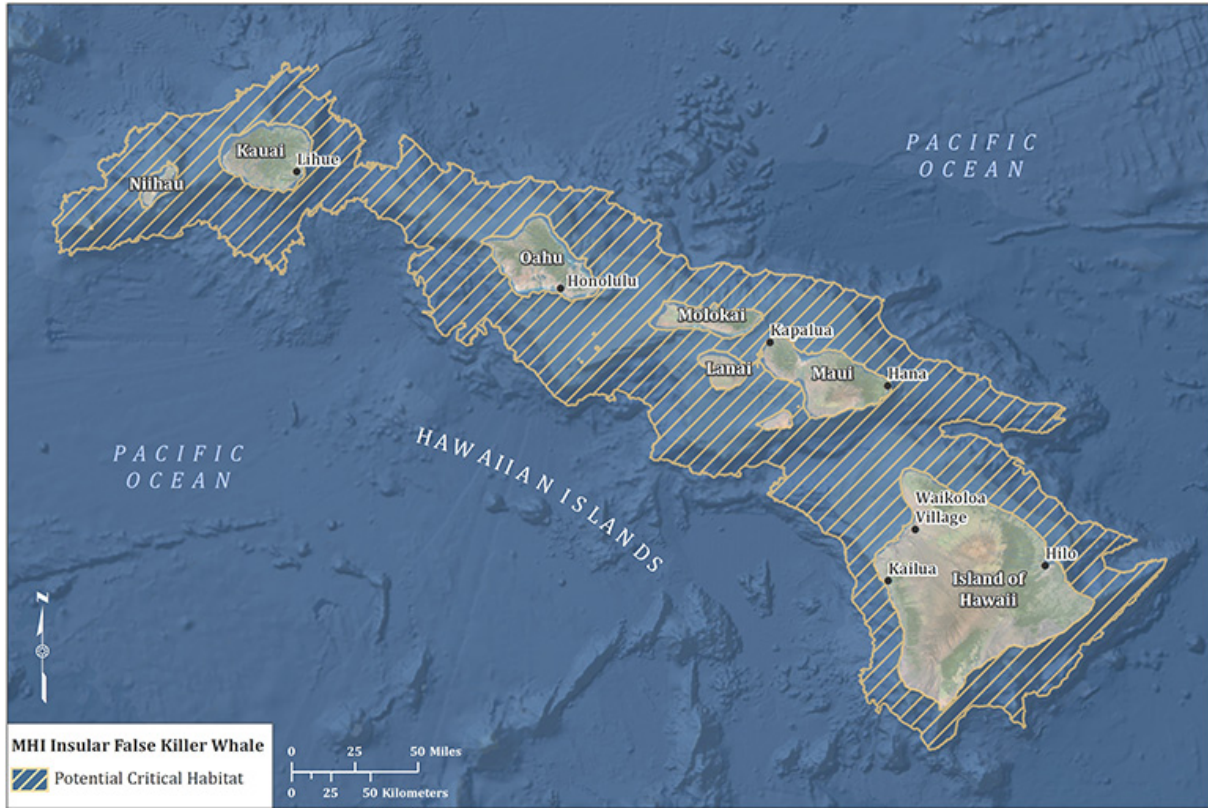


Figure ES-1 MHI Insular False Killer Whale Critical Habitat – Hawaiian Archipelago

Study Area

The geographic scope of the analysis includes the MHI IFKW critical habitat designation. The analysis focuses on activities within or affecting these areas, and presents costs and benefits at the lowest level of resolution feasible, given available data. Effects are reported for the area identified in the NMFS 2018 Final Biological Report.⁶ Note that economic activities affecting (or affected by) critical habitat may be sited outside of the boundaries of the critical habitat area (e.g., development projects in the vicinity of the critical habitat area, but outside the water); these activities are considered relevant to this analysis.

The analysis acknowledges certain activities and projects that have the potential to affect the essential feature and associated characteristics, but are located outside the boundaries of the critical habitat. Such actions may trigger Section 7 consultation(s) under ESA—for example, activities that could affect prey resources outside of the critical habitat designation could potentially require consultations.

Results

Table ES-2 summarizes the forecast economic impacts associated with the critical habitat designation for the MHI IFKW. While most of the impacts are associated with fisheries activities, the quantified impacts do not represent the total costs and benefits of critical habitat designation. Unquantified impacts may

⁶ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

change the relative magnitude of impacts, and the unquantified benefits can further adjust the economic impact across activities.

Summary of Anticipated Costs

In current (2016) dollars, the incremental cost of the MHI IFKW critical habitat designation is estimated at between approximately \$247,000 and \$263,000 in undiscounted terms. Over the 10-year period of analysis, the present value of these costs would be a little over \$212,000 to \$227,000 using a 3 percent discount rate, and approximately \$177,000 to \$190,000 using a 7 percent discount rate (Table ES-2). Most of these potential costs are associated with in-water construction projects, followed closely by fisheries activities. Costs related to military and U.S. Coast Guard (USCG) operations, aquaculture/mariculture activities, and energy development projects are also identified.

A large portion of these costs would likely be borne by NMFS and NMFS – Sustainable Fisheries Division (NMFS-SFD; as an action agency) (approximately \$166,000 to \$175,000 in undiscounted terms) (Table ES-3). Other entities expected to bear these costs include the U.S. Army Corps of Engineers (USACE), Department of Defense (DoD) (Navy), USCG, and Bureau of Ocean Energy Management (BOEM). In terms of types of costs, all of these costs are administrative costs of Section 7 consultations.

Following are the key findings of this Final Economic Report with respect to each of the evaluated economic activities:

- > **In-water Construction:** Large-scale in-water construction projects may have the potential to alter the quantity, quality, and availability of MHI IFKW critical habitat such that project modifications may be identified during Section 7 consultation to reduce potential adverse effects to the essential feature and associated characteristics. However, projects of this size within the designated critical habitat are only predicted for energy projects, which are treated as a separate activity and discussed below. The designation of critical habitat is not anticipated to result in any additional project modification costs to in-water construction projects and activities that are small in scale. Any potential Section 7 consultations that may occur due to in-water construction projects would be triggered by the protections already in place for this DPS and other ESA-listed species. These associated costs are considered baseline, and any effort to consider the critical habitat designation within the context of these consultations is expected to be minimal. The analysis identifies potential administrative costs associated with activities related to dredging and dredging disposal, buoys, moorings, and FADs, as well as submarine cable laying and maintenance.
 - Dredging and Dredging Disposal: Incremental administrative costs associated with dredging disposal are anticipated in this analysis. Within the 10-year timeframe of this analysis, it is expected that 1 formal, 11 informal, and 1 reinitiation of the programmatic Section 7 consultation, and 4 technical assistances under that programmatic consultation, would take place. In current (2016) dollars, the estimated incremental administrative cost for these consultations would be a little over \$29,000 for NMFS and about \$26,000 for USACE, for a total cost of approximately \$55,000. The present value of these costs would be almost \$46,000 using a 3 percent discount rate and a little over \$37,000 when a discount rate of 7 percent is used. The annualized costs are estimated at approximately \$5,000 using both 3 percent and 7 percent discount rates. These costs would be shared between NMFS and USACE.
 - Buoys, Moorings, and FADs: This analysis anticipates incremental administrative costs associated with activities related to buoys, moorings, and FADs. Within the 10-year timeframe of this analysis, it is expected that up to six informal Section 7 consultations and three technical assistances would take place that consider the MHI IFKW critical habitat designation. In current (2016) dollars, the total incremental cost of these informal consultations and technical assistances are estimated at approximately \$17,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$15,000 using a 3 percent discount rate, and about

\$12,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$2,000 using both 3 percent and 7 percent discount rates. These costs would be shared between NMFS and USACE.

- **Cable Laying and Maintenance:** Incremental administrative costs associated with submarine cable laying and maintenance are anticipated in this analysis. Within the 10-year timeframe of this analysis, it is expected that up to 11 informal Section 7 consultations and one technical assistance would take place that consider the MHI IFKW critical habitat designation. In current (2016) dollars, the total incremental cost of these informal consultations and technical assistance are estimated at approximately \$29,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$25,000 using a 3 percent discount rate, and about \$21,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$3,000 using both 3 percent and 7 percent discount rates. These costs would be shared between NMFS and USACE.
- > **Activities that Contribute to Water Pollution:** Runoff from onshore or shallow water construction projects could contribute to water pollution although these construction activities do not overlap with the MHI IFKW critical habitat area. It is expected that future Section 7 consultations would be informal and relate to activities occurring outside the critical habitat area, and these consultations would occur absent the critical habitat designation. We find that the incremental costs of a critical habitat designation on water quality and drainage related to nearshore construction have no expected value over the 10-year period of analysis. Although there is no change anticipated to individual consultations occurring on shore or near the designation, the NMFS 2018 Final Biological Report notes that as future information about the fate and influence of persistent organic pollutants, chemicals of emerging concern, heavy metals, or other chemicals increases, new management or mitigation methods may be identified to support water quality in marine ecosystems adjacent to developed areas, including MHI IFKW critical habitat. At this time, NMFS currently has insufficient information to predict what, if any, water quality modifications may be necessary to address potential impacts to MHI IFKW essential feature and associated characteristics.

Table ES-2 Preliminary Cost Estimates of Critical Habitat Designation of MHI IFKW

| Sector / Sub-sector | Brief Description | Entity (ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|--|--|-------------------------------|---|------|------------------|------|------------------|------|---------------|------|---------------|------|
| | | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | | Low | High | Low | High | Low | High | Low | High | Low | High |
| In-water Construction | | | | | | | | | | | | |
| Dredging and Dredging Disposal | Section 7 consultations – Timeline assumes 1 formal and 11 informal consultations, 1 reinitiation of a programmatic consultation, and 4 technical assistances under the programmatic consultation over the 10-year period. | NMFS and USACE | \$55 | \$55 | \$46 | \$46 | \$37 | \$37 | \$5 | \$5 | \$5 | \$5 |
| Buoys, Moorings, and FADs | Section 7 consultations – Timeline assumes 6 informal consultations and 3 technical assistances over the 10-year period. | NMFS and USACE | \$17 | \$17 | \$15 | \$15 | \$12 | \$12 | \$2 | \$2 | \$2 | \$2 |
| Cable Laying | Section 7 consultations – Timeline assumes 11 informal consultations and 1 technical assistance over the 10-year period. | NMFS and USACE | \$29 | \$29 | \$25 | \$25 | \$21 | \$21 | \$3 | \$3 | \$3 | \$3 |
| Military Activities | | | | | | | | | | | | |
| Department of Defense (Hawaii Range Complex) | Section 7 consultations – Timeline assumes 3 formal and 2 informal consultations over the 10-year period. The 3 formal consults are expected every 5 years given that the HRC EIS is consistently re-evaluated. | NMFS and DoD (Navy) | \$26 | \$26 | \$22 | \$22 | \$18 | \$18 | \$3 | \$3 | \$3 | \$3 |
| U.S. Coast Guard | Section 7 consultations – Timeline assumes 3 informal consultations over the 10-year period. One of these is a reinitiation of consultation. | NMFS and USCG | \$11 | \$11 | \$9 | \$9 | \$8 | \$8 | \$1 | \$1 | \$1 | \$1 |

Table ES-2 Preliminary Cost Estimates of Critical Habitat Designation of MHI IFKW

| Sector / Sub-sector | Brief Description | Entity (ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|------------------------------------|--|--|---|--------------|------------------|--------------|------------------|--------------|---------------|-------------|---------------|-------------|
| | | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | | Low | High | Low | High | Low | High | Low | High | Low | High |
| Energy Development | | | | | | | | | | | | |
| Wind Energy | Section 7 consultations – Timeline assumes 3 formal consultations over the 10-year period, one for each of the three proposed offshore wind energy development projects. | NMFS, BOEM, and Private Energy Project Developer (s) | \$0 | \$16 | \$0 | \$15 | \$0 | \$13 | \$0 | \$2 | \$0 | \$2 |
| Aquaculture/Mariculture | | | | | | | | | | | | |
| Offshore Aquaculture / Mariculture | Section 7 consultations – Timeline assumes 7 informal consultations over the 10-year period. | NMFS, NMFS-SFD (as an action agency), and USACE | \$18 | \$18 | \$15 | \$15 | \$12 | \$12 | \$2 | \$2 | \$2 | \$2 |
| Fisheries | | | | | | | | | | | | |
| NA | Section 7 consultations – Timeline assumes 7 formal and 17 informal consultations, and 2 technical assistances over the 10-year period. The formal consultations, 3 of the informal consultations, and the 2 technical assistances are reinitiations of consultations for each of the fisheries. | NMFS and NMFS-SFD (as an action agency) | \$90 | \$90 | \$79 | \$79 | \$67 | \$67 | \$9 | \$9 | \$10 | \$10 |
| TOTAL | | | \$247 | \$263 | \$212 | \$227 | \$177 | \$190 | \$25 | \$27 | \$25 | \$27 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

NA: Not applicable.

Throughout this table, “NMFS” refers to NMFS Protected Resources Division bearing costs as the consulting agency; however, for aquaculture/mariculture and fisheries, “NMFS-SFD” is used to recognize that NMFS – Sustainable Fisheries Division also bears costs as an action agency. These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

Table ES-3 Preliminary Cost Estimates by Entity of Critical Habitat Designation of MHI IFKW

| Entity (ies) Bearing the Cost | Sector | Type of Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|--------------------------------------|--|----------------|---|--------------|------------------|--------------|------------------|--------------|---------------|-------------|---------------|-------------|
| | | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | | Low | High | Low | High | Low | High | Low | High | Low | High |
| NMFS | In-water Construction; Military Activities; USCG Activities; Energy Development; Aquaculture/ Mariculture; Fisheries | Administrative | \$119 | \$128 | \$102 | \$110 | \$85 | \$92 | \$12 | \$13 | \$12 | \$13 |
| NMFS-SFD (as an action agency) | Aquaculture/ Mariculture; Fisheries | Administrative | \$47 | \$47 | \$41 | \$41 | \$35 | \$35 | \$5 | \$5 | \$5 | \$5 |
| USACE | In-water Construction; Aquaculture/ Mariculture | Administrative | \$56 | \$56 | \$48 | \$48 | \$39 | \$39 | \$6 | \$6 | \$6 | \$6 |
| DoD (Navy) | Military Activities | Administrative | \$19 | \$19 | \$16 | \$16 | \$13 | \$13 | \$2 | \$2 | \$2 | \$2 |
| USCG | USCG Activities | Administrative | \$6 | \$6 | \$5 | \$5 | \$4 | \$4 | \$1 | \$1 | \$1 | \$1 |
| BOEM | Energy Development | Administrative | \$0 | \$5 | \$0 | \$5 | \$0 | \$4 | \$0 | \$1 | \$0 | \$1 |
| Private Energy Project Developer (s) | Energy Development | Administrative | \$0 | \$3 | \$0 | \$3 | \$0 | \$2 | \$0 | \$0 | \$0 | \$0 |
| TOTAL | | | \$247 | \$263 | \$212 | \$227 | \$177 | \$190 | \$25 | \$27 | \$25 | \$27 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

In this table, “NMFS” refers to NMFS Protected Resources Division bearing costs as the consulting agency; however, for aquaculture/mariculture and fisheries, “NMFS-SFD” is used to recognize that NMFS – Sustainable Fisheries Division also bears costs as an action agency. These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

> **Military Activities:**

- DoD (Hawaii Range Complex [HRC]): Military activities occurring in Hawaii's waters include a high level of baseline protections for the marine environment, many of which provide protections for the MHI IFKW essential feature and associated characteristics. At this time no additional modifications to activities have been identified; however, the NMFS 2018 Final Biological Report notes that many military activities "will need to be addressed on an activity-specific basis to determine the nature of potential impacts to the essential feature and associated characteristics of MHI IFKW critical habitat," to help understand how the duration of activities may affect different particular areas. It is anticipated that there would be incremental administrative costs associated with future updates of the EISs that cover the HRC.

Under the 10-year timeframe of this analysis, it is expected that up to three formal and two informal Section 7 consultations would take place, and that MHI IFKW critical habitat designation would be covered as part of these consultations. In current (2016) dollars, the total incremental cost of these formal and informal consultations is estimated at approximately \$26,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$22,000 using a 3 percent discount rate, and about \$18,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$3,000 using both 3 percent and 7 percent discount rates. These costs would be shared between NMFS and DoD (Navy).

Note that specific areas that satisfy the definition of critical habitat are not automatically designated as critical habitat. Section 4(b)(2) of the ESA requires NMFS to consider the economic impact, impact on national security, and any other relevant impact of specifying any particular area as critical habitat. Section 4(b)(2) also provides the Secretary (delegated to the Assistant Administrator of NMFS)⁷ with discretion to exclude any particular area from a designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and the exclusion will not result in extinction of the species. NMFS proposed nine areas for national security exclusion in the proposed rule⁸ and has identified that one area, in addition to the nine originally proposed, will also be excluded from the final designation due to national security impacts.⁹ This report only considers the economic impacts of designation with regard to military activities and does not consider national security impacts. A detailed assessment of the requested exclusions of military lands due to national security is provided in NMFS' Final ESA Section 4(b)(2) Report. While these exclusions avoid the national security costs associated with designating these ten particular areas as MHI IFKW critical habitat, it is unlikely that these exclusions will reduce DoD's administrative costs estimated in this report because these exclusions will not necessarily alter the number of consultations expected for DoD. Rather, these exclusions are expected to reduce the geographic scope of analysis required under the larger formal consultations for the HRC.

- USCG: No adverse modification to critical habitat designation or alteration of USCG activities is anticipated in association with the critical habitat designation. While critical habitat may be briefly discussed during future Section 7 ESA consultations, incremental costs associated with a critical habitat designation would be minimal over the 10-year timeframe of analysis.

Based on past consultation history, it is expected that up to two informal Section 7 consultations would take place involving USCG activities that consider the MHI IFKW critical habitat designation. In addition, the analysis assumes the designation would result in the reinitiation of the programmatic consultation related to aids to navigation maintenance and repair activities on an

⁷ Department Organization Order 10-15 (5/24/04). NOAA Organization Handbook, Transmittal #34, May 31, 1993. 16 U.S.C. 1533(b)(1)(A) – Best scientific and commercial data available.

⁸ At 82 FR 51186, November 3, 2017.

⁹ Higgins, Jean. 2018. Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. March 15.

informal level to consider whether impacts might be different in Hawaii post-designation. In current (2016) dollars, the total incremental cost of these informal consultations is estimated at approximately \$11,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$9,000 using 3 percent discount rate, and about \$8,000 when a 7 percent discount rate is used. The annualized costs are estimated at less than \$1,000 using both 3 percent and 7 percent discount rates. These costs would be shared between NMFS and USCG.

> **Energy:**

- **Wind Energy:** Unless the development of offshore wind power is prohibited or requires cost-prohibitive mitigation measures in the MHI IFKW critical habitat area, it is unlikely that any of the three proposed offshore wind power generation projects would not be developed due to overlap with the MHI IFKW critical habitat area, and BOEM staff note that the projects cannot be moved outside of the critical habitat designation. However, given the time required to develop such projects and the uncertainty related to the current progress of these, there is a possibility that these projects may not be developed within the 10-year period of analysis of this study. Further, monitoring studies may be recommended due to the presence of MHI IFKW and other listed species in the area, but the costs associated with those are considered baseline. Therefore, the most likely additional potential costs to energy development related to MHI IFKW critical habitat designation would be the additional costs associated with Section 7 consultations.

The analysis anticipates one formal Section 7 consultation for each of the three projects. While these consultations would occur absent the MHI IFKW critical habitat designation, the cost of the additional effort required to consider the critical habitat designation during these consultations will be incremental. Therefore, a reasonable estimate of cost impact to the three proposed wind energy projects could range between \$0, assuming none of these projects are developed within the 10-year period of analysis, and approximately \$16,000 in current (2016) dollars, if all three projects are developed between 2020 and 2037 and one formal Section 7 consultation occurs in 2020 for each project. Over the 10-year period of analysis, the present value of these costs would be between \$0 and \$15,000 using a 3 percent discount rate, and from \$0 to \$13,000 using a 7 percent discount rate. The administrative costs associated with the formal Section 7 consultations would be shared among NMFS, BOEM, and private energy project developers.

- **Wave Energy:** The costs associated with additional Section 7 consultations required by MHI IFKW critical habitat designation for any of the proposed wave energy projects are uncertain at this time. However, these would likely include the time of a full-time employee for at least 1 year to meet all consultation requirements, which would cost \$250,000 in current (2016) dollars, at a minimum.¹⁰ The greatest costs, which are not quantifiable at this time, would be the device deployment postponement due to the consultation requirements. Because of the uncertainty regarding the likelihood of these consultations, as well as uncertainty associated with the requirements of such consultations for these projects, this analysis does not quantify these costs.
- **Ocean Thermal Energy Conversion:** The existing OTEC project is a land-based experimental plant, and does not overlap with the critical habitat designation area. Future OTEC project development is uncertain; however, if planned in areas near or overlapping the designation it could result in costs (e.g., administrative consultation costs). At this time, with no additional plans specified, there are no costs attributed to OTEC development as a result of this designation.

According to the State of Hawaii Energy Office staff, the critical habitat designation could have significant economic impacts to the State of Hawaii. The designation can increase the costs

¹⁰ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

associated with ocean energy development and transmission due to the substantial increase in State of Hawaii documentation and the consultations required to address critical habitat issues. The Hawaii State Energy Office staff noted that the economic cost/impact of losing potential ocean energy developments due to the critical habitat designation is significant. BOEM staff noted that additional cost of the designation could include project delays or cancelation if adverse modifications of critical habitat are perceived to be likely. However, these projects are in the pre-planning stage and given the uncertainty regarding when such projects would actually be planned, this analysis does not quantify such impacts.

- > **Aquaculture/Mariculture:** Based on NMFS's past consultation history for aquaculture projects occurring in waters 45 meters or deeper, it is expected that up to seven informal Section 7 consultations would take place involving aquaculture/mariculture activities that consider the MHI IFKW critical habitat designation, with NMFS-SFD anticipated to be the federal action agency in three of these, while USACE will have that role in four. In current (2016) dollars, the total incremental cost of these informal consultations is estimated at approximately \$18,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$15,000 using 3 percent discount rate, and about \$12,000 when a 7 percent discount rate is used. The annualized costs are estimated at about \$2,000 using both 3 percent and 7 percent discount rates. These costs would be shared among NMFS, NMFS-SFD (as an action agency), and USACE. No project modifications based on the designation of MHI IFKW critical habitat are anticipated during the period of analysis, given that best management practices and habitat are already considered when developing these projects.
- > **Environmental Response Activities (oil spill response, marine debris cleanup):** Modifications have not been identified for these activities as a result of this designation, as efforts are concentrated toward protecting the marine environment. Further, consultation records indicate that a majority of these activities occur in shallower waters in Hawaii, not overlapping with MHI IFKW critical habitat area. It is expected that most future Section 7 consultations for these types of activities would be informal and continue to occur outside the critical habitat area. However, emergency response planning may include planning for oil spill response in areas that overlap the designation. Regional planning efforts may undergo consultation in the 10-year period and efforts to include MHI IFKW critical habitat concerns are expected to be minimal.

Based on information provided by USCG, the critical habitat area will not result in additional incremental Section 7 consultation costs when responding to spills or vessel groundings. Emergency consultation or post-spill consultation was not indicated within the MHI IFKW critical habitat designation in the NMFS Section 7 consultation history reviewed for this analysis; therefore, no quantitative discussion on additional costs of spill or vessel grounding response due to the critical habitat designation is included in this report. Since marine debris removal activities are highly unlikely to occur within the critical habitat area, and as determined by NMFS ("For those marine debris activities that may overlap, best management practices already recommended and practiced by staff to prevent impacts to the listed species or to sensitive habitats provide sufficient protection to the MHI IFKW essential feature"), no quantitative discussion on additional costs of marine debris removal activities due to critical habitat designation is included in this report.

- > **Fisheries:** Current data, although incomplete, suggests that competition between commercial federally managed fisheries is low, and that additional management is not necessary. However, future management needs may be identified as more information is gained about MHI IFKW foraging ecology, or a better understanding of the relative importance of certain prey species is gained. Therefore, in the future it is remotely possible that there might be some kind of modification (e.g., restriction to catch or effort of a pelagic fishery) to reduce the impacts that fisheries have on IFKW prey species. This is not anticipated within the 10-year timeframe of this analysis.

At this time, no additional modifications to fishery activities have been identified; however, fisheries will need to consider any potential impacts to MHI IFKW critical habitat during the Section 7 consultation process, for actions such as future amendments to FMPs or other fishery-related actions with a federal nexus. These considerations could incur minor administrative costs. Based on past consultation history, the analysis assumes that twenty Section 7 consultations will occur related to fisheries in Hawaii during the 10-year period of analysis; six formal and fourteen informal. This number of consultations is considered an expected number of consultations, but there may be additional administrative costs to address MHI IFKW critical habitat during those same consultations. Further, we assume there will be an additional three informal reinitiation consultations and one formal reinitiation consultation to consider the potential impacts of relevant fisheries on the MHI IFKW critical habitat. The three informal reinitiation consultations include the shallow-set longline fishery (under the pelagic fishery plan), the bottomfish fishery, and the coral reef ecosystem fishery. The formal reinitiation consultation would be for the deep-set longline fishery (under the pelagic fishery plan). Since the crustacean and precious coral fisheries do not target MHI IFKW prey, consultation requirements are assumed to be minimal and may be addressed through technical assistance. We conservatively include the bottomfish fishery and coral reef ecosystem fishery in the cost projections because both may indirectly or directly harvest MHI IFKW prey species of unknown importance.

Under the 10-year timeframe of this analysis, the three informal and one formal Section 7 fishery consultations related to designation of MHI IFKW critical habitat (reinitiations), the two technical assistance reinitiation consultations, and the incremental administrative costs resulting from the fourteen informal consultations and the six formal consultations result in additional administrative costs of \$90,000 (2016 dollars) in undiscounted terms. The present value of these costs is \$79,000 using a 3 percent discount rate, and \$67,000 when a 7 percent discount rate is used. The annualized costs are estimated at about \$9,000 to \$10,000 using 3 percent and 7 percent discount rates, respectively. These costs would be shared between NMFS and NMFS-SFD (as an action agency).

Benefits

Benefits that may accrue due to the critical habitat designation include those related to recreation, aesthetics, environmental education, and cultural and community identity. The close proximity of MHI IFKW critical habitat to Hawaii's largest main islands suggests potential for significant benefits to accrue to the local population and tourists. Furthermore, the fact that the critical habitat area protects the habitat of a "charismatic megafauna" indicates that there may be benefits to the wider U.S. population, as individuals throughout the nation are assured of the preservation of the MHI IFKW's natural habitat.¹¹ It is important to note that many of the values that are associated with critical habitat designation are non-market, meaning that they cannot be directly measured in the marketplace (as with typical economic goods and services that have a market price), but rather must be ascertained either indirectly through observing the behavior of people, or directly through rigorous studies of how much they value the resource (for further information see Chapter 12 of this report). For example, several studies have explored the total economic value of marine mammals such as whales, dolphins, and sea lions.¹²

In purpose and design, this report focuses on the benefits of critical habitat designation, but in practice, there is considerable overlap between the benefits of listing the MHI IFKW DPS and the benefits of critical habitat designation. Because the critical habitat designation is intended to support the goal of the listing, which is the conservation and recovery of the DPS of the MHI IFKW, there would be some co-extensive

¹¹ Reynolds, J.E, H. Marsh, and T.J. Regan. 2009. Marine Mammal Conservation. *Endangered Species Research* 7: 23-28.

¹² In addition to the literature cited in Chapter 12 of this document, a good overview is provided Wallmo, Kristy, "Threatened and Endangered Species Valuation: Literature Review and Assessment," NMFS, 2003. Available at https://www.st.nmfs.noaa.gov/Assets/economics/documents/Protected_Resources_Valuation%20.pdf. Additional information may be found at the NMFS protected species economics webpage: <http://www.st.nmfs.noaa.gov/economics/publications/protected-species/index>.

benefits as a result. That is, in certain scenarios, it is difficult to distinguish between benefits uniquely arising from critical habitat designation and benefits arising in whole or in part from the listing.

The different types of expected benefits include direct use, indirect use, nonuse, or passive use, consumptive, and non-consumptive benefits. While the magnitude of some of these types of benefits has been studied, none of these types of benefits has been studied in direct association with critical habitat designation for the MHI IFKW. Further, in all cases, the types of economic benefits associated with critical habitat designation are largely co-extensive with listing the MHI IFKW as endangered. As a result, it is very difficult to quantify the total value of economic benefit to be expected from the action of designating critical habitat at this time. It is clear, however, that critical habitat designation will contribute additional economic benefits of the same type that are generated by the listing. Additional information on this may be found in Chapter 12 of this report.

Final Regulatory Flexibility Analysis

This report also includes a Final Regulatory Flexibility Analysis (FRFA) assessing the impact of the critical habitat area on small entities. The only entities identified with potential impacts (and for which projects are already planned) related to the critical habitat designation are NMFS, NMFS-SFD (as an action agency), U.S. Navy (DoD), USCG, USACE, BOEM, and two developers of offshore wind energy projects: AWH and Progression. Of these impacted entities, all exceed the size criterion established by the Small Business Administration (SBA) for entities in their respective sectors.

However, the analysis also looks at longline fishers as potentially being affected by the critical habitat designation but, as noted below, there is uncertainty regarding that. There are currently 145 active permit holders (with a maximum of 164 total permits) for Hawaii longline fishing.¹³ Due to limited financial and ownership information, NMFS treats each permitted vessel as an individual entity. NMFS believes that each of these vessels is a small entity. The Hawaii longline pelagic fishery is the most economically important fishery, accounting for 89 percent of Hawaii commercial fish landings.¹⁴ The longline fisheries (deep-set and shallow-set) combine to contribute \$94.3 million in revenue, or approximately \$0.65 million per vessel, far below the \$11 million small business threshold size used by NMFS for vessels primarily engaged in commercial fishing.

It is unlikely that the federally managed pelagic fisheries (shallow-set and deep-set longline) will be impacted by the designation of critical habitat. However, NMFS has not ruled out the possibility that additional management could be necessary in the future. If pelagic catches were to be reduced in the future, this could reduce the potential profit to longline pelagic fishers. This could have further impacts on fisheries-dependent industries, including seafood processors, wholesalers, and distributors.

¹³ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

¹⁴ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

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1 Introduction

This Final Economic Report identifies and analyzes the potential economic impacts resulting from critical habitat designation for the Main Hawaiian Islands (MHI) insular false killer whale (IFKW) (*Pseudorca crassidens*) distinct population segment (DPS). The action addressed in this report is the designation of critical habitat in waters of Hawaii for the DPS of MHI IFKW under authority of the Endangered Species Act of 1973 (ESA or the Act), as amended.¹⁵ This Final Economic Report also allows NMFS to address the requirements of Executive Orders (EOs) 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).¹⁶

The Draft Economic Report was prepared and made available to the public on November 3, 2017,¹⁷ when the MHI IFKW critical habitat proposed rule was published in the Federal Register. The public comment period was established for 60 days and a public hearing was held in Honolulu, Hawaii. This Final Economic Report addresses comments received regarding the economic impacts of the MHI IFKW critical habitat.

1.1 Purpose

The purpose of this assessment is to evaluate the economic, socioeconomic, and other costs and benefits of designating critical habitat for IFKW, and assist the National Marine Fisheries Service (NMFS) in determining if the benefits of excluding any particular area from the designation outweigh the benefits of including that area in the designation.¹⁸

Under the provisions of the ESA, NMFS developed a critical habitat designation for the DPS of MHI IFKW. Section 4(b)(2) of the ESA requires NMFS to consider the economic and national security impacts, in addition to any other relevant impacts, of specifying any particular area as critical habitat. NMFS may exclude an area from a critical habitat designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and exclusion of the area will not result in extinction of the species.

1.2 Objectives

On November 28, 2012, NMFS published a final rule listing the MHI IFKW DPS as endangered.¹⁹ Under the ESA, NMFS is required to designate critical habitat for the endangered MHI IFKW DPS.²⁰ To compile the necessary information for this process, as well as to identify and estimate the economic effects of such rule-making, NMFS has identified the objectives of this study as follows:

¹⁵ 16 U.S.C. Section 1533, Determination of endangered species and threatened species.

¹⁶ Executive Order 12866, Regulatory Planning and Review. September 30, 1993; Executive Order 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use. May 18, 2001; 5 U.S.C. Section 601 et. seq; and Pub Law No. 104-121, Contract with America Advancement Act of 1996.

¹⁷ NMFS. 2017. MHI Insular False Killer Whale Critical Habitat Designation Draft Economic Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office.

¹⁸ Department Organization Order 10-15, Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration. March 11, 2011. http://www.ossec.doc.gov/opog/dmp/doors/doo10_15.html.

¹⁹ NOAA. 2012. Endangered and Threatened Wildlife and Plants; Endangered Status for the Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment, Final Rule. November 28, 2012. 77 Federal Register 70915-70939.

²⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

1. To identify, compile, characterize, and synthesize economic data, capital investment, regional impacts, and associated information as related to development activities in and around the MHI that have been or may reasonably be assumed to be affected by the critical habitat; and
2. To apply the information compiled through the first objective to prepare an Economic Report to inform NMFS's 4(b)(2) analyses and any alternative MHI IFKW critical habitat designations.

1.3 Statutory Authority

Under the ESA, NMFS is responsible for designating critical habitat for the endangered DPS of MHI IFKW. The following principles explain how the Act supports the designation of critical habitat.

1.3.1 Emphasis on Habitat Conservation

In Section 1 of the ESA, "Findings,"²¹ Congress declared that:

Various species of fish, wildlife and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation.

Section 2 of the ESA sets forth the purposes of the Act, beginning with habitat protection:

The purposes of this chapter are to provide a means whereby *the ecosystems upon which endangered species and threatened species depend may be conserved*, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth in subsection (a) of this section. [emphasis added]

1.3.2 Definition of "Critical Habitat"

Section 3(5) of the ESA²² defines critical habitat as follows:

The specific areas occupied by the species, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Additionally, specific areas outside the geographical area occupied by the species at the time it is listed that are essential for the conservation of the species.

Critical habitat may be established for those species now listed as threatened or endangered species for which no critical habitat has heretofore been established, except in those circumstances determined by the Secretary of Commerce (Secretary), critical habitat shall not include the entire geographical area which can be occupied by the threatened or endangered species.

1.3.3 Definition of "Conservation"

Section 3(3) of the Act defines conservation:²³

The terms "conserve," "conserving," and "conservation" mean to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary.

1.3.4 Information Required for Making Designations and Revisions

Section 4(a)(3) requires NMFS to make critical habitat designations concurrently with the listing and describes how designations may be revised as appropriate:

²¹ 16 U.S.C. Section 1531 (a)(1) – Congressional Findings and Declaration of Purposes and Policy.

²² 16 U.S.C. Section 1532 (5) – Definitions, Critical Habitat.

²³ 16 U.S.C. Section 1532 (3) – Definitions, Conserve.

The Secretary shall designate any habitat of such species which is considered to be critical habitat; and may thereafter revise such designation.

1.3.5 Impacts of Designation Must be Considered and Areas May Be Excluded

Specific areas that fall within the definition of critical habitat are not automatically designated as critical habitat. Section 4(b)(2)²⁴ requires the Secretary to first consider the impact of designation and permits the Secretary to exclude areas from designation under certain circumstances. The Secretary shall designate, and make revisions to critical habitat on the basis of the best scientific data available and after taking into consideration the economic impact, the impact to national security and any other relevant impact, of specifying any particular area as critical habitat.

1.3.6 Federal Agencies Must Ensure Their Actions are not Likely to Destroy or Adversely Modify Critical Habitat

The regulatory protections of critical habitat is included in Section 7(a)(2) of the Act. This section requires federal agencies to ensure any actions they authorize, fund, or carry out are not likely to result in the destruction or adverse modification of designated critical habitat.²⁵ Section 7 also requires federal agencies to ensure such actions are not likely to jeopardize the continued existence of the listed species. To ensure this, each agency shall use the best scientific and commercial data available.

1.4 Regulatory Requirements

This document contains the economic, socioeconomic, and other costs and benefits of designating critical habitat for the MHI IFKW pertinent to informing NMFS's Section 4(b)(2) assessment. The following sections summarize the requirements of each of the two components of this document.

1.4.1 Requirements of Section 4(b)(2) of the ESA

Specific areas that satisfy the definition of critical habitat are not automatically designated as critical habitat. Section 4(b)(2) of the ESA requires NMFS to consider the economic impact, impact on national security, and any other relevant impact of specifying any particular area as critical habitat. Section 4(b)(2) also provides the Secretary (delegated to the Assistant Administrator of NMFS),²⁶ with discretion to exclude any particular area from a designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and exclusion will not result in extinction of the species.

A Section 4(b)(2) analysis consists of two components:

1. An initial mandatory requirement that the agency consider certain impacts of critical habitat designation; and
2. A discretionary component, wherein the agency, informed by those considerations, may propose excluding particular areas from the designation.

The ESA's legislative history explains the broad latitude afforded NMFS in its consideration of impacts:

Economics and any other relevant impact shall be considered by the Secretary in setting the limits of critical habitat for such a species. The Secretary is not required to give economics or any other "relevant impact" predominant consideration in his specification of critical habitat. [...] The

²⁴ 16 U.S.C. Section 1533 (b)(1)(A) – Best scientific and commercial data available.

²⁵ 16 U.S.C. Section 1536 (a)(2) – Federal agency actions and consultations.

²⁶ Department Organization Order 10-15 (5/24/04). NOAA Organization Handbook, Transmittal #34, May 31, 1993. 16 U.S.C. 1533(b)(1)(A) – Best scientific and commercial data available.

consideration and weight given to any particular impact is completely within the Secretary's discretion.^{27,28}

To this end, NMFS undertakes the following steps to implement Section 4(b)(2):

1. Identify particular areas for possible exclusion from critical habitat designation;
2. Determine the benefit of designation (e.g., biological, economic, or other benefits) of each particular area;
3. Determine the benefit of exclusion of each particular area;
4. Determine whether the benefits of exclusion outweigh the benefits of designation; and
5. Determine whether the exclusions (if any) will result in extinction of the species.

The Secretary may then choose to exclude from a designation of critical habitat a particular area that otherwise meets the definition of critical habitat, on a determination that the benefits of exclusion outweigh the benefits of including the area(s), and that the exclusion will not result in the species' extinction. This step is discretionary with respect to exclusion (i.e., does not require exclusion, in any circumstance).

1.4.2 Requirements of the Regulatory Flexibility Act

The purpose of the RFA is to inform the agency, as well as the public, of the expected economic impacts of a proposed designation, and to ensure that the agency considers alternatives that minimize expected significant adverse economic impacts of the rule on substantial numbers of small entities, while meeting the goals and objective of the final action. As such, the RFA does not contain specific decision criteria. Major goals of the RFA are as follows:

1. To increase agency awareness and understanding of the impact of their regulations on small business;
2. To require that agencies communicate and explain their findings to the public; and
3. To encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting impacts on small entities as a group, distinct from other entities, and on the consideration of alternatives that may minimize adverse economic impacts, while still achieving the stated objective of the action. Under 5 U.S. Code (U.S.C.), Section 603(b) and (c) of the RFA, each Final Regulatory Flexibility Analysis (FRFA) is required to contain the following elements:

1. A description of the reasons why action by the agency is being considered;
2. A succinct statement of the objectives of, and legal basis for, the final rule;
3. A description of and, where feasible, an estimate of the number of small entities to which the final will apply;
4. A description of the projected reporting, recordkeeping, and other compliance requirements of the final rule;
5. A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes; and
6. A summary and response to public comments received on the Initial Regulatory Flexibility Analysis (IRFA).

²⁷ H.R. Rep. No. 95-1625, at 16-17 (1978), 1978 U.S.C.A.N. 9453, 9466-67.

²⁸ The provisions requiring consideration of impacts were originally discussed as applicable only to critical habitat designations for invertebrate species. However, Section 4(b)(2) as enacted is not limited to invertebrates, and NMFS and the U.S. Fish and Wildlife Service have applied the provision to designations for vertebrate and invertebrate species.

1.5 Structure of the Report

The remainder of this Final Economic Report proceeds through 14 additional chapters. These chapters include:

- > Chapter 2 – Overview of DPS range and critical habitat designation
- > Chapter 3 – Methodology and framework for analysis
- > Chapter 4 – Description of economic costs of critical habitat designation
- > Chapter 5 – Economic impacts related to in-water construction activities
- > Chapter 6 – Economic impacts related to activities that contribute to water pollution
- > Chapter 7 – Economic impacts related to military activities
- > Chapter 8 – Economic impacts related to energy development
- > Chapter 9 – Economic impacts related to aquaculture/mariculture
- > Chapter 10 – Economic impacts related to environmental response activities
- > Chapter 11 – Economic impacts related to fisheries
- > Chapter 12 – Identifying Benefits
- > Chapter 13 – Potential impacts on small business entities
- > Chapter 14 – List of preparers
- > Chapter 15 – References

In addition, the report includes one appendix, which contains employment and economic sector data.

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2 Overview of DPS Range and Critical Habitat Designation

The MHI IFKW DPS is one of three demographically independent populations or stocks of false killer whales found in waters surrounding the Hawaiian Archipelago (Figure 2-1).^{29,30} The other two are the Northwestern Hawaiian Islands and pelagic stocks.³¹ The MHI IFKW population was determined to be a DPS and listed under the ESA in 2012,³² and is the population for which critical habitat is being determined. The biology of this DPS is described in the NMFS 2018 Final Biological Report.³³

2.1 Geographic Range

In 2009, NMFS was petitioned to list the MHI IFKW as a DPS under the ESA. NMFS reviewed the petition and concluded that the petition presented substantial scientific or commercial information indicating that the ESA listing may be warranted.³⁴ As a result of the finding, NMFS convened a Biological Review Team (BRT) and committed to complete a status review of Hawaiian IFKWs. The BRT developed a Status Review report,³⁵ which provided a comprehensive review of the Hawaiian IFKWs under the ESA. This population was determined to be discrete from other populations, and to be significant to the taxon based on marked genetic differences between MHI IFKWs and their conspecifics in other areas.^{36,37} On November 28, 2012, this DPS was listed as endangered under the ESA.³⁸

At the time of the ESA listing in 2012,³⁹ the range was described consistent with the Marine Mammal Protection Act (MMPA) description for this stock as nearshore of the MHI to 140 kilometers (km).⁴⁰ NMFS revised the range under the MMPA in 2015 based on a review of tracking data summarized by Bradford

²⁹ Carretta, J. V., Erin M. Oleson, Jason Baker, David W. Weller, Aimee R. Lang, Karin A. Forney, Marcia M. Muto, Brad Hanson, Anthony J. Orr, Harriet Huber, Mark S. Lowry, Jay Barlow, Jeffrey E. Moore, Deanna Lynch, Lilian Carswell, and Robert L. Brownell Jr. 2016. U.S. Pacific Marine Mammal Stock Assessments: 2016. NOAA Tech. Memo – SWFSC- 561. Department of Commerce, NOAA, NMFS, Southwest Fisheries Science Center, La Jolla, CA. May 2016. 426 pp.

³⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

³¹ Carretta, J. V., Erin M. Oleson, Jason Baker, David W. Weller, Aimee R. Lang, Karin A. Forney, Marcia M. Muto, Brad Hanson, Anthony J. Orr, Harriet Huber, Mark S. Lowry, Jay Barlow, Jeffrey E. Moore, Deanna Lynch, Lilian Carswell, and Robert L. Brownell Jr. 2016. U.S. Pacific Marine Mammal Stock Assessments: 2016. NOAA Tech. Memo – SWFSC- 561. Department of Commerce, NOAA, NMFS, Southwest Fisheries Science Center, La Jolla, CA. May 2016. 426 pp.

At 77 FR 70915, November 28, 2012.

³² NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

At 75 FR 316, January 5, 2010.

³³ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2010. Status review of Hawaiian IFKWs (*Pseudorca crassidens*) under the Endangered Species Act. U.S. Department of Commerce, NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-22, 140 p. + Appendices

³⁴ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2010. Status review of Hawaiian insular false killer whales (*Pseudorca crassidens*) under the Endangered Species Act. U.S. Department of Commerce, NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-22, 140 p. + Appendices

³⁵ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2012. Reevaluation of the DPS Designation for Hawaiian (now Main Hawaiian Islands) Insular False Killer Whales. PIFSC Insular Report IR-12-038. October 11, 2012. 39 pp

At 77 FR 70915, 28 November 2012.

³⁶ At 77 FR 70915, 28 November 2012.

³⁷ Carretta, James V., Karin A. Forney, Erin Oleson, Karen Martien, Marcia M. Muto, Mark S. Lowry, Jay Barlow, Jason Baker, Brad Hanson, Deanna Lynch, Lilian Carswell, Robert L. Brownell Jr., Jooke Robbins, David K. Mattila, Katherine Ralls, and Marie C. Hill. 2012. U.S. Pacific Marine Mammal Stock Assessments: 2011. NOAA Tech. Memo. NMFS-SWFSC-488. Department of Commerce, NOAA, NMFS, Southwest Fisheries Science Center, La Jolla, CA. August 2015. 360 pp.

et al.⁴¹ Overall, the MHI population had a much smaller range that was not uniform around the islands.⁴² The NMFS 2018 Final Biological Report for this critical habitat designation recognizes that the MMPA 2015 stock boundary is equivalent to the range for this DPS at the time of listing.

Baird et al.^{43,44} described three areas of high-use by the insular population: the north side of the Island of Hawaii (both east and west sides), a broad area extending from north of Maui to northwest of Molokai, and a small area to the southwest of Lanai. Figure 2-1 shows these high-use areas as described by Baird et al.⁴⁵ and includes areas with a density of locations greater than one standard deviation above the mean density to identify Biologically Important Areas for MHI IFKWs.⁴⁶

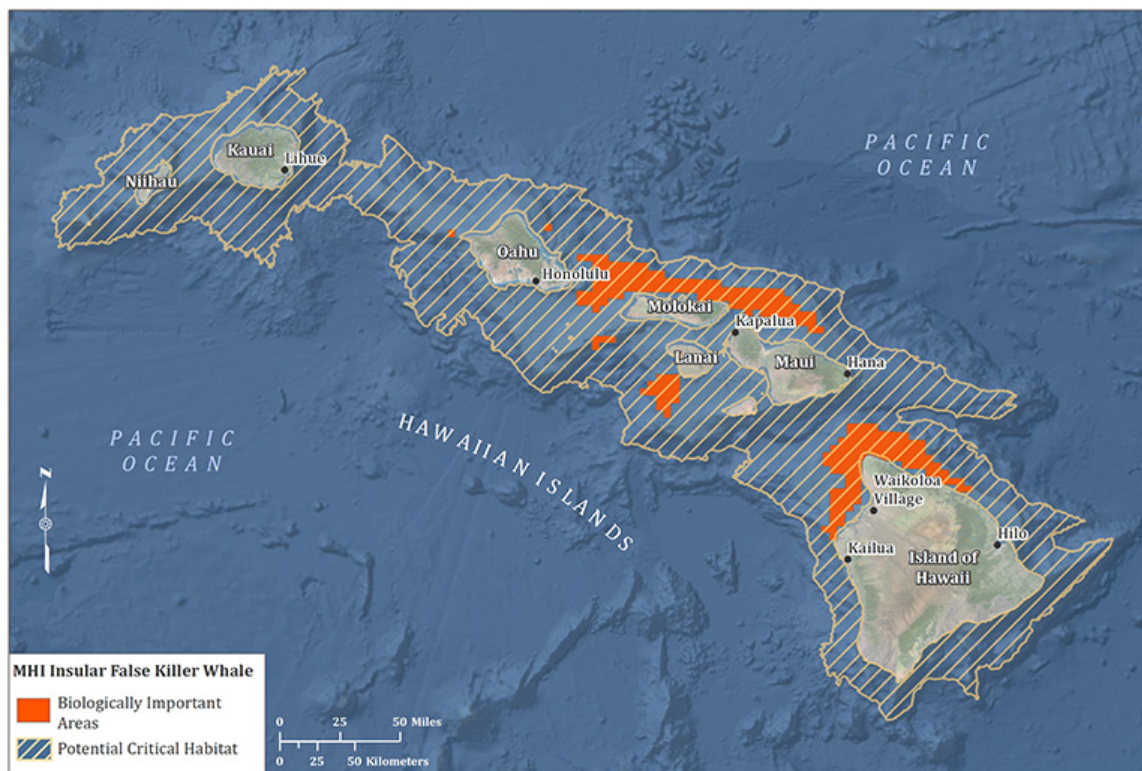


Figure 2-1 Biologically Important Areas for the MHI IFKW (in orange)

Source: NOAA (<https://data.noaa.gov/dataset/biologically-important-areas-for-cetaceans-within-u-s-waters>).

⁴¹ Bradford, A. L., E. M. Oleson, et al. 2015. Revised stock boundaries for false killer whales (*Pseudorca crassidens*) in Hawaiian waters. NOAA Tech. Memo. NMFS-PIFSC-47. Department of Commerce, NOAA, NMFS, Pacific Islands Fisheries Science Center, Honolulu, HI.

⁴² Carretta, James V., Karin A. Forney, Erin Oleson, Karen Martien, Marcia M. Muto, Mark S. Lowry, Jay Barlow, Jason Baker, Brad Hanson, Deanna Lynch, Lilian Carswell, Robert L. Brownell Jr., Jooke Robbins, David K. Mattila, Katherine Ralls, and Marie C. Hill. 2012. U.S. Pacific Marine Mammal Stock Assessments: 2011. NOAA Tech. Memo. NMFS-SWFSC-488. Department of Commerce, NOAA, NMFS, Southwest Fisheries Science Center, La Jolla, CA.

⁴³ Baird, R.W., M.B. Hanson, G.S. Schorr, D.L. Webster, D.J. McSweeney, A.M. Gorgone, S.D. Mahaffy, D. Holzer, E.M. Oleson and R.D. Andrews. 2012. Assessment of range and primary habitats of Hawaiian IFKWs: informing determination of critical habitat. *Endangered Species Research* 18:47-61.

⁴⁴ Baird, R.W., D. Cholewiak, D.L. Webster, G.S. Schorr, S.D. Mahaffy, C. Curtice, J. Harrison, and S.M. Van Parijs. 2015. 5. Biologically Important Areas for Cetaceans Within U.S. Waters – Hawai'i Region. *Aquatic Mammals* 2015, 41(1), 54-64, DOI 10.1578/AM.41.1.2015.54.

⁴⁵ Baird, R.W., M.B. Hanson, G.S. Schorr, D.L. Webster, D.J. McSweeney, A.M. Gorgone, S.D. Mahaffy, D. Holzer, E.M. Oleson and R.D. Andrews. 2012. Assessment of range and primary habitats of Hawaiian IFKWs: informing determination of critical habitat. *Endangered Species Research* 18:47-61.

⁴⁶ Baird, R.W., D. Cholewiak, D.L. Webster, G.S. Schorr, S.D. Mahaffy, C. Curtice, J. Harrison, and S.M. Van Parijs. 2015. 5. Biologically Important Areas for Cetaceans Within U.S. Waters – Hawai'i Region. *Aquatic Mammals* 2015, 41(1), 54-64, DOI 10.1578/AM.41.1.2015.54.

2.2 Critical Habitat Boundaries and Essential Feature

NMFS convened a critical habitat review team (CHRT) to evaluate critical habitat for the MHI IFKW DPS. The CHRT relied on the range described in Bradford et al.⁴⁷ and the 2015 Stock Assessment Report to provide information on the current range and distribution of MHI IFKW DPS. The CHRT agreed that the range proposed by Bradford et al.⁴⁸ provides the best description of the geographical areas occupied at the time of listing.

In the proposed rule NMFS identified four features essential to MHI IFKWs: island-associated habitat, prey, water quality, and sound.⁴⁹ NMFS received public comments that questioned the clarity of some of these features, and whether certain features were sufficiently described to meet the definition of critical habitat. After review of these comments, NMFS recognized that the proposed features may not be individually essential to this population's conservation. Rather, when found together in an island-associated habitat, these features collectively support important life history functions, such as foraging and reproduction, which are essential for this population's conservation. Unlike pelagic false killer whales found more in open oceans, MHI IFKWs are an island-associated population of false killer whales with their range restricted to the shelf and slope habitat around the MHI. Because these habitat characteristics are important components to the ecology of these whales, NMFS reorganized the essential features in the proposed rule into a single feature for the final designation (see below). Because this restructuring includes the same habitat components described in the proposed rule, this reorganization has not altered the boundaries of the areas that meet the definition of critical habitat for MHI IFKWs or the analyses of the impacts of this critical habitat designation.⁵⁰

Based on the best available scientific information, the following feature and associated characteristics were identified as essential for the conservation of the MHI IFKW DPS.

Island-associated marine habitat for MHI IFKW. MHI IFKWs are an island-associated population of false killer whales that relies entirely on the productive submerged habitats of the MHI to support all of their life-history stages. As they are adapted to an island-associated foraging strategy and ecology, this area of the MHIs offers the following habitat characteristics that support IFKWs' ability to travel, forage, communicate, and move freely around and among the waters surrounding the main Hawaiian Islands:

- > **Adequate space for movement and use within shelf and slope habitat** – As large marine predators, MHI IFKWs are highly mobile, employing a foraging strategy that includes circumnavigating the islands and moving throughout their restricted range. Generally found in deeper waters just offshore of the MHI, these whales move primarily throughout and among the shelf and slope habitat on both the windward and leeward sides of all the islands. This generally includes depths ranging from 45 m to 3,200 m. Available data indicate that habitat use is not uniform in waters that surround the islands, and may be concentrated in certain areas (often described as high-use or high-density areas) that are likely to provide greater foraging success than other areas, and that high-use areas may be specific to certain social clusters.

Human activities can interfere with movement of the whales and adversely affect their ability to travel to and move throughout areas of high use. In particular, large marine structures or long-term acoustic disturbance may present obstacles to whale movement. These obstacles could cause the whales to swim farther to reach high-use areas, expending additional energy and displacing these whales into

⁴⁷ Bradford, A.L., E.M. Oleson, et al. 2015. Revised stock boundaries for false killer whales (*Pseudorca crassidens*) in Hawaiian waters. NOAA Tech. Memo. NMFS-PIFSC-47. Department of Commerce, NOAA, NMFS, Pacific Islands Fisheries Science Center, Honolulu, HI.

⁴⁸ Bradford, A.L., E.M. Oleson, et al. 2015. Revised stock boundaries for false killer whales (*Pseudorca crassidens*) in Hawaiian waters. NOAA Tech. Memo. NMFS-PIFSC-47. Department of Commerce, NOAA, NMFS, Pacific Islands Fisheries Science Center, Honolulu, HI.

⁴⁹ At 82 FR 51186, November 3, 2017.

⁵⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

waters farther from shore. In severe cases, such obstacles may cause the whales to abandon areas of concentrated use.

- > **Prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth** – MHI IFKWs are top predators that feed on a variety of large pelagic fish and squid. Prey preference and relative importance is still difficult to determine for this population; however, commonly described prey species from observations include large game fish such as mahi mahi, wahoo, yellowfin tuna, albacore tuna, skipjack tuna, broadbill swordfish and threadfin jack. In addition, analyses from recent strandings of IFKWs suggest that some species of squid may play a role in the IFKW diet.

Sustained decreases in prey quantity and availability in island-associated waters can decrease foraging success of these whales and eventually lead to reduced individual growth, reproduction, and development. Additionally, factors that influence prey size and contaminant or toxin levels reduce the quality of prey for these whales. Decreased prey size reduces the energetic value gained, while contaminants and toxins introduced through prey consumption may put these whales' individual health or reproduction at risk.

- > **Waters free of pollutants of a type and amount harmful to MHI insular false killer whales** – Pollutants that reach Hawaii's marine waters through point source and nonpoint source pollution have the potential to degrade the water quality or prey quality and increase the health risks to MHI IFKWs. As a long-lived, top marine predator, water quality plays an important role in supporting the MHI IFKWs' ability to forage and reproduce free from disease and impairment. Environmental contaminants, such as organochlorines, heavy metals, and other chemicals that persist and accrue in waters surrounding the MHI, accumulate in prey species and subsequently in MHI IFKWs. Biomagnification of some pollutants can adversely affect health in these top marine predators, causing immune suppression, decreased reproduction, or other impairments. Water pollution and changes in water temperatures may also increase pathogens, naturally occurring toxins, or parasites in surrounding waters. MHI IFKWs may be exposed to these infectious or harmful agents (such as bacteria, viruses, toxins, or parasites) either through their prey or directly through ingestion of contaminated waters. Exposure to water pollutants is known to adversely affect the health and reproduction of cetaceans, including false killer whales.
- > **Sound levels that would not significantly impair false killer whales' use or occupancy** – False killer whales rely on their ability to produce and receive sound within their environment to navigate, communicate, and detect predators and prey. With a foraging strategy that is adapted to a restricted range, these large marine predators travel in dispersed subgroups that converge when prey resources are found. Accordingly, these animals rely on their ability to receive and interpret acoustic cues to find prey at a distance and convey information about available prey resources to other dispersed subgroups of IFKWs. Habitats that contribute to the conservation of MHI IFKWs allow these whales to employ underwater sound in ways that support important life history functions, such as foraging and communicating.

A large body of scientific information on the effects of anthropogenic noise on the behavior and distribution of toothed whales, including false killer whales, demonstrates that the presence of

anthropogenic noise can adversely affect the value of marine habitat to MHI IFKWs.^{51,52,53,54} Of particular concern are those anthropogenic noises that are chronic or cause cumulative interference such that the animals' ability to receive benefits (e.g., opportunities to forage or reproduce) from these habitats is sufficiently inhibited. The geographic areas identified as having the essential feature for the MHI IFKW DPS range in depth from 45 m to 3,200 m. The area meeting this depth requirement in waters that surround the MHI from Niihau east to Hawaii is shown in Figures 2-2a to 2-2e. Both the inshore (45-m depth) and the outer boundary (3,200-m depth) were selected based on information gained from MHI IFKW tracking data (see the NMFS 2018 Final Biological Report for additional information).⁵⁵ These areas were described as "under consideration for designation as critical habitat" for the DPS. NMFS has selected to designate these waters, but excluding particular areas based on the impacts to national security and economic considerations. In these cases the benefits of excluding particular areas based on these impacts outweighed the benefits of including them in the designation. This may also help to reduce the regional economic impact to small businesses that are economically involved with activities in these areas; however, there is insufficient information to monetize the benefits of these exclusions at this time.

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- ⁵¹ Shannon, G., M.F. McKenna, L.M. Ageloni, K.R. Crooks, K.M. Fristrup, E. Brown, K.A. Warner, M.D. Nelson, C. White, J. Briggs, S. McFarland, and G. Wittemyer. 2015. A synthesis of two decades of research documenting the effects of noise on wildlife. *Biological Reviews*.
- ⁵² Erbe, C., C. Reichmuth, K. Cunningham, K. Lucke, and R. Dooling. 2016. Communication masking in marine mammals: A review and research strategy. *Marine Pollution Bulletin* 103(1): 15-38.
- ⁵³ Gedamke, J., J. Harrison, L. Hatch, R. Angliss, J. Barlow, C. Berchok, C. Caldwell, M. Castellote, D. Cholewiak, M. DeAngelis, R. Dziak, et al. 2016. Ocean Noise Strategy Roadmap. Department of Commerce, National Oceanic and Atmospheric Administration. Available at: https://cetsound.noaa.gov/Assets/cetsound/documents/Roadmap/ONS_Roadmap_Final_Complete.pdf accessed April 10, 2018.
- ⁵⁴ Hatch, L. T., C. M. Wahle, J. Gedamke, J. Harrison, B. Laws, S.E. Moore, J.H. Stadler, S.M Van Parijs. 2016. Can you hear me here? Managing acoustic habitat in US waters. *Endangered Species Research* 30: 171-186.
- ⁵⁵ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

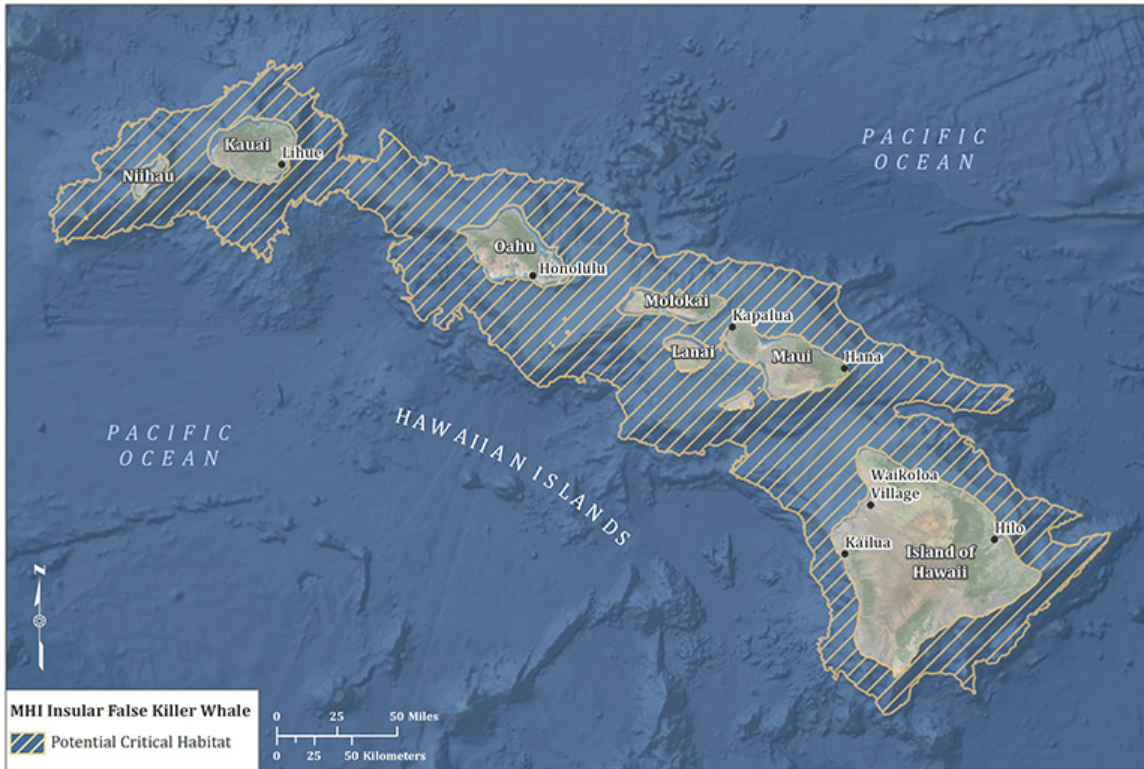


Figure 2-2a MHI Insular False Killer Whale Potential Critical Habitat – Hawaiian Archipelago

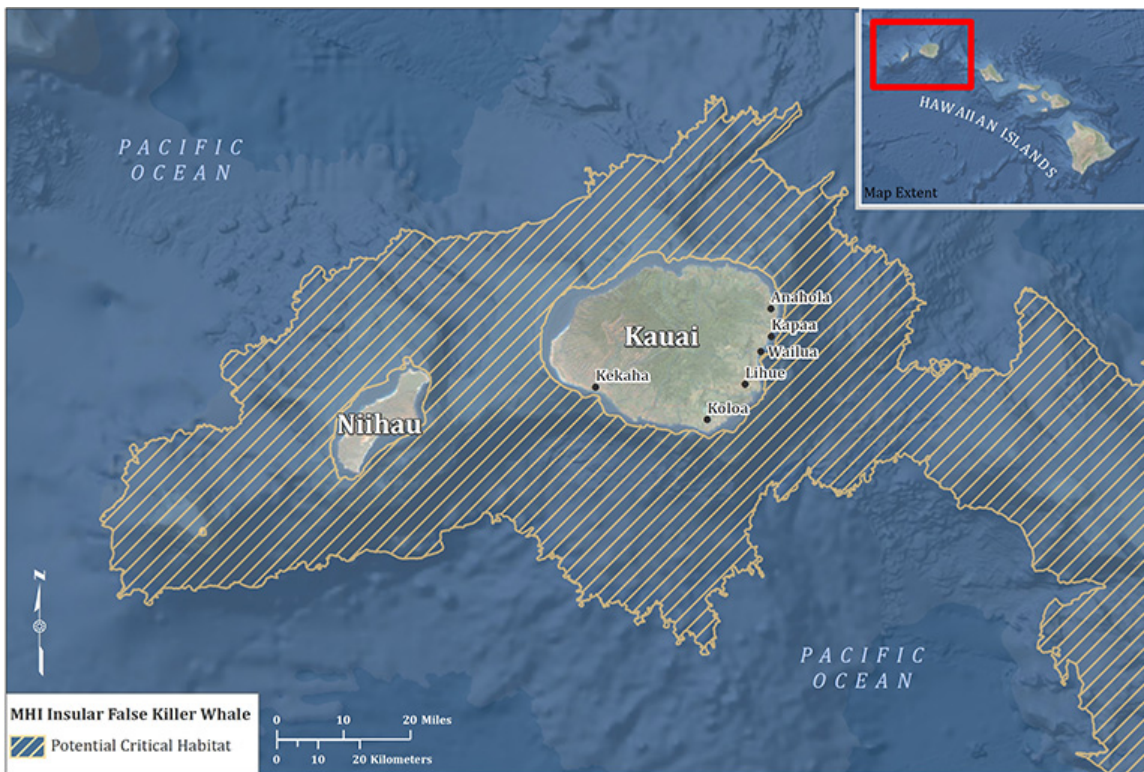


Figure 2-2b MHI Insular False Killer Whale Potential Critical Habitat – Kauai and Niihau

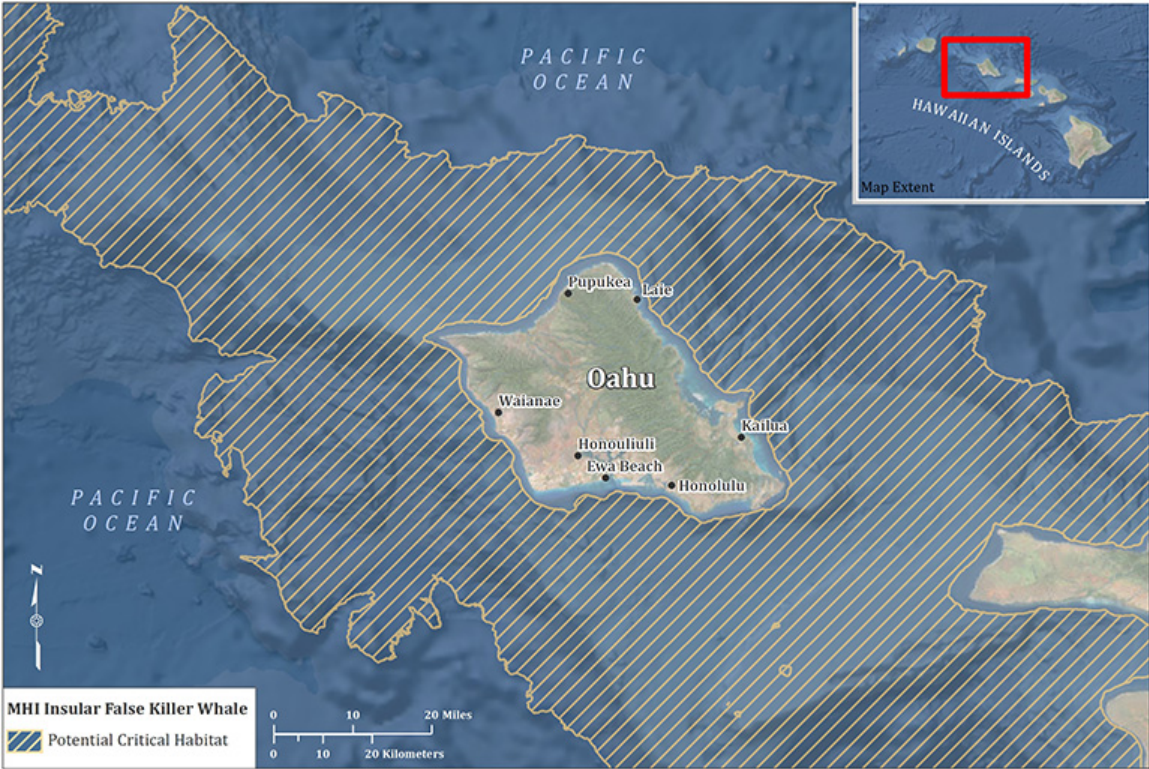


Figure 2-2c MHI Insular False Killer Whale Potential Critical Habitat – Oahu

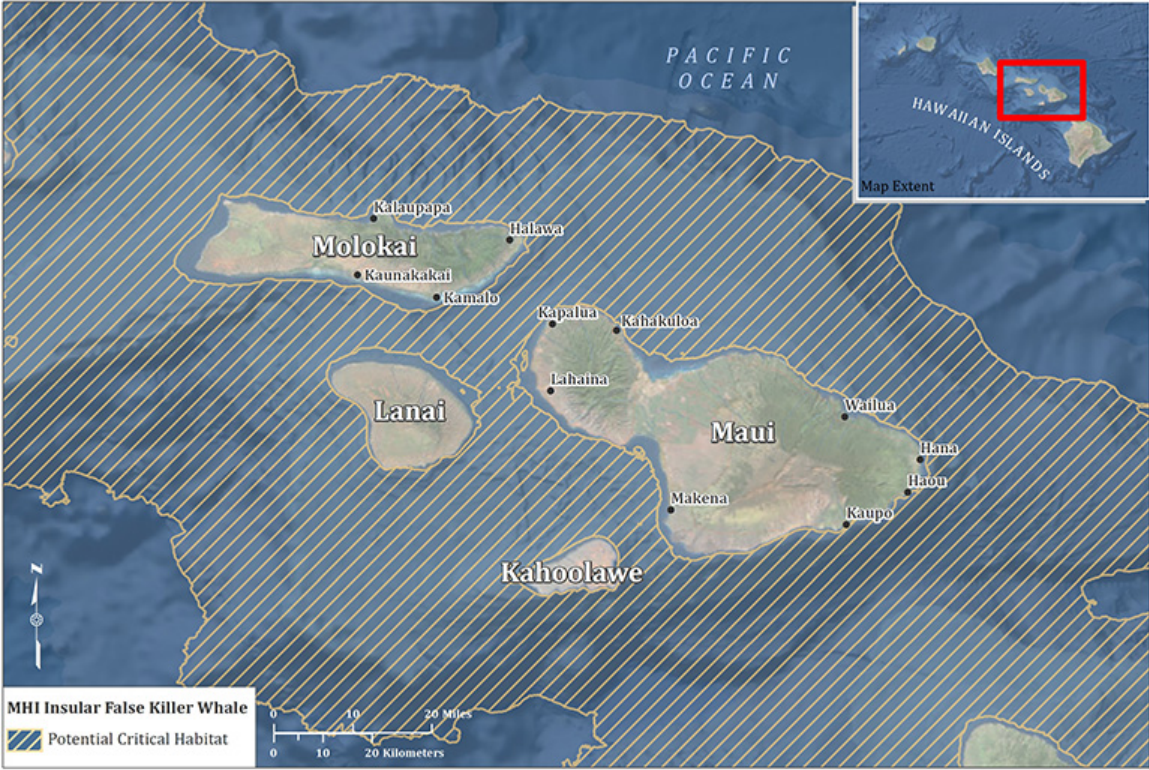


Figure 2-2d MHI Insular False Killer Whale Potential Critical Habitat – Maui Nui

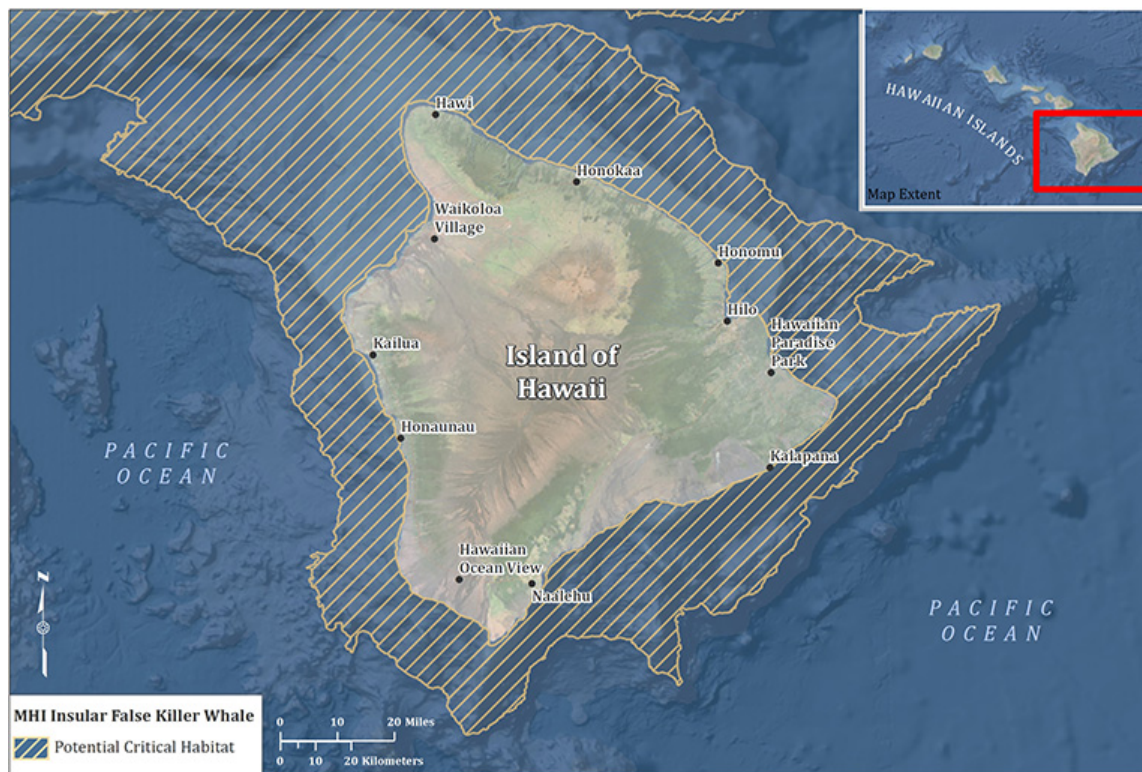


Figure 2-2e MHI Insular False Killer Whale Potential Critical Habitat – Hawaii

2.3 Threats and Human Activities

Based on a review of potential impacts, NMFS identified the following activities that may affect the feature essential to conservation, such that “special management considerations or protections,” may be required.^{56,57} These include, but are not limited to: (1) in-water construction; (2) activities that contribute to water pollution; (3) military activities; (4) energy development; (5) aquaculture/mariculture; (6) environmental response activities; and (7) fisheries.

All of these activities may have an effect on one or more characteristics of the essential feature by altering the quantity, quality, or availability of the feature that supports MHI IFKW critical habitat. This does not represent an exhaustive or complete list of potential effects; rather, it provides a description of the primary concerns and potential effects that NMFS is aware of at this time. For a more detailed discussion see the NMFS 2018 Final Biological Report.⁵⁸

2.3.1 In-Water Construction

This category consists of a broad range of activities associated with construction and development in marine habitats and may include any activities that would affect island-associated marine habitat, by affecting adequate space for movement and use, prey species, water quality, or the sound within that

⁵⁶ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2012. Reevaluation of the DPS Designation for Hawaiian (now Main Hawaiian Islands) Insular False Killer Whales. PIFSC Insular Report IR-12-038. October 11, 2012. 39 pp.

⁵⁷ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

⁵⁸ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

habitat.⁵⁹ Many of the projects that occur in Hawaiian waters are coastal construction projects associated with the maintenance or replacement of existing structures that are unlikely to extend into MHI IFKW critical habitat (depths greater than 45 m). Projects unlikely to extend into critical habitat include the maintenance or construction of coastal structures such as docks, piers, revetments, harbors, marinas, or seawalls.

Construction activities that may extend into critical habitat include the installation of buoys, moorings, or fish aggregating devices (FADs), the laying of cables or pipelines, dredge disposal, and large-scale construction projects. Temporary effects to prey, water quality, or in-water noise levels during initial construction or placement of these items are possible. For the most part for small-scale projects, existing best management practices for federal permits are likely to provide sufficient protections for the essential feature and associated characteristics. It is expected that only large-scale in-water construction projects (larger structures or groupings of structures) would have the potential to alter the quantity, quality, and availability of MHI IFKW critical habitat such that additional project modifications may be identified to reduce potential adverse effects to the essential feature and associated characteristics.⁶⁰

2.3.2 Activities that Contribute to Water Pollution

Pollutants that reach Hawaii's marine waters have the potential to degrade water quality and may subsequently reduce the quantity or quality of available prey resources. Pollutants may enter Hawaii's marine waters via direct inputs (e.g., local sewage outfalls, industrial, urban and agricultural pesticide runoff) as well as from indirect sources (e.g., ocean currents, atmospheric transport, and through migratory species in the food chain).⁶¹ Local sources of pollution may include other activities that contribute to increased turbidity and sediment loads such as coastal and nearshore construction activities. Of most concern to MHI false killer whale critical habitat are those activities that may reduce water or prey quality by increasing persistent organic pollutants or other chemicals of emerging concern, heavy metals, pathogens, or naturally occurring toxins in Hawaii's surrounding waters.

2.3.3 Military Activities

Military activities include a wide variety of training, construction, and research activities that have the potential to affect the essential feature and associated characteristics of MHI IFKW critical habitat. The U.S. Navy (USN) Hawaii Range Complex (HRC) encompasses the known range of the MHI IFKW and employs sonar ranging from the unit-level to multi-strike group exercises.⁶² Because in-water sound-producing activities, such as mid-frequency naval sonar, have the potential to affect false killer whales and other listed species, the Department of Defense (DoD), USN, consults with NMFS to ensure that these activities are not likely to jeopardize this DPS and other listed species.⁶³ Additionally, the USN activities require review and authorization under the MMPA, to minimize the impacts of their activities on marine mammals, including the MHI IFKW. As a result of the ESA consultation and MMPA authorization, the USN engages in many best management practices to minimize impacts to the marine environment,

⁵⁹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

⁶⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. Dept. of Commerce, NOAA, NMFS, Pacific Islands Regional Office, Protected Resources Division, 1845 Wasp Blvd., Building 176, Honolulu, HI 96818. May 2017. 49 pp.

⁶¹ Friedlander, A., G. Aeby, et al. 2008. The state of coral reef ecosystems of the main Hawaiian Islands. The state of coral reef ecosystems of the United States and Pacific Freely Associated States: 222-269.

⁶² USN. 2008. Final Environmental Impact Statement/Overseas Environmental Impact Statement (EIS/OEIS). U.S. Department of Navy, Hawaii Range Complex, Pacific Missile Range, Kekaha, Kauai, Hawaii 96752-0128. May 2008. 536 pp.

⁶³ NMFS. 2015. NMFS Endangered Species Act Section 7 Biological Opinion, on 1) the U.S. Navy's Training Exercises and Testing Activities in the Hawaii-Southern California Training and Testing Study (HSST) Area (2) NMFS regulations pursuant to the MMPA for the U.S. Navy to "take" marine mammals incidental to training exercises and testing activities in the HSST Area from December 2013 through December 2018 (3) NMFS issuance of two Letters of Authorization pursuant to regulations under the MMPA to "take" marine mammals incidental to training exercises and testing activities in the HSST Area from December 2013 through December 2018, dated April 2, 2015. NMFS, Office of Protected Resources, Endangered Species Act Interagency Cooperation Division, Silver Spring, MD. 516 pp.

and conducts monitoring and research to provide better information about potential impacts to protected species and their habitat.

2.3.4 Energy Development

Energy development activities may require the construction or placement of a structure in the marine environment, anchoring of the structure to the ocean floor, the installation of cables to conduct electricity ashore, possible anchors for those cables, and/or periodic maintenance of any associated structures, much like in-water construction activities. Beyond the placement of structures, operation of energy projects may include the emission of electromagnetic fields and underwater sound. The focus on energy independence has brought increased attention to renewable sources of energy. Activities that may affect the essential feature and associated characteristics include: offshore wind energy; OTEC; and energy generation from waves or currents. In addition to the impacts already noted for infrastructure, OTEC projects may affect water quality due to changes in temperature, salinity gradients, and changes to the amounts of dissolved gases, dissolved minerals, and water turbidity.⁶⁴

Effects to water quality and prey from energy development projects are similar to those discussed for in-water construction, and effects to all the characteristics from large-scale projects present the most concern. The scale and location of these projects will determine whether MHI IFKW island-associated habitat could be affected and whether project modifications will be recommended. As much is still unknown about the long-term impacts of larger structures in the marine environment, modifications could involve monitoring how prey, water, sound, and habitat use is influenced by such a project.

2.3.5 Aquaculture/Mariculture

Aquaculture and mariculture (cultivation of marine organisms) activities include impacts similar to both in-water construction and to activities that affect water quality. Modifications to aquaculture/mariculture projects as a result of this designation are difficult to determine without project-specific information that includes location, operation details, and size. It is expected that smaller projects that are similar to existing operations in low-use areas for MHI IFKWs using existing best management practices to protect water quality and marine resources will not require additional modifications. However, newer technologies or aquaculture/mariculture methods may require monitoring efforts if the potential exists for different or new effects to water quality, prey, or sound. Similar to large-scale in-water construction projects, selecting the correct location for aquaculture/mariculture structures may avoid effects to island-associated habitat for MHI IFKWs.

On May 26, 2016, National Oceanic and Atmospheric Administration (NOAA) Fisheries published a Marine Aquaculture Strategic Plan that will guide efforts within NOAA Fisheries to support development of sustainable marine aquaculture from 2016 to 2020.⁶⁵

NMFS Pacific Islands Regional Office (PIRO) and the Western Pacific Region Fisheries Management Council are analyzing in a Programmatic Environmental Impact Statement (PEIS), consistent with the Marine Aquaculture Strategic Plan, a program that would authorize the development of commercial aquaculture operations in federal waters of Hawaii. The PEIS will serve as the basis for evaluating the potential direct, indirect, and cumulative impacts on the human environment of the alternative management approaches to implementing a large-scale program in the PIRO.

⁶⁴ U.S. Department of Energy (DOE). 2009. Report to Congress on the Potential Environmental Effects of Marine and Hydrokinetic Energy Technologies. December 2009.

⁶⁵ NOAA Fisheries. 2015. Marine Aquaculture Strategic Plan FY 2016-2020. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Available at: http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture_docs/noaa_fisheries_marine_aquaculture_strategic_plan_fy_2016-2020.pdf.

2.3.6 Environmental Response Activities

Environmental contaminants, such as organochlorines, heavy metals, plastics, and other chemicals, persisting and accruing in surrounding waters may bioaccumulate through the food chain into prey species and subsequently into MHI IFKWs.⁶⁶ MHI IFKWs may be exposed to infectious or harmful agents (such as bacteria, viruses, toxins, or parasites) either through their prey or directly through ingestion of contaminated waters. Environmental exposure to these toxins may adversely affect whale health or ability to reproduce.⁶⁷

Oil-spill response activities may affect water quality and prey of MHI IFKWs. The severity of oil spill impacts on the marine environment depends on the volume of the spill, duration, and the type of petroleum product, in combination with the physical factors at the location of the spill such as wind, wave, and current conditions. Minimization of impacts from oil spills depends on the ability to respond to the spill and the effectiveness of methods used to remove or disperse the oil. Response and recovery efforts associated with oil spill events are planned in advance to provide protection to environmental and economic interests.⁶⁸ As efforts already focus on protection of the environment, there are no modifications expected to be specific to this designation.

2.3.7 Fisheries

Fishing activities that may affect MHI IFKW critical habitat include those that reduce the quantity, quality, or availability of MHI IFKW prey species including large game fish such as mahi-mahi, wahoo, yellowfin tuna, albacore tuna, skipjack tuna, broadbill swordfish, and threadfin jack. Fisheries may affect MHI IFKW prey resources in two ways: (1) by removing potential prey in the immediate vicinity of false killer whales, thereby influencing foraging success and leading to reduced individual growth, reproduction, and development; and (2) by contributing to the long-term reduction of prey biomass over the range of the fish stocks that these whales encounter, which could reduce the quality of prey as smaller prey have reduced energetic value.⁶⁹ Fisheries that target prey of false killer whales and overlap with MHI IFKW critical habitat are likely to have the most direct impact on the availability of prey for this DPS. Hawaii's pelagic fisheries that target prey of IFKWs include the longline, MHI troll and handline, offshore handline, and the aku (pole and line) fisheries.⁷⁰

Federally managed pelagic fisheries that are subject to Section 7 consultations include the deep-set and shallow-set longline fisheries, which target tuna and swordfish, respectively, in waters surrounding the Hawaiian Islands. The longline exclusion zone, which was used to manage the fisheries for other reasons, became effective year-round as part of the 2012 false killer whale Take Reduction Plan. Due to this exclusion zone, these fisheries do not overlap with MHI IFKW critical habitat; accordingly, these two longline fisheries do not directly remove locally available prey from within the critical habitat areas.⁷¹

⁶⁶ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

⁶⁷ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2010. Status review of Hawaiian IFKWs (*Pseudorca crassidens*) under the Endangered Species Act. U.S. Department of Commerce, NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-22, 140 p. + Appendices.

⁶⁸ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

⁶⁹ Oleson, E. M., C. H. Boggs, K. A. Forney, M. B. Hanson, D. R. Kobayashi, B. L. Taylor, P. R. Wade, and G. M. Ylitalo. 2010. Status review of Hawaiian IFKWs (*Pseudorca crassidens*) under the Endangered Species Act. U.S. Department of Commerce, NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-22, 140 p. + Appendices.

⁷⁰ Carretta, J. V., Erin M. Oleson, Jason Baker, David W. Weller, Aimee R. Lang, Karin A. Forney, Marcia M. Muto, Brad Hanson, Anthony J. Orr, Harriet Huber, Mark S. Lowry, Jay Barlow, Jeffrey E. Moore, Deanna Lynch, Lilian Carswell, and Robert L. Brownell Jr. 2016. U.S. Pacific Marine Mammal Stock Assessments: 2016. NOAA Tech. Memo – SWFSC- 561. Department of Commerce, NOAA, NMFS, Southwest Fisheries Science Center, La Jolla, CA. May 2016. 426 pp.

⁷¹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office:50.

These fisheries may contribute to the reduction of prey biomass to some degree because of the wide-ranging nature of some prey species. Current data, although incomplete, suggests that competition between these commercial federally managed fisheries and MHI IFKWs is low, and that additional management is not necessary. However, future management needs may be identified as more information is gained about MHI IFKW foraging ecology, or a better understanding of the relative importance of certain prey species to the health and recovery of a larger MHI IFKW population is gained.

There is geographic overlap between other federally managed fisheries, such as the bottomfish and seamount groundfish, coral reef ecosystem, crustacean and precious corals fisheries, and MHI IFKW critical habitat.⁷² There is some potential for the bottomfish fishery, coral reef ecosystem, and the groundfish fishery to target MHI IFKW prey, and so these fisheries are expected to engage in Section 7 consultation. The precious coral and crustacean fisheries are not known to target MHI IFKW prey, and the needs in these fisheries are expected to be met through technical assistance. No additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat designation.

⁷² Baird, R.W., S.D. Mahaffy, and A.G. Gorgonne. 2015. Minimum population size of main Hawaiian Islands IFKWs based on photo-identification. Presented to the Pacific Scientific Review Group, 10-12 March, 2015, Seattle, WA. PSRG-2015-08 3 pp.

3 Methodology and Framework for Analysis

This section describes the methodology and framework for the economic analysis. The general framework relevant to the 4(b)(2) analysis is described in Section 3.1. Some of the fundamental principles behind economic analyses are described in Section 3.2. Section 3.3 outlines the socioeconomic context for this analysis. Section 3.4 covers the regulatory baseline, or starting point for measuring costs and benefits. The final section of this chapter, Section 3.5, identifies information sources used in the analysis.

3.1 General Framework for the 4(b)(2) Process

Section 4(b)(2)⁷³ of the ESA requires NMFS to consider the economic impact, impact on national security, and any other relevant impact of designating any particular area as critical habitat. Section 4(b)(2) also provides NMFS, on behalf of the Secretary, with discretion to exclude any particular area from a designation, but only if the benefits of excluding that area outweigh the benefits of including it in the designation and if the exclusion will not result in extinction of the species.

In preparation of the 4(b)(2) analysis, the potentially impacted activities will be reviewed in order to determine:

1. If there is a federal nexus, meaning that a federal agency funds, authorizes, or carries out the action,
2. For projects that have a federal nexus, how these would be affected by the critical habitat designation,
3. What species conservation measures have already been taken/identified for the projects through the MMPA and ESA consultations and National Environmental Policy Act (NEPA) processes, among others (regulatory baseline),
4. What kind of incremental economic impacts are anticipated related to these activities and the designation of critical habitat, and
5. How these impacts can be quantified, qualified, monetized, or discussed qualitatively.

As noted above, data collection and synthesis focus on the significant activities in MHI IFKW critical habitat, including activities that may either be affected by critical habitat designation or that may affect critical habitat. These activities are expected to include those described in Section 2.3.

3.1.1 Benefit-Cost Analysis

A benefit-cost analysis (BCA) is preparatory and supports the ESA's Section 4(b)(2) decision-making process by allowing NMFS, on behalf of the Secretary, to compare an estimate of the "benefits of exclusion" of any particular area from the designation against an estimate of the "benefits of inclusion" of that particular area.⁷⁴ In addition to strong scientific support, this approach is supported by the Office of Management and Budget (OMB), through its guidelines on regulatory analysis.⁷⁵ A BCA is a well-established procedure for assessing the "best" course or scale of action that maximizes net benefits. Since a BCA seeks to empirically measure the value of an activity in net benefit terms, it typically requires that a single metric, most commonly U.S. dollars, is used to gauge both benefits and costs. While all

⁷³ 16 U.S.C. Section 1533 (b)(1)(A) – Best scientific and commercial data available.

⁷⁴ NMFS. 2005. Final Economic Analysis of Critical Habitat Designation for 12 West Coast Salmon and Steelhead ESUs. Northwest Fisheries Science Center. August 2005.

⁷⁵ OMB. 2003. Circular A-4. September 17, 2003.

efforts are made to monetize the net benefits associated with the MHI IFKW critical habitat designation, some benefits and costs are discussed qualitatively where sufficient data are not available. EO 12866 explicitly provides for, and OMB guidance concurs with, the use of a non-quantitative BCA that is consistent with economic theory and also consistent with the best available information where meaningful quantification is not possible.

3.2 Fundamental Principles

This economic analysis considers the net benefit to the nation of designation of critical habitat by measuring the benefits and costs of the action compared with a scenario where the action was not taken. The “no action” scenario is a key concept in the economic analysis as this scenario defines the baseline from which the benefits and the costs of the action are measured. This baseline is fundamental to the analysis, as it is only the incremental benefits and costs that are the focus of the analysis – that is, the gains and losses that accrue to the public and individuals incrementally from the action of critical habitat designation. The concept is described more completely in Section 3.2.1. Opportunity costs and distributional effects that may result from efforts to protect the critical habitat that supports the conservation and recovery of the listed MHI IFKW DPS are also fundamental concepts.

Opportunity costs generally reflect the commitment of resources required to accomplish, in this context, habitat conservation. For example, if the set of activities that may take place within a parcel of the marine environment is reduced as a result of the critical habitat designation because those activities would be expected to adversely impact critical habitat, then the market value of those activities is reduced. This value reduction represents one measure of opportunity cost or change in economic efficiency. The opportunity costs attributable to the reduction in the set of activities are weighed in contrast to the welfare gains that accrue from not allowing unconstrained actions to destroy or adversely modify the critical habitat. Similarly, the costs of a federal agency’s consultation with NMFS represent opportunity costs weighed in contrast to alternative activities that the federal agency may be able to conduct with the resources used for the consultation. The BCA framework is intended to comprehensively identify and assess all such trade-offs.

This analysis also addresses the distribution of costs and benefits associated with the designation, including an assessment of any local or regional economic effects of habitat conservation and the potential effects of conservation efforts on small entities and the energy industry (distributional effects). This information may be used by decision-makers to assess whether the costs and benefits of designating the critical habitat area for the MHI IFKW inequitably burden or benefit a particular group or economic sector. For example, while conservation efforts may have a relatively small effect on the national economy as a whole, individuals employed in a particular sector of the regional or local economy may experience substantially greater economic effects.

Finally, some of the analytic boundaries of this analysis such as the geographic and temporal scope are defined at the end of this section and an explanation of the discounting process is provided. These concepts—the baseline and incremental effects analysis, economic efficiency effects, distributional effects (i.e., measures of change in economic activity), and scale of analysis and discounting as applied to this analysis are discussed in greater detail below.

3.2.1 Baseline and Incremental Effects

This analysis examines the state of the world with and without the designation of the area under consideration as critical habitat for MHI IFKW. The “without critical habitat designation” scenario represents the baseline for the analysis, considering habitat protections already extended to MHI IFKW under its ESA federal listing or under other federal, state, and local regulations, including collateral protections resulting from protections afforded other listed species, such as the Hawaiian monk seal. The “with critical habitat designation” scenario attempts to describe the incremental effects associated

specifically with, and unique to the critical habitat designation for the MHI IFKW.⁷⁶ This aspect of the analysis also provides an overview of costs and benefits that may be considered co-extensive with the listing of MHI IFKW and other baseline protections. The focus of the analysis, however, is determining the incremental effects that can be uniquely attributed to the critical habitat area, to the fullest extent practicable.

The first step in the economic analysis is to identify the baseline level of protection afforded the MHI IFKW and their habitat (i.e., without critical habitat designation). This section provides a description of the methodology used to identify baseline conditions, against which incremental effects stemming from the critical habitat designation for the MHI IFKW (i.e., with critical habitat designation) will be contrasted. It also describes the incremental effects in more detail.

3.2.1.1 Baseline for the Economic Analysis

The baseline for this analysis is the existing state of regulation that provides protection to the MHI IFKW DPS under the ESA, as well as under other federal, state, and local laws and guidelines, without the critical habitat designation. The baseline includes the protections of Sections 7, 9, and 10 of the ESA and economic effects resulting from these protections in the absence of critical habitat designation for the MHI IFKW (i.e., the status quo).

Absent a designation of critical habitat, Section 7 of the ESA requires federal agencies to consult with NMFS to ensure that any action authorized, funded, or carried out are not likely to jeopardize the continued existence of any endangered or threatened species. The portion of the administrative costs of consultations under the jeopardy standard and the effects of any project modifications resulting from consideration of this standard are considered baseline effects.

Section 9 defines the actions that are prohibited by the ESA. In particular, it prohibits the “take” of endangered wildlife, where “take” means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”⁷⁷ The economic effects associated with this section manifest themselves in Sections 7 and 10.

Under Section 10(a)(1)(B) of the ESA, an entity (e.g., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a listed animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.⁷⁸ The requirements posed by the HCP may have economic costs associated with the goal of ensuring that the effects of an incidental take are adequately avoided or minimized. The development and implementation of HCPs are considered a baseline protection for the species and habitat, unless the HCP is determined to be precipitated by the designation of critical habitat, or critical habitat designation influences stipulated conservation efforts under HCPs.

The protection of listed species and habitat is not limited to the ESA. Other federal statutes, as well as state and local laws, may also seek to protect the natural resources under their jurisdiction. If the requirements of the Rivers and Harbors Appropriation Act, the Clean Water Act (CWA), or state environmental quality laws, for example, protect habitat for the species, such protective efforts are considered to be baseline protections and costs associated with these efforts are categorized accordingly. Many of the relevant existing regulations are discussed in Section 3.3.

⁷⁶ We note that although the focus of this analysis is on the incremental effects of the designation, due to uncertainties regarding future management actions associated with MHI IFKW critical habitat, it was difficult in some cases to exclude potential impacts that may already occur under the baseline. Thus, the analysis may include some costs that would have occurred under the baseline, regardless of this rule (i.e., co-extensive costs). An effort to explicitly identify co-extensive cost estimates and distinguish them from uniquely incremental critical habitat designation costs, whenever possible, has been made herein.

⁷⁷ 16 U.S.C. Section 1532 – Definitions.

⁷⁸ U.S. Fish and Wildlife Service. 2005. Habitat Conservation Plans. Available at: https://www.fws.gov/endangered/esa-library/pdf/HCP_Incidental_Take.pdf.

3.2.1.2 Identifying Incremental Impacts of Critical Habitat Designation

This analysis separately monetizes, quantifies, or qualitatively assesses the “incremental” costs and benefits identified as deriving from this critical habitat designation action, to the fullest extent practicable (a description of the types of benefits is provided in Chapter 12). This incremental analysis determines the effects on human uses and activities uniquely attributable to the critical habitat designation that are above and beyond those effects due to existing or planned (required or voluntary) conservation efforts being conducted under other federal, state, and local regulations or guidelines, including the ESA listing.

When critical habitat is designated, Section 7 requires federal agencies to ensure that their actions are not likely to result in the destruction or adverse modification of critical habitat (in addition to, and separate from, ensuring the actions are not likely to jeopardize the continued existence of the species). The added administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation.

Figure 3-1 depicts the process for deciding whether an effect should be considered incremental. Incremental costs may be the direct compliance costs associated with additional effort for forecast consultations, reinitiated consultations, new consultations occurring specifically because of the designation, and additional project modifications that would not otherwise have been required under the jeopardy standard. Additionally, incremental costs may accrue as a result of actions initiated in response to the designation of critical habitat (e.g., developing HCPs in an effort to avoid designation of critical habitat), triggering of additional requirements under state or local laws intended to protect sensitive habitat, and uncertainty and perceptual⁷⁹ effects on markets.

Per the revised definition, “Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.” The critical habitat designation will incrementally change the quality of the habitat insofar as it prevents degradation and actions that would otherwise impede the development of the essential feature and associated characteristics. Thus, critical habitat designation costs and benefits associated with habitat quality will accrue based on the degradation that the designation is expected to prevent as well as the natural progression that the designation is expected to allow compared to the future conditions expected without critical habitat designation. Any increase in critical habitat quality due to the designation is measured as the difference between the future condition of critical habitat with and without the designation, rather than the difference between current conditions and post-designation conditions (Figure 3-2).

⁷⁹ While listed here under incremental costs, perceptual effects on the market need not be limited to adverse impacts. Generally, it is assumed that property values for parcels adjacent to critical habitat will fall upon designation, owing to perceived limits on use. However, it may be equally possible that proximity to designated critical habitat may enhance the market value of a parcel (e.g., a home site abutting an estuary designated as critical habitat may command a premium price, because critical habitat designation ensures that no action with a federal nexus will be allowed to destroy or adversely modify the estuary’s primary constituent elements).

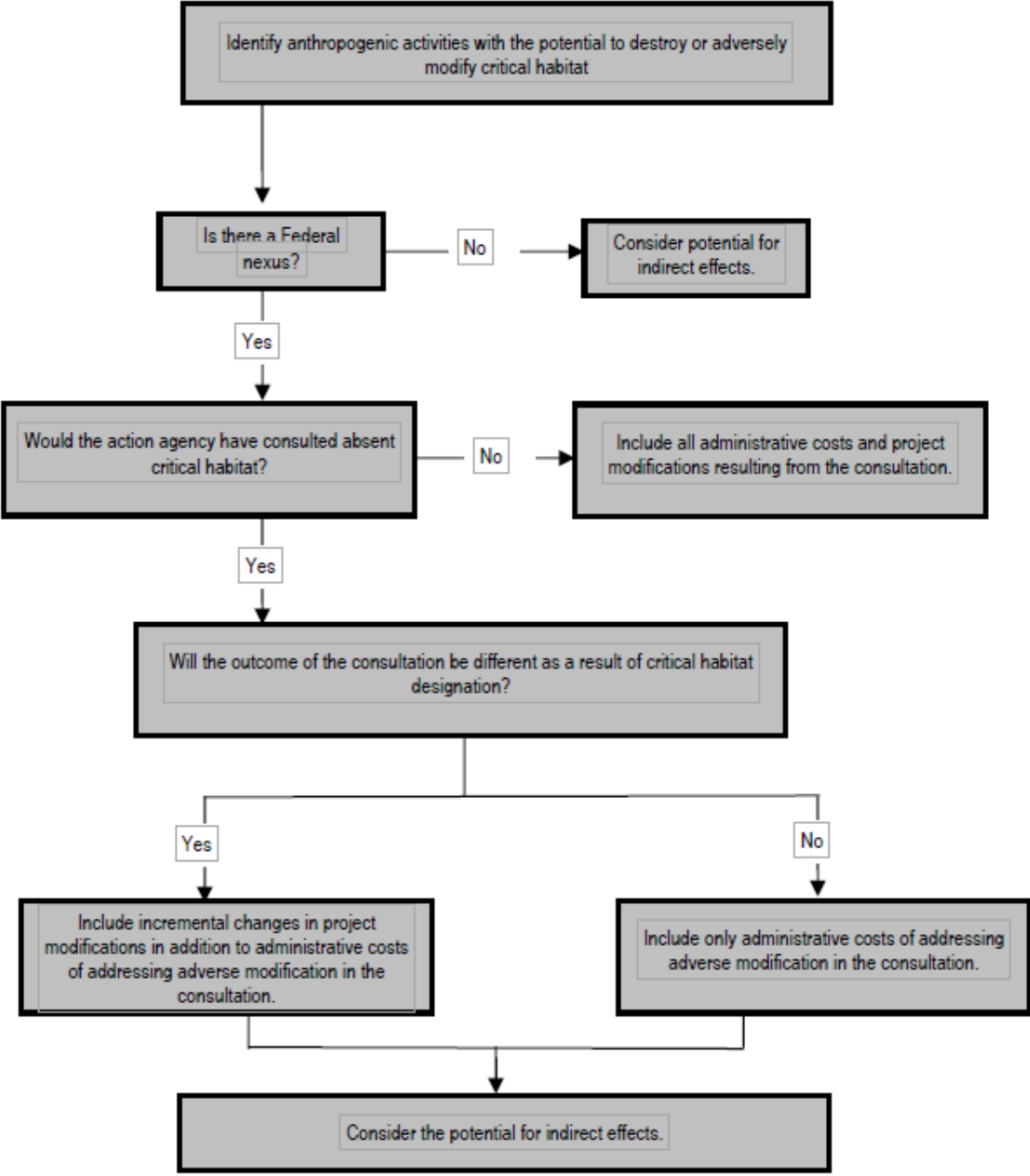


Figure 3-1 Identifying Incremental Effects of Critical Habitat Designation

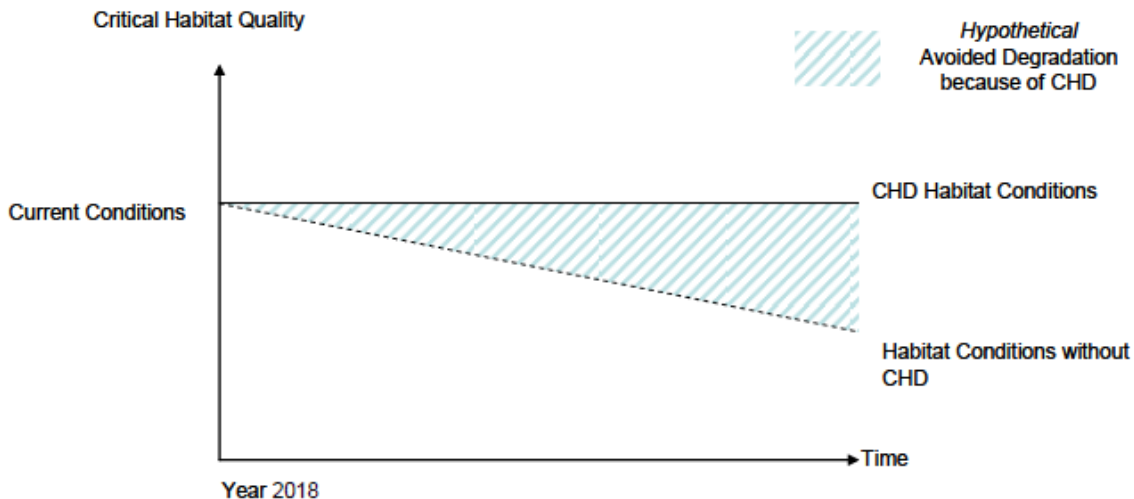


Figure 3-2 Hypothetical Avoided Habitat Quality Deterioration due to Critical Habitat Designation

3.2.2 Economic Efficiency and Opportunity Costs

At the guidance of OMB and in compliance with EO 12866, “Regulatory Planning and Review,” federal agencies measure changes in economic efficiency to understand how society will be affected by a regulatory action. Economic efficiency is typically measured against a baseline or status quo condition (i.e., the no action alternative), with all attributable gains and losses compared for each alternative regulatory path. In the context of regulations that would designate critical habitat for the MHI IFKW, society seeks to accrue benefits from the conservation, recovery, and stewardship of this endangered species (as reflected in the provisions of the ESA). Simultaneously, these welfare gains cause societal costs. These costs reflect the opportunity cost of resources used or benefits foregone by society, as a result of the specific regulatory alternative considered. Economists generally characterize opportunity costs in terms of changes to producer and/or consumer surplus in affected markets.⁸⁰ Economic efficiency analyses seek to measure, to the extent practicable, the relative trade-offs of each competing regulatory alternative (including the no action alternative) to ensure: (1) that a full accounting of all relevant costs and benefits is made, and (2) that the most economically efficient available alternative is identified.

It is, however, not always possible to measure each cost and benefit in a common metric (e.g., U.S. dollars). When the regulatory action bears on welfare changes with both market and non-market characteristics, as is the case for endangered species management, conservation, and recovery efforts, markets (and, therefore, prices) do not exist for many important components of resource management.

In some instances, compliance costs may provide a reasonable approximation of the economic burden associated with a regulatory action. For example, a federal agency such as the U.S. Army Corps of Engineers (USACE), may enter into consultation with NMFS to ensure that a particular activity it plans to undertake, fund, or permit will not adversely modify critical habitat. The effort required for the consultation (which, in practice, may be quite small) is an economic opportunity cost—the manager’s time and effort could have been spent on an alternative activity had the area not been regulated as part of the critical habitat designation. However, this “burden” captures only one component of the analysis. The investment of time and resources spent on consultation also yields social benefits, by ensuring that inadvertent,

⁸⁰ Gramlich, E.M. 1990. *A Guide to Benefit-Cost Analysis* (2nd Ed.). Prospect Heights, Illinois: Waveland Press, Inc; Environmental Protection Agency. 2000. *Guidelines for Preparing Economic Analyses*. EPA 240-R-00-003. September. Available at: <http://yosemite.epa.gov/ee/epa/eed/nsf/webpages/Guidelines.html>.

unintentional, or inappropriate actions that destroy or adversely modify critical habitat are not permitted, sanctioned, or undertaken by a federal agency.

This analysis begins by measuring the costs and benefits associated with efforts undertaken to designate critical habitat for the MHI IFKW DPS. Compliance costs, under certain limiting assumptions, may provide a first approximation of the direct “cost” side of the change in economic efficiency. If the cost of conservation efforts is expected to significantly affect markets, the analysis will be expanded to consider potential changes in consumer and/or producer surplus in affected markets.

3.2.3 Distributional and Regional Economic Effects

Measurements of change in economic benefits and costs focus on the net welfare outcome attributable to a specific regulatory action, without consideration of how certain users, sectors, or groups of people are affected. Thus, an analysis of net benefit effects alone, may miss important distributional considerations. The OMB encourages federal agencies to consider distributional effects separately from benefits and costs.⁸¹ This analysis considers several types of distributional effects, including effects on small entities; effects on energy supply, distribution, and use; and regional economic effects. It is important to note that these measures are fundamentally different economic attributes from benefits and/or costs and, thus, cannot be added to or compared with estimates of net economic changes. Distributional effect estimators describe changes in “economic activity,” not economic benefits and costs.

This analysis also considers how small entities, including small businesses, not-for-profit organizations, and governments, as defined by the RFA, might be affected by future species conservation efforts.⁸² In addition, in light of EO 13211, “Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use,” this analysis considers the future effects of critical habitat designation for the MHI IFKW on the energy industry and its customers.⁸³

Regional economic impact analysis can provide an assessment of the potential localized effects of critical habitat designation. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in regional economic activity resulting from a regulatory action. Regional economic impacts are commonly measured using regional input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by fishers) and the effect of that change on economic output, income, or employment in other local sectors (e.g., suppliers of goods and services to fishers). These economic data provide a numerical estimate of the magnitude of growth or contraction of jobs, income, and transactions in a specific local economy. These economic impacts reflect “activity” (i.e., they characterize “transfers” among local or regional components of the broader economy), not “net” changes in the economy as a whole.

The use of regional input/output models in analysis of the economic impacts of critical habitat designation can overstate the long-term effects of a regulatory change. Most importantly, these models provide a static view of the economy of a region or locality—that is, they attempt to measure the initial impact of a regulatory change on aspects of an economy, but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost in a given local or regional market as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by affected businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.

⁸¹ OMB. 2003. Circular A-4. September 17, 2003.

⁸² 5 U.S.C. Section 601 – Definitions.

⁸³ Executive Order 13211. Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use. May 18, 2001.

Despite these and other limitations, in certain circumstances, the regional economic impact analysis may provide useful information about the scale and scope of localized changes in economic activity. It is important to remember that measures of regional economic activity generally reflect shifts in resource use, rather than net welfare losses or gains. Thus, these types of distributional impacts are reported separately from net benefit effects (i.e., not summed), and cannot be compared with estimates of net benefits.

3.2.4 Geographic Scope

The geographic scope of the analysis includes the MHI IFKW critical habitat designation. Figure 2-2a in Section 2.2 presents the MHI IFKW critical habitat designation. The analysis focuses on activities within or affecting these areas, and presents costs and benefits at the lowest level of resolution feasible, given available data. Effects are reported for the areas identified in the NMFS 2018 Final Biological Report. Note that economic activities affecting (or affected by) critical habitat may be sited outside of the boundaries of the critical habitat designation (e.g., development projects in the vicinity of the critical habitat designation, but outside the water); these activities are considered relevant to this analysis. Further, there is the potential for significant benefits to accrue to not just the local population but to tourists. Also, especially because the critical habitat designation protects the habitat of a “charismatic megafauna” there may be other benefits to the greater U.S. population.⁸⁴

The analysis acknowledges certain activities and projects that have the potential of affecting the essential feature and associated characteristics, but are located outside the boundaries of the critical habitat. Such actions may trigger Section 7 consultation(s) under ESA. For example, activities that could affect prey resources outside of the critical habitat designation could potentially require consultations.

3.2.5 Analytic Timeframe

The analysis estimates costs and benefits based on activities that are “reasonably foreseeable,” including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. This analysis considers economic effects of activities from 2018 (anticipated year of the species’ final critical habitat designation) through 2027 (10 years from the expected year of final critical habitat designation). This interval of 10 years, widely employed in the policy analysis arena, allows sufficient scope over which longer-cycle trends may be observed (e.g., progress toward population recovery for the MHI IFKW), yet is short enough to allow “reasonable” projections of changes in “use patterns” in an area, as well as exogenous factors (e.g., world supply and demand for petroleum, U.S. inflation rate trends) that may be influential.

3.2.6 Discounting Impacts over Time

The present value represents the value of a payment or stream of payments in common dollar terms, in today’s dollars. Present value costs and benefits are discounted at a 3 percent and 7 percent real discount rate. The same assessment is presented at two different discounting rates to judge the sensitivity of the social rate of time preference. This approach is recommended in the Office of Management and Budget Circular A-4 from 2003,⁸⁵ which provides guidance to federal agencies on conducting regulatory reviews.

⁸⁴ Reynolds, J.E., H. Marsh, and T.J. Regan. 2009. Marine Mammal Conservation. *Endangered Species Research* 7:23-28.

⁸⁵ Available at: https://www.whitehouse.gov/omb/circulars_a004_a-4.

3.3 Socioeconomic Context

This section presents information on the existing economic conditions in the critical habitat designation, including the State of Hawaii overall, and each of its four major counties: Hawaii County, the City and County of Honolulu (Honolulu County), Kauai County, and Maui County.⁸⁶

3.3.1 Description of Affected Economies

Figure 3-3 shows the county delineations. The section is organized into four main components: (1) Population Trends and Projections; (2) Income-Related Measures of Social Well-Being; (3) Race and Ethnicity; and (4) Major Industrial Sectors. The focus of this section is on those socioeconomic parameters most likely to be affected by the critical habitat designation. These key parameters include demographic characteristics of local residents, as well as employment and income levels in these counties.

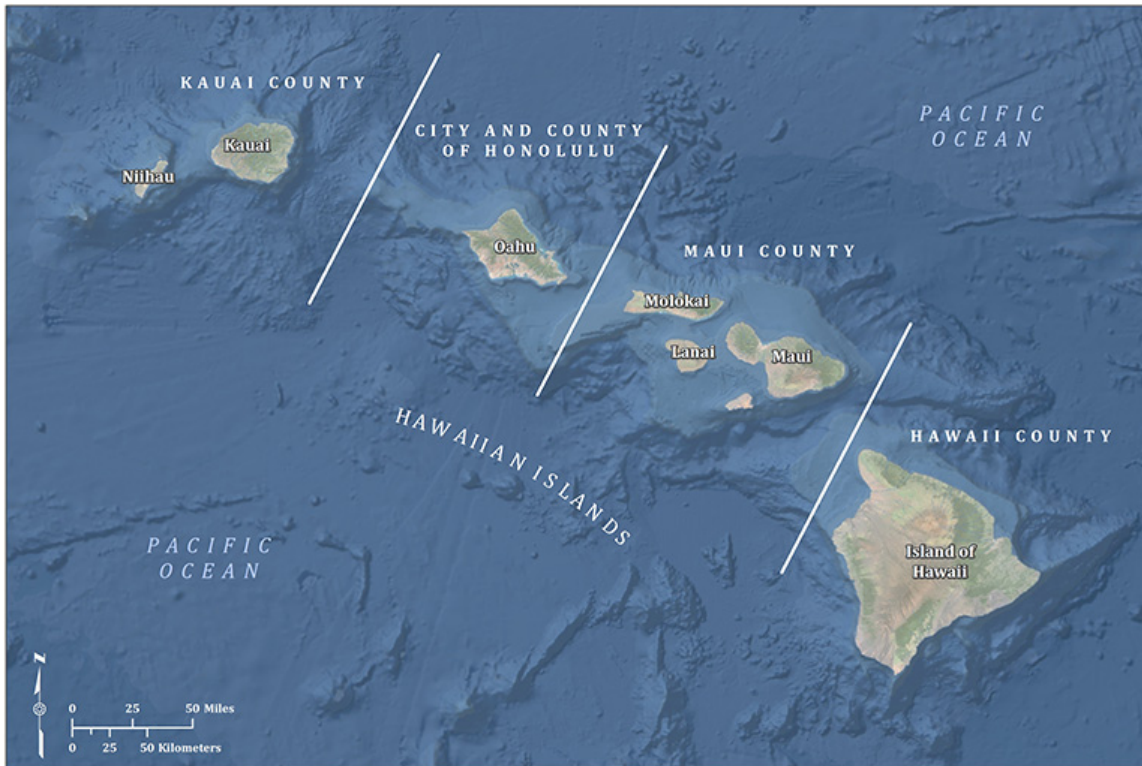


Figure 3-3 Map of Counties in the Study Area

3.3.1.1 Population Trends and Projections

The populations of Honolulu, Hawaii, Kauai, and Maui counties are shown in Table 3-1. The Honolulu County is the most populous county in the State, with a population of 984,178 in 2015.⁸⁷ This county includes the island of Oahu and most of the Northwestern Hawaiian Islands.

As shown in Table 3-1, each county experienced growth between 2000 and 2015. The largest rate of population growth was in Hawaii County, which grew more than 28 percent during that time period. The counties of Kauai and Maui experienced the most growth from 2010 to 2015, each at a rate of nearly four

⁸⁶ Hawaii has one additional county, Kalawao County. However, its population is significantly smaller than those of the other counties (typically less than 100 residents). For most of this section, Kalawao County is counted as part of Maui County.

⁸⁷ U.S. Census Bureau. 2017. Profile of General Population and Housing Characteristics: Demographic Profile Data. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF> accessed May 2017.

percent. The State of Hawaii as a whole has grown at a faster rate than the U.S., partially due to increased allocation of active military personnel to Hawaii by the federal government over the past 10 years, and to a relatively strong economy.⁸⁸

Table 3-1 Population and Population Growth

| Area | Population | | | Growth % | | |
|--------------------------------------|-------------|-------------|-------------|-----------|-----------|-----------|
| | 2000 | 2010 | 2015 | 2000-2010 | 2010-2015 | 2000-2015 |
| Hawaii County | 148,677 | 185,079 | 191,482 | 24.5% | 3.5% | 28.8% |
| Honolulu County | 876,156 | 953,207 | 984,178 | 8.8% | 3.2% | 12.3% |
| Kauai County | 58,610 | 67,181 | 69,776 | 14.6% | 3.9% | 19.1% |
| Maui County (includes Kalawao) | 128,094 | 154,834 | 160,863 | 20.9% | 3.9% | 25.6% |
| State of Hawaii | 1,211,537 | 1,360,301 | 1,406,299 | 12.3% | 3.4% | 16.1% |
| United States | 281,421,906 | 308,745,538 | 316,515,021 | 9.7% | 2.5% | 12.5% |

Source: U.S. Census Bureau. 2017. Profile of General Population and Housing Characteristics: Demographic Profile Data. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF> accessed May 2017.

Population projections through 2040 for each county, the State of Hawaii, and the U.S. are shown in Table 3-2. It is projected that populations will accelerate in Hawaii, Kauai, and Maui counties, as growth rates from 2015 to 2020 are predicted to be more than double those of 2010 to 2015. National and state growth rates are also expected to increase between the two time periods. Growth rates are then projected to decrease over subsequent periods. Over all of the observed time periods, growth rates in the counties of Hawaii, Kauai, and Maui are significantly greater than those of the state and the nation. Honolulu is expected to experience lower growth rates than the other counties over these time periods.

Table 3-2 Population Projections (U.S. Census and Hawaii State Government; Performed 2014 and 2012, respectively)

| Area | Population | | | | Growth % | | | |
|--------------------------------------|-------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|
| | 2015 | 2020 | 2030 | 2040 | 2015-2020 | 2020-2030 | 2030-2040 | 2015-2040 |
| Hawaii County | 191,482 | 220,880 | 258,510 | 296,320 | 15.4% | 17.0% | 14.6% | 54.8% |
| Honolulu County | 984,178 | 1,003,710 | 1,052,130 | 1,086,710 | 2.0% | 4.8% | 3.3% | 10.4% |
| Kauai County | 69,691 | 75,640 | 84,380 | 93,020 | 8.5% | 11.6% | 10.2% | 33.5% |
| Maui County (includes Kalawao) | 160,948 | 181,020 | 207,310 | 232,860 | 12.5% | 14.5% | 12.3% | 44.7% |
| State of Hawaii | 1,406,299 | 1,481,240 | 1,602,340 | 1,708,920 | 5.3% | 8.2% | 6.7% | 21.5% |
| United States | 316,515,021 | 334,503,000 | 359,402,000 | 380,219,000 | 5.7% | 7.4% | 5.8% | 20.1% |

⁸⁸ Hawaii Department of Business, Economic Development, and Tourism. 2017. Population and Economic Projections for the State of Hawaii to 2040. Available at: http://files.hawaii.gov/dbedt/economic/data_reports/2040-long-range-forecast/2040-long-range-forecast.pdf accessed May 15, 2017.

Table 3-2 Population Projections (U.S. Census and Hawaii State Government; Performed 2014 and 2012, respectively)

| Area | Population | | | | Growth % | | | |
|------|------------|------|------|------|-----------|-----------|-----------|-----------|
| | 2015 | 2020 | 2030 | 2040 | 2015-2020 | 2020-2030 | 2030-2040 | 2015-2040 |

Sources: U.S. Census Bureau. 2017. Profile of General Population and Housing Characteristics: Demographic Profile Data. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF> accessed May 2017. Hawaii Department of Business, Economic Development, and Tourism. 2012. Table 1.27 – Resident Population Projections by County: 2010 to 2040. Honolulu, HI. July, 2012.

Note: Figures are from the U.S. Census, with the exception of projected populations for counties in Hawaii from the year 2020 and beyond. All projections were performed prior to release of the 2015 American Community Survey's population figures.

3.3.1.2 Income-related Measures of Social Well-being

As derivatives of total personal income, per capita and median household income, poverty rates, and unemployment rates represent widely used economic indicators of social well-being. Table 3-3 presents these data for the four counties as well as the State of Hawaii and the U.S.

Honolulu County has the highest per capita income of \$31,041 and median household income of \$74,460, both exceeding state and national averages. Hawaii County has the lowest income levels, with \$24,548 and \$52,108 per capita and median household incomes, respectively. These Hawaii County figures fall well below those of state and national averages. Overall, the State of Hawaii fares better than the U.S. in terms of income.

Hawaii County holds the highest poverty and unemployment rates at 19.5 percent and 4.4 percent, respectively, while Honolulu County holds the lowest of both rates at 9.7 percent and 3.4 percent, respectively. Again, the State of Hawaii fares better than the U.S. in terms of poverty and unemployment rates, with the exception of Hawaii County's unemployment rate of 19.5 percent, which exceeds state and national averages.

Table 3-3 Income, Poverty Rates, and Unemployment Rates, 2015

| Area | Per Capita Income | Median Household Income | Poverty Rate | Unemployment Rate |
|--------------------------------|-------------------|-------------------------|--------------|-------------------|
| Hawaii County | \$24,548 | \$52,108 | 19.5% | 4.4% |
| Honolulu County | \$31,041 | \$74,460 | 9.7% | 3.4% |
| Kauai County | \$27,441 | \$65,101 | 10.7% | 4.0% |
| Maui County (includes Kalawao) | \$29,664 | \$66,476 | 11.0% | 3.7% |
| State of Hawaii | \$29,822 | \$69,515 | 11.2% | 3.5% |
| United States | \$28,930 | \$53,889 | 15.5% | 5.2% |

Sources: U.S. Census Bureau. 2017. Selected Economic Characteristics: 2011-2015 American Community Survey 5-Year Estimates. Available at: https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml accessed May 2017; U.S. Bureau of Labor Statistics. 2017. Databases, Tables, & Calculators by Subject: Labor Force Statistics from the Current Population Survey. Available at: <https://data.bls.gov/timeseries/LNS14000000> accessed May 15, 2017.

Table 3-4 provides the trends in median household incomes from 2000 to 2015. Between 2000 and 2010, each of the four counties' median household income grew at a faster rate than that of the U.S. as a whole. Each county continued to do so from 2010 to 2015, with the notable exception of Hawaii County, the only county to experience a decrease in median household income over that time period. Honolulu County maintained the highest median household income over all three time periods observed, while Hawaii County maintained the lowest. In the most recent observation, 2015, Honolulu County had a median

household income of \$74,460, while Hawaii County was measured at \$52,108, and the state and national averages were \$69,515 and \$53,889, respectively.

Table 3-4 Historical Median Household Incomes

| Area | Median Household Income (2000) | Median Household Income (2010) | Median Household Income (2015) |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Hawaii County | \$39,805 | \$54,996 | \$52,108 |
| Honolulu County | \$51,914 | \$70,093 | \$74,460 |
| Kauai County | \$45,020 | \$62,531 | \$65,101 |
| Maui County (includes Kalawao) | \$49,489 | \$63,989 | \$66,476 |
| State of Hawaii | \$49,820 | \$66,420 | \$69,515 |
| United States | \$41,994 | \$51,914 | \$53,889 |

Source: U.S. Census Bureau. 2017. Selected Economic Characteristics: 2011-2015 American Community Survey 5-Year Estimates. Available at: https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml accessed May 2017.

3.3.1.3 Race and Ethnicity

The racial and ethnic compositions of the four major Hawaiian counties, the State of Hawaii, and the U.S. are presented in Table 3-5.

Generally, the racial and ethnic composition of the State of Hawaii and each of its counties is more diverse than nationwide conditions. Neither the state nor any of its counties have a single racial group that makes up the majority of its population. The predominant racial group in the state is Asian, constituting 37.7 percent of the population. However, the Asian racial group only constitutes a plurality in two of the four counties, Honolulu and Kauai at 42.6 percent and 35.6 percent, respectively. In the counties of Hawaii and Maui, the largest racial group is White, constituting 33.4 percent and 34.9 percent, respectively. The third most populous racial group, both in the State of Hawaii and in each of its counties, is Native Hawaiian and Other Pacific Islanders. This group constitutes 9.9 percent of the state and is at its highest proportion in Hawaii County (12.9 percent) and its lowest in Honolulu County (9.2 percent).

Table 3-5 Population by Racial and Ethnic Groups

| Area | Population | Race | | | | | | | Ethnicity |
|-----------------|-------------|------------|-------------|--|------------|-----------------------------------|------------|-------------------|--------------------|
| | | Asian | White | Native Hawaiian and Other Pacific Islander | Black | American Indian and Alaska Native | Other | Two or More Races | Hispanic or Latino |
| Hawaii County | 191,482 | 42,071 | 63,927 | 24,623 | 1,324 | 843 | 3,988 | 54,706 | 23,444 |
| | | 22.0% | 33.4% | 12.9% | 0.7% | 0.4% | 2.1% | 28.6% | 12.2% |
| Honolulu County | 984,178 | 419,451 | 213,878 | 90,740 | 25,901 | 1,685 | 9,009 | 223,514 | 91,036 |
| | | 42.6% | 21.7% | 9.2% | 2.6% | 0.2% | 0.9% | 22.7% | 9.2% |
| Kauai County | 69,691 | 24,838 | 23,199 | 6,903 | 467 | 214 | 464 | 13,606 | 7,350 |
| | | 35.6% | 33.3% | 9.9% | 0.7% | 0.3% | 0.7% | 19.5% | 10.5% |
| Maui County | 160,948 | 44,171 | 56,128 | 16,605 | 996 | 270 | 1,401 | 41,292 | 17,417 |
| | | 27.4% | 34.9% | 10.3% | 0.6% | 0.2% | 0.9% | 25.7% | 10.8% |
| State of Hawaii | 1,406,299 | 530,551 | 357,164 | 138,901 | 28,688 | 3,012 | 14,864 | 333,119 | 139,251 |
| | | 37.7% | 25.4% | 9.9% | 2.0% | 0.2% | 1.1% | 23.7% | 9.9% |
| United States | 316,515,021 | 16,235,305 | 232,943,055 | 546,255 | 39,908,095 | 2,569,170 | 14,865,258 | 9,447,883 | 54,232,205 |
| | | 5.1% | 73.6% | 0.2% | 12.6% | 0.8% | 4.7% | 3.0% | 17.1% |

Source: U.S. Census Bureau. 2017. Profile of General Population and Housing Characteristics: Demographic Profile Data. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF> accessed May 2017.

3.3.2 Major Industrial Sectors

Appendix A of this report shows detailed tables for each county with the number of non-employer firms, non-employer receipts, employer establishments and employees, and the annual payroll for the various industry sectors within the four counties. Industry sectors are defined by the North American Industry Classification System. Unlike employer establishments, non-employer firms have no paid employees; however, non-employer receipts contribute substantially to a number of sectors.

Based on the number of employees within employer establishments, the major industrial sectors common to the four counties are: retail trade; health care and social assistance; and accommodation and food services. When assessing non-employer receipts, major industrial sectors common to the four counties are: construction; real estate and rental and leasing; professional scientific and technical services, and other services (except public administration).^{89,90} The industrial sectors by county are shown below based on the numbers of employees and non-employer receipts.

3.3.2.1 Hawaii County

The major industrial sectors based on the number of employees within employer establishments are:⁹¹

1. Accommodation and Food Services
2. Retail Trade
3. Health Care and Social Assistance
4. Administrative and Support and Waste Management and Remediation Services
5. Construction

The major industrial sectors based on non-employer receipts are:⁹²

1. Real Estate and Rental and Leasing
2. Construction
3. Professional, Scientific, and Technical Services
4. Other Services (except public administration)
5. Retail Trade

3.3.2.2 City and County of Honolulu

Based on the number of employees within employer establishments, the major industrial sectors in the county are:⁹³

1. Accommodation and Food Services
2. Health Care and Social Assistance
3. Retail Trade

⁸⁹ U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk> accessed May 2017.

⁹⁰ U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=NES_2014_00A2&prodType=table accessed May 2017.

⁹¹ U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns.

⁹² U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics.

⁹³ U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns.

4. Administrative and Support and Waste Management and Remediation Services
5. Transportation and Warehousing

The major industrial sectors based on non-employer receipts are:⁹⁴

1. Real Estate and Rental and Leasing
2. Professional, Scientific, and Technical Services
3. Other Services (except public administration)
4. Retail Trade
5. Health Care and Social Assistance

3.3.2.3 Kauai County

Based on the number of employees within employer establishments, the major industrial sectors in the county are:⁹⁵

1. Accommodation and Food Services
2. Retail Trade
3. Health Care and Social Assistance
4. Administrative and Support and Waste Management and Remediation Services
5. Transportation and Warehousing

The major industrial sectors based on non-employer receipts are:⁹⁶

1. Real Estate and Rental and Leasing
2. Construction
3. Other Services (except public administration)
4. Professional, Scientific, and Technical Services
5. Retail Trade

3.3.2.4 Maui County

Based on the number of employees within employer establishments, the major industrial sectors in the county are:⁹⁷

1. Accommodation and Food Services
2. Retail Trade
3. Health Care and Social Assistance
4. Administrative and Support and Waste Management and Remediation Services
5. Construction

⁹⁴ U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics.

⁹⁵ U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns.

⁹⁶ U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics.

⁹⁷ U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns.

The major industrial sectors based on non-employer receipts are:⁹⁸

1. Real Estate and Rental and Leasing
2. Other Services (except public administration)
3. Construction
4. Professional, Scientific, and Technical Services
5. Retail Trade

3.4 Regulatory Baseline

This section provides relevant information about the regulatory elements that exist in the absence of a critical habitat designation for the MHI IFKW. Where proposed activities directly affect critical habitat areas, these regulations may provide a level of protection to the species.

3.4.1 State and Federal Regulations

Several state and federal regulations are currently in place throughout the area under consideration for critical habitat designation. Each is described briefly below.

3.4.1.1 *Endangered Species Act*

The ESA provides for the conservation of endangered or threatened species and the conservation of the ecosystems on which they depend.⁹⁹ The MHI IFKW became a listed species under the ESA in 2012, and was added to the inventory of endangered marine species under the jurisdiction of NMFS.¹⁰⁰

The species' classification as "endangered" entitles it to protections under Section 7 of the ESA. Section 7 requires federal agencies to ensure that actions they fund, authorize, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or otherwise adversely modify designated critical habitat.¹⁰¹ This includes federal grants, permitting, licensing, or other regulatory actions. In general, if a listed species may be present in an "action" area, the federal action agency must conduct a biological assessment to determine whether the proposed action may affect listed species. If the action agency's assessment shows, and NMFS concurs, that the proposed action is not likely to adversely affect any listed species or designated critical habitat, then the consultation is concluded.

If the federal action agency's biological assessment shows that a proposed action is likely to adversely affect any listed species or cause destruction or adverse modification of designated critical habitat, formal consultation and issuance of a biological opinion are required. During the formal consultation process, the action agency supplies NMFS with information that includes descriptions of the proposed action, action area, listed species that may be affected, and how the species may be affected by that action. NMFS has up to 135 days to complete consultation and prepare a biological opinion that contains the analysis of whether the proposed action are likely to jeopardize the continued existence of the species or adversely modify or destroy designated critical habitat. If a jeopardy or adverse modification determination is made, the biological opinion must identify reasonable and prudent alternatives, if any, that would not jeopardize the continued existence of the listed species or destroy/adversely modify designated critical habitat and that are economically and technologically feasible. The action agency may choose to implement a

⁹⁸ U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics.

⁹⁹ U.S. Fish and Wildlife Service. 2005. Endangered Species Act of 1973: As Amended through the 108th Congress. Section 2: Findings, Purposes, and Policy. Washington, DC. January 2005.

¹⁰⁰ U.S. Fish and Wildlife Service. 2012. ECOS Environmental Conservation Online System: Species Listed During Calendar Year 2012. Washington, D.C. December 2012. Available at: <https://ecos.fws.gov/ecp0/reports/species-listings-by-year-report?year=2012> accessed May 19, 2017.

¹⁰¹ U.S. Fish and Wildlife Service. 1973. Endangered Species Act of 1973 As Amended through the 108th Congress. Washington, DC. December 28.

reasonable and prudent alternative, modify the proposed action and consult with NMFS again, decide not to authorize, fund, or otherwise proceed with the action, or apply for an exception, a process rarely undertaken.

In cases where an action may adversely affect a species, but not jeopardize its continued existence, the biological opinion includes an incidental take statement to authorize a specified amount and the extent of anticipated take resulting from the action. Incidental take is incidental to, and not the purpose of, an otherwise lawful activity. The incidental take statement also specifies reasonable and prudent measures, considered necessary or appropriate to minimize the impact of the anticipated incidental take to the species.

Based on the MHI IFKW's inclusion under the ESA, NMFS subsequently announced its intent to prepare a recovery plan for the MHI IFKW in October of 2013.¹⁰² The formation of the recovery plan is still in early planning phases. As of the most recent planning workshop, potential recovery actions focused on research to learn more about the threats to and the conservation needs of this DPS, including investigating interactions with local fisheries and studies of nutrition, contaminants, and noise.¹⁰³

3.4.1.2 Marine Mammal Protection Act

The MMPA prohibits the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the import of marine mammal products to the U.S.¹⁰⁴ It is intended to keep species or stocks at or above their optimum sustainable population level or help depleted stocks to reach these levels. Under the MMPA, commercial fisheries are allowed to incidentally take a marine mammal provided they obtain a marine mammal authorization certificate from NOAA Fisheries. Any incidental mortality or injury to a marine mammal that occurs as a result of commercial fishing operations must be reported within 48 hours to NOAA. The MMPA also authorizes the Take Reduction Program (described below) and the preparation of "stock assessments" for marine mammals.

In addition, the MMPA allows, upon request, the incidental take of small numbers of marine mammals by U.S. citizens who engage in specified activity, other than commercial fishing see above, within a specified geographic region. NMFS authorizes the permissible methods of taking and required mitigation, monitoring, and reporting of such takings, which are meant to reduce or minimize negative impacts to marine mammals and the use of marine mammals for subsistence users. These authorizations are often sought for activities such as military sonar and training exercises; oil and gas development, exploration, production, and abandonment projects; geophysical surveys for other energy and scientific research projects; pile driving associated with construction projects; and explosive structure removal.

Because MHI IFKW is formally listed as endangered under the ESA, the DPS was automatically designated as a "depleted" and "strategic" stock under the MMPA, in 2012.¹⁰⁵

3.4.1.2.1 Take Reduction Program

The MMPA authorizes NMFS to develop and implement a TRP in order to aid in species recovery and prevent depletion of strategic marine mammal stocks that interact with fisheries that directly cause

¹⁰² U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2013. Endangered and Threatened Species; Notice of Intent to Prepare a Recovery Plan for Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment. Federal Register 78 (191). Washington D.C. October 2, 2013.

¹⁰³ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2016. Main Hawaiian Islands Insular False Killer Whale Recovery Planning Workshop. Honolulu, HI. October 2016.

¹⁰⁴ U.S. Fish and Wildlife Service. The Marine Mammal Protection Act of 1972 as Amended through 2015. Washington, DC. January 2015.

¹⁰⁵ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2017. Endangered and Threatened Marine Species under NMFS Jurisdiction: Marine Mammals. Washington, D.C. May 10, 2017. Available at: <http://www.nmfs.noaa.gov/pr/species/esa/listed.htm> accessed May 19, 2017.

significant levels of annual mortality and serious injury.¹⁰⁶ A “strategic” stock is one that is listed as endangered or threatened, declining and likely to become threatened, listed as depleted, or experiencing direct human-caused mortality that brings the stock below its potential biological removal level.¹⁰⁷

In 2012, NMFS finalized a TRP for false killer whales that imposed regulations on the activities of deep-set longline fisheries in Hawaii. These regulations can be summarized as follows:

- > The maximum allowable dimensions of circle hooks were reduced.
- > Line materials must have a minimum diameter and breaking strength.
- > An existing longline exclusion area was modified from being closed only seasonally to being closed year-round.
- > Certification requirements for longline vessel owners were expanded to include marine mammal interaction mitigation techniques.
- > Longline vessels are now required to post onboard a NMFS “marine mammal handling and release” placard.
- > Captains must now supervise handling and release of a hooked or entangled marine mammal.
- > Vessels are also required to post a placard that instructs the crew to notify the captain if a marine mammal is hooked.
- > An additional longline exclusion zone is implemented if the number of observed false killer whale incidental mortality and serious injury within the exclusive economic zone (EEZ) meet an established number or “trigger.”

3.4.1.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is the leading federal statute governing marine fisheries in U.S. waters and the EEZ.¹⁰⁸ The MSA establishes regional fishery management plans for federally managed fisheries in order to prevent overfishing and rebuild overfished stocks, and to protect the long-term health and stability of the fishery while allowing for optimum yield from each fishery.

The MSA contains general provisions requiring fisheries (particularly tuna fisheries) to minimize bycatch and mortality of marine mammals to the extent practicable.

3.4.1.4 Clean Water Act

The purpose of the CWA is to restore the physical, biological, and chemical integrity of the waters of the U.S., using two basic mechanisms: (1) direct regulation of discharges pursuant to permits issued under the National Pollution Discharge Elimination System (NPDES) and Section 404 (discharge of dredge or fill materials); and (2) the Title III water quality program.¹⁰⁹

Under the NPDES program, the U.S. Environmental Protection Agency (EPA) sets pollutant-specific limits on the point source discharges for major industries and provides permits to individual point sources that

¹⁰⁶ These are Category I and II fisheries, which are defined as fisheries that cause an annual mortality and serious injury of the species that is greater than 1 percent of the species’ potential biological removal level. The potential biological removal level is the maximum number of animals that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.

¹⁰⁷ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2016. Marine Mammal Take Reduction Program. Washington, D.C. February 5, 2016. Available at: http://www.nmfs.noaa.gov/pr/interactions/trt/marine_mammal_take_reduction_program.html accessed May 19, 2017.

¹⁰⁸ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2007. Magnuson-Stevens Fishery Conservation and Management Act. As Amended through January 12, 2007. Washington, D.C. Available at: http://www.nmfs.noaa.gov/sfa/laws_policies/msa/documents/msa_amended_2007.pdf accessed May 19, 2017.

¹⁰⁹ U.S. Environmental Protection Agency. Clean Water Act, Section 404. Washington, DC. Updated October 2016.

apply these limits. EPA has delegated responsibility for the NPDES permitting program to most states. State-issued NPDES permits are treated as non-federal actions.

Under the water quality standards program, EPA has issued water quality criteria to establish limits on the ambient concentration of pollutants in surface waters that will still protect the health of the water body. States issue water quality standards that reflect the federal water quality criteria and submit the standards to EPA for review. State water quality standards are subject to review every 3 years (triennial review). States apply the standards to NPDES discharge permits to ensure that discharges do not violate the water quality standards.

Under Section 401 of the CWA, all applicants for a federal license or permit to conduct activity that may result in discharge to navigable waters of the U.S. are required to submit a state certification application to the licensing or permitting agency. Section 404 of the CWA prescribes a permit program for the discharge of dredged or fill material into navigable waters. Specifically, pursuant to Section 404, permit applicants are required to show that they have “taken steps to avoid wetland impacts, where practicable, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through activities to restore or recreate wetlands.”

The CWA will influence the critical habitat designation in that activities that could otherwise discharge pollutants, and thus negatively affect the water quality within IFKW habitat, may require NPDES or Section 404 permits.

3.4.1.5 Clean Water Act; Comprehensive Environmental Response, Compensation, and Liability Act; and Oil Pollution Act of 1990

The CWA, Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. §§ 9601 et seq.), and Oil Pollution Act of 1990 (33 U.S.C. §§ 2701 et seq.) mandate that parties that release hazardous materials or oil into the environment are responsible not only for the cost of cleaning up the release, but also for restoring any injury to natural resources that results from the actual or threatened release, or from response actions.¹¹⁰ These provisions could be applied to address impacts to IFKW from release incidents.

3.4.1.6 Water Resources Development Act

The Water Resources Development Act (33 U.S.C. §§ 2201 et seq.) authorizes the construction or study of USACE projects and applies to all features of water resources development and planning, including environmental assessment and mitigation requirements.¹¹¹

3.4.1.7 The Rivers and Harbors Act

The Rivers and Harbors Act (RHA; 33 USC §§ 401 et seq.) authorizes the USACE to issue permits for dams or dikes in intrastate waters of the U.S. (Section 9) and construction or other work, such as docks/piers and aquaculture/mariculture studies, in or affecting navigable waters (Section 10). In issuing these permits, USACE conducts a “public interest balancing,” which can include evaluation of benefits and detriments of a project to fish and wildlife values, such as the MHI IFKW. As a general matter, adverse impacts to MHI IFKW are considered to be detrimental to the public interest, and the USACE findings for Section 10 permits must document how these impacts have been avoided. Through this evaluation, USACE requires applicants to avoid and minimize impacts to the MHI IFKW, by altering the design of a project or by imposing mitigation actions.

¹¹⁰ U.S. Environmental Protection Agency. 2017. Summary of the Comprehensive Environmental Response, Compensation, and Liability Act. Washington, DC. Last updated February 7, 2017. Available at: <https://www.epa.gov/laws-regulations/summary-comprehensive-environmental-response-compensation-and-liability-act> accessed May 19, 2017.

¹¹¹ U.S. Army Corps of Engineers. 2016. Water Resources Development Act as Amended through 2016. Washington, DC. January 2016.

The RHA also authorizes the USCG to protect U.S. navigable waters. Navigable waters are those waters that, at some time in the past, present, or future, are used to transport interstate or foreign commerce. Under 14 USC § 81, the USCG is charged with establishing, maintaining, and operating aids to navigation to serve the needs of U.S. armed forces and maritime commerce, and when those aids are electronic, air commerce as well, when requested by the Federal Aviation Administration. Protection of navigable waters also includes regulating bridge-related activities. In general, a bridge cannot be constructed across any navigable water(s) until the USCG has approved the location and construction plans.

3.4.1.8 Act to Prevent Pollution from Ships as amended by the Marine Plastic Pollution Research and Control Act

The Act to Prevent Pollution from Ships (APPS), as amended by the Marine Plastic Pollution Research and Control Act (MPPRCA), protects IFKW by requiring all U.S. ships and all ships in U.S. navigable waters or the EEZ to comply with the International Convention for the Prevention of Pollution from Ships (33 U.S.C. §§ 1901 et seq.).¹¹² Under the regulations implementing APPS, as amended by MPPRCA, the discharge of plastics, including synthetic ropes, fishing nets, plastic bags, and biodegradable plastic, into the water is prohibited. Discharge of floating dunnage, lining, and packing materials is prohibited in navigable waters and in areas offshore less than 25 nautical miles from the nearest land. Food waste or paper, rags, glass, metal, bottles, crockery, and similar refuse cannot be discharged in navigable waters or in waters offshore inside 12 nautical miles from the nearest land. Finally, food waste, paper, rags, glass, and similar refuse cannot be discharged in navigable waters or in waters offshore inside 3 nautical miles from the nearest land. There are some exceptions for emergencies. The USCG has the primary responsibility for enforcing regulations under the APPS, and the APPS applies to all vessels, including cruise ships, regardless of flag, operating in U.S. navigable waters and the EEZ.

3.4.1.9 Regulatory Actions that Overlap with MHI IFKW Critical Habitat Designation

In addition to the regulatory longline fisheries restriction boundary discussed above, there are additional regulatory actions shown in Figure 3-4 that demonstrate how the critical habitat designation will be imposed upon certain areas that are already significantly regulated (Figure 3-4). The figure shows the MHI IFKW critical habitat area, as well as the longline exclusion zone, whale sanctuary areas, and bottomfish restricted fishing sites. Activities prohibited within the Hawaii Humpback Whale National Marine Sanctuary include approaching within 100 yards of any humpback whale; operating an aircraft within 1,000 feet above any humpback whale; and discharging or depositing any material or otherwise altering the seabed.¹¹³ Bottomfish restricted fishing areas are administered by the State of Hawaii and are intended to protect habitat features that are preferred by bottomfish.¹¹⁴

¹¹² U.S. Environmental Protection Agency. 1987. The Act to Prevent Pollution from Ships. Title 33: Navigation and Navigable Waters. Washington, DC. January 1987.

¹¹³ NOAA. 2014. Hawaiian Islands Humpback Whale National Marine Sanctuary, Resource Protection, Regulations. Available at: <http://hawaiihumpbackwhale.noaa.gov/res/regulations.html> accessed June 28, 2017.

¹¹⁴ Hawaii Department of Land and Natural Resources. 2017. Bottom Fishing. Department of Aquatic Resources. Available at: <http://dlnr.hawaii.gov/dar/fishing/bottom-fishing/> accessed June 28, 2017.

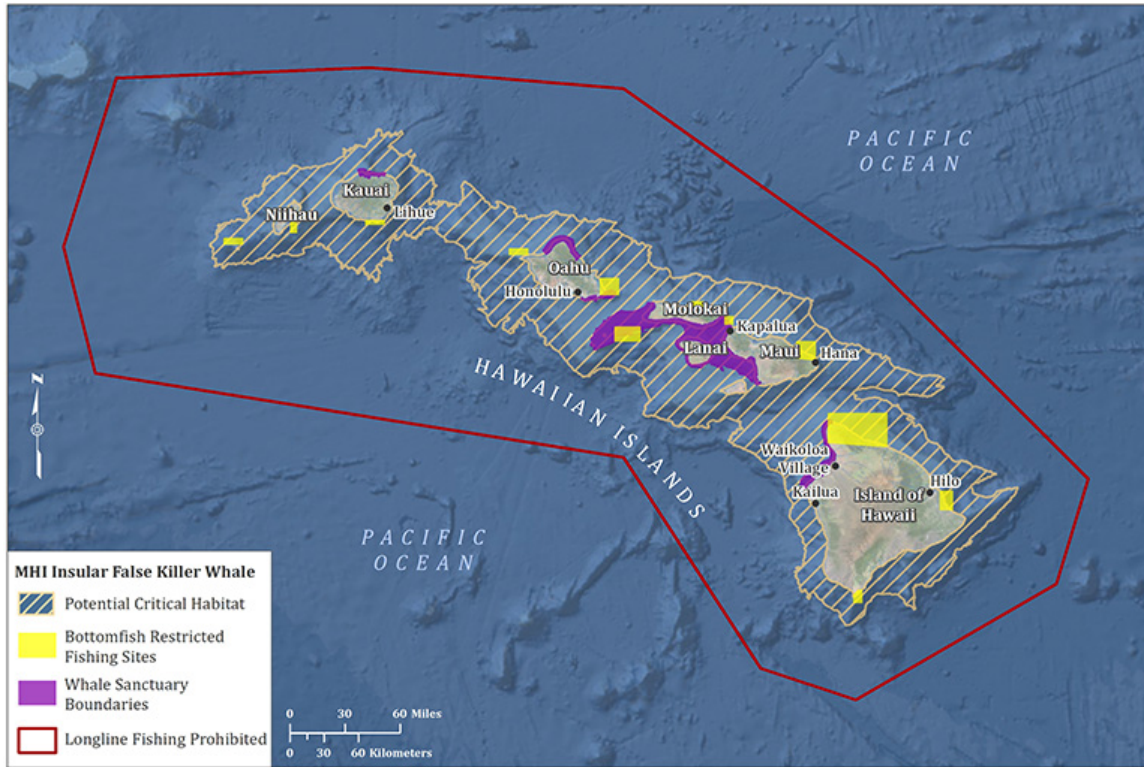


Figure 3-4 Some Regulatory Baseline Boundaries

3.4.2 International Regulations

IFKW are listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora Appendix II throughout their range. This listing indicates that the IFKW has the potential to become threatened with extinction across its range without proper trade controls.

3.5 Information Sources

The primary sources of information for this report are communications with, and data provided by, personnel from NMFS, other federal action agencies, non-governmental organizations, potentially affected private parties, and state and municipal agencies. One key data set provided by NMFS is the record of all consultations conducted between 2006 and 2016.¹¹⁵ The data set comprises annual records of the consultation type, the date of response, the project and activity, the federal action agency, the representative from the agency the location of the project, and whether or not the project was inside the IFKW range. For each category of activity that involves the costs for Section 7 consultations in this report, data from the NMFS data set was evaluated and used as a starting point to estimate the number and type of consultations that could be expected to occur in the future 10 years. Adjustments were made in each case based on discussions with agency representatives.

¹¹⁵ NMFS. 2017. "Section 7 Data 2006-2016 (2_6)" spreadsheet data compilation sent to Cardno researchers on February 6.

In addition to the consultation history data, the economic analysis relies on data collected in communication with personnel from the following entities:

- > Bureau of Ocean Energy Management
- > Hawaiian Telcom
- > Hawaii State Energy Office
- > National Marine Fisheries Service
- > University of Hawaii, Hawaii National Marine Renewable Energy Center
- > U.S. Army Corps of Engineers
- > U.S. Coast Guard
- > U.S. Department of Navy
- > Western Pacific Regional Fishery Management Council

4 Description of Economic Costs of Critical Habitat Designation

This section describes the different economic costs that may result from the MHI IFKW critical habitat designation. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. These costs are categorized as direct and indirect costs.

4.1 Direct Costs

The direct, incremental costs of critical habitat designation stem from the consideration of the potential for destruction or adverse modification of critical habitat. The two categories of direct incremental costs of critical habitat designation are: (1) the administrative costs of conducting Section 7 consultation and (2) project modification costs.

4.1.1 Administrative Costs

Parties involved in Section 7 consultations for MHI IFKW include NMFS,¹¹⁶ in its role as “consulting” agency, the federal “action” agency (the federal action, such as a permit or other authorization, provides the “federal nexus” requiring consultation), and in some cases, a private (or non-federal public) entity involved in the project or use activity. The federal action agency serves as the liaison with NMFS. While consultations are required for activities that may adversely affect a listed species, regardless of whether critical habitat is designated and whether the project involves a federal nexus, the critical habitat designation may increase the cost and complexity of consultations where the project may adversely modify critical habitat. Administrative expenditures associated with consultation may, therefore, result in both baseline and incremental costs.

For contextual purposes, Table 4-1 presents generalized per-event administrative costs of consultations. In general, three different scenarios associated with the designation of critical habitat may trigger incremental administrative consultation costs:

1. **Additional effort to address adverse modification in a new consultation** – New consultations occurring after critical habitat designation may require additional effort to address critical habitat issues above and beyond the listing issues. In this case, only the additional administrative effort (i.e., expenditure of resources) required to address critical habitat is considered an incremental cost of the designation.
2. **Reinitiation of consultation to address adverse modification** – Consultations that have already been completed on a project or activity may require reinitiation specifically to address critical habitat considerations. In this case, the cost of reinitiating the consultation, including all associated administrative and project modification costs, are appropriately attributed to the designation.
3. **Incremental consultation resulting entirely from critical habitat designation** – Critical habitat designation may trigger consultations that would not have occurred absent the designation (e.g., for an activity for which adverse modification may be an issue, while jeopardy is not). All

¹¹⁶ In cases where federal management actions governing fisheries are proposed that “may adversely modify” critical habitat, NMFS may be both the “action” agency and the “consulting” agency, although different divisions within NMFS would perform these respective roles.

associated administrative and project modification costs of incremental consultations are considered directly attributable to the designation.

The administrative costs of these consultations vary, depending on the specific details of the project. Where possible, a range of possible costs is discussed. Table 4-1 provides the best estimate of consultation costs representing effort required for all types of consultation, including those that consider both adverse modification and jeopardy. These costs are based on additional staff time spent on conducting these consultations. To estimate the fractions of the total administrative consultation costs that are baseline versus incremental, the following assumptions were applied:

- > Costs associated with an incremental consultation (one occurring because of the designation of critical habitat) would be attributed wholly to critical habitat designation.
- > Incremental costs of a reinitiation of a consultation because of the critical habitat designation are assumed to be approximately half the cost of the original consultation that considered only jeopardy. This assumes that reinitiations are less time-consuming, as the groundwork for the project has already been considered in terms of its effect on the species.
- > Efficiencies exist when considering both jeopardy and adverse modification at the same time (e.g., in staff time saved for project review, logistical expenses, data gathering and synthesis, and report writing) and, therefore, incremental administrative costs of considering adverse modification in consultations that will already be required to consider jeopardy result in the smallest attributable incremental expenditure of these three consultation categories, roughly half that of a reinitiating (or one quarter of the original consultation cost).
- > It is important to note that the estimated costs represent the midpoint of a potential range of costs to account for variability regarding levels of effort of specific consultations.

Table 4-1 Example Range of Attributable Costs per Consultation (by Administrative Cost Type in 2016 dollars)

| Consultation Area | Incremental Administrative Costs of Consultation* | | | | |
|--|---|----------------------------|------------------|------------------------------|------------|
| | NMFS Cost | Federal Action Agency Cost | Third Party Cost | Biological Assessment Cost** | Total Cost |
| Incremental Consultation Resulting Entirely from Critical Habitat Designation | | | | | |
| Technical Assistance | \$620 | \$1,170 | N/A | N/A | \$1,790 |
| Informal Consultation | \$2,680 | \$5,590 | N/A | \$2,240 | \$10,510 |
| Formal Consultation | \$5,930 | \$6,710 | \$3,920 | \$5,370 | \$21,930 |
| Programmatic Consultation | \$17,900 | \$14,880 | N/A | \$6,260 | \$39,040 |
| Reinitiation of Consultation to Address Adverse Modification | | | | | |
| Technical Assistance | \$310 | \$585 | N/A | N/A | \$895 |
| Informal Consultation | \$1,340 | \$2,795 | N/A | \$1,120 | \$5,255 |
| Formal Consultation | \$2,965 | \$3,355 | \$1,960 | \$2,685 | \$10,965 |
| Programmatic Consultation | \$8,950 | \$7,440 | N/A | \$3,130 | \$19,520 |
| Additional Effort to Address Adverse Modification in a New Consultation | | | | | |
| Technical Assistance | \$155 | \$293 | N/A | N/A | \$448 |
| Informal Consultation | \$670 | \$1,398 | N/A | \$560 | \$2,628 |

Table 4-1 Example Range of Attributable Costs per Consultation (by Administrative Cost Type in 2016 dollars)

| Consultation Area | Incremental Administrative Costs of Consultation* | | | | |
|---------------------------|---|----------------------------|------------------|------------------------------|------------|
| | NMFS Cost | Federal Action Agency Cost | Third Party Cost | Biological Assessment Cost** | Total Cost |
| Formal Consultation | \$1,483 | \$1,678 | \$980 | \$1,343 | \$5,483 |
| Programmatic Consultation | \$4,475 | \$3,720 | N/A | \$1,565 | \$9,760 |

Source: Industrial Economics, Inc. 2008 (analysis of full administrative costs, based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2008; a review of consultation records from several U.S. Fish and Wildlife Service field offices across the country, conducted in 2002; and modifications by National Marine Fisheries Service).

Notes:

* Estimates reflect average hourly time required by staff. Totals may not sum due to rounding. Note that these costs only reflect the incremental administrative costs associated with Section 7 consultations, and do not include any potential incremental costs resulting from project modifications due to the critical habitat designation.

** This cost is primarily borne by NMFS, but some can be shared with the relevant federal action agency and/or any third party involved.

Acronym: N/A – not applicable.

This report relies on 11 years of NMFS consultation records (since 2006) to forecast the number of anticipated consultations (see Section 3.5), discussions with affected entities, as well as per consultation cost estimates developed by Industrial Economics¹¹⁷ with representatives of relevant entities, to determine the estimated administrative costs of this designation. The consultation records include those consultations that have occurred for activities (with a federal nexus) in waters that surround the MHI. Although this record includes consultations that predate the listing of the MHI IFKW (in 2012), it is assumed that any consultations occurring in these waters under the titled activities would require consultation to ensure protections for MHI IFKW critical habitat in the future.

4.1.2 Project Modification Costs

Section 7 consultations considering critical habitat may result in additional project modification recommendations that address potential destruction or adverse modification of critical habitat.

For consultations considering jeopardy and adverse modification, as well as reinitiations of past jeopardy consultations to consider critical habitat concerns, the economic costs of project modifications undertaken specifically to avoid destruction or adverse modification of critical habitat are attributable as incremental costs of critical habitat designation. For consultations that are forecast to occur specifically because of the designation (incremental consultations), costs of all associated project modifications are assumed to be attributable to critical habitat designation. This is summarized below.

1. **Incremental consultation resulting entirely from critical habitat designation** – Costs of all project modifications are considered incremental.
2. **Reinitiation of consultation to address adverse modification** – Only project modifications associated solely with avoiding adverse modification are considered incremental.
3. **Additional effort to address modification in a new consultation** – Only project modifications associated solely with avoiding adverse modification are considered incremental.

¹¹⁷ Industrial Economics, Inc. 2008. Analysis of Full Administrative Costs, Based on Data from the Federal Government General Schedule Rates, Office of Personnel Management, 2008.

4.2 Indirect Costs

Indirect costs are those changes in economic behavior that may occur outside of the ESA, through other federal, state, or local actions that are motivated by the designation of critical habitat. This section identifies common types of indirect costs that may be associated with the designation of critical habitat. Importantly, these types of costs are not always considered incremental. If these types of conservation efforts and economic effects are expected to occur regardless of critical habitat designation, they are appropriately considered baseline costs.

4.2.1 Other State and Local Laws (Trigger Effects)

Under certain circumstances, critical habitat designation may provide new information to a polity about the sensitive ecological nature of a geographic region, potentially triggering additional economic effects under state or local laws. In cases where these effects would not have been triggered in the absence of a critical habitat designation, they are appropriately considered indirect, incremental effects of the designation, for purposes of this analysis.¹¹⁸

4.2.2 Stigma Effects

In some cases, the public may perceive that the critical habitat designation will result in limitations on private property uses, above and beyond those associated with anticipated project modifications and regulatory uncertainty described below. Public attitudes about the limits or restrictions that critical habitat designation may impose can be positive or negative, and can cause real economic effects to property owners, regardless of whether such limits are actually imposed. As the public becomes aware of the true regulatory burden imposed by critical habitat designation, the effect of the designation on property markets may equilibrate. To the extent that potential stigma effects on markets are probable and identifiable, these are considered indirect, incremental costs (and benefits)¹¹⁹ of the designation.

4.2.3 Time Delays

Both public and private entities may incur incremental delays associated with projects and other activities due to requirements associated with the need to reinstate the Section 7 consultation process and/or comply with other laws triggered by critical habitat designation. To the extent that delays result from the designation, they are appropriately attributable as incremental costs of the designation.

4.2.4 Regulatory Uncertainty

NMFS conducts Section 7 consultations on a case-by-case basis and issues biological opinions on formal consultations based on species-specific and site-specific information. As a result, federal government agencies and private parties who seek permits or other authorizations from those agencies consult with NMFS under Section 7 and may face uncertainty concerning whether project modifications will be recommended by NMFS and, if so, what the nature of such modification recommendations may be. This uncertainty may diminish as consultations are completed and additional information becomes available on the effects of critical habitat designation on specific activities. Where information suggests that this type of regulatory uncertainty stemming from critical habitat designation may affect a project or allied economic behavior, associated costs are considered indirect, incremental results, attributable to the designation action.

¹¹⁸ Enhanced scientific information and understanding of sensitive ecological assets also yield benefits to society, facilitate sustainable management, and reduce risks that uninformed actions will impose subsequent high mitigation costs, or result in irreparable damage.

¹¹⁹ Many forms of “use restrictions” result in enhanced property values for adjacent parcels. For example, the value of a property adjoining a wilderness area, a National Park, or a scenic reservation will “benefit,” perhaps substantially, from such proximity. This is discussed in Holmes et al. 2016, A Synthesis of the Economic Values of Wilderness, Journal of Forestry May 2016.

5 In-water Construction

This chapter looks at the potential economic effects of the MHI IFKW critical habitat designation on in-water construction and development activities within and in the vicinity of the critical habitat designation. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. The essential feature, island-associated marine habitat, may be under threat, along with the associated characteristics including adequate space for movement and use within shelf and slope habitat; prey species of sufficient quantity, quality, and availability to support individual growth, reproduction, and development, as well as overall population growth; waters free of pollutants of a type and amount harmful to MHI IFKWs; and sound levels that would not significantly impair false killer whales' use or occupancy.

Given that most in-water construction in Hawaii is coastal construction associated with the maintenance or replacement of existing structures along the coast, these are not likely to extend into the critical habitat designation for MHI IFKW. These activities include the maintenance or construction of coastal structures such as docks, piers, revetments, harbors, marinas, or seawalls. Because of the potential locations of such projects, these are not analyzed further in this report. Therefore, this section only considers the potential economic effects on construction activities that occur in deeper waters, such as the installation of buoys, moorings, or FADs; the laying of submarine cables or pipelines; and site investigations. In addition, while dredging activities in Hawaii primarily occur within the harbors and navigable waterways along the coastline and most large harbor dredging projects do not overlap with the critical habitat designation, this section does consider dredging disposal activities as the disposal sites overlap with the critical habitat area.

The majority of these projects are relatively small in scale and/or affect a limited amount of area during the initial construction phase. Therefore, per the NMFS 2018 Final Biological Report, additional modifications are not anticipated to be necessary to protect MHI IFKW critical habitat for most of these routine projects.¹²⁰

Temporary effects to prey, water quality, or sound quality during initial construction or placement of these items are possible; however, existing best management practices for federal permits (such as those protecting water quality and reducing the impacts of sound on marine species) provide protections for these characteristics.

While buoys, moorings, and FADs have the potential to enhance prey species in certain areas, these changes are expected to have little overall effect on prey resources across the wider expanse of habitat where MHI IFKW prey may be found.

Only large-scale in-water construction projects are anticipated to potentially alter the quantity, quality, and availability of MHI IFKW critical habitat, and modifications may be identified during Section 7 consultations to reduce potential adverse effects to the essential feature and associated characteristics from these projects. Based on the NMFS 2018 Final Biological Report, large-scale in-water construction projects could affect the critical habitat designation in the following ways:¹²¹

¹²⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

¹²¹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

- > The placement of large structures in the marine environment can have positive effects on the essential feature and associated characteristics that supports conservation of this DPS. For example, structures can act as fish aggregating devices, enhancing foraging areas for predators such as MHI IFKWs.
- > Large-scale projects can alter space for movement and use in marine habitat. For example, these projects could prevent MHI IFKWs from accessing or using large portions of high-use areas, or create a barrier to access habitat around and between islands.
- > Larger projects may affect water or sound quality within these areas depending on factors associated with size, maintenance, and operation of a given structure.

Initial research on these potentially larger projects and activities suggests that there are no underwater pipeline projects anticipated within the critical habitat designation.¹²² In addition, in terms of site investigations, only those requiring the most extreme and invasive measures would have the potential to alter MHI IFKW critical habitat, such as seismic surveys for ventures related to oil and gas development. Given the protections already in place within the critical habitat area and lack of oil and gas development prospects, such activities are unlikely to occur within the study area over the 10-year period of analysis. Therefore, this section looks at the potential economic effects of the MHI IFKW critical habitat designation on buoys, moorings, and FADs; dredging and dredging disposal; and cable laying. All in-water construction activities in federal waters must be permitted through the USACE under Section 404 of the CWA and Section 10 of the RHA.¹²³ Specifically, pursuant to Section 404, permit applicants are required to show that they have “taken steps to avoid wetland impacts, where practicable, minimized potential impacts to wetlands, and provided compensation for any remaining, unavoidable impacts through activities to restore or recreate wetlands.” In 2010, USACE conducted a programmatic consultation with NMFS PRD on a set of endangered species SOPs for regulated projects, called Pac-SLOPES. Pac-SLOPES constitutes a set of approved programmatic guidance criteria under which the USACE Honolulu District can issue permits for common nearshore and in-water activities in the central and western Pacific region, including the Main and Northwestern Hawaiian Islands. This programmatic consultation was updated again in 2015, and is meant to streamline the consultation process for routine projects. Activities covered under this programmatic and discussed in this report include site preparation for above- or over-water construction; buoy installation and repair; other minor discharges and dredging/excavation; and vessel removal.¹²⁴ If a project does not meet that standard of the programmatic, a separate consultation would be necessary.

5.1 Buoys, Moorings, and FADs

Buoys, moors, and FADs may be installed as a result of construction or to support fishing activities. These structures can be located in deeper waters, are small in scale, and affect a limited area. According to the NMFS 2018 Final Biological Report, “Temporary effects to prey, water quality, or even sound during initial construction or placement of these items are possible; however, existing best management practices for federal permits (such as those protecting water quality and reducing the impacts of sound on marine species) provide protections for these characteristics.”¹²⁵

¹²² Bliss, Kate. 2017. Regulatory and Environmental Program Manager, Pacific Ocean Division, U.S. Army Corps of Engineers (USACE). Personal communications with Maul Foster & Alongi (MFA) staff on May 24 and 25.

¹²³ Bliss, Kate. 2017. Regulatory and Environmental Program Manager, Pacific Ocean Division, U.S. Army Corps of Engineers (USACE). Personal communications with Maul Foster & Alongi (MFA) staff on May 24 and 25.

¹²⁴ USACE. 2010. Biological Evaluation: Effects of Implementing Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) on ESA-Listed Sea Turtles and Marine Mammals. July 2010.

¹²⁵ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

FADs are used to attract pelagic fishes, including yellowfin tuna, albacore, and marlin, to one area, improving the fishing catch.¹²⁶ Most of these fish are known prey for MHI IFKW and the presence of FADs in MHI IFKW habitat may concentrate prey, potentially providing a benefit to MHI IFKWs foraging in these areas.^{127,128, 129} FADs could potentially attract fishers and fishing implements that could result in an interaction of MHI IFKWs with fishing gear.¹³⁰ However, the likelihood of the presence of FADs influencing MHI IFKW behavior is minimal and is not anticipated. There have been no incidents reported to date among the roughly 40 FADs overlapping with MHI IFKW habitat.

Similar to other in-water construction activities in federal waters, buoys, moors, and FADs must be permitted through the USACE. This activity generally falls under the Pac-SLOPES program. Pac-SLOPES issues programmatic guidance for permit issuance of buoy installation in nearshore and in-water areas for projects following best management practices (see description above). Provided these projects fall within the scope of Pac-SLOPES, consultation requirements are met and permitting is expedited due to the overarching programmatic consultation.

Since 2006, there have been nine Section 7 consultations related to buoys, moorings, and FADs within the critical habitat designation. Six of these were informal consultations, and three fell under the Pac-SLOPES programmatic consultation. Two of these consultations were for the Maui Fishing Community FAD and one was a temporary buoy. While a similar number and types of consultations can be expected over the next decade, no additional consultations are anticipated as a result of the MHI IFKW critical habitat designation. There may be some additional administrative cost associated with taking the critical habitat designation into consideration during these consultations, but that cost is anticipated to be minimal and quantified in Table 5-2.¹³¹ In addition, no project modifications would be necessary for buoys, moorings, or FADs due to the MHI IFKW critical habitat designation. These are routine projects with minimal impacts. Impacts that could occur are already considered due to the ESA listing of MHI IFKW and other species, particularly through the Pac-SLOPES program, and no project modifications are expected due to the MHI IFKW critical habitat designation.^{132,133}

5.2 Dredging and Dredging Disposal

Dredging and disposal of dredging materials may occur as a result of construction activities or as a necessary activity to preserve navigation channels. Dredging and dredging disposal can potentially affect MHI IFKW habitat through disturbing sediment, increasing turbidity, and suspending contaminants in the water column.¹³⁴ Depending on the location, scale, frequency, dredging or disposal method, oceanography, physical characteristics, and duration, these activities can impact the marine environment,

¹²⁶ Hawaii Institute of Marine Biology. 2017. State of Hawaii's Fish Aggregation Device Program. Last updated May 23, 2017. Available at: <http://www.himb.hawaii.edu/FADS/>.

¹²⁷ McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

¹²⁸ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U. S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

¹²⁹ Holland, Kim. 2017. P.I. (Manager), Hawaii FAD Program. Personal Communication with Maul Foster & Alongi (MFA) staff. June 7, 8, and 9.

¹³⁰ McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

¹³¹ McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

¹³² McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

¹³³ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

¹³⁴ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

and dredging impacts are expected to be strongest in the benthic community. While there is the potential for these activities, especially disposal, to impact the pelagic environment, impacts are largely temporary and best management practices that are already required of the industry to reduce the scale of sedimentation impacts and avoid the re-suspension of contaminants into the water column are expected to be sufficient to help protect the feature essential to MHI IFKW.

5.2.1 Extent of Dredging and Dredging Disposal

It is unlikely that any dredging will occur in the critical habitat for the MHI IFKW given that no dredging activity has occurred in these areas in recent years and most dredging activities occur closer to the shore, within harbors and navigable waterways.¹³⁵

There are five dredging disposal areas in the MHI, all of which overlap with the area under consideration for MHI IFKW critical habitat designation (Figure 5-1). These are located off of South Oahu, Hilo, Nawiliwili, Port Allen, and Kahului. All of the disposal areas measure 1.8 km in diameter, forming a circular disposal area on the seafloor, except for the South Oahu dredging disposal site, which is rectangular and measures 2.0 by 2.6 km on the seafloor. The depths of the dredging disposal areas vary from 330 m to 1,610 m.

The five dredging disposal areas were designated in 1980 to accept dredge materials from six harbors in Hawaii.¹³⁶ In order to update the Site Monitoring and Management Plan (SMMP) published in concert with the USACE in 1997, EPA conducted surveys at the South Oahu and Hilo sites in 2013 to review disposals. Based on EPA's surveys, sufficient sampling determined that there were only "minor and localized physical impacts from dredged material disposal [...] but no significant adverse impacts are apparent to the benthic environment outside of site boundaries. Continued use of the disposal sites, under an updated SMMP, is recommended."¹³⁷ Table 2 of the 2015 SMMP combines information from the EPA's compliance tracking records and USACE Ocean Disposal database to report on disposal at the five Hawaii ocean dredged material disposal sites from 1981 to 2014. While the South Oahu site is used the most, disposal has occurred at all five sites over this time period.¹³⁸

¹³⁵ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

¹³⁶ 40 CFR Part 228.Vol 46 No 115 1981.

¹³⁷ EPA Dredging and Sediment Management Team. 2013 Hawaii Ocean Disposal Site Monitoring: Synthesis Report. April 27, 2015.

¹³⁸ EPA Dredging and Sediment Management Team and USACE. 2015. Site Management and Monitoring Plan: Five Hawaii Ocean Disposal Sites - 2015 Update. December 15, 2015. Available at: <https://19january2017snapshot.epa.gov/www3/region9/water/dredging/hi/pdf/hi-smmp-final-2015-12-15.pdf> accessed June 6, 2018.

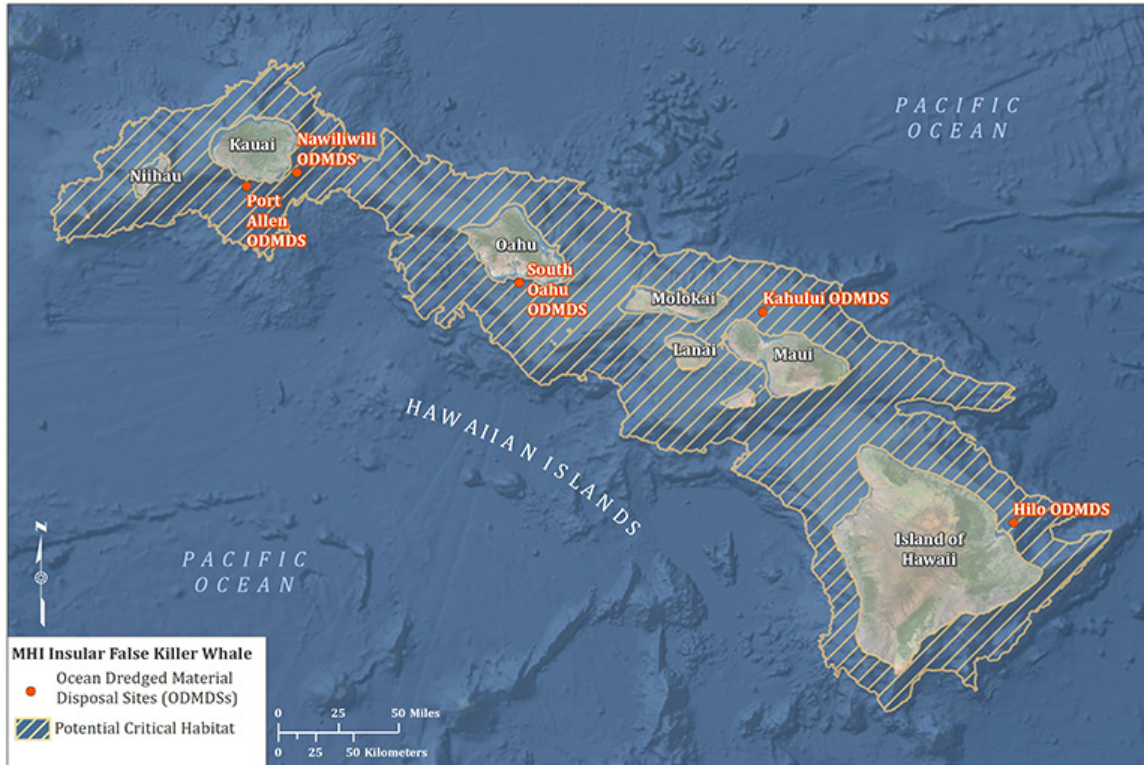


Figure 5-1 Ocean Dredged Material Disposal Sites Serving Hawaii Ports and Harbors

5.2.2 Regulation of Dredging and Dredging Disposal

Dredging and dredged material disposal are both regulated by Section 10 of the 1899 RHA and the Marine Protection Research and Sanctuaries Act (MPRSA) when the dredged material is proposed for ocean disposal. If the dredged material is proposed for disposal within the baseline of the territorial sea that material may be regulated under Section 404 of the CWA if the purpose of disposal is “placement.” Section 401 of the CWA requires that any permitted discharges must be certified by the state water certifying agency when the proposed discharge into waters of the U.S. is within the territorial sea. In those cases the discharge must be in compliance with applicable water quality standards.

Section 404 of the CWA requires the USACE to permit dredging and dredged material disposal in waters of the U.S. including within the territorial sea unless that disposal activity is for purposes of dumping as defined under the MPRSA. Specifically, pursuant to Section 404, those proposing discharges into waters of the U.S. must demonstrate compliance with the CWA 404(b)(1) guidelines. The EPA designates ocean dredged material disposal sites under the authority of the MPRSA¹³⁹ and in concert manages the disposal of dredged sediments at designated ocean disposal sites with the USACE. These sites are chosen to minimize impacts to the environment, and only approved materials can be disposed of in this way. All projects must minimize the potential for impacts to ESA-listed species and their habitat. Contaminants are not allowed to be disposed of in ocean dredged material disposal sites.

5.2.3 Impacts of Critical Habitat Designation on Dredging and Dredging Disposal

According to the NMFS 2018 Final Biological Report,¹⁴⁰ “best management practices in place to reduce the scale of sedimentation impacts and avoid the re-suspension of contaminants into the water column

¹³⁹ 33 U.S.C. Section 1401 – Finding, Policy, and Purpose.

¹⁴⁰ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

help to protect the feature essential to MHI IFKWs. At this time, additional modifications are not anticipated to be necessary to protect MHI IFKW critical habitat.” Further, “dredging activities primarily occur within the harbors and navigable waterways along the coastline. Most large harbor dredging projects do not overlap with areas under consideration for MHI IFKW critical habitat.”

EPA is responsible for designating permanent disposal sites and enforcing disposal site use conditions, while USACE is the permitting authority for projects proposing to transport for disposal discharge material at an EPA-designated ocean disposal site.¹⁴¹ There are no Section 7 consultations related specifically to dredging disposal activities at the five ocean dredged material disposal sites with the EPA or USACE in the consultation history; however, from 2006 to 2016 USACE consulted on a number of dredging projects outside of the critical habitat designation that would require the use of the ocean dredged material disposal sites for disposal of dredged materials. We expect that recent spatial and temporal trends in dredging activity provide an accurate indication of where these activities will occur in the future and reference the historical consultations to identify the number of projects that may require consultation for disposal activity. Based on data from the past 10 years, USACE has engaged in 11 informal, 1 formal, and 1 reinitiation of an informal programmatic consultation, and there are four records of implementation under the informal programmatic consultation for dredging projects in Hawaii’s harbors from 2006 to 2016. There may be some additional administrative cost associated with taking the critical habitat designation into consideration during these consultations, but that cost is anticipated to be minimal and quantified in Table 5-1. At this time, no additional modification costs have been identified that would be attributable to this designation.

5.3 Cable Laying

This section identifies two categories of undersea cables: cables to transmit energy between islands (also addressed in Chapter 8) and submarine fiber-optic cables.

The idea of a submarine transmission cable in Hawaii that would wheel in power from other islands to Oahu, where demand is highest, was discussed by Lesperance and Eaton in a 1986 paper.¹⁴² In 1982, the U.S. government helped fund Hawaii’s Deep Water Cable program to determine the overall technical feasibility of deploying a submarine transmission cable from Oahu to Big Island over a useful life of at least 30 years stated by Lesperance and Eaton. Preliminary studies indicated that there were no drastic environmental impacts expected; however, the estimated capital cost for a direct route from Oahu to Big Island would be significant.¹⁴³ From 1982 to the early 1990s, this program aimed to diversify Hawaii’s energy sources and lay a 150-mile submarine transmission power cable in the ocean from Puna, Hawaii Island, to Maui and Oahu. However, this cable program was not found to be financially feasible.¹⁴⁴ Therefore, this section does not discuss cables transmitting energy between other islands any further.

As of early 2017, there are approximately 428 submarine cables in service around the world (over 1.1 million km, or approximately 683,508 miles). The total number of cables changes constantly as new cables enter service and older cables are decommissioned. These cables go all the way down to the bottom of the ocean floor. Nearer to the shore, cables are buried under the seabed for protection, but in the deep sea they are laid directly on the ocean floor. Considerable care is taken to ensure cables follow the safest path to avoid fault zones, fishing zones, anchoring areas, and other dangers. To reduce inadvertent damage, the undersea cable industry also educates other marine industries on the locations

¹⁴¹ EPA Dredging and Sediment Management Team and USACE. 2015. Site Management and Monitoring Plan: Five Hawaii Ocean Disposal Sites - 2015 Update. December 15, 2015. Available at: <https://19january2017snapshot.epa.gov/www3/region9/water/dredging/hi/pdf/hi-smmp-final-2015-12-15.pdf> accessed June 6, 2018.

¹⁴² Lesperance, G. and R. Eaton. 1986. Hawaii’s Geothermal and Deep Water Cable Programs. *Geothermics* 15, 4 (1986).

¹⁴³ Ho, Alexander. 2010. Economics of Submarine Transmission Cables in Hawaii. Submitted as coursework for Physics 240, Stanford University, Fall 2010.

¹⁴⁴ University of Hawaii at Manoa – Hawaii Groundwater and Geothermal Resource Center. 2017. Hawaii Deep Water Cable Program. Available at: <https://www.higp.hawaii.edu/hggrc/projects/geothermal-digital-collection/geothermal-topic-guides/hawaii-deep-water-cable-program/> accessed May 31, 2017.

of cables. Most countries have multiple cables to ensure reliable connectivity in case of damage to a cable. These cables were traditionally owned by telecommunications carriers, who would form a consortium of all parties interested in using the cable. In the late 1990s, an influx of entrepreneurial companies built a number of private cables and sold the capacity to users.

Cables are engineered with a minimum design life of 25 years. While they may remain operational longer than 25 years, they are often retired earlier because they become economically obsolete. When a cable is retired, it could remain inactive on the ocean floor. Increasingly, there are companies that are gaining the rights to these cables, pulling them up, and salvaging them for raw materials. In some cases, retired cables are repositioned along other routes.

In Hawaii, Hawaiian Telcom owns three cables: Hawaii Interisland Cable System, Hawaii Interisland Fiber Network, and Southeast Asia – US Cable System.¹⁴⁵ In addition, there are other interisland and trans-Pacific cable systems in the area that are owned and managed by other entities: Paniolo Cable System, Southern Cross Cable Network, Japan – US Cable, Honotua Cable, Asia America Gateway, and Hawaiiki. Given that these have landing points on the MHI, all these cables overlap with the MHI IFKW critical habitat designation (Figure 5-2).

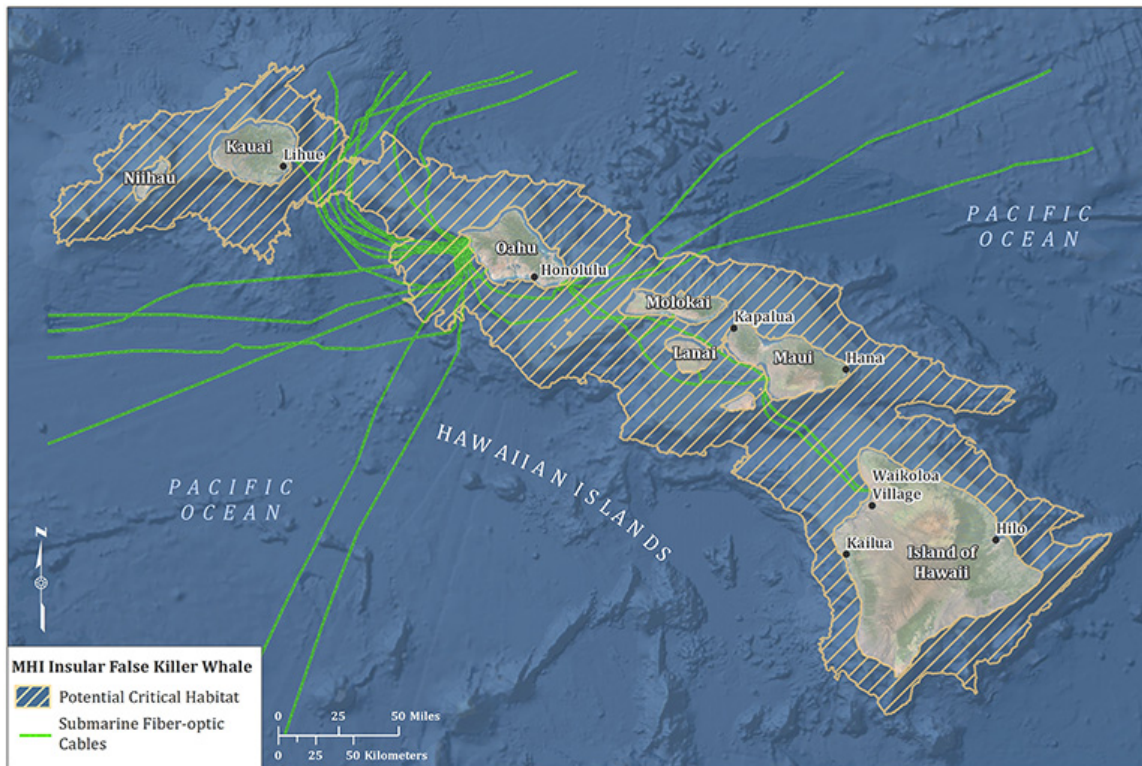


Figure 5-2 Submarine Fiber-optic Cables within and in the Vicinity of the MHI Insular False Killer Whale Potential Critical Habitat

The repair, maintenance, or replacement of these cables triggers a Section 7 consultation. However, these are generally low-impact projects and are not anticipated to alter the MHI IFKW critical habitat.¹⁴⁶ The following lists the Hawaiian Telcom projects, along with upcoming repair, maintenance, or

¹⁴⁵ Masutomi, Daniel. 2017. Director - Subsea Engineering & Network Optimization, Hawaiian Telcom. Personal communications with Maul Foster & Alongi (MFA) staff on May 25 and June 2.
¹⁴⁶ McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

replacement activities (cables owned by other entities in the area may have similar projects and schedules):

- > Hawaii Interisland Cable System
 - Service date: July 1994
 - Length: 479 km
 - Repair & Maintenance: 2018, 2022
 - Replacement: 2025
- > Hawaii Interisland Fiber Network
 - Service date: June 1997
 - Length: 529 km
 - Repair & Maintenance: 2019, 2025, 2033, 2037
- > Southeast Asia – US Cable System
 - Service date: 3Q17
 - Length: 15,000 km
 - Repair & Maintenance: 2028, 2037

Conversations with personnel from Hawaiian Telcom indicate that each of the Section 7 consultations for the repair and maintenance or replacement projects listed above could potentially result in approximately \$10,000 in additional costs.¹⁴⁷ However, these consultations would be triggered by protections already in place within the critical habitat area, and there is expected to be minimal additional effort required to consider the MHI IFKW critical habitat designation in these consultations.¹⁴⁸ Per the communications with Hawaiian Telcom personnel, in terms of possible restrictions, ship proximity restrictions¹⁴⁹ would likely have the most impact to such projects. Project bids would need to assume some delay, whether or not the delay actually occurs. This would cost projects an additional \$200,000 to \$500,000 (two to five days delay at \$100,000/day). If projects are restricted to specific routes through the critical habitat designation, this could potentially increase project costs by \$4,000,000 to \$8,000,000 (\$20,000 per km with 200 km to 400 km route deviation).¹⁵⁰ However, given that these projects are low impact, the likelihood of any such restrictions or project modifications being imposed as a result of the designation are unlikely.¹⁵¹ Also, the Section 7 consultations would be triggered because of the species listing itself and protections for other listed species or designations of critical habitat. Therefore, Section 7 consultation costs discussed above associated with fiber-optic cable projects are considered baseline and not incremental as a result of this designation, because no project modifications are anticipated due to the MHI IFKW critical habitat designation. Since 2006, there have been six informal Section 7 consultations and one technical

¹⁴⁷ Masutomi, Daniel. 2017. Director - Subsea Engineering & Network Optimization, Hawaiian Telcom. Personal communications with Maul Foster & Alongi (MFA) staff on May 25 and June 2.

¹⁴⁸ Masutomi, Daniel. 2017. Director - Subsea Engineering & Network Optimization, Hawaiian Telcom. Personal communications with Maul Foster & Alongi (MFA) staff on May 25 and June 2.

¹⁴⁹ For marine mammals, the impacts for cable projects are minimal to none from the infrastructure standpoint. However, it could affect ship operations when laying or retrieving the cable. Typically, there are restricted times and areas during breeding season that ships may or may not be allowed to enter. There are also requirements for a marine mammal observer to be on board the cable ship, speeds limits in the critical habitat area, and possible time of day restrictions. All this leads to longer installation times or delays that must be built into the schedules and increases the construction costs since bids received from suppliers doing the work will estimate what this will cost them. Masutomi, Daniel. 2017. Director - Subsea Engineering & Network Optimization, Hawaiian Telcom. Personal communications with Maul Foster & Alongi (MFA) staff on May 25, June 2, and June 15.

¹⁵⁰ Masutomi, Daniel. 2017. Director - Subsea Engineering & Network Optimization, Hawaiian Telcom. Personal communications with Maul Foster & Alongi (MFA) staff on May 25 and June 2.

¹⁵¹ McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

assistance related to cable laying and maintenance with entities other than Hawaiian Telcom in the vicinity of the MHI IFKW critical habitat designation. A similar number and types of consultations can be expected over the next decade. In addition, based on the projects identified by Hawaiian Telcom between 2018 and 2027, another five informal consultations are expected between that period involving Hawaiian Telcom. None of these 11 informal consultations and one technical assistance are anticipated to be triggered as a result of the MHI IFKW critical habitat designation. Because no project modifications are expected for this activity, impacts to future consultations are expected to be minimal and administrative in nature.

5.4 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

The designation of critical habitat would not be expected to result in any additional project modification costs to in-water construction projects and activities identified in this chapter. Any potential Section 7 consultation that may occur due to in-water construction projects would be triggered by the protections already in place within the MHI IFKW critical habitat area. The associated costs of consultation are considered baseline, and the effort to consider the critical habitat designation during these consultations would be minimal.¹⁵²

Incremental administrative costs associated with dredging disposal are anticipated in this analysis. Within the 10-year timeframe of this analysis, it is expected that 1 formal, 11 informal, and 1 reinitiation of the programmatic Section 7 consultation, and 4 technical assistances under that programmatic consultation, would take place. In current (2016) dollars, the estimated incremental administrative cost for these consultations would be a little over \$29,000 for NMFS and about \$26,000 for USACE, for a total cost of approximately \$55,000. The present value of these costs would be almost \$46,000 using a 3 percent discount rate and a little over \$37,000 when a discount rate of 7 percent is used. The annualized costs are estimated at approximately \$5,000 using both 3 percent and 7 percent discount rates (Table 5-1). These costs would be shared between NMFS and USACE.

Table 5-1 Potential Economic Impact to Dredging and Dredging Disposal due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|------------------------------|--|------|------------------|------|------------------|------|---------------|------|---------------|------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 1 formal and 11 informal consultations, 1 reinitiation of a programmatic consultation, and 4 technical assistances under the programmatic | NMFS | \$29 | \$29 | \$24 | \$24 | \$19 | \$19 | \$3 | \$3 | \$3 | \$3 |
| | USACE | \$26 | \$26 | \$22 | \$22 | \$18 | \$18 | \$3 | \$3 | \$3 | \$3 |

¹⁵² McIntosh, Randy. 2017. Endangered Species Biologist, Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. June 2.

Table 5-1 Potential Economic Impact to Dredging and Dredging Disposal due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | | |
|--|------------------------------|--|------|------------------|------|------------------|------|---------------|------|---------------|------|--|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High | |
| consultation, over the 10-year period. | | | | | | | | | | | | |
| TOTAL | | \$55 | \$55 | \$46 | \$46 | \$37 | \$37 | \$5 | \$5 | \$5 | \$5 | |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

This analysis anticipates incremental administrative costs associated with activities related to buoys, moorings, and FADs. Within the 10-year timeframe of this analysis, it is expected that up to six informal Section 7 consultations and three technical assistances would take place that consider the MHI IFKW critical habitat designation. In current (2016) dollars, the estimated incremental administrative cost for each informal consultation would be \$1,398 for USACE and \$1,230 for NMFS, for a total cost of \$2,628 per consultation. Each technical assistance is estimated to cost \$448, with USACE bearing \$293 and the remaining \$155 accruing to NMFS. The total cost of these informal consultations and technical assistances are estimated at approximately \$17,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$15,000 using a 3 percent discount rate, and about \$12,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$2,000 using both 3 percent and 7 percent discount rates (Table 5-2). These costs would be shared between NMFS and USACE.

Table 5-2 Potential Economic Impact to Buoys, Moorings, and Fish Aggregating Devices due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|------------------------------|--|-------------|------------------|-------------|------------------|-------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 6 informal consultations and 3 technical assistances over the 10-year period. | NMFS | \$8 | \$8 | \$7 | \$7 | \$5 | \$5 | \$1 | \$1 | \$1 | \$1 |
| | USACE | \$9 | \$9 | \$8 | \$8 | \$6 | \$6 | \$1 | \$1 | \$1 | \$1 |
| TOTAL | | \$17 | \$17 | \$15 | \$15 | \$12 | \$12 | \$2 | \$2 | \$2 | \$2 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

Incremental administrative costs associated with submarine cable laying and maintenance are anticipated in this analysis. Within the 10-year timeframe of this analysis, it is expected that up to 11 informal Section 7 consultations and one technical assistance would take place that consider the MHI IFKW critical habitat designation. In current (2016) dollars, the estimated incremental administrative cost for each informal consultation would be \$1,398 for USACE and \$1,230 for NMFS, for a total cost of \$2,628 per consultation. The technical assistance is estimated to cost \$448, with USACE bearing \$293 and the remaining \$155 accruing to NMFS. The total cost of these informal consultations and technical assistance are estimated at approximately \$29,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$25,000 using a 3 percent discount rate, and about \$21,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$3,000 using both 3 percent and 7 percent discount rates (Table 5-3). These costs would be shared between NMFS and USACE. It is assumed that NMFS and USACE will be able to make any modification needed to consider critical habitat in informal Section 7 consultations and technical assistances and that no third-party costs will be incurred.

Table 5-3 Potential Economic Impact to Submarine Cable Laying and Maintenance due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|------------------------------|--|-------------|------------------|-------------|------------------|-------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 11 informal consultations and 1 technical assistance over the 10-year period. | NMFS | \$14 | \$14 | \$12 | \$12 | \$10 | \$10 | \$1 | \$1 | \$1 | \$1 |
| | USACE | \$16 | \$16 | \$13 | \$13 | \$11 | \$11 | \$2 | \$2 | \$2 | \$2 |
| TOTAL | | \$29 | \$29 | \$25 | \$25 | \$21 | \$21 | \$3 | \$3 | \$3 | \$3 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

6 Activities that Contribute to Water Pollution

This chapter evaluates the potential effects of critical habitat designation for the MHI IFKW on onshore construction and similar activities that may affect water quality in the study area. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. The activities covered in this section include shoreline reinforcement, beach nourishment, bridges and roadways, coastal construction/development, stream maintenance, debris removal, sewer/water maintenance, and wastewater discharge. The associated characteristic of the essential feature that may be under threat is waters free of pollutants of a type and amount harmful to MHI IFKWs.

A water body can be impacted and impaired by chemical constituents or conditions such as nutrients, heavy metals, petroleum products, sediment toxicity, bacteria, pesticides, polynuclear aromatic hydrocarbons, and polychlorinated biphenyls as eroded soil from construction sites is carried to water bodies where it causes excess turbidity that harms aquatic life. Onshore construction activities could have water quality impacts such as localized turbidity; decreased water clarity and quality (e.g., reduced dissolved oxygen and photosynthetic potential, and increased nutrient load); or benthic siltation of marine resources that could individually or collectively impact the ecological health of the onshore and nearshore environment. Sedimentation associated with construction clogs drainage ditches, stream channels, water intakes, and reservoirs, and destroys aquatic habitats. Impacts to surface water features include drainage alterations, flood protection, and water quality degradation. Threats to surface water features include increased pollutant loads and loss of surface water area (dredge/fill alterations). Such activities could potentially alter (i.e., divert or restrict) water circulation into/from surface waters features and/or potentially involve the release of pollutants into ecosystems and critical habitat. Loss of functionality in surface water features (i.e., ecosystem health and circulation) must be accounted for in terms of impacts to critical habitat.

Section 307 of the Coastal Zone Management Act of 1972, as amended, requires applicants to certify that the described activity affecting land or water uses in the coastal zone complies with the enforceable policies of the state/territory's approved Coastal Zone Management Program and that the activity will be conducted in a manner consistent with the program. Section 7 of the ESA requires federal agencies to consult with the NMFS and/or U.S. Fish and Wildlife Service (USFWS) to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of species listed as threatened or endangered under the ESA, or result in the destruction or adverse modification of designated critical habitat. Concurrently, the USACE evaluates the potential impacts to proposed and/or listed species and their designated critical habitat and provides coordination letters to NMFS and/or USFWS, as required, with the USACE's effects determination for the proposed project.

Sections 6.1 through 6.8 enumerate and discuss recent MHI IFKW consultations under the ESA for specific onshore activities, and Section 6.9 describes expected costs and benefits of the critical habitat designation over the next 10 years.

6.1 Shoreline Reinforcement

From 2006 to 2016, there were 24 Section 7 consultations conducted related to shoreline reinforcement. However, because shoreline reinforcement activities occur in shallower waters, each of these consultations was related to activities occurring outside of the critical habitat designation. Given this, no future projects are identified that would take place within the MHI IFKW critical habitat area.

6.2 Beach Nourishment

There were three Section 7 consultations conducted related to beach nourishment from 2006 to 2016. Each of these consultations was related to activities occurring outside of the critical habitat area and in shallower waters. Due to such projects being located in shallower waters, no future beach nourishment projects are identified that would take place within the critical habitat area.

6.3 Bridges and Roadways

Between 2006 and 2016, there were 15 Section 7 consultations conducted related to bridges and roadways. Each of the consultations was related to activities occurring outside of the critical habitat designation. No future bridges and roadways projects are identified within the MHI IFKW critical habitat area over the 10-year period of analysis.

6.4 Coastal Construction/Development

From 2006 to 2016, four Section 7 consultations related to coastal construction occurred. Each of the consultations was related to activities occurring outside of the critical habitat designation. No future coastal construction/development projects are identified within the critical habitat area given that these occur in shallower waters.

6.5 Stream Maintenance

Eight Section 7 consultations related to stream maintenance occurred from 2006 to 2016, each of which was related to activities occurring outside of the critical habitat designation. No future stream maintenance projects were identified that would take place within the critical habitat area.

6.6 Debris Removal

From 2006 to 2016 there was one Section 7 consultation conducted related to debris removal. This consultation was related to activities occurring outside of the critical habitat designation. No future debris removal projects were identified that would take place within the critical habitat area over the 10-year period of analysis.

6.7 Sewer/Water Maintenance

Fifteen Section 7 consultations were conducted between 2006 and 2016 related to sewer/water maintenance. Each of the consultations was related to activities occurring outside of the critical habitat designation. No future sewer/water maintenance projects were identified that would take place within the critical habitat area.

6.8 Wastewater Discharge

There were no Section 7 consultations conducted related to wastewater discharge from 2006 to 2016. No future wastewater discharge projects were identified that would take place within the critical habitat designation.

6.9 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

All of the Section 7 consultations related to water pollution from onshore construction activities that occurred from 2006 to 2016 were informal and associated with activities outside of the MHI IFKW critical habitat designation. These consultations would occur absent the critical habitat designation of MHI IFKW, and are likely to remain informal. Modifications to these future consultations are not expected, because baseline protections for water quality are expected to protect MHI IFKW essential feature and associated

characteristics and administrative costs are not expected to increase as these projects do not overlap with the designation. Although there is no change anticipated to these individual consultations, the NMFS 2018 Final Biological Report notes that as future information about the fate and influence of persistent organic pollutants (POPs), chemicals of emerging concern, heavy metals, or other chemicals increases, new management or mitigation methods may be identified to support water quality in marine ecosystems adjacent to developed areas, including MHI IFKW critical habitat. At this time, NMFS currently has insufficient information to predict, what if any, project modifications may be necessary to address potential impacts to the MHI IFKW essential feature and associated characteristics.

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7 Military Activities

This chapter evaluates the potential effects of critical habitat designation for the MHI IFKW on military activities in the study area. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. For the purposes of this evaluation, military activities include training exercises, construction and maintenance, and research activities that may have the potential to affect the essential feature and associated characteristics of MHI IFKW critical habitat.

Military construction activities could affect critical habitat in similar ways to in-water construction activities discussed above (see Chapter 5), and concerns would be mostly associated with large-sized projects, especially in sensitive areas. Research activities may include the testing of certain technologies and processes. In combination, research and training for military preparedness may include activities that have the potential to affect water quality, prey availability, or the quantity or quality of sound levels within these habitats depending on the type of activity taking place and the location of the activity.

The DoD and the USCG consult with NMFS, under the ESA, to ensure that military activities will not threaten listed species or cause destruction or adverse modification to designated critical habitat. Additionally, these activities require authorization under the MMPA to ensure protections for marine mammals and their habitat. As a result, the U.S. military engages in many best management practices to minimize impacts to the marine environment and conducts monitoring and research to provide better information about potential impacts to protected species and critical habitat. Many of these military activities are subject to a 5-year MMPA authorization for the incidental take of marine mammals that is consulted on under the ESA; these 5-year authorizations include annual reviews of monitoring reports and activities. Military activities that are chronic in nature and which have the potential to affect one of the characteristics of the essential feature over a large area may raise the most concerns about degrading the quality or the value of critical habitat. In contrast, activities that are within discrete locations for brief periods are less likely to have lasting effects on the overall feature within that habitat, unless that activity occurs on a regular basis and, in aggregate, the temporary effects degrade the habitat and ultimately prevent IFKWs from benefitting from that habitat.¹⁵³

7.1 Department of Defense (Hawaii Range Complex)

7.1.1 Recent Activities

DoD activities associated with the HRC taking place within the critical habitat designation include training and research activities in marine habitat throughout the MHI. Specifically, NMFS has consulted regarding effects these activities have on the MHI IFKW. The Reinitiated Biological Opinion on U.S. Navy Hawaii-Southern California Training and Testing (i.e., the Environmental Impact Statement [EIS] that covers HRC activities) indicates that the authorized take of MHI IFKW for HRC activities is zero lethal takes and 17,261 sub-lethal takes.¹⁵⁴

¹⁵³ NMFS. 2015. Reinitiated Biological Opinion on U.S. Navy Hawaii-Southern California Training and Testing. Public Consultation Tracking: FPR-2015-9111. Consultation conducted by Endangered Species Act Interagency Cooperation Division, Office of Protected resources, National Marine Fisheries Service. Available at: https://hstteis.com/portals/hstteis_p3/hstteis/endangeredspeciesact/HSTT_Reinitiated_BiOp_FINAL_4.2.15_signed.pdf.

¹⁵⁴ NMFS. 2015. Reinitiated Biological Opinion on U.S. Navy Hawaii-Southern California Training and Testing. Public Consultation Tracking: FPR-2015-9111. Consultation conducted by Endangered Species Act Interagency Cooperation Division, Office of Protected resources, National Marine Fisheries Service. Available at: https://hstteis.com/portals/hstteis_p3/hstteis/endangeredspeciesact/HSTT_Reinitiated_BiOp_FINAL_4.2.15_signed.pdf.

The Navy distinguishes between two areas within the HRC: the Hawaii Operating Area, which is nearer the MHI and comprises 235,000 square nautical miles, and the Temporary Operating Area, comprising 2.1 million square nautical miles of surface and subsurface ocean areas and airspace. Both areas are used for training and for research, development, testing, and evaluation activities. The Hawaii Operating Area includes the Pacific Missile Range Facility (PMRF) on Kauai as well as 1,020 squares nautical miles of instrumented ocean area at depths between 1,800 feet and 15,000 feet. It also includes the eastern tip of the Papahānaumokuākea Marine National Monument that extends into areas the Navy traditionally used as part of its activities at PMRF. Other major features include designated warning and training areas, airspace, water ranges, land ranges, airfields, the Pearl Harbor Naval Defensive Sea Area, and open ocean areas.¹⁵⁵

The HRC covers a range of training and exercise activities conducted by all DoD forces and other associated federal agencies in Hawaii, as well as the activities associated with Rim of the Pacific Exercises that involve military personnel of other nations.

In its May 2008 EIS evaluating the effects of HRC activities on environmental resources, the Navy stated that the HRC plays a vital part in the execution of the naval readiness mandate as Hawaii hosts a large concentration of U.S. naval forces: “Naval forces based in Hawaii and those transiting across the Pacific Ocean use and rely on the HRC because of its capabilities and strategic location in the mid-Pacific region.” Ongoing activities occurring in the HRC include:¹⁵⁶

- > Training events: including “Major Exercises,” such as Rim of the Pacific Exercises and undersea warfare exercises, as well as anti-air warfare, amphibious warfare, anti-surface warfare, anti-submarine warfare, electronic combat, mine warfare, naval special warfare, and strike warfare exercises.
- > Research, development, test, and evaluation operations: occurring primarily at PMRF and Naval Undersea Warfare Center Detachment Pacific ranges.
- > Support activities: including command and control, in-port ship and aircraft support, and personnel support.

There were 15 individual major training events that took place in the HRC from January 8, 2009, to December 25, 2014. These events are summarized below in Table 7-1.

Table 7-1 Summary of Major Training Events

| Exercise Type | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | Total |
|----------------------------|----------|----------|----------|----------|----------|----------|-----------|
| Undersea Warfare Exercises | 2 | 0 | 6 | 1 | 1 | 2 | 12 |
| Rim of Pacific Exercises | 0 | 1 | 0 | 1 | 0 | 1 | 3 |
| Total | 2 | 1 | 6 | 2 | 1 | 3 | 15 |

In association with these activities there were 26 total mitigation events where sonar was powered down or delayed due to the sighting of marine mammals or sea turtles.¹⁵⁷

¹⁵⁵ Industrial Economics, Incorporated. 2014. Economic Analysis of Critical Habitat Designation for the Hawaiian Monk Seal. Prepared for: National Marine Fisheries Service. November 2014.

¹⁵⁶ Industrial Economics, Incorporated. 2014. Economic Analysis of Critical Habitat Designation for the Hawaiian Monk Seal. Prepared for: National Marine Fisheries Service. November 2014.

¹⁵⁷ NMFS. 2015. Reinitiated Biological Opinion on U.S. Navy Hawaii-Southern California Training and Testing. Public Consultation Tracking: FPR-2015-9111. Consultation conducted by Endangered Species Act Interagency Cooperation Division, Office of Protected resources, National Marine Fisheries Service. Available at: https://hstteis.com/portals/hstteis_p3/hstteis/endangeredspeciesact/HSTT_Reinitiated_BiOp_FINAL_4.2.15_signed.pdf.

7.1.2 Planned Activities

The ongoing activities associated with the DoD in the HRC are expected to continue. An updated EIS is being prepared by the U.S. Navy that will propose a continuation of some activities as well as additional activities. The updated EIS will require a formal Section 7 consultation. It is further anticipated that HRC activities will continue into the future, with updated EISs, and associated formal Section 7 consultations, occurring approximately every 5 years. It is, therefore, anticipated that three formal Section 7 consultations associated with these updated EISs would occur during the 10-year period of analysis.

In addition, from 2006 to 2016, the DoD was involved in two informal Section 7 consultations within the MHI IFKW critical habitat area related to training exercises and wave energy testing. It is anticipated that a similar number and type of Section 7 consultations would occur over the 10-year period of analysis.

7.2 U.S. Coast Guard

7.2.1 Training Activities

7.2.1.1 *Recent Activities*

From 2006 to 2016, there were 17 Section 7 consultations conducted related to USCG training. Two of the training activities that were consulted on occurred within the critical habitat designation. All of the consultations were informal. It is anticipated that a similar number and type of consultations would occur over the 10-year period of analysis related to USCG training activities.

7.2.1.2 *Planned Activities*

Search and rescue at sea: Vessels and aircraft conduct search and rescue of personnel and vessels at sea. This activity could occur throughout the critical habitat designation and is expected to have negligible impacts on island-associated habitat, water quality, prey availability, or the quality of noise within the critical habitat area.

Live-fire exercises: Surface-to-surface live-fire exercises occur about 12 times per year. Each exercise occurs on one day for a few hours between sunrise and sunset. USCG cutters typically conduct these exercises outside of the critical habitat. Since these activities occur outside of the critical habitat area, they are not expected to impact island-associated habitat, water quality, prey availability, or the quality of noise within the critical habitat area.

Pyrotechnic exercises: USCG small boats conduct pyrotechnic exercises about 12 times per year. Each exercise occurs on one day for a few hours. USCG small boats typically conduct these exercises offshore, from platform, south of Oahu, north of Kahului, or east of Nawiliwili. These locations are within the critical habitat designation. Pyrotechnics expended include high-altitude flares designed to burn completely in air, handheld flares, and parachute flares made of cloth and nylon. Since the pyrotechnics are expended above the surface of the sea, they are expected to have negligible impacts on island-associated habitat, water quality, prey availability, or the quality of noise within the critical habitat area.

7.2.2 Construction and Maintenance

7.2.2.1 *Recent Activities*

From 2006 to 2016, there were six Section 7 consultations conducted related to USCG construction and maintenance. These activities were primarily related to docks, harbors, piers, and marinas. Each of the consultations related to USCG construction and maintenance activities occurred outside of the critical habitat designation, and all of these consultations were informal.

7.2.2.2 *Planned Activities*

Aids to navigation maintenance and repair: Aids to navigation are strategically placed to mark the channel for safe navigation of vessels. These aids help prevent vessels from running aground and causing marine casualties involving damage to vessels and marine life. The USCG visits these aids periodically, usually about once every 3 years. A 225-foot WLB cutter (Buoy Tender) will usually be alongside each aid for about 3 to 4 hours for maintenance. There is little risk of pollution from this operation. The cutter has its sewage valves closed while close to shore. All oily waste is either separated through a 15-parts-per-million oily water separator, or retained onboard in waste oil tanks and pumped ashore to an approved mobile reception facility (tank truck). The aids that are lighted have batteries that are maintained on a routine basis and properly disposed of as required. Since the maintenance would be small scale and occur for a brief period of time, and best management practices are in place to minimize the impacts to the marine environment, no additional modifications are expected for this activity as a result of this designation. The USCG is undergoing a programmatic consultation for these activities and any additional efforts to include concerns associated with the MHI IFKW critical habitat are expected to be minimal. Given that this consultation is currently taking place, and may be complete prior to the final MHI IFKW critical habitat designation, this analysis assumes the designation would result in the reinitiation of the consultation on an informal level to consider whether impacts might be different in Hawaii post-designation.

7.2.3 Research and Other Activity

7.2.3.1 *Recent Activities*

From 2006 to 2016, there were three Section 7 consultations conducted related to other USCG activities. These activities were related to mooring buoys, marine debris cleanup, and a fireworks display. Each of the consultations related to these activities occurred outside of the critical habitat designation, and all of the consultations were informal.

7.2.3.2 *Planned Activities*

Marine environmental protection (pollution response): The USCG deploys available resources to adequately and efficiently clean up discharged oil to minimize environmental impact. As part of the pollution response protocol, the USCG would seek a consultation from the appropriate authority to discuss the intended response plan and address the potential for any associated risks to protected marine mammals or other sea life. Oil discharges may rarely occur inside of the critical habitat designation (none have in the past 10 years); however, in cases where there is a discharge, USCG marine environmental protection activities are expected to be planned to be protective of listed species and their habitat and environmentally beneficial via means of allowing for habitat restoration (also see Chapter 10).

Fisheries and marine protected species enforcement: Fisheries and marine protected species enforcement could occur throughout the critical habitat designation. This activity includes regular and reoccurring small boat and patrol boat operations enforcing federal fisheries and marine protected resource laws. This activity is expected to have negligible impacts on island-associated habitat, water quality, prey availability, or the quality of noise within the critical habitat area.

7.3 Costs and Benefits of MHI Insular False Killer Whale Critical Habitat Designation (Application of ESA Section 4(b)(2))

7.3.1 Department of Defense (Hawaii Range Complex)

As discussed previously, military activities occurring in Hawaii's waters include a high level of baseline protections for the marine environment, many of which provide protections for the MHI IFKW essential feature and associated characteristics. At this time, no additional modifications to activities have been identified; however, the NMFS 2018 Final Biological Report notes that many military activities "will need to

be addressed on an activity-specific basis to determine the nature of potential impacts to the essential feature of MHI IFKW critical habitat,” to help understand how the duration of activities may affect particular areas. As much of this additional consideration will be directed toward the impacts that training activities may have on the designation, for this analysis, the administrative costs associated with future consultations are included.

It is anticipated that there would be incremental administrative costs associated with future updates of the EISs that cover the HRC. Under the 10-year timeframe of this analysis, it is expected that up to three formal Section 7 consultations would take place, and that MHI IFKW critical habitat designation would be covered as part of these consultations. In current (2016) dollars, the estimated incremental administrative cost for each formal consultation would be \$5,409 for the DoD and \$1,548 for NMFS, for a total cost of \$6,356 per consultation.¹⁵⁸

In addition, based on past consultation history, it is expected that up to two informal Section 7 consultations would take place involving Military activities that consider the MHI IFKW critical habitat designation. In current (2016) dollars, the estimated incremental administrative cost for each informal consultation would be \$1,398 for DoD and \$1,230 for NMFS, for a total cost of \$2,628 per consultation.

The total cost of these formal and informal consultations is estimated at approximately \$26,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$22,000 using a 3 percent discount rate, and about \$18,000 when a 7 percent discount rate is used. The annualized costs are estimated at \$3,000 using both 3 percent and 7 percent discount rates (Table 7-2). These costs would be shared between NMFS and DoD (Navy).

Note that specific areas that satisfy the definition of critical habitat are not automatically designated as critical habitat. Section 4(b)(2) of the ESA requires NMFS to consider the economic impact, impact on national security, and any other relevant impact of specifying any particular area as critical habitat. Section 4(b)(2) also provides the Secretary (delegated to the Assistant Administrator of NMFS),¹⁵⁹ with discretion to exclude any particular area from a designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and the exclusion will not result in extinction of the species. Through the ESA 4(b)(2) consideration process, NMFS proposed nine areas for national security exclusion in the proposed rule¹⁶⁰ and has identified that one area, in addition to the nine originally proposed, will also be excluded from the final designation due to national security impacts.¹⁶¹ This report only considers the economic impacts of designation with regard to military activities and does not consider national security impacts. A detailed assessment of the requested exclusions of military lands due to national security is provided in NMFS' Final ESA Section 4(b)(2) Report. While these exclusions avoid the national security costs associated with designating these 10 particular areas as MHI IFKW critical habitat, it is unlikely that these exclusions will reduce DoD's administrative costs estimated in this report because these exclusions will not necessarily alter the number of consultations expected for DoD. Rather, these exclusions are expected to reduce the geographic scope of analysis required under the larger formal consultations for the HRC.

¹⁵⁸ Note that these costs are based on information provided by contacts at the Department of Defense and, therefore, differ slightly from the administrative costs presented in Table 4-1.

¹⁵⁹ Department Organization Order 10-15 (5/24/04). NOAA Organization Handbook, Transmittal #34, May 31, 1993. 16 U.S.C. 1533(b)(1)(A) – Best scientific and commercial data available.

¹⁶⁰ At 82 FR 51186, November 3, 2017.

¹⁶¹ Higgins, Jean. 2018. Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. March 15.

Table 7-2 Potential Economic Impact to Military Activities (Department of Defense) due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|--|-------------------------|---|-------------|------------------|-------------|------------------|-------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 3 formal and 2 informal consultations over the 10-year period. The 3 formal consults are expected every 5 years given that the HRC EIS is consistently re-evaluated. | NMFS | \$7 | \$7 | \$6 | \$6 | \$5 | \$5 | \$1 | \$1 | \$1 | \$1 |
| | DoD (Navy) | \$19 | \$19 | \$16 | \$16 | \$13 | \$13 | \$2 | \$2 | \$2 | \$2 |
| TOTAL | | \$26 | \$26 | \$22 | \$22 | \$18 | \$18 | \$3 | \$3 | \$3 | \$3 |

Notes:

In 2016 dollars. Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding. While the 5-year schedule would put a consultation in 2028, rather than 2027, for purposes of conducting a conservative assessment of costs, the consultation that would take place in 2028 is included.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

7.3.2 U.S. Coast Guard

No adverse modification to the critical habitat designation or alteration of USCG activities is anticipated in association with the critical habitat designation. From 2006 to 2016, two informal Section 7 consultations were conducted that were related to USCG activities in the critical habitat area. It is anticipated that future MHI IFKW Section 7 consultations for USCG activities within the critical habitat area would be informal and few in number. As such, while critical habitat may be briefly discussed during future Section 7 ESA consultations, incremental costs associated with a critical habitat designation would be minimal over the 10-year timeframe of analysis.

Based on past consultation history, it is expected that up to two informal Section 7 consultations would take place involving USCG activities that consider the MHI IFKW critical habitat designation. In addition, the analysis assumes the designation would result in the reinitiation of the programmatic consultation related to aids to navigation maintenance and repair activities on an informal level to consider whether impacts might be different in Hawaii post-designation. In current (2016) dollars, the estimated incremental administrative cost for each informal consultation would be \$1,398 for USCG and \$1,230 for NMFS, for a total cost of \$2,628 per consultation. The reinitiation of the consultation on an informal level related to aids to navigation maintenance and repair activities is estimated to cost \$5,255, with \$2,460 accruing to NMFS and the remaining \$2,795 being borne by USCG. The total cost of these informal consultations is estimated at approximately \$11,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$9,000 using a 3 percent discount rate, and about \$8,000 when a 7 percent discount rate is used. The annualized costs are estimated at less than \$1,000 using both 3 percent and 7 percent discount rates (Table 7-3). These costs would be shared between NMFS and USCG.

Table 7-3 Potential Economic Impact to U.S. Coast Guard Activities due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|-------------------------|--|-------------|------------------|------------|------------------|------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 3 informal consultations over the 10-year period. One of these is a reinitiation of consultation. | NMFS | \$5 | \$5 | \$4 | \$4 | \$4 | \$4 | \$1 | \$1 | \$1 | \$1 |
| | USCG | \$6 | \$6 | \$5 | \$5 | \$4 | \$4 | \$1 | \$1 | \$1 | \$1 |
| TOTAL | | \$11 | \$11 | \$9 | \$9 | \$8 | \$8 | \$1 | \$1 | \$1 | \$1 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

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8 Energy Development

This chapter assesses the potential impacts of designating critical habitat for the MHI IFKW on the development and operation of energy projects, most of which are related to renewable energy. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. Several proposed renewable energy projects overlap the critical habitat for the MHI IFKW. Both the development of the structures and the installation and maintenance of undersea cables to transmit energy between islands is included in this analysis.

The 2015 average monthly residential electricity bill in Hawaii was \$152, the highest in the U.S. The U.S. average monthly bill that same year was \$114. Further, the average residential electricity rate in Hawaii in 2015 was 29.6 cents/kilowatt-hour (kWh), also the highest in the U.S. By comparison, the U.S. average residential electricity rate was 12.65 cents/kWh. In Hawaii, the 2015 average residential electricity usage was 514 kWh/month, the lowest in U.S., with a U.S. average of 901 kWh/month.¹⁶²

The sources of electricity for 95 percent of residents of Hawaii on the islands of Oahu, Maui, Molokai, Lanai, and Hawaii include oil, coal, waste-to-energy, wind, solar, and hydro. In 2016, nearly 26 percent of all electricity used in Hawaii was produced from renewable resources.¹⁶³

On the Hawaiian island of Kauai, energy sources include diesel, steam, natural gas, and hydro. The electricity provider on Kauai is KIUC, which plans on generating 50 percent of its power needs from renewable energy sources by 2023. The current Kauai Island Utility Cooperative fee structure includes a demand rate of \$10.58 per month, plus an energy rate of 32.16 cents/kWh.

Recent legislation in Hawaii pushes the state to a renewable portfolio standard of 100 percent by 2045. This shift is largely due to the high electricity prices throughout the state.¹⁶⁴ There is, therefore, a big push in Hawaii for more renewable energy, with less reliance on fossil fuels.¹⁶⁵ Hawaiian Electric Company produces 19.4 percent renewable energy (Oahu), while Maui Electric produces 36.9 percent renewable energy (Maui, Lanai, Molokai), and Hawaiian Electric Light produces 54.2 percent renewable energy (Hawaii).¹⁶⁶

The primary ways energy project development and operations may impact the essential feature and associated characteristics of critical habitat for the MHI IFKW include:

- > Large-scale projects may act as barriers for these whales, and preventing whales' movement to and from or within may have the potential to negatively affect how these animals use or access island-associated habitat, especially high-use areas—similar to the large-scale in-water construction projects.
- > Larger projects may affect water or sound quality within these areas depending on factors associated with size, maintenance, and operation of a given structure.

¹⁶² U.S. Energy Information Administration. 2015. 2015 Average Monthly Bill-Residential. Available at: https://www.eia.gov/electricity/sales_revenue_price/pdf/table5_a.pdf, accessed May 19, 2017.

¹⁶³ Hawaiian Electric Maui Electric Hawaii Electric Light. 2017. Powering Our Community, Power Facts. Available at: <https://www.hawaiianelectric.com/about-us/power-facts>, accessed May 5, 2017.

¹⁶⁴ Page, S. 2015. Think Progress. Hawaii Will Soon Get All of its Electricity from Renewable Sources. Available at: <https://thinkprogress.org/hawaii-will-soon-get-all-of-its-electricity-from-renewable-sources-ba2a31ccbbfe>, accessed May 5, 2017.

¹⁶⁵ Page, S. 2015. Think Progress. Hawaii Will Soon Get All Of Its Electricity From Renewable Sources. Available at: <https://thinkprogress.org/hawaii-will-soon-get-all-of-its-electricity-from-renewable-sources-ba2a31ccbbfe>, accessed May 5, 2017.

¹⁶⁶ Hawaiian Electric Maui Electric Hawaii Electric Light. 2017. Powering Our Community, Power Facts. Available at: <https://www.hawaiianelectric.com/about-us/power-facts>, accessed May 5, 2017.

8.1 Wave Energy

There are two potential existing projects with maintenance and ongoing activities. There are no existing commercial-scale wave energy projects in Hawaii. However, there is a current test project within state waters. The demonstration project, the U.S. Navy's grid-connected 30-m Wave Energy Test Site (WETS), is located in state waters offshore from the Kaneohe Marine Corps Base Hawaii on Oahu. The WETS is a collaboration between Northwest Energy Innovations, Naval Facilities Engineering Command Engineering and Expeditionary Warfare Center, University of Hawaii's Hawaii National Marine Renewable Energy Center, and the U.S. Department of Energy's National Renewable Energy Laboratory.¹⁶⁷ The experimental wave energy buoy, with two buoys anchored 0.5 to 1 mile offshore, was manufactured by Ocean Power Technologies, Inc. and employs the bobbing motion of a buoy to drive an electrical generator with a capacity of 40-kW.¹⁶⁸ The Office of Naval Research is monitoring the buoy.

The WETS project is not within the critical habitat designation area, as it is in shallow water (30 m). There are three test berths within 2 km offshore, at 30, 60, and 80 m depth, respectively. The berth at 30 m is suitable for testing point absorber type wave energy conversion (WEC) devices, and the two deep-water berths at 60 and 80 m are suitable for both point absorber and oscillating water column testing.¹⁶⁹ A test berth is a location in the ocean where a WEC is moored for testing. The WEC is connected to buried subsea cable for transmitting electricity to an onshore facility.¹⁷⁰ Construction of all three berths required Section 7 consultation, with consultation for the last two (at 60 and 80 m) occurring in 2012. That consultation took 2.5 years to complete, at a cost of over \$1.5 million plus other expenses to keep staff employed during the waiting period. Two generic designs will be permitted without further consultation, but any other generic designs will require additional consultation. Ongoing WETS activities include the measuring of sound emissions using hydrophones to ensure acoustic emission levels remain within threshold values (expressed in decibels) and periodic diving and remotely operated underwater vehicle (if below the standard diver depth of 30 m) inspection of wave energy conversion devices under testing. Inspections are required monthly for the first 3 months after deployment and quarterly afterward. Most wave energy conversion are tested for 1 year in-water.¹⁷¹

There are currently two proposed WETS projects that may be within the critical habitat designation, as they would be located in waters 60 m and 80 m deep. However, as none of these test projects are commercial-scale, any impacts are expected to be minimal. The NMFS 2018 Final Biological Report states, "only large-scale in-water construction projects are expected to be capable of negatively affecting island-associated habitat for MHI IFKWs and the location, scale, and operations of these projects will determine whether project modifications are necessary to reduce any potential effects."¹⁷² Further, due to the short-term duration of the projects, they would not require reinitiation of consultation. By the time a designation would be established the projects being implemented now would be past the experimental phase and removed. WETS is not planning on adding additional berths, but at least five different devices

¹⁶⁷ Northwest Energy Innovations. 2017. Hawaii Demonstration Project. Available at: <http://azurawave.com/projects/hawaii/>, accessed May 4, 2017

¹⁶⁸ Hawaiian Electric Maui Electric Hawaii Electric Light. 2017. Renewable Energy Sources, Ocean Energy. Available at: <https://www.hawaiianelectric.com/clean-energy-hawaii/clean-energy-facts/renewable-energy-sources/ocean-energy>, accessed May 5, 2017.

¹⁶⁹ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

¹⁷⁰ Oregon State University, Northwest National Marine Renewable Energy Center, FAQs, available at: <http://nnmrec.oregonstate.edu/facilities/faqs>.

¹⁷¹ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

¹⁷² NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50. Page 28.

will be tested through 2019. It is anticipated that these devices will be classified under the two generic design categories that require no additional consultation.¹⁷³

8.2 Wind Energy

There are no existing offshore wind energy projects in Hawaii. However, AW Hawaii Wind, LLC (AWH) has proposed two areas for lease for wind power, both of which are located offshore of Oahu. Progression Hawaii Offshore Wind Inc. (Progression) has proposed one wind power lease area offshore of Oahu (May 2016). There are two general wind lease areas designated by the Bureau of Ocean Energy Management (BOEM) near Oahu: one to the north (240 square miles) and one to the south (517 square miles). AWH has a request to lease the Oahu Northwest Project. Progression and AWH each has a request to lease the South Coast of Oahu Project; however, there is no overlap between the two requests.¹⁷⁴ Each of the three proposed projects describes approximately 400 megawatts (MW) of generation (1,200 MW in total), utilizing between 40 and 51 turbines for each project.¹⁷⁵ Both of the BOEM lease areas, and thus the three proposed wind site areas, are within the MHI IFKW critical habitat designation (Figure 8-1). In order for Hawaii to reach its goal of 100 percent renewable energy by 2045, wind projects will be needed.¹⁷⁶

Currently, there are three proposed commercial-scale energy projects within the critical habitat area, all of which are offshore wind development projects. BOEM has jurisdiction over the Outer Continental Shelf from 3 miles offshore to 200 miles offshore. BOEM provides lease blocks that can be made available for energy development. Section 7 consultations will already be required for these proposed projects due to the existing ESA listing of the MHI IFKW and other listed species that are found in Hawaii's waters. At present, wind energy is the only technology being evaluated for commercial development and most wind energy development is being considered off Oahu for a variety of reasons.

The process for the three lease requests off of Oahu includes a public outreach and comment period to minimize any conflicts. Much of the lease decision will depend on state input and generation requirements or needs. An immediate concern regarding the overlap between the wind lease requests and the MHI IFKW critical habitat area is if and how the designation would affect the goal to achieve 800 MW of offshore wind power by 2045. Oahu is looking at meeting the long-term wind energy generation needs of the island within 200 to 300 miles from the shoreline, and all of the critical habitat occurs within this potential energy generation area. Current lease requests are located between 8 to 40 miles offshore from Oahu, all within the critical habitat area (Figure 8-1). Oahu is the primary energy consumption area within Hawaii, and it has the best opportunity to bring power onshore to its population centers. Most other islands are on track to meet the 100 percent renewable energy goal by 2045.

Oahu has greater energy needs and less prospective land available for renewable energy development. If interconnection of the islands were more promising, all energy needs for all islands could likely be met. However, island interconnection is very difficult and associated costs are not addressed further in this analysis. Therefore, meeting energy needs through offshore wind generation projects is more feasible. Noise impacts of floating wind energy projects are expected to be less than those described for monopiles, and monitoring could be required to help with understanding the potential for long-term

¹⁷³ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

¹⁷⁴ Herrera, K., Renewable Energy Specialist, Bureau of Ocean Energy Management (BOEM). 2016. Fourth Renewable Energy Task Force Meeting, May 16. Available at: <https://www.boem.gov/BOEM-Leasing-Update-for-Task-Force/>, accessed May 5, 2017.

¹⁷⁵ Herrera, K., Renewable Energy Specialist, Bureau of Ocean Energy Management (BOEM). 2016. Fourth Renewable Energy Task Force Meeting, May 16. Available at: <https://www.boem.gov/BOEM-Leasing-Update-for-Task-Force/>, accessed May 5, 2017.

¹⁷⁶ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

impacts.¹⁷⁷ Since the proposed projects are floating turbines and the turbines and floats are assembled outside the MHI IFKW critical habitat area and towed out, there are no construction noise impacts. Further, BOEM staff note that there is no clear way to mitigate any sounds from the project, so no project design modifications or mitigations are likely.¹⁷⁸ Given the large-scale of some of these projects within the restricted range and within areas of critical habitat, there is still much uncertainty about how these commercial size projects might impact space for movement and use, prey, and sound level characteristics of island-associated habitat.

NMFS proposed the exclusion of the BOEM call area (including both sites off Oahu) for the proposed rule due to economic impacts, but noted that this exclusion may be reevaluated prior to the final designation due to other concerns raised about the location of the call areas. If the critical habitat designation includes exclusions for the BOEM call areas or excludes a portion of those areas, the economic impacts of the designation would be nonexistent or reduced. If these areas are included in the designation, incremental administrative costs are anticipated as a result of the designation. BOEM staff has expressed concerns that if the areas are not excluded and project limitations or modifications in critical habitat areas remain uncertain, it is likely such a designation would be a barrier to any wind development, due to the high costs of siting changes once a project has been proposed.¹⁷⁹

NMFS recommendations associated with Section 7 consultations may involve monitoring how these projects impact MHI IFKWs, especially for first generation projects. The timing of these monitoring studies would depend on the timing of the wind projects. It is likely that it would take at least 2 to 3 years before development of any of these wind projects. Therefore, for this analysis, it is assumed that these studies would commence in 2021, and could range in frequency between one study in 2021 with a cost of \$2 million (low range estimate) to three studies every other year (2021, 2023, 2025, and 2027) with a total cost of \$24 million (high range estimate) over the 10-year period of analysis. These costs would likely be borne by the project developers. However, this monitoring would be required due to the presence of MHI IFKW and other listed species in the area, and not specifically associated with the MHI IFKW critical habitat designation.

Estimates for these monitoring costs are based on studies for a similar energy project off Maryland to meet BOEM's protective requirements under both the MMPA and the ESA. As noted earlier, ESA protections are part of the regulatory baseline and similar monitoring projects could be required absent the designation to ensure protections for MHI IFKWs or other protected species.

¹⁷⁷ Higgins, Jean. 2017. Pacific Islands Regional Office – National Marine Fisheries Service. Personal Communication with Maul Foster & Alongi (MFA) staff. May 31.

¹⁷⁸ Sanders, Greg. 2017. Bureau of Ocean Energy Management. Personal Communication with Maul Foster & Alongi (MFA) staff. June 1.

¹⁷⁹ Herrera, Karen, and Greg Sanders. 2018. Bureau of Ocean Energy Management. Personal Communication with Maul Foster & Alongi (MFA) staff. March 15.

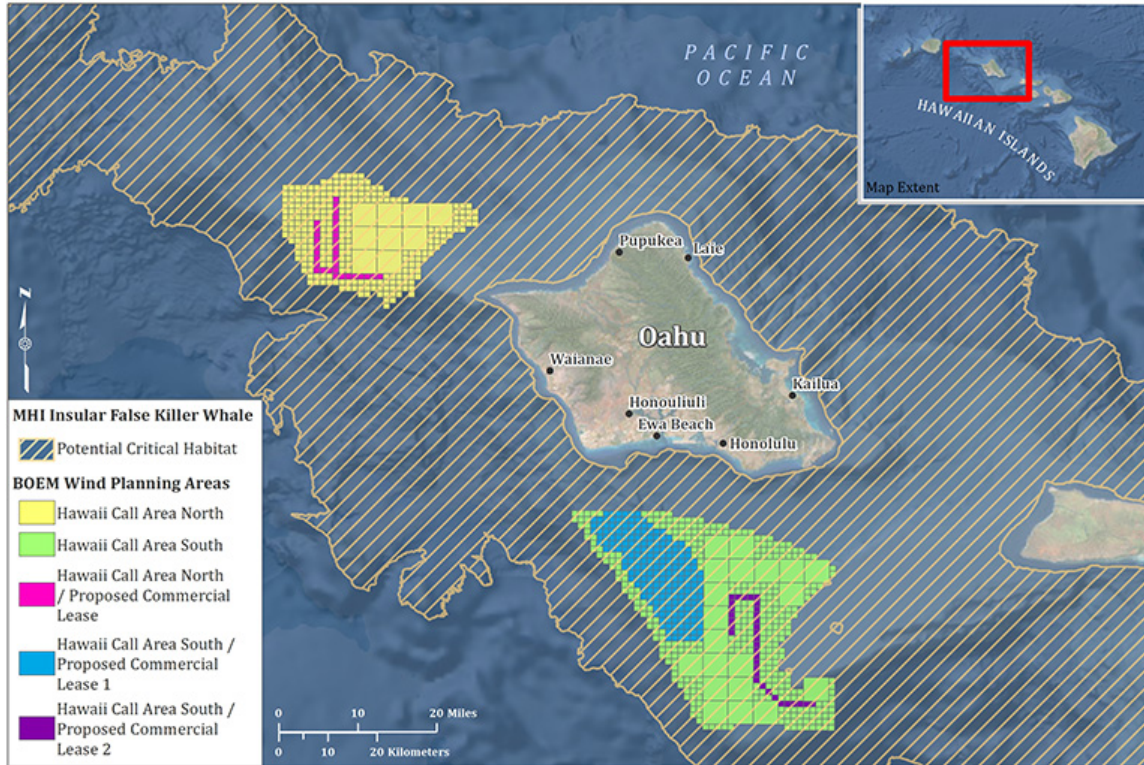


Figure 8-1 Offshore Wind Power Lease Requests

8.3 Ocean Temperature

OTEC is developed using the temperature differences between sun-warmed surface water and cold deep water to generate electricity. OTEC systems must have a temperature difference of at least 25 degrees Celsius to operate, limiting their use to tropical regions. Natural Energy Laboratory of Hawaii (NELHA) on Hawaii Island experimented with OTEC in the 1970s, and found at the time that while it was feasible, it was unreasonably expensive compared to oil.¹⁸⁰ The only current OTEC project (the NELHA experimental project) is land-based on the Island of Hawaii, and therefore not within the critical habitat designation. There are currently no planned or proposed commercial-scale OTEC projects, but in order for Hawaii to reach their goal of 100 percent renewable energy by 2045, OTEC projects will be needed, which may overlap with the critical habitat area.¹⁸¹

8.4 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

Unless risk of limitations to development is high or projects are essentially prohibited, it is unlikely that any proposed offshore wind power generation project would not be developed due to overlap with the MHI IFKW critical habitat area, and BOEM staff note that the projects cannot be moved outside of the critical habitat designation.¹⁸² However, given the time required to develop such projects and the uncertainty related to the current progress of these, there is a possibility that these projects may not be developed

¹⁸⁰ Hawaiian Electric Maui Electric Hawaii Electric Light. 2017. Renewable Energy Sources, Ocean Energy. Available at: <https://www.hawaiianelectric.com/clean-energy-hawaii/clean-energy-facts/renewable-energy-sources/ocean-energy>, accessed May 5, 2017.

¹⁸¹ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

¹⁸² Sanders, Greg. 2017. Bureau of Ocean Energy Management. Personal Communication with Maul Foster & Alongi (MFA) staff. June 1.

within the 10-year period of analysis of this study. Further, as discussed previously, monitoring studies may be recommended due to the presence of MHI IFKW and other listed species in the area, but the costs associated with those are considered baseline. Therefore, the most likely additional potential costs to energy development related to MHI IFKW critical habitat designation would be the additional costs associated with Section 7 consultations.

The analysis anticipates one formal Section 7 consultation for each of the three projects. While these consultations would occur absent the MHI IFKW critical habitat designation, the cost of the additional effort required to consider the designation in these consultations will be incremental. Assuming that these projects are implemented after 2020 and within the 10-year period of analysis, these consultations are assumed to occur in 2020. In current (2016) dollars, based on the costs provided in Table 4-1, the estimated incremental administrative cost for each formal consultation would be \$1,678 for BOEM, \$2,825 for NMFS, and \$980 for private energy project developers, for a total cost of \$5,483 per consultation.

Therefore, a reasonable estimate of cost impact to the three proposed wind energy projects could range between \$0, assuming none of these projects are developed within the 10-year period of analysis, and approximately \$16,000 in current (2016) dollars, if all three projects are developed between 2020 and 2037 and one formal Section 7 consultation occurs in 2020 for each project.¹⁸³ Over the 10-year period of analysis, the present value of these costs would be between \$0 and \$15,000 using a 3 percent discount rate, and from \$0 to \$13,000 using a 7 percent discount rate (Table 8-1). The administrative costs associated with the formal Section 7 consultations would be shared among NMFS, BOEM, and private energy project developers.

If any wave energy projects are proposed and the MHI IFKW critical habitat designation requires additional Section 7 consultations, the costs associated with such consultations are uncertain at this time. However, these would likely include the time of a full-time employee for at least one year to meet all consultation requirements, which would cost \$250,000 in current (2016) dollars, at a minimum. The greatest costs, which are not quantifiable at this time, would be the device deployment postponement due to the consultation requirements. Because of the uncertainty regarding the likelihood of these consultations, as well as uncertainty associated with the requirements of such consultations for these projects, this analysis does not quantify these costs. The existing OTEC project is a land-based experimental plant and does not overlap with the critical habitat designation area. Future OTEC project development is uncertain; however, if planned in areas near or overlapping the designation could result in costs (e.g., administrative consultation costs). At this time, with no additional plans specified, there are no costs attributed to OTEC development as a result of this designation.¹⁸⁴ However, there are potential unspecified costs related to potential future project development. According to State of Hawaii Energy Office staff, the critical habitat designation could have significant economic impacts to the State of Hawaii. The designation can increase the costs associated with ocean energy development and transmission due to the substantial increase in State of Hawaii documentation and the consultations required to address critical habitat issues. The Hawaii State Energy Office staff noted that the economic cost/impact of losing potential ocean energy developments due to the critical habitat designation is significant.¹⁸⁵ BOEM staff noted that additional cost of the designation could include project delays or cancelation if adverse modifications of critical habitat are perceived to be likely.¹⁸⁶ However, these projects are in the pre-planning stage and given the uncertainty regarding when such projects would actually be planned,

¹⁸³ BOEM. 2016. Environmental Studies Program: Ongoing Studies, Mid-Atlantic (Offshore Maryland), Determining Offshore Use by Marine Mammals and Ambient Noise Levels Using Passive Acoustic Monitoring. Revised December 28. Available at: <https://www.boem.gov/Determining-Offshore-Use-by-Marine-Mammals-Maryland-PAM/> accessed June 1, 2017.

¹⁸⁴ Vega, Luis. 2017. University of Hawaii, Director- Hawaii National Marine Renewable Energy Center (HNMREC). Personal Communication with Maul Foster & Alongi (MFA) staff. May 25.

¹⁸⁵ Black, Cameron. 2017. Hawaii State Energy Office. Personal Communication with Maul Foster & Alongi (MFA) staff, May 25.

¹⁸⁶ Herrera, Karen, and Greg Sanders. 2017. Bureau of Ocean Energy Management. Personal Communication with Maul Foster & Alongi (MFA) staff, May 10.

estimating costs would be speculative, and at this point in the process too little is known. Therefore, this analysis does not quantify such impacts.

Table 8-1 Potential Economic Impact to Energy Development due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|----------------------------------|--|-------------|---------------------|-------------|---------------------|-------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 3 formal consultations over the 10-year period, one for each of the three proposed offshore wind energy development projects. | NMFS | \$0 | \$8 | \$0 | \$8 | \$0 | \$7 | \$0 | \$1 | \$0 | \$1 |
| | BOEM | \$0 | \$5 | \$0 | \$5 | \$0 | \$4 | \$0 | \$1 | \$0 | \$1 |
| | Private Energy Project Developer | \$0 | \$3 | \$0 | \$3 | \$0 | \$2 | \$0 | \$0 | \$0 | \$0 |
| TOTAL | | \$0 | \$16 | \$0 | \$15 | \$0 | \$13 | \$0 | \$2 | \$0 | \$2 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

9 Aquaculture/Mariculture

This chapter analyzes the potential economic effects of the MHI IFKW critical habitat designation on aquaculture and mariculture (cultivation of marine organisms) activities near and within the vicinity of the critical habitat area. Most aquaculture/mariculture activities intersecting the MHI IFKW critical habitat designation are in the offshore region. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. Fishpond and nearshore aquaculture activities do not occur in the MHI IFKW critical habitat designation¹⁸⁷ and are not analyzed further in this report. Therefore, this section only considers the potential economic effects of critical habitat designation on offshore aquaculture and mariculture activities that occur in deeper waters.

The impacts to aquaculture and mariculture activities are similar to both in-water construction and to activities that affect water quality. Offshore aquaculture and mariculture activities, particularly those related to the placement of cages or structures that are anchored in the marine environment, can affect water quality, prey, sound, or space for movement and use.

According to the NMFS 2018 Final Biological Report, “water quality or prey resources may be affected by waste disposal, the introduction of exotic species or pathogens, or release of pesticides or antibiotics. Facilities may also impact local prey resources, because farms may use wild stock seeding, or feed made from wild fish. Alternatively, these aquaculture/mariculture activities may positively affect wild stocks by decreasing commercial fishing pressure by lowering the demand on commercial fish species. Similar to routine in-water construction projects, best management practices already attempt to reduce risks associated with water quality and impacts to local fish species.”¹⁸⁸

NMFS-PIRO is developing a PEIS to review the economic, social, and environmental impacts of the proposed NMFS aquaculture management program. The aquaculture management program will regulate and manage offshore aquaculture/mariculture through developing appropriate species management strategies and establishing reporting and permitting requirements for the aquaculture/mariculture industry.¹⁸⁹

9.1 Offshore Aquaculture/Mariculture

Blue Oceans Mariculture is currently the only commercial finfish farm in operation off the west coast of the island of Hawaii Island, producing roughly 1 million pounds of almaco jack or amberjack (*Seriola rivoliana*) annually (Table 9-1). This facility intersects with the area currently under consideration for MHI IFKW critical habitat and with the designated critical habitat for the Hawaiian monk seal. An additional proposed temporary operation, Forever Oceans, Inc., has been issued a Special Coral Reef Ecosystem Fishing Permit by NMFS to test the feasibility of a net pen design for raising amberjack. This permit is valid from

¹⁸⁷ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50. Page 28.

¹⁸⁸ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50. Page 28.

¹⁸⁹ NOAA Fisheries. 2015. Marine Aquaculture Strategic Plan FY 2016-2020. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Available at: http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture_docs/noaa_fisheries_marine_aquaculture_strategic_plan_fy_2016-2020.pdf

April 3, 2017, to March 31, 2019. The experimental facility will be located in federal waters, approximately 5.5 nautical miles offshore west of Keauhou, Hawaii.

Table 9-1 Existing and Proposed Offshore Aquaculture/Mariculture Ventures in Hawaii

| Company | Common Name | Species | Site Location | Cage Depth | No. of Cages | Production |
|---------------------------------------|-----------------------|--------------------------|--|------------|--------------|---|
| Blue Ocean Mariculture (in operation) | Almaco Jack/amberjack | <i>Seriola rivoliana</i> | 0.5 mile offshore, 200 feet depth | Surface | 6 | 1,000,000 pounds per year |
| Forever Oceans, Inc. (permitted) | Almaco jack/amberjack | <i>Seriola rivoliana</i> | 5.5 nautical miles offshore, 6,000+ feet depth | 30 feet | 1 | 120,000 pounds over the two year project duration |

The NOAA Fisheries Marine Aquaculture Strategic Plan for Fiscal Year 2016 to 2020 indicates NMFS's desire to have a positive impact on the future growth of the marine aquaculture sector. NMFS has a goal of expanding sustainable U.S. marine aquaculture production by volume by at least 50 percent by 2020.¹⁹⁰ In recognition of the growing need and desire to develop aquaculture/mariculture and the possibility of user conflicts and effects to the marine environment, the Western Pacific Fishery Management Council recommended NMFS amend the regional Fishery Ecosystem Plans to establish a federal management program for aquaculture fisheries in federal waters of the Pacific Islands Region (including Hawaii) under the MSA. If approved, the Pacific Islands Region aquaculture management program would establish a marine aquaculture management program and support long-term sustainable aquaculture/mariculture in federal waters.

It is unknown how aquaculture/mariculture initiatives will be expanded in federal or state waters in the MHI, but it is possible that additional aquaculture/mariculture farms could be established in MHI IFKW critical habitat.¹⁹¹

9.2 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

There have been seven informal consultations related to aquaculture/mariculture within the study area since 2006, and it is anticipated that a similar number and type of consultations related to aquaculture/mariculture activities would occur over the 10-year period of analysis. No project modifications based on the designation of MHI IFKW critical habitat are anticipated during the period of analysis, given that best management practices and habitat are already considered when developing these projects, and any time spent on consultations to address MHI IFKW critical habitat is expected to be minimal.

Based on past consultation history, it is expected that up to seven informal Section 7 consultations would take place involving aquaculture/mariculture activities that consider the MHI IFKW critical habitat designation, with NMFS-SFD anticipated to be the federal action agency in three of these, while USACE will have that role in four. In current (2016) dollars, the estimated incremental administrative cost for each informal consultation would be \$1,398 for NMFS-SFD/USCG and \$1,230 for NMFS, for a total cost of \$2,628 per consultation. The total cost of these informal consultations is estimated at approximately

¹⁹⁰ NOAA Fisheries. 2015. Marine Aquaculture Strategic Plan FY 2016-2020. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Available at: http://www.nmfs.noaa.gov/aquaculture/docs/aquaculture_docs/noaa_fisheries_marine_aquaculture_strategic_plan_fy_2016-2020.pdf.

¹⁹¹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50. Page 28.

\$18,000 in undiscounted terms over the 10-year period of analysis. The present value of these costs would be approximately \$15,000 using 3 percent discount rate, and about \$12,000 when a 7 percent discount rate is used. The annualized costs are estimated at about \$2,000 using both 3 percent and 7 percent discount rates (Table 9-2). These costs would be shared among NMFS, NMFS-SFD (as an action agency), and USACE.

Table 9-2 Potential Economic Impact to Offshore Aquaculture/Mariculture Activities due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|--------------------------------|--|-------------|------------------|-------------|------------------|-------------|---------------|------------|---------------|------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 7 informal consultations over the 10-year period. | NMFS | \$9 | \$9 | \$7 | \$7 | \$6 | \$6 | \$1 | \$1 | \$1 | \$1 |
| | NMFS-SFD (as an action agency) | \$4 | \$4 | \$4 | \$4 | \$3 | \$3 | \$0 | \$0 | \$0 | \$0 |
| | USACE | \$6 | \$6 | \$5 | \$5 | \$4 | \$4 | \$1 | \$1 | \$1 | \$1 |
| TOTAL | | \$18 | \$18 | \$15 | \$15 | \$12 | \$12 | \$2 | \$2 | \$2 | \$2 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

In this table, “NMFS” refers to NMFS Protected Resources Division bearing costs as the consulting agency; however, “NMFS-SFD” is used to recognize that NMFS – Sustainable Fisheries Division also bears costs as an action agency.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

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10 Environmental Response Activities

This chapter describes the potential economic impacts of the critical habitat designation for MHI IFKW on actions taken in response to marine debris cleanup, vessel removal, or oil spills or spills of other substances in the study area. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. Activities considered in this chapter include actions taken to mitigate or contain the harmful effects of marine debris, removal of grounded vessels, oil spills or spills of other substances on the environment, and cleanup efforts undertaken post-spill.

NMFS has identified environmental response activities as potentially posing a threat to the MHI IFKW critical habitat. Areas near the shoreline that are more developed experience more vessel traffic, putting these areas at a higher risk for impacts to the critical habitat area from marine debris cleanup, vessel removal, or oil or other spills.

Environmental response activities may affect water quality of available MHI IFKW habitat or reduce the quantity or quality of MHI IFKW prey. The extent of response efforts required depends on the severity of environmental disturbance from marine debris, vessel groundings, and oil spills or spills of other substances. Response activities are typically planned in advance, and methods used to remove environmental disturbance are designed to minimize destruction to the site of disturbance or nearby habitats.

This chapter is divided into four sections. The first section details the recent history and spatial distribution of oil spills and spills of other substances in the Hawaiian Islands. The second discusses vessel grounding response, and the third discusses marine debris removal. The fourth section forecasts the economic impacts across the study area.

10.1 Oil Spills and Spills of Other Substances

Data from the Hawaii State Department of Health indicate that approximately 90 oil releases occur in water in the vicinity of MHI each year.¹⁹² While most of these are small, a spill at Pearl Harbor has released over 5 million gallons (159,000 barrels) of fuel since World War II.¹⁹³ The Ehime Maru spill in 2002 released more than 2,000 barrels of oil off the south coast of Oahu.

Oil spill response planning has continually improved due to the passage of the Oil Pollution Act in 1990 in response to the 1989 Exxon-Valdez oil spill. This act mandates the development of an Area Contingency Plan for every marine planning area. Hawaii's Area Contingency Plan (HACP) was released in March of 2012. While the HACP outlines specific measures to be taken in the event of a major oil spill to minimize impacts to some species, including the Hawaiian monk seal, the HACP does not outline specific measures for the IFKW, although the HACP calls for protection of listed species "as well as listed species' habitat not yet designated as critical" to further protect habitat of listed species themselves.¹⁹⁴ Measures to protect MHI IFKWs are expected to largely overlap with measures taken for other similar sized cetaceans and, as appropriate, other listed species.

¹⁹² Hawaii Department of Health. 2017. DOH Environmental Indicators: Table 15: Oil and Chemical Releases. Available at: <https://data.hawaii.gov/Health/Table-15-Oil-and-Chemical-Releases/yqmp-94ap/data>.

¹⁹³ D'Angelo, C. 2015. The Massive Oil Plume Beneath Pearl Harbor Isn't New, but it is Shocking. The Huffington Post on September 28. Available at: http://www.huffingtonpost.com/entry/massive-oil-plume-pearl-harbor_us_55fc63d8e4b08820d91891ed accessed May 22, 2017.

¹⁹⁴ U.S. Coast Guard. 2012. Hawaii Area Contingency Plan.

Actions outlined in the HACP to protect other listed species include controlling the release and spread of oil, protection of haul-out sites for relevant species, and active monitoring of seals, humpback whales, reef and estuarine birds, reptiles, shellfish, and their habitat. The actions prioritized in the HACP are designed to minimize harm to these species and their habitat in the event of a spill. These actions are triggered as soon as a spill occurs with the potential to affect any habitat, including the MHI IFKW critical habitat designation.

By introducing spill response planning requirements and making vessel owners liable for damages caused by oil spills, the likelihood of spills has decreased and spill response teams are able to respond more quickly and appropriately in the event of a spill.

In recent years, spills of non-oil substances have caused significant damage in Hawaii, specifically in nearshore areas. In September of 2013, a pipeline spilled over 200,000 gallons of molasses into Honolulu Harbor, causing thousands of fish deaths and response activities costing over a million dollars.¹⁹⁵ There were no reports of injuries or death to endangered species as a result of this spill.¹⁹⁶ However, spills of substances such as molasses may threaten MHI IFKW habitat by reducing water oxygen levels and by harming prey species. Prior to the September 2013 molasses spill, no response plans existed for spills of non-oil substances. After the molasses spill, Hawaii passed a bill allocating funds to update spill response plans to include risk assessments and mitigation plans for various toxic substances other than oil.¹⁹⁷

The USCG has the authority to respond to all spills of oil and hazardous substances in the offshore or coastal zone. In concert, the EPA and the USCG oversee the Oil Pollution Prevention regulations concerning spill prevention, control, and countermeasure plans, and facility response plans for offshore and onshore oil producers and carriers. These categories may include vessel groundings due to the possibility for release of hazardous substances.¹⁹⁸ The procedures developed between the groups are intended to streamline Section 7 consultations and better protect ESA-listed species.¹⁹⁹ By identifying the impact of spill response activities on MHI IFKW critical habitat areas, the USCG and EPA can minimize effects on critical habitat while responding to spills.

Between 2006 and 2016, no Section 7 consultations occurred related to oil spill or spills of hazardous substances within the MHI IFKW critical habitat area.

Emergency consultation will occur between the USCG, the State of Hawaii, and NMFS in the event of a spill. Following response efforts, these parties would engage in formal consultation. However, no information is currently available on the likely geographic and temporal distribution of oil spills and vessel groundings in the MHI. Furthermore, no information is available on the frequency of emergency consultation or post-spill consultation, as Section 7 consultations have not occurred in these contexts in the MHI IFKW critical habitat area.

10.2 Vessel Groundings

Due to fishing, recreation, military activity, and transport through the MHI, vessel groundings can occur anywhere due to weather or human error. Vessel groundings could lead to oil spills, which can magnify

¹⁹⁵ Grube, N. 2013. New Molasses Spill Response Plan Concedes Environmental Danger. Honolulu Civil Beat on November 13. Available at: <http://www.civilbeat.com/articles/2013/11/13/20382-new-molasses-spill-response-plan-concedes-environmental-danger/>, accessed on May 19, 2017.

¹⁹⁶ Garcia, O. 2013. Endangered species unhurt in Hawaii molasses spill. The Guardian on September 18. Available at: <http://www.cnsnews.com/news/article/endangered-species-unhurt-hawaii-molasses-spill>, accessed on May 19, 2017.

¹⁹⁷ Cocke, S. 2014. Honolulu Harbor Molasses Spill Sparks Legislation. Honolulu Civil Beat on January 27. Available at: <http://www.civilbeat.com/articles/2014/01/27/21013-honolulu-harbor-molasses-spill-sparks-legislation/>, accessed on May 19, 2017.

¹⁹⁸ 33 U.S.C Section 1251 et. seq. – Clean Water Act.

¹⁹⁹ USCG, USEPA, USFWS, and NOAA. 2002. Inter-agency Memorandum of Agreement Regarding Oil Spill Planning and Response Activities Under the Federal Water Pollution Control Act's National Oil and Hazardous Substances Pollution Contingency Plan and the Endangered Species Act.

the damages associated with such events.²⁰⁰ Responses to these vessel groundings may lead to a federal nexus, as federal agencies may need to provide support for the recovery effort.

Vessel groundings “have the potential to disrupt habitat important to prey species and to increase sediment deposition in nearby areas, impacting water quality, and potentially, prey health. Vessel groundings also have the potential to release toxic chemicals (such as oil or petroleum products) into the marine environment which, in turn, may impact the quantity and quality of prey species and water quality in surrounding areas. Groundings causing damage to coral reefs have also been linked to incidence of ciguatera outbreaks that are caused by blooms of toxic algae; such algal blooms may impact IFKW through the consumption of prey. Vessel grounding response activities must be planned to minimize the likelihood of further impacts to IFKW foraging areas. Since most activities associated with removing grounded vessels from the marine environment already attempt to minimize the amount of damage to the surrounding habitat, it is unlikely that further modifications will be necessary for these activities.”²⁰¹

Between 2006 and 2016, there were no vessel groundings within the MHI IFKW critical habitat designation, or within Hawaii, though there was a planned vessel “sinking” within this area in 2015 that resulted in a Section 7 consultation, which consisted of technical assistance effort provided by NMFS that involved the sinking of an abandoned NELHA pipeline.

10.3 Marine Debris

In the MHI, NOAA’s Pacific Islands Fisheries Science Center Coral Reef Ecosystem Division manages efforts to remove marine debris. Most marine debris removal activity occurs in shallower depths near coastal areas or on nearshore reefs, where marine debris tends to accumulate. It is expected that common areas for marine debris removal will not overlap with MHI IFKW critical habitat.²⁰²

However, other ESA-listed species are also present at these shallower depths where marine debris removal activities occur, causing marine debris removal activities to be often subject to Section 7 consultation. Modifications to marine debris removal efforts to prevent impacts to MHI IFKW critical habitat are not likely to differ from best management practices already recommended and practiced to prevent impacts to the MHI IFKW, other listed species, or to sensitive coral reef habitats. As indicated in the NMFS 2018 Final Biological Report, “For those marine debris activities that may overlap, best management practices already recommended and practiced by staff to prevent impacts to the listed species or to sensitive habitats provide sufficient protection to MHI IFKW essential feature.”²⁰³

Between 2006 and 2016, five informal Section 7 consultations and one technical assistance were conducted related to marine debris in Hawaii, but none of these were within the MHI IFKW critical habitat designation.

10.4 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

Personal communication with the USCG indicates that:²⁰⁴

²⁰⁰ NOAA, National Ocean Service. 2002. U.S. Flag Pacific Islands Vessel Grounding Workshops Proceedings.

²⁰¹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²⁰² NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²⁰³ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²⁰⁴ Norman, Maile. 2017. US Coast Guard. Personal Communication with Maul Foster & Alongi (MFA) staff, May 23.

The [critical habitat designation] should not change USCG response efforts for a spill within the designated area/s. USCG will continue to implement and deploy all necessary/available resources to adequately and efficiently clean up the discharged oil to minimize environmental impact. As part of the response protocol, the USCG would seek a consultation from the appropriate authority to discuss intended response plan and address the potential for any associated risks to protected marine mammals or other sea life. There are no foreseen costs aside from the Section 7 consultation itself. Labor and equipment requirements would be driven by incident characteristics (distance from shore, water depth, product type and amount) and other factors apart from the critical habitat designation.

Further, the USCG stated that “there have been no documented oil discharges since 2006 that fall within the critical habitat designation area and resulted in a Section 7 consultation. All recorded discharges and/or vessel groundings have occurred in much shallower water [...] thus also much closer to the shoreline or in our harbors.”

Comments from the USCG indicated that the critical habitat area will not result in additional incremental Section 7 consultation costs when responding to spills or vessel groundings. This conclusion was based on the lack of available information on the frequency of emergency or post-spill consultations. There were no emergency or post-spill consultation records within the area for the MHI IFKW critical habitat designation in the NMFS Section 7 consultation history reviewed for this analysis; therefore, no quantitative discussion on additional costs of spill or vessel grounding response due to the critical habitat designation is included in this report.

Since marine debris removal activities are highly unlikely to occur within the critical habitat area, and as determined by NMFS (“For those marine debris activities that may overlap, best management practices already recommended and practiced by staff to prevent impacts to the listed species or to sensitive habitats provide sufficient protection to MHI IFKW essential feature”²⁰⁵), no quantitative discussion on additional costs of marine debris removal activities due to critical habitat designation is included in this report.

²⁰⁵ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

11 Fisheries

Fisheries have been identified as a potential threat to MHI IFKW critical habitat through reducing the quantity, quality, or availability of MHI IFKW prey species.²⁰⁶ This reduction can occur through removal of prey in the IFKW critical habitat or through the indirect, long-term reduction of prey biomass over the range of fish stocks. This chapter describes the potential for an economic impact resulting from federal action in response to the designation of critical habitat. As discussed in Chapter 3, the additional administrative costs of including consideration of critical habitat in Section 7 consultations, and the additional costs of implementing project modifications, uniquely resulting from the protection of critical habitat, are the direct compliance costs of designating critical habitat. These costs are not in the baseline and are considered incremental costs of the critical habitat designation. The chapter begins with a discussion of fisheries regulation in Hawaii, followed by a brief overview of Hawaii fisheries. The chapter concludes with a discussion of potential impacts and how costs and benefits may be measured for any potentially affected fisheries.

11.1 Regulation of Fishing Activity in Hawaii

Fishery management plans in federal waters off the coast of Hawaii are the responsibility of the Western Pacific Regional Fishery Management Council and NMFS under the MSA.²⁰⁷ The Western Pacific Regional Fishery Management Council develops management measures for federal fisheries in the region. In Hawaii, pelagic fisheries are managed under the Pacific Pelagic Fishery Ecosystem Plan (FEP) and the bottomfish, crustacean, precious coral, and coral reef ecosystem fisheries are managed under the Hawaii FEP. As noted in the NMFS 2018 Final Biological Report, “False killer whales appear to forage primarily on large pelagic fish, including yellowfin tuna, albacore tuna, skipjack tuna, broadbill swordfish, mahi-mahi, wahoo, and lustrous pomfret. However, they are also known to prey on reef associated species, including scrawled file fish and threadfin jack (Baird 2009, Oleson et al. 2010).”²⁰⁸ Below we discuss how federally managed fisheries that are subject to Section 7 consultation may overlap with the designation, whether these fisheries harvest MHI IFKW prey, and how the designation of critical habitat may impact the consultation process. Activities with no federal nexus are not subject to project modifications from Section 7 consultations. There are several fishery-related activities such as boating, diving, and state-regulated fishing that do occur in MHI IFKW critical habitat areas, but have no federal nexus.²⁰⁹ A discussion of the federal nexus for many fisheries with this potential is provided below.

11.1.1 Federal Nexus for Fisheries

Activities that are funded, authorized, or carried out by a federal agency are subject to Section 7 consultation. Table 11-1 below identifies the aspects of these federally-managed fisheries that are subject to Section 7 consultation.

²⁰⁶ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²⁰⁷ U.S. Department of Commerce, NOAA. 2007. Magnuson-Stevens Fishery Conservation and Management Act. As Amended through January 12, 2007. Washington, D.C. Available at http://www.nmfs.noaa.gov/sfa/laws_policies/msa/documents/msa_amended_2007.pdf accessed May 19, 2017

²⁰⁸ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²⁰⁹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

Under the Pelagic FEP, the deep-set and shallow-set longline fisheries are subject to Section 7 consultation because these fisheries have federal permits, catch limits, and reporting and gear requirements. Specifically, federal regulations impacting the longline pelagic fisheries include limitations on the number of permitted vessels (only 164, all of which must be shorter than 101 feet in length), a mandatory observer program, a mandatory vessel monitoring system, and gear requirements to minimize bycatch of sea turtles.²¹⁰ Among the pelagic fisheries, only the striped marlin, bigeye tuna, and some species of sharks have catch limits, which are driven by international management measures through the Western and Central Pacific Fisheries Commission and the Inter-American Tropical Tuna Commission. Sharks and striped marlin are not known to be prey species for the MHI IFKW.²¹¹ There are no catch limits for other pelagic fisheries, as pelagic fisheries in Hawaii are exempt from the MSA requirement to establish annual catch limits.

Under the Hawaii FEP, the bottomfish fishery is jointly managed by NMFS and the State of Hawaii; State law requires fishers to obtain a commercial fishing license to sell bottomfish, while federal regulations require non-commercial fishers to obtain a non-commercial fishing permit and also place limits on the number of fish a non-commercial fishers may catch per trip. Both the commercial and non-commercial bottomfish sectors are subject to federal annual catch limits (ACLs) and thus, are subject to Section 7 consultations.

The crustacean and precious coral fisheries both have federal permits, gear requirements, minimum size limits, and ACLs that are subject to Section 7 consultation.

The coral reef ecosystem fisheries have ACLs that are subject to Section 7 consultation.

11.2 Overview of Hawaii Fisheries

The following overview addresses each type of fishery in Hawaii, and summarizes why and whether each is considered for economic impact in this analysis. Hawaii fisheries include bottomfish fisheries, coral reef ecosystem fisheries, crustacean fisheries, precious corals fisheries, and pelagic fisheries. Table 11-1 shows the federal nexus for each fishery discussed, whether the habitat overlaps with MHI FKW critical habitat area under consideration, and whether the fishery harvests prey of these whales.

Table 11-1 Overview of Hawaii Fisheries

| Fishery | Subject to Section 7 (Federal Nexus) | Overlap with Critical Habitat Area Under Consideration | Prey Harvested |
|------------------------------------|--|--|----------------|
| Bottomfish and seamount groundfish | ACL, federal non-commercial fishing permits | Yes | Yes |
| Coral reef ecosystem | ACL | Yes | Yes |
| Crustacean | ACL, federal permits | Yes | No |
| Precious coral | ACL, federal permits | Yes | No |
| Pelagic | Federal permits, reporting, gear, Catch Limits | No (longline exclusion zone) | Yes |

²¹⁰ Western Pacific Regional Fishery Management Council. 2017. Pacific Pelagic Federal Regulations and Enforcement. Accessible at <http://www.wpcouncil.org/managed-fishery-ecosystems/pacific-pelagic/regulations-and-enforcement-pelagics/>

²¹¹ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report. U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

Due to the longline exclusion zone established around the MHI, the federally-managed deep-set and shallow-set longline fisheries are closed in areas that overlap the designation of critical habitat for the DPS.²¹² Accordingly, these longline fisheries do not directly remove IFKW prey from the critical habitat designation. However, these fisheries may contribute to the reduction of total biomass of prey available to IFKW, because many prey species are wide-ranging and may be subject to harvest by these fisheries while outside the designation.

The Hawaii bottomfish fishery area of operation overlaps with the MHI IFKW critical habitat. This fishery does not target known prey species, but may harvest small amounts of a couple of prey species. As an insignificant fraction of the total bottomfish fishery harvests, adverse impacts to MHI IFKW critical habitat are not expected, and no additional modifications are expected to this fishery. Hawaii crustacean and precious coral fisheries are federally managed fisheries that overlap with the MHI IFKW critical habitat, but neither of these fisheries target MHI IFKW prey species and modifications to these fisheries are not anticipated as a result of MHI IFKW critical habitat.²¹³ The coral reef ecosystem fisheries overlap with MHI IFKW critical habitat, and these fisheries do harvest a couple of the species noted to be observed prey of MHI IFKWs, but not pelagic species. Although NMFS and the Council annually set catch limits for these fisheries, they are not otherwise subject to federal management, and no additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat.

11.2.1 Bottomfish and Seamount Groundfish Fisheries

In this region, bottomfish comprise snappers, groupers, and jacks. The most prominent target species are onaga, ehu, gindai, kalekale, hapuupuu, opakapaka, and lehi (the “Deep 7” bottomfish). Federal bottomfish grounds include Middle Bank and Penguin Bank. These fisheries target depths ranging from 55 to 275 m.²¹⁴ In 2007, the Western Pacific Fishery Management Council instituted catch limits for the seven primary species listed above in response to overfishing.²¹⁵ The 2017 to 2018 catch limit is 306,000 pounds for the Deep 7. It is estimated that there are 250 to 500 vessels that target bottomfish each season.²¹⁶ It is also estimated that about 34 percent of bottomfish vessel trips include catch in federal waters (14 percent is solely federal waters, and 20 percent is some combination of federal and state waters). The bottomfish fisheries are in large part made up of commercial and recreational, but also subsistence fishers. These species have played a key role in the culture of indigenous peoples and continue to do so today.²¹⁷ A 2012 survey showed that more than 60 percent of commercially licensed bottomfish fishers sold less than half of their bottomfish catch over the preceding year, suggesting that much of the catch was used for non-commercial use (personal subsistence, sharing, etc.).

The Hawaii bottomfish fishery is federally managed and overlaps with MHI IFKW critical habitat. Bottomfish, however, and the Deep 7 species are not known to be a prey species for the MHI IFKW. The NMFS 2018 Final Biological Report notes that this fishery may harvest several species of jack (i.e., kahala and white ulua) that may intersect with the MHI IFKW diet; however, there is not a commercial market for these species and this represents a small portion of overall catch. Since bottomfish fisheries do not target MHI IFKW prey species and present no major threats to the MHI IFKW essential feature and

²¹² NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²¹³ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²¹⁴ Western Pacific Regional Fishery Management Council. 2009. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, DC. September 24, 2009.

²¹⁵ Hospital, J. and C. Beavers. 2012. Economic and Social Characteristics of Bottomfish Fishing in the Main Hawaiian Islands. Pacific Islands Fisheries Science Center. April, 2012.

²¹⁶ Western Pacific Regional Fishery Management Council. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, DC. September 24, 2009.

²¹⁷ Hospital, J. and C. Beavers. 2012. Economic and Social Characteristics of Bottomfish Fishing in the Main Hawaiian Islands. Pacific Islands Fisheries Science Center. April, 2012.

associated characteristics, no additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat designation.

11.2.2 Coral Reef Ecosystem Fisheries

Commercial catch of coral reef ecosystem fishes is mostly comprised of akule, surgeonfishes, goatfishes, squirrelfishes, unicornfishes, and parrotfishes. Akule is the most commonly fished species, representing more than half of the catch by volume from 2000 to 2005, and about 31 percent of the catch in 2015. The average coral reef fishery catch between 2005 and 2009 was 394,000 pounds, of which only 17 percent was caught in federal waters. In 2015, the total was 909,904 pounds (Figure 11-1).²¹⁸ Most of the overall catch of coral reef fishes comes from the nearshore reefs of the MHI, which are in state waters. Onshore fishing of these species via netting, trapping, hook and line, or hand gathering has been a part of Native Hawaiian culture since its earliest inhabitants. These fishing practices continue to serve an important cultural role among indigenous peoples today.²¹⁹

As previously noted, the federal ACLs for the Hawaii coral reef fisheries are subject to Section 7 consultation; however, these fisheries are not otherwise federally managed or subject to Section 7 consultation (i.e., there are no federal permits or gear requirements associated with these fisheries and other aspects of the fishery are State managed). Coral reef ecosystem fisheries are almost exclusively located in state waters. A significant portion of the total coral reef fish catch is harvested in recreational fisheries and these activities are primarily conducted from the shoreline. Some of these fisheries target MHI IFKW prey species, including oio and white ulua; however, the relative importance of these non-pelagic fish to the MHI IFKW is currently unknown. At this time, no additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat.

11.2.3 Crustacean Fisheries

The primary target crustacean species are crabs (primarily kona), lobsters (spiny and slipper), and shrimps.²²⁰ Between 2005 and 2014, crabs constituted about 44 percent of the overall catch volume while lobsters constituted about 24 percent. Over 185,000 pounds of lobster were caught between 1984 and 2004, while about 90,000 pounds were caught from 2005 to 2014. About 170,000 pounds of crabs were caught from 2005 to 2014. Lobster has served as another traditional food source for Native Hawaiians, primarily caught by hand. In 1990, it was determined that lobster were overfished and the first quota for the species was established the next year. In 2000, the Northwest Hawaiian lobster fishery was closed due to uncertainty over the future of the overall stock and in 2006, overall Northwest Hawaiian Island crustacean fishery operations were closed down by the Papahānaumokuākea Monument Designation and Regulations.²²¹ Deepwater shrimp fishing began in the region in the 1960s and peaked at over 250,000 pounds per year in the mid-1980s. These average catch rates have also decreased, to around 15,000 pounds per year over the past decade.

The Hawaii crustacean fishery is federally managed and overlaps with MHI IFKW critical habitat. Both the ACLs and the federal permits for the fishery are subject to Section 7 consultations. Crustaceans, however, are not a prey species for the MHI IFKW. Since crustacean fisheries do not target MHI IFKW prey species and present no major threats to the MHI IFKW essential feature and associated

²¹⁸ Western Pacific Regional Fishery Management Council. 2015. Annual Stock Assessment and Fishery Evaluation (SAFE) Report: Hawaii Archipelago Fishery Ecosystem Plan. Washington, D.C.

²¹⁹ Western Pacific Regional Fishery Management Council. 2009. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, D.C. September 24, 2009.

²²⁰ U.S. Department of Commerce. National Oceanic and Atmospheric Administration Office of Science and Technology. 2016. Commercial Fisheries Statistics: Annual Commercial Landings by Group. Washington, DC. Last updated 2016. Available at: <https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings-with-group-subtotals/index> accessed May 2017.

²²¹ Western Pacific Regional Fishery Management Council. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, D.C. September 24, 2009.

characteristics, no additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat designation.

11.2.4 Precious Coral Fisheries

Precious corals have been harvested at depths ranging from 30 to 500 m off the shores of Hawaii for at least 70 years.²²² Landings data over this time have been limited due to confidentiality laws that protect this information when there are fewer than three participants in the fishery. Approximately 3,000 pounds were harvested from 1990 to 1997. Multiple conservation measures are in place for these species, in particular regulations to protect black coral from invasive soft corals and preserve the sustainability of gold coral.²²³

The Hawaii precious corals fishery is federally managed and overlaps with MHI IFKW critical habitat. Both the ACLs and the federal permits for the fishery are subject to Section 7 consultations. Precious coral fisheries, however, do not target prey species for the MHI IFKW and present no major threats to the MHI IFKW essential feature and associated characteristics. No additional modifications are expected to these fisheries as a result of MHI IFKW critical habitat designation.

11.2.5 Pelagic Fisheries

Pelagic fisheries in Hawaii include the longline, MHI troll and handline, offshore handline, and the aku boat (pole and line) fisheries. Longline fisheries land the most pelagic species, a total of 34 million pounds in 2015, or approximately 88 percent of all pelagic landings.²²⁴ MHI pelagic trolling is significantly smaller, landing only 3 million pounds in 2015, equivalent to eight percent of all pelagic landings. Smaller still is the MHI handline pelagic fishery, landing approximately one million pounds of pelagic fish in 2015, or three percent of all pelagic landings. The offshore handline pelagic fishery landed only 400 thousand pounds in 2015, or one percent of all pelagic landings. The landings of aku boat pelagic fisheries is too minimal to be reported. The distribution of landings by year and gear type for the pelagic fishery is shown in Figure 11-1, reproduced from the Pacific Islands Fisheries Science Center, part of NMFS. Of these fisheries, the federally managed pelagic longline fisheries (i.e., deep-set and shallow-set) have federal permits, gear and reporting requirements, and catch limits that are subject to Section 7 consultation.

²²² Western Pacific Regional Fishery Management Council. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, D.C. September 24, 2009.

²²³ Western Pacific Regional Fishery Management Council. Fishery Ecosystem Plan for the Hawaii Archipelago. Washington, D.C. September 24, 2009.

²²⁴ PIFSC. 2016. 1987-2015 Landings of All Pelagic Species by Gear Type. Available at <https://www.pifsc.noaa.gov/wpacfin/hi/Data/Pelagic/hpel3.htm> accessed June 2017.

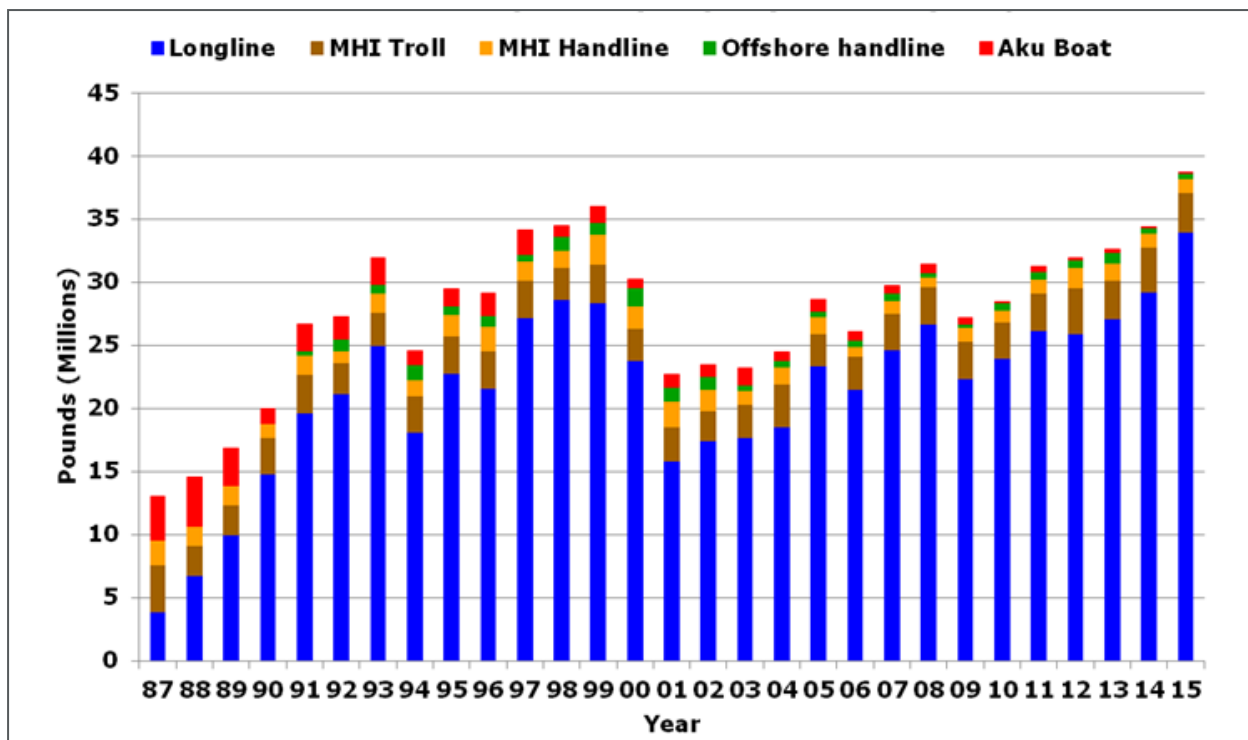


Figure 11-1 Landings of All Pelagic Species caught in Hawaii by Gear Type

Source: Pacific Island Fishery Science Center, 2016. Available at <https://www.pifsc.noaa.gov/wpacfin/hi/Data/Pelagic/hpel3.htm>.

11.2.5.1 Shallow-set Longline Fisheries

Shallow-set longline fisheries primarily target swordfish.²²⁵ Swordfish are most abundant north of Hawaii, outside of the U.S. EEZ on the high seas. These fisheries operate year-round, traveling slightly farther north during summer and fall. Shallow-set hooks tend to be set at depths of 30 to 90 m. As noted above, these fisheries are subject to Section 7 consultations.

11.2.5.2 Deep-set Longline Fisheries

Bigeye tuna is the primary target of the deep-set longline fisheries. This species made up more than half of the total commercial landings in Hawaii in 2015, at approximately 18.7 million pounds.²²⁶ Yellowfin tuna accounted for the next highest proportion, at 9.1 percent (3.1 million pounds). Deep-set hooks are set at a depth between 40 and 350 m, or an average of about 167 m.²²⁷ As noted above, these fisheries are subject to Section 7 consultations.

²²⁵ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2011. Taking of Marine Mammals Incidental to Commercial Fishing Operations: False Killer Whale Take Reduction Plan. Washington, D.C. July 18, 2011. p. 34

²²⁶ U.S. Department of Commerce. National Oceanic and Atmospheric Administration Office of Science and Technology. 2016. Commercial Fisheries Statistics: Annual Commercial Landings by Group. Washington, DC. Last updated 2016. Available at: <https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/annual-landings-with-group-subtotals/index> accessed May 2017

²²⁷ Western Pacific Regional Fishery Management Council. 2010. Managing Domestic Western Pacific Region Longline Fisheries under Tuna Catch Limits: Draft Amendment to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. Washington, D.C. January 27, 2010.

11.2.5.3 MHI Trolling

Trolling fisheries target many pelagic species including blue marlin, striped marlin, yellowfin tuna, mahi-mahi, ono, and skipjack tuna.²²⁸ While trolling does not land as many pelagic fish as longline fisheries, it is pursued by a greater number of boaters, encompassing commercial fishers, recreational fishers, and charter boats. This fishery is not subject to the Section 7 requirements identified for the federally managed deep-set and shallow-set fisheries.

11.2.5.4 Handline Fishing

Handline fishing is an ancient Hawaiian technique that targets yellowfin and bigeye tuna.²²⁹ Handline fisheries are located near or offshore. This fishery is not subject to the Section 7 requirements identified for the federally managed deep-set and shallow-set fisheries.

11.2.5.5 Aku Boat (Pole and Line) Fishing

Aku boat fishing targets aku (skipjack tuna), by first capturing live bait and then using the live bait to catch skipjack tuna.²³⁰ Fishers use barbless hooks attached to bamboo poles to catch the tuna. The use of this type of fishing has declined dramatically over the past several decades. This fishery is not subject to the Section 7 requirements identified for the federally managed deep-set and shallow-set fisheries.

11.3 Impacts to Fisheries from Designation of MHI IFKW Critical Habitat

MHI IFKW predominantly prey on large pelagic fish, such as tuna, swordfish, marlins, mahi-mahi, wahoo, and pomfret. These large pelagic fish are harvested from thousands of vessels in the Pacific Ocean, but those fisheries that overlap with the critical habitat are most likely to impact the MHI IFKW prey. As previously described, in Hawaii, pelagic fisheries include longline, troll and handline, offshore handline, and aku boat (pole and line). Of the pelagic fisheries, only the longline pelagic fisheries (i.e., deep-set and shallow-set) are federally managed and subject to Section 7 consultations. Due to the MHI longline exclusion zone implemented in 1992 under the Pelagic FEP and the 2012 false killer whale TRP, these federally managed longline pelagic fisheries do not overlap with the critical habitat for the MHI IFKW and do not remove prey directly from IFKW critical habitat.^{231, 232}

However, the federally managed longline pelagic fisheries could potentially and indirectly reduce the total biomass of prey available for the IFKW in the critical habitat areas by harvesting prey in the surrounding ecosystem, thereby reducing the number of prey that would otherwise travel through the designation. The magnitude of these effects is unclear. NMFS finds that the threat of commercial longline fisheries to IFKW prey stocks is low and no future modifications to fishery management are expected, but this conclusion relies on incomplete information.²³³ As the diets and foraging ecology of IFKW are understood more fully, including understanding the relative importance of specific prey, additional fishery management (including restricting effort) may be necessary to protect MHI IFKW critical habitat. For the nine identified primary prey species for the MHI IFKW, the U.S. landings as a percentage of stock biomass is low (less than 1

²²⁸ Hawaii Seafood. 2015. Hawaii Fishing Industry. Available at: <https://www.hawaii-seafood.org/hawaii-fishing-industry/>

²²⁹ Hawaii Seafood. 2015. Hawaii Fishing Industry. Available at: <https://www.hawaii-seafood.org/hawaii-fishing-industry/>

²³⁰ Hawaii Seafood. 2015. Hawaii Fishing Industry. Available at: <https://www.hawaii-seafood.org/hawaii-fishing-industry/>

²³¹ U.S. Department of Commerce, National Oceanic and Atmospheric Administration. 2011. Taking of Marine Mammals Incidental to Commercial Fishing Operations: False Killer Whale Take Reduction Plan. Washington, D.C. July 18, 2011.

²³² NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²³³ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

percent for all prey species).²³⁴ Further, some of these prey species (e.g., mahi-mahi, ono, and flying squid) have seen increased total biomass in recent years, possibly due to declines in predator population. Also, even if one prey species declined, the NMFS 2018 Final Biological Report notes that the MHI IFKW's "diversity in diet, which includes mid-trophic level fishes, likely allows these whales to shift to available prey items to meet their energetic needs."²³⁵

11.4 Economic Importance of the Pelagic Fishery

Commercial pelagic fisheries in Hawaii accounted for \$112.8 million in revenue in 2016.²³⁶ Of this, 89 percent was contributed by longline fishing.²³⁷ MHI troll revenue was seven percent of the total and handline fishing totaled three percent.

As a percentage of total catch, 15 percent of pelagic fish catches in Hawaii were by recreational fishers. The Western Pacific Region Fisheries Management Council cautions that "the definition of recreational fishing [...] continues to be problematic in a region where many fishers who are fishing primarily for recreation may sell their fish to cover their expenses."²³⁸ Hawaii requires a commercial license for anyone selling any amount of fish, and as a result, some of the fish caught by recreational fishers may be reported as commercial catch, complicating commercial and recreational estimates.

The total recreational pelagic catch, from 11,000 vessels and 273,190 trips, was estimated at 6.6 million pounds in 2016.²³⁹ Part of this recreational catch is catch from sports-fishing charter boats. Charter boats typically target blue marlin, yellowfin and mahi-mahi. In 2016, charter boats caught an estimated 409,769 pounds of pelagic species.²⁴⁰ These charter vessels are a mixture of commercial and recreational landings, because the skippers of the boats are operating commercial businesses, while the clientele is motivated by recreational fishing. The value of the catch is economically important in several ways. First, the skipper is a proprietor earning income from operating these boats; second, the catch is valuable for meat; and third, the recreational experience has value over and above what people are willing to pay for it.²⁴¹ The commercial value of the recreational catch for all small boats in Hawaii (including pelagics, reef fish, and bottomfish) was estimated at \$5.54 million via a survey of small boat fisheries in Hawaii.²⁴²

The total value of recreational pelagic catch from 11,000 vessels and 273,190 trips was valued as \$5.54 million in 2016. Note that the actual benefits accrued to small boat fishers is smaller than this total, since costs are a high percentage of this revenue.

²³⁴ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²³⁵ NMFS. 2018. Designation of Critical Habitat for the Endangered Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment – Final Biological Report, U.S. Department of Commerce, NOAA. Honolulu, HI, National Marine Fisheries Service, Pacific Islands Regional Office: 50.

²³⁶ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

²³⁷ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

²³⁸ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

²³⁹ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

²⁴⁰ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

²⁴¹ This value, or consumer's surplus, is what is counted in a BCA and is challenging to measure because the "market" for recreational fishing includes many people who pay little or nothing for the experience. Recreational fishing is known as a "non-market good."

²⁴² WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf> accessed May 2017.

For the large pelagic longline fisheries (of which there is a maximum number of permits set at 164), the average revenue per vessel was \$745,825 (in 2012).²⁴³ Due to high labor, fixed, and variable costs, the average annual profit was only \$56,522 per vessel (in 2012), with some vessels reporting negative profit. Given the variability of revenue for all of the MHI fisheries, this complicates the calculation of any potential impacts.

In Hawaii in 2015, 2,045 licensed fishers fished with the intention of catching pelagic fish.²⁴⁴ The majority of these (50 percent) used trolling as the primary method, with 36 percent using longline fishing methods. Aku boat fishers made up 1 percent of pelagic fishing licenses, and handline fishers 13 percent. Note that only 3,691 fishers were licensed in 2015, so pelagic fishing is the primary intent of the majority of fishers.

Sixty-four percent of the pelagic catch was tuna (50 percent of the pelagic catch was bigeye tuna). Mahi-mahi were primarily caught by troll fisheries (49 percent of the mahi-mahi catch) and by deep-set longline fisheries (47 percent of the mahi-mahi catch).

Subsistence fishing is disproportionately important in Hawaii compared to the US at large, affecting both the local economy and way of life. While it is unlikely that subsistence fishing will impact MHI IFKW critical habitat, there remains the potential for future impacts, and any future restrictions could incur costs on these fishers.

11.5 Methodology for Evaluating Impacts to Fishing Activities

Current data, although incomplete, suggests that competition between commercial federally managed fisheries and MHI IFKW critical habitat is low, and that additional management is not necessary. However, future management needs may be identified as more information is gained about MHI IFKW foraging ecology, or a better understanding of the relative importance of certain prey species is gained. Therefore, in the future it is remotely possible that there might be some kind of restriction to catch or effort of a pelagic fishery to reduce the impacts that fisheries have on IFKW prey species.

Were there to be such a restriction to one or more of the pelagic fisheries, the costs of this restriction would be measured in terms of the loss of producer and consumer surpluses. The producer surplus in this case would be the net revenue (total revenue minus costs) of the fishery overall. This could be measured through interviews with current fishers and by reviewing averages for estimated annual costs of fishing boat operations.

Several challenges are present in attempting to quantify the costs or losses associated with restricting access to fisheries in the future for this current analysis. First, as mentioned above, total landings vary substantially from year to year based on incidental catch. Hence, to estimate the magnitude of a constraint, the analyst would need to develop an estimate of what the catch would have been in the absence of the designation of critical habitat. Also, forecasting total catch would be challenging because it depends on weather conditions, boat gear, and availability and numbers of crew. The success of the fishing effort would determine the overall net revenue, or producer surplus. Given the many sources of variability in the fishing industry, estimates of foregone net revenue for the future could be challenging to support at present. However, should this arise in the future, a number of approaches could be used to estimate foregone net revenue such as using 5-year averages, or at a minimum describing the impacts to a representative firm.

It is important to note that because there are so many federally managed boats involved in commercial fishing, the calculation of producer surplus overlooks the fact that the captain and crew of the boats are paid (as part of the costs) and that there is value in the employment created by the fishery. Using BCA, these impacts are not counted because it is assumed that (1) any employment would be reallocated to

²⁴³ Pacific Islands Fisheries Science Center. 2012 Economic Cost Earnings of Pelagic Longline Fishing in Hawaii. October 2016. NOAA Technical Memorandum NMFS-PIFSC-56. doi: 10.7289/V5/TM-PIFSC-56.

²⁴⁴ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at http://www.wpcouncil.org/wp-content/uploads/2017/05/06_B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf

the next best employment opportunity resulting in no net loss, and (2) any expenditures would also be re-spent elsewhere if the restriction were to take effect. As a result, BCA does not count these as losses, and it is therefore just the producer surplus, or the profit that would be given up in the event of a restriction.

If impacts to the fishery were to occur in the future, the measurement of lost producer surplus would be expected to be small. However, if employment consideration were to be evaluated, this could amplify the potential costs of any restriction due to critical habitat designation.

Some additional measurement challenges would occur if effort in the pelagic longline fishery were ever to be restricted (albeit highly unlikely). That is, for these fisheries, it is difficult to determine what kind of baseline producer surplus could be used for measuring the impact of a restriction, because a significant amount of pelagic catch is incidental to other target species. This results in significant variation in catch from year to year and would complicate the calculation of economic impact.²⁴⁵ Due to the uncertainty of these impacts and the uncertainty in setting a baseline, these impacts are not quantified.

11.6 Costs and Benefits of MHI Insular False Killer Whales Critical Habitat Designation (Application of ESA Section 4(b)(2))

Fisheries generate employment and revenue, as well as regional economic impacts (the economic ripple effects). For example, in 2015, commercial pelagic landings revenue totaled \$111 million, creating 6,802 jobs and having an additional value-added impact of \$221 million.²⁴⁶ Although these employment and regional economic impacts are not all included in the “costs” used to measure welfare changes using BCA, the impacts are still important. However, because there are no impacts expected as result of the critical habitat designation at present or in the future, the fishery does not merit any consideration of a potential exclusion under Section 4(b)(2) of the ESA. However, were effort restrictions to be put in place in the future, and were unemployment in Hawaii to be high, then the consideration of costs would be worth re-evaluation. This is not anticipated within the timeframe of this analysis (10 years).

At this time, no additional modifications to fishery activities have been identified; however, fisheries may have to consider MHI IFKW critical habitat in future amendments to FEPs, future Section 7 consultations, and in reinitiations of consultations. This consideration could incur minor administrative costs. Over the last 10 years, twenty Section 7 consultations have occurred related to fisheries in Hawaii. Six of these are formal and fourteen are informal. To estimate the administrative costs associated with future Section 7 consultations and the designation of the critical habitat, we assume there will be the same number and types of consultations over the next decade: fourteen informal Section 7 consultations and six formal Section 7 consultations. This number of consultations is considered baseline, but there may be additional administrative costs to address MHI IFKW critical habitat. Further, we assume there will be an additional three informal reinitiation consultations and one formal reinitiation consultation to consider the potential impacts of relevant fisheries on the MHI IFKW critical habitat. The three informal reinitiations include the shallow-set longline fishery (under the pelagic fishery plan), the bottomfish fishery, and the coral reef ecosystem fishery. The formal reinitiation consultation would be for the deep-set longline fishery (under the pelagic fishery plan). Since the crustacean and precious coral fisheries do not target MHI IFKW prey, consultations requirements are assumed to be minimal and may be addressed through technical assistance. We conservatively include the bottomfish fishery and coral reef ecosystem fishery in the cost projections because both may indirectly or directly harvest MHI IFKW prey species of unknown importance.

²⁴⁵ Elaboration based on data from, WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at <http://www.wpcouncil.org/wp-content/uploads/2017/05/06.B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf>

²⁴⁶ U.S. Department of Commerce. 2015. Fisheries Economics of the United States. Economics and Sociocultural Status and Trends Series.

Under the 10-year timeframe of this analysis, the three informal and one formal Section 7 fishery consultations related to designation of MHI IFKW critical habitat (reinitiations), the two technical assistance reinitiation consultations, and the incremental administrative costs resulting from the fourteen informal consultations and the six formal consultations result in additional administrative costs of \$90,000 (2016 dollars) in undiscounted terms. The present value of these costs is \$79,000 using a 3 percent discount rate, and \$67,000 when a 7 percent discount rate is used. The annualized costs are estimated at about \$9,000 to \$10,000 using 3 percent and 7 percent discount rates, respectively (Table 11-2). These costs would be shared between NMFS and NMFS-SFD (as an action agency).

Table 11-2 Potential Economic Impact to Fisheries due to the MHI IFKW Critical Habitat Designation

| Brief Description | Entity(ies) Bearing the Cost | Post-Designation Costs (\$1,000s of 2016 Dollars) (2018–2027) | | | | | | | | | |
|---|--------------------------------|---|-------------|------------------|-------------|------------------|-------------|---------------|------------|---------------|-------------|
| | | Undiscounted | | Present Value 3% | | Present Value 7% | | Annualized 3% | | Annualized 7% | |
| | | Low | High | Low | High | Low | High | Low | High | Low | High |
| ADMINISTRATIVE COST: Section 7 consultations – Timeline assumes 7 formal and 17 informal consultations, and 2 technical assistances over the 10-year period. The formal consultations, 3 of the informal consultations, and the 2 technical assistances are reinitiations of consultations for each of the fisheries. | NMFS | \$48 | \$48 | \$42 | \$42 | \$36 | \$36 | \$5 | \$5 | \$5 | \$5 |
| | NMFS-SFD (as an action agency) | \$43 | \$43 | \$37 | \$37 | \$32 | \$32 | \$4 | \$4 | \$5 | \$5 |
| TOTAL | | \$90 | \$90 | \$79 | \$79 | \$67 | \$67 | \$9 | \$9 | \$10 | \$10 |

Notes:

In 2016 dollars.

Results are rounded to the nearest \$1,000 and reported in \$1,000s. Numbers may not sum due to rounding.

In this table, “NMFS” refers to NMFS Protected Resources Division bearing costs as the consulting agency; however, “NMFS-SFD” is used to recognize that NMFS – Sustainable Fisheries Division also bears costs as an action agency.

These costs only reflect the incremental administrative costs associated with Section 7 consultations; the analysis did not identify any incremental costs resulting from project modifications due to the critical habitat designation.

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12 Identifying Benefits

Under EO 12866, the OMB directs federal agencies to provide an assessment of all costs and benefits of proposed regulatory actions (e.g., effects on health, safety, environment, economy, and well-being).²⁴⁷ This section focuses on the benefits of critical habitat designation for the DPS of MHI IFKW. Benefits that may accrue due to the critical habitat designation include those related to recreation, aesthetics, environmental education, and cultural and community identity.

The close proximity of the MHI IFKW critical habitat to Hawaii's largest main islands suggests the potential for significant benefits to accrue to the local population and tourists. Furthermore, because the critical habitat designation protects the habitat of a "charismatic megafauna" there are benefits to the greater U.S. population, as individuals throughout the nation are assured of the preservation of the MHI IFKW's natural habitat.²⁴⁸

To address benefits of the MHI IFKW critical habitat designation, this chapter is divided into the following sections. Section 12.1 provides a framework for understanding the benefits of critical habitat designation (i.e., the incremental changes that may occur due to critical habitat designation) and the economic theory of how changes due to critical habitat designation can generate economic value. Section 12.2 describes the different types of economic benefits that may accrue from critical habitat designation, while Section 12.3 summarizes the methods commonly used to estimate the value of such benefits. The values for these types of benefits from the peer-reviewed literature for Hawaii and other areas of the U.S. are presented in Section 12.4, followed by a brief summary. It is important to note that many of the values that are associated with critical habitat designation are non-market, meaning that they cannot be directly measured in the marketplace (as with typical economic goods and services that have a market price), but rather must be ascertained either indirectly through observing the behavior of people, or directly through simply asking people how much they value the resource.

12.1 Framework for Estimating Benefits

The primary driver for benefits from critical habitat designation is a potential change in the quality or condition of the critical habitat that is an improvement over the expected condition of the habitat absent critical habitat designation. It is an incremental change in the condition of the critical habitat, and not the entire resource, that is relevant to this evaluation (see Section 3.2.1 of this report for more information on the incremental approach). Furthermore, according to Section 3 of the ESA, habitat is only designated as critical habitat if it includes "those physical or biological features essential to the conservation of the species." Rather than improve the quality of the habitat or the essential features, the critical habitat designation aims to sustain or preserve the quality of the habitat by preventing degradation, more specifically "destruction or adverse modification." Along with the potential to sustain habitat quality above what it would otherwise be in the future, there is the potential that increased investment in public awareness, education, and scientific research associated with critical habitat designation will generate benefits.

In purpose and design, this analysis is focused on the benefits of critical habitat designation, but in practice, there is considerable overlap between the benefits of listing the MHI IFKW and the benefits of designating critical habitat for this DPS. Because the critical habitat designation is intended to support the goal of the listing, which is the conservation and recovery of the DPS of the MHI IFKW, there will be some co-extensive benefits as a result. Thus in certain scenarios, it is difficult to distinguish between benefits uniquely arising from critical habitat designation and benefits arising in whole or in part from the listing.

²⁴⁷ Executive Order 12866. Regulatory Planning and Review. September 30, 1993.

²⁴⁸ Reynolds, J.E., H. Marsh, and T.J. Regan. 2009. Marine Mammal Conservation. *Endangered Species Research*. 7:23-28.

For example, if the designation of critical habitat helps support an incremental increase in the number of MHI IFKW, this will potentially benefit whale or dolphin watchers. It will also provide regional economic benefits to suppliers of marine mammal watching excursions, and ancillary service suppliers (such as hotels, restaurants, marine fuel suppliers, etc.). However, this benefit arises from both the listing of the species and the designation of critical habitat.

The benefits outlined above will generate economic benefits if they increase individual well-being, or “utility,” as compared with what would otherwise occur. In the following discussion, a brief conceptual overview is provided of how economists measure an increase in well-being from consumption of a good or service. This understanding is useful in that it explains (1) how critical habitat designation might translate into a source of economic benefit or increased individual well-being, and (2) how this benefit could be empirically measured (i.e., quantified).

Economists measure the increase in well-being of consumers of a good or service as the difference between the price consumers pay for the good or service and the benefit they derive from it (which is measured as the maximum price they would be willing to pay, and commonly referred to as willingness-to-pay or WTP). For example, if a tourist is willing to pay \$100 for a fishing trip off the MHI, but only has to pay \$75, then the tourist has a net benefit, or increase in well-being, from the trip equal to \$25. Assuming all other things being equal, a change, or increase, in this well-being from the consumption of goods and services can thus occur either because the price falls or because the quality of the good or service rises and results in increased value to (or WTP by) the consumer. In the case of the MHI IFKW critical habitat designation, such improved well-being may arise if there is higher habitat quality in the future (than would otherwise occur in the absence of critical habitat designation). This may result in increased well-being (and WTP) if improved habitat quality increases the quality of goods and services provided by the habitat, such as fishing trips. If increased investment in public education and scientific knowledge occurs due to critical habitat designation, this too may cause increased well-being by causing personal preferences to change. If personal preferences change, such that public perception and enjoyment of critical habitat or other environmental attributes increases for a given level of critical habitat quality, critical habitat designation will also increase well-being and WTP for habitat services or environmental attributes even without changes in habitat quality.

12.2 Overview of Types of Economic Benefits

The benefits generated by a natural resource, such as MHI IFKW critical habitat, can be classified into several categories (Figure 12-1). One important distinction is between use benefits that are generally associated with people’s present use of the critical habitat resource and nonuse (or passive use) benefits that do not require present use and, instead, are derived through knowledge that the habitat exists and is protected. Within the use and nonuse benefit categories, there are further subcategories, which are described below. Economists differ on how to organize these values in terms of use and nonuse classification and sub-classifications. However, as the aim of this study is to account for all benefits, the specific categorical labels are less important than ensuring that all types of potential benefits accruing from critical habitat designation are identified and addressed.

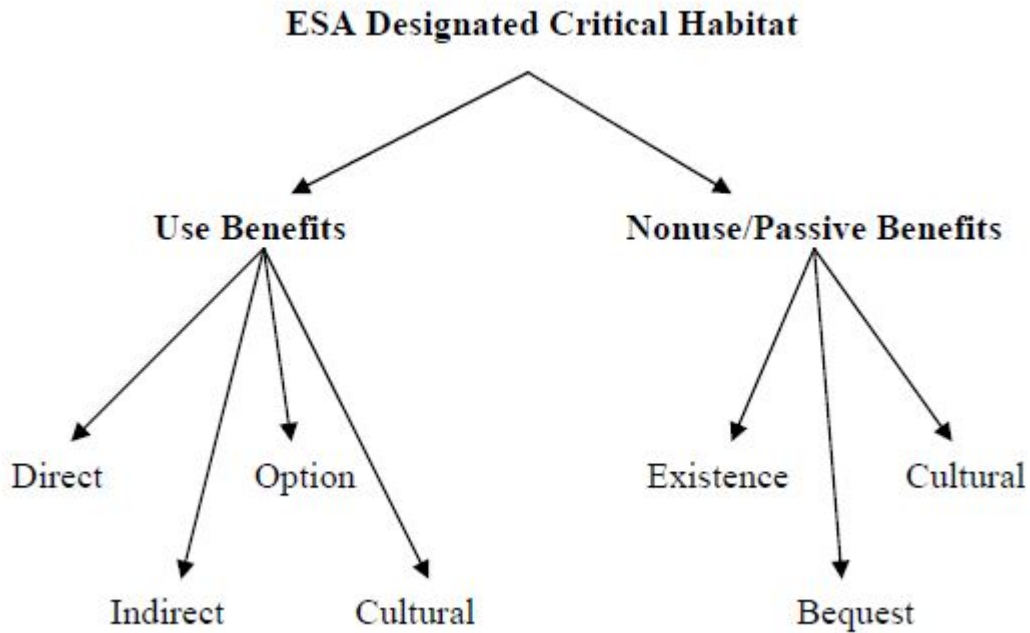


Figure 12-1 Benefits of Critical Habitat Designation

In addition to the categories shown in Figure 12-1 above, economic benefits arising from the use and passive use of MHI IFKW critical habitat can be divided into consumptive or non-consumptive uses. The economic benefits of protecting MHI IFKW critical habitat primarily arise from non-consumptive uses, which are uses associated with a good or service independent of its consumption. Non-consumptive MHI IFKW critical habitat benefits may include use benefits from whale watching, shoreline recreation, public education, and scientific study and associated literature, as well as passive use benefits (e.g., preservation for future generations' use). Consumptive uses of critical habitat primarily consist of hunting and fishing or other extractive uses, including energy, as well as physical, ecological, and biological service flows (e.g., effluent dissipation and absorption).

As noted earlier, the close proximity of MHI IFKW critical habitat to population centers and communities suggests significant potential for non-consumptive benefits to accrue to the local population (e.g., quality of life effects). Furthermore, many of the locations immediately adjacent to the MHI are regional, national, and international tourist destinations and world class outdoor recreation sites. Again, their proximity to MHI IFKW critical habitat suggests potential for significant generation of non-consumptive use benefits (e.g., aesthetics).

12.2.1 Use Benefits

Use benefits of critical habitat will be generated if the value of services derived from use of MHI IFKW critical habitat incrementally increases (above what it would be otherwise) due to the designation. The increase in marginal value associated with the change in use, due directly to the designation, makes up the use benefit portion of the total benefits of critical habitat designation. Use benefits are described below in four distinct (i.e., additive) but related categories: direct, indirect, option, and cultural.

12.2.1.1 Direct Use Value

Direct use values include both consumptive and non-consumptive direct uses of the designated habitat. Any positive change in activities undertaken within the critical habitat compared to the no-designation condition, including changes in activity type, timing, or intensity, or any increase in the level of enjoyment

of the current activities in the critical habitat due to the designation, generates direct use benefits to society.

For example, compared to the “without critical habitat designation” conditions, the designation of critical habitat could increase the value of the sport fishing experience in critical habitat, as it overlaps substantially with popular recreational fishing locations. Prey for MHI IFKW include pelagic fish (including tuna and mahi-mahi) and cephalopods. These prey species will be sustained as an essential feature of the critical habitat. If, compared to the “no critical habitat designation” condition, the critical habitat designation enhances long-term stability and sustains healthy stocks of MHI IFKW prey species, then recreational anglers may experience an increased consumptive use value from fishing in and adjacent to MHI IFKW critical habitat.²⁴⁹

In addition to potential effects on fish stocks, critical habitat designation may also improve the non-consumptive value attributable to the aesthetic experience associated with fishing, as well as other related outdoor uses of adjacent areas, such as shorelines, viewpoints, and beaches within view of the critical habitat. If the critical habitat designation preserves the aesthetic appeal of critical habitat by decreasing adverse and objectionable anthropogenic changes, it may increase personal well-being to those users who value one or more attributes (such as water quality, sighting of marine mammals or other wildlife) of the current state of areas to be designated as critical habitat.

An example of a potential non-consumptive, direct²⁵⁰ use benefit of critical habitat designation is associated with increased value of wildlife viewing, including, but not limited to, wildlife viewings. Critical habitat for MHI IFKW supports and sustains a myriad of other species, including other ESA-listed species. Many of these are highly valued as critical components of the aesthetic reward, cultural heritage, and non-pecuniary remuneration associated with living in the MHI. If the critical habitat designation incrementally increases the MHI IFKW population (compared to the condition without critical habitat designation), then people who value viewing the MHI IFKW from shoreline vantage points or from boats in the water will experience increased well-being.

12.2.1.2 Indirect Use Value

Indirect use values are derived from the consumptive and/or non-consumptive indirect use of a natural resource. In this case, indirect use value is created from using a resource that is enhanced by an improvement (or an avoided deterioration) in the quality of the MHI IFKW critical habitat. For example, when MHI IFKW critical habitat quality is sustained and preserved, nearby habitat may benefit. Fishers located outside of the critical habitat may benefit from the maintenance of sport fish species spawning and rearing in critical habitat (indirect consumptive use). Similarly, if the designation creates a more aesthetically appealing habitat in areas adjacent to critical habitat, critical habitat designation could result in a more enjoyable boating or shoreline activity experience in these adjacent areas and a higher value (or WTP) for these activities (indirect, non-consumptive use). Thus, in its use of habitat off the coast of the MHI, society may benefit both directly from the sustained quality within critical habitat itself, as well as indirectly from sustained quality in adjacent habitats.

²⁴⁹ Based on the purpose of critical habitat designation, sustaining prey stocks is intended to benefit the MHI IFKW, and any increase in prey stock population resulting from critical habitat designation may be entirely consumed by MHI IFKW, creating no net gain or loss in direct benefits to subsistence, personal-use, or recreational fishermen in terms of retained fish. It is well established, however, that in the case of recreational fishing, many aspects of the experience contribute to the overall value attained, not simply the number of fish retained. Therefore, if critical habitat designation resulted in no net change in the number of retained sport fish, recreational anglers may still accrue increases in “value” from their experience since some anglers might see a MHI IFKW and/or other charismatic mammals such as dolphins and that could improve the experience. Presumably, this would be less the case for either subsistence or personal-use fishermen, who are, by and large, assumed to be fishing for “meat.”

²⁵⁰ Note that any increased value of wildlife viewing, including dolphin viewing excursions, could also be considered an indirect benefit of critical habitat designation, as the MHI IFKW is a resource that benefits directly from the critical habitat’s conservation. But, as noted above, this categorical distinction is less important than noting that this benefit exists.

Indirect use benefits also include scientific and educational gains attributable to the critical habitat designation. If critical habitat designation results in new and enhanced scientific understanding of the relationship between attributes of the critical habitat and the MHI IFKW, natural resource managers and scientists, as well as the population as a whole, benefit in a number of ways. Critical habitat designation contributes to education, informing a wide range of individuals of the role habitat plays in maintenance of natural environmental service flows, the effects of human activity (both positive and negative) on those service flows, and ways in which human activity and natural functions interact. Critical habitat designation may facilitate improved understanding of these interactions and trade-offs at every level, from highly technical disciplines (e.g., microbiological analysis of demersal substrates) to K-12 classroom curricula, and to local civic decision-making.

12.2.1.3 Option Use Value

Option use values derive from the preservation of the option for future use of a resource. In the present context, the MHI IFKW critical habitat designation will, it is anticipated, sustain the essential feature and associated characteristics critical to the conservation and recovery of the MHI IFKW. This action retains the option for individuals to use the preserved habitat in the future for any desired activities, based on prevailing conditions, needs, and preferences. Conceptually, option value reflects an individual's WTP to avoid foreclosing future access to a resource or activity. Here, WTP reflects the current value to an individual of preserving the opportunity, at some unspecified point in the future, of using the designated critical habitat. Some economists prefer to consider option value as another form of use value, because both current and future values should be considered and accounted for in all cases of value measurement. However, others consider this a unique classification, because it implies that people place distinct value on the "possibility" (i.e., option) of future use that is different from expected future use. This categorical distinction, while an interesting aside, has no immediate bearing on the evaluation of MHI IFKW critical habitat designation.

12.2.1.4 Cultural Use Value

Cultural values are different from other economic values, because they are specific to each group of people and do not readily lend themselves to monetary approximation. Economic monetization, in general, is based upon the premise that markets exist, or at least can be approximated, within which trade can occur between two parties. This is not a valid assumption in the case of cultural values. Nevertheless, changes in individual well-being connected with enhanced cultural welfare constitute real, potentially significant, economic benefits attributable to the critical habitat designation.

12.2.2 Nonuse or Passive Use Benefits

Natural resources also have value to society independent of their use. Passive or nonuse values include, among others, existence, bequest, and cultural values. An increasing number of peer-reviewed, empirical studies have sought to estimate society's value or WTP to protect rare species, unique habitats, or whole ecosystems. These nonuse or passive use values of habitat, as they may pertain to critical habitat designation, are identified and briefly discussed here.

Existence value is defined as individual utility or well-being derived from the knowledge of the existence of a natural resource, without the expectation of any form of use. For example, the mere knowledge of the existence of a relatively few California condors in the wild may elicit a large WTP (i.e., generate a large benefit) to ensure the continued existence of that species in its natural ecological setting. This WTP, or benefit derived by an individual, may be substantial, even though the individual has no expectation of ever seeing the bird or visiting its habitat. Because the MHI IFKW is an iconic species, it may also elicit a large WTP among residents with the region and possibly the mainland U.S.

Passive use value to society of critical habitat designation reflects the increased well-being obtained from the knowledge that MHI IFKW persist within their natural habitat off of Hawaii. Society would not derive

the same level of well-being (i.e., would not have an equivalent WTP) for a remnant population of MHI IFKW kept in an artificial environment, such as an aquarium tank in Honolulu. Thus, critical habitat contributes directly to the nonuse benefit enjoyed by society due to the existence of the MHI IFKW in situ. WTP for passive use welfare changes can be empirically estimated.

Passive use benefits are also generated by the preservation of natural resources, such as plant and animal species, habitat, and ecosystems, for future generations' use. It has been empirically estimated that individuals derive utility from the knowledge that society preserves resources so that they will be extant for the next generation, creating a bequest value. Economists disagree about whether bequest value is distinct from existence value, but it still represents an important conceptual element of passive use valuation. The potential change in the bequest value of habitat following critical habitat designation is one element of the total benefit society may derive from the critical habitat designation.

12.3 Valuation Methods

Economists typically rely on observed trades between willing buyers and willing sellers to identify the market-clearing price of a good or service. As described in the introduction to this section, environmental goods for which no market exists (non-market goods) are particularly challenging to value, because absent an observable market, no "price" is revealed. The following describes some of the techniques that have been developed to measure non-market values.

The value of non-market goods may be estimated using either revealed preference or stated preference evaluation approaches. Revealed preference valuation methods use information on observed behavior to infer the value of the non-market good or service.²⁵¹ As such, these methods require data on observable behavior to be linked to the non-market good in question.²⁵² Stated preference methods, on the other hand, involve asking individuals carefully worded hypothetical market questions to either directly or indirectly infer the value they place on a non-market good or service.²⁵³ Thus, the principal difference between the revealed preference and stated preference methods is the type of data used. Revealed preference methods use data on observed behavior to infer economic values, while stated preference methods use data on stated or intended behavior to infer economic values. Due to their reliance on observable behavior, revealed preference methods are generally not able to estimate nonuse values, which, by definition, are not tied directly to observable behavior. Thus, researchers generally use stated preference methods to estimate nonuse values.

The most commonly used and best known stated preference method is the contingent valuation (CV) class of methods. In CV, economic values for a non-market good or service are revealed through survey questions that design hypothetical markets for a non-market good or service, and ask respondents to indicate their WTP (or willingness-to-accept compensation) for (or to forgo) the good or service. In a standard CV survey, a public good is described, such as a program to protect one or more "threatened or

²⁵¹ Bockstael, N.E. and K.E. McConnell. 1983. Welfare Measurement in the Household Production Function Framework. *American Economic Review* 73(4):806-814; Boyle, K. J. 2003. Introduction to Revealed Preference Methods, in P.A. Champ, K.J. Boyle, and T.C. Brown (eds). *A Primer on Nonmarket Valuation*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

²⁵² Included in the category of revealed preference methods are travel cost methods (Parsons, 2003), hedonic methods (Taylor, 2003), and the avoidance expenditure approach (Dickie, 2003). The appropriateness of each method depends upon how the non-market good enters individuals' preferences, as discussed above and in Freeman (2003). In many of these methods, the economic value of the non-market good is measured through changes in the observable demand for a related good, such as a good that is consumed in conjunction with the non-market good (complement) or instead of the non-market good (substitute).

²⁵³ Mitchell, R.C., and R.T. Carson. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington, D.C.: Resources for the Future; Carson, R.T., N.E. Flores, and N.F. Meade. 2001. Contingent Valuation: Controversies and Evidence, *Environmental and Resource Economics*, 19:173-210.

endangered” species, or their critical habitat, and respondents are asked questions to elicit their WTP for the public good through a payment vehicle, such as taxes or contributions to a trust fund.^{254, 255}

12.4 Related Literature

Previous economic studies have estimated the economic value of the types of benefits that could accrue from critical habitat designation. A selection of these studies is reviewed below for each primary type of use value or activity associated with critical habitat designation, including wildlife viewing, recreational fishing, subsistence activities, and education and volunteerism.

Using the Consumer Price Index, all values from the studies reviewed in this section were adjusted to 2017 dollars for comparison purposes.²⁵⁶ The literature and values cited in this section provide a general sense of the magnitude of the use benefit individuals and society derive from the attributes provided by resources such as MHI IFKW critical habitat. The benefits from these studies, however, are not directly associated with MHI IFKW critical habitat designation, but instead demonstrate representative values. These cannot be directly translated to critical habitat designation values, because it is not known with certainty how critical habitat designation will affect habitat quality (i.e., to what degree the critical habitat designation will reduce degradation, compared to the no-critical habitat designation condition), nor is it known with certainty the extent to which critical habitat designation will increase public education, awareness, or scientific research on the MHI IFKW and its habitat. The values from these studies do, however, provide important context for understanding the possible magnitude of the use values that may result from critical habitat designation.

12.4.1 Recreation Benefits

The economic benefits of fishing and wildlife viewing have been studied extensively by economists, resulting in a wide range of values. In a 2001 study, Randall Rosenberger and John Loomis examined relevant literature to determine the value of outdoor recreation use in the U.S.²⁵⁷ The final database includes 163 studies that provide over 750 benefit estimates of per-day or per-trip-day recreation values. A trip day is defined as recreation occurring within a 1-day period and lasting for any length of time, from a half hour excursion to an all-day outing.

While there are no estimates in the database specifically for Hawaii, through a technique called benefits transfer, where values from one study are applied in another context, values from the database were analyzed for the nation. Results showed that the national value of wildlife viewing was \$44.46 per trip day.

A 2005 study by John Loomis²⁵⁸ updates the Rosenberger and Loomis²⁵⁹ literature review through 2003 and provides over 1,200 benefit estimates in 30 outdoor recreation use categories. In the Pacific coast region (inclusive of Washington, Oregon, California, and Hawaii), Loomis (2005) finds from 23 studies that the average general recreation value is \$41.18 per trip day.

²⁵⁴ Cummings, R.G., D.S. Brookshire, and W.D. Schultz ed. 1986. *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*. Rowman & Allanheld Publishers; Mitchell, R.C., and R.T. Carson. 1989. *Using Surveys to Value Public Goods: The Contingent Valuation Method*. Washington, D.C.: Resources for the Future; Arrow, K., R. Solow, P.R. Portney, E.E. Leamer, R. Radner, and H. Schuman. 1993. Report of the NOAA Panel on Contingent Valuation. 58 FR 4601–4614.

²⁵⁵ While willingness-to-accept is sometimes the more relevant welfare measure, empirical and experimental evidence has pointed to the use of WTP welfare measures in stated preference surveys (e.g., Arrow, et al., [1993], Adamowicz, Bhardwaj, and McNab [1993], Mansfield [1999]).

²⁵⁶ Bureau of Labor Statistics. 2017. CPI Inflation Calculator. Available at http://www.bls.gov/data/inflation_calculator.htm accessed May 2017.

²⁵⁷ Rosenberger, R. and J. Loomis. 2001. *Benefit Transfer of Outdoor Recreation Use Values*. USDA Forest Service General Technical Report RMRS-GTR-72.

²⁵⁸ Loomis, J. 2005. *Updated Outdoor Recreation Use Values on National Forests and Other Public Lands*. USDA Forest Service General Technical Report PNW-GTR-658.

²⁵⁹ Rosenberger, R. and J. Loomis. 2001. *Benefit Transfer of Outdoor Recreation Use Values*. USDA Forest Service General Technical Report RMRS-GTR-72.

12.4.2 Fishing

The economic benefits of fishing have been estimated in many studies, creating a wide range of values. From the Rosenberger and Loomis²⁶⁰ study, a CV study in Hawaii finds the value of a fishing trip day in Hawaii to be \$95.03. In the Pacific coast region, Loomis (2005) finds from 15 studies that the average value of fishing is \$56.88 per trip day.

12.4.3 Wildlife Viewing and Sightseeing

The economic benefits from wildlife viewing, and particularly marine mammal viewing (whales and dolphins), can be substantial. For example, in a 2006 review of whale watching studies,²⁶¹ Linwood Pendleton presents a range of consumer surplus values between \$43 and \$57 per whale watching trip.²⁶²

Two studies by John Loomis in 1994 and 2000²⁶³ use the CV method to estimate the value of whale watching to California whale watchers. The studies were based on a 1991 to 1992 survey of whale watchers conducted at four locations along the California coast during times of the gray whale migration.²⁶⁴ Whale watching from shore was available at all four sites, while boat whale watching trips were common at two of the sites. It is important to note that at the time of the survey, gray whales had recently been removed from the ESA threatened species list. In the 1994 study, John Loomis and Douglas Larson examined whale watchers' WTP for a 50 percent and 100 percent increase in the gray whale population and a corresponding increase in sightings. The study finds the WTP for a 50 percent increase in gray whale sightings is \$64, while a 100 percent increase in sightings elicits a WTP or benefit of \$75.

A 2000 study by John Loomis, Shizuka Yorizane, and Douglas Larson²⁶⁵ estimates the consumer surplus associated with gray whale watching along the California coast, using the travel cost method. The study uses two estimation techniques, which provide the per-person per-day benefit values to whale watchers participating in several types of whale watching trips, including (1) a whale watching trip to a single destination (\$93–\$107), (2) a single or multi-destination trip where whale watching is a main purpose of the trip (\$112), and (3) a trip where whale watching is part of “a bundle of visits to related nearby sites” (\$382). The higher values for multi-activity, multi-destination trips are consistent with the literature, since such trips are typically more valuable to participants due to the variety of experiences offered.

12.4.4 Passive Use Value Literature

Although no studies have been done regarding the passive use value for the MHI IFKW specifically, passive use values for other large marine mammals have been studied fairly extensively by economists. For example, of the total value for whales, dolphins, sea otters and seals, Hageman found that about two-thirds (65–72 percent) of the total WTP was for the mere existence of the species, and not for any non-consumptive use nor for the option to view the species in the future. The total annual household WTP for blue and gray whales was the equivalent of \$41.54 now, or \$17.15 in 1984.²⁶⁶ In 1994, another study

²⁶⁰ Rosenberger, R. and J. Loomis. 2001. Benefit Transfer of Outdoor Recreation Use Values. USDA Forest Service General Technical Report RMRS-GTR-72.

²⁶¹ While IFKW are not actually whales, a discussion of whale watching benefits is provided and considered relevant to the benefits of observing false killer whales (dolphins).

²⁶² Pendleton, L.H. 2006. Understanding the Potential Economic Impact of Marine Wildlife Viewing and Whale Watching in California: Using the Literature to Support Decision-Making for the Marine Life Protection Act.

²⁶³ Loomis, J.B. and D.M. Larson. 1994. Total Economic Values of Increasing Gray Whale Populations: Results from a contingent valuation survey of visitors and households. *Marine Resource Economics* 9:275-286; and Loomis, J., S. Yorizane, and D. Larson. 2000. Testing Significance of Multi-Destination and Multi-Purpose Trip Effects in a Travel Cost Method Demand Model for Whale Watching Trips. *Agriculture and Resource Economics Review* 29/2:183-191.

²⁶⁴ The Loomis and Larson 1994 study reports that surveys were conducted over the winter of 1991/1992. However, the Loomis et al., 2000 study reports that the surveys were conducted in 1993. Hence it is not clear exactly when the surveys were completed.

²⁶⁵ Loomis, J., S. Yorizane, and D. Larson. 2000. Testing Significance of Multi-Destination and Multi-Purpose Trip Effects in a Travel Cost Method Demand Model for Whale Watching Trips. *Agriculture and Resource Economics Review* 29/2:183-191.

²⁶⁶ Hageman, R. 1985. Valuing marine mammal populations: Benefit valuations in a multi-species ecosystem. Administrative report LJ-85-22. Southwest Fisheries Science Center, National Marine Fisheries Service, La Jolla, CA

again showed the consistency of WTP for whales—gray whales in California—by both visitors and local households, using the total economic value concept covering both passive and active use value.²⁶⁷ Another good example is from authors Sample and Hollyer (1990), who found that households would be willing to pay a one-time fee of \$266 to \$302 (in 2017 dollars) to prevent extinction of humpback whales in Hawaii.²⁶⁸ This collection of literature demonstrates that it is very likely there are similar types of benefits associated with the MHI IFKW listing and critical habitat designation.

12.4.5 Environmental Education and Volunteerism Benefits

Environmental education and environmental volunteerism associated with habitat preservation are another potential source of individual and societal benefits of critical habitat designation. The relationship between critical habitat designation activities (e.g., the science, politics, economics, and public policy) and education and volunteerism is interdependent and, so, complicates the process of attempting to quantify the benefits. Nonetheless, studies show that environmental education and volunteering can provide substantial benefits to individuals and society as a whole. Many economic studies focus on the value of general education benefits, including wage, health, and improved social relationship benefits from increased education levels.²⁶⁹ Studies specifically focusing on the benefits of environmental education and volunteering, such as those that may accrue from MHI IFKW critical habitat designation are few, but two studies conducted in the United Kingdom on environmental volunteering indicate the potential for significant benefits, both to society as well as to the individual volunteer.²⁷⁰ In these studies, British environmental volunteers, who likely have similar motivations and benefits as American environmental volunteers, reported such varied individual benefits as increased personal well-being and positive emotional effects, gaining new skills and knowledge about environmental issues and policies, enjoyment of nature and the outdoors, increased physical exercise, and becoming more connected to other people in their community and their natural environment.

Community benefits reported in these studies include the value of environmental improvements, such as habitat restoration, as well as increased social capital and community cohesion that is generated from people connecting and working collaboratively. Social capital (often defined as the “social network and norms of reciprocity and trustworthiness that arise from them”)²⁷¹ is, in turn, associated with broad societal benefits, including economic, psychological, health, social, and political benefits.²⁷² To the extent that critical habitat designation increases environmental volunteering, it is expected that these individual and collective benefits will be generated.

In addition to the empirical studies, the fact that volunteer work for such purposes as the conservation of the MHI IFKW and its critical habitat is done without monetary compensation suggests that volunteering creates benefits for the volunteer. In economic theory, the time that individuals spend on volunteer work reduces the time they have available for paid work and, therefore, “costs” them the equivalent of their foregone wages, or some portion thereof. Consequently, economists often estimate the minimum value of benefits to volunteers as the value to them of their foregone wages (adjusted downward for taxes and upward for fringe benefits), as well as any disutility of work (e.g., downward wage rate adjustment for work-induced stress). The theory suggests that for volunteers to be motivated to volunteer, the value of

²⁶⁷ Loomis, J.B. and D.M. Larson. 1994. Total Economic Values of Increasing Gray Whale Populations: Results from a contingent valuation survey of visitors and households. *Marine Resource Economics* 9: 275-286

²⁶⁸ Samples, K. and J. Hollyer. 1990. Contingent valuation of wildlife resources in the presence of substitutes and complements. In: R. Johnson and G. Johnson, Eds., *Economic Valuation of Natural Resources: Issues, Theory, and Application*. Westview Press, Boulder, CO

²⁶⁹ Wolfe, B.L. and R.H. Haveman. 2002. Social and Nonmarket Benefits from Education in an Advanced Economy. Conference Series 47. *Education in the 21st Century: Meeting the Challenges of a Changing World*.

²⁷⁰ O'Brien, L., M. Townsend, and M. Ebdon. 2008. *Environmental Volunteering: Motivations, Barriers, and Benefits*. Report to the Scottish Forestry Trust and Forestry Commission. Hine, Rachel, Jo Peacock, and Jules Pretty. 2008. Evaluating the impact of environmental volunteering on behaviours and attitudes to the environment. For the British Trust of Conservation Volunteers.

²⁷¹ Putnam, R.D. 2000. *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon & Schuster, p.19.

²⁷² Saguaro Seminar on Civic Engagement in America. 2000. *Better Together: The Report of the Saguaro Seminar on Civic Engagement in America*. Harvard University, Kennedy School of Government.

volunteering must exceed this foregone adjusted wage rate. Based on intrinsic enjoyment of the volunteer activity, the true hourly benefit derived from volunteering may actually exceed the labor rate.

12.5 Qualitative Discussion of the Ancillary Benefits of Critical Habitat Designation for the MHI Insular False Killer Whales

There are numerous types of economic benefits that may accrue to residents living near the MHI IFKW critical habitat, and to citizens throughout the U.S. These include potential benefits associated with recreation, fishing, wildlife viewing, fishing, and environmental and volunteering benefits. The different types of expected benefits include direct use, indirect use, nonuse or passive use, consumptive, and non-consumptive benefits. While the magnitude of some of these types of benefits has been studied, they have not been studied in direct association with the critical habitat designation for the MHI IFKW. Further, in all cases, the types of economic benefits associated with critical habitat designation are largely co-extensive with listing the MHI IFKW as endangered. As a result, it is difficult to quantify the total value of economic benefit to be expected from the action of designating critical habitat at this time. It is clear, however, that critical habitat designation will contribute to the types of economic benefits described in this section.

13 Potential Impacts on Small Entities and Energy Effects – A Regulatory Flexibility Act Analysis of MHI IFKW Critical Habitat Designation

The RFA, first enacted in 1980, was designed to place the burden on the government to review all regulations to ensure that while accomplishing their intended purposes they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or non-profit organization frequently has a bearing on its ability to comply with a federal regulation. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting impacts on small entities as a group, distinct from other entities, and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action.

President Clinton signed the SBREFA on March 29, 1996. Among other things, the new law amended the RFA to allow judicial review of an agency's compliance with the RFA. The 1996 amendment also updated the requirements for a final regulatory flexibility analysis, including a description of the steps an agency must take to minimize the significant economic impact on small entities. Finally, the 1996 amendments expanded the authority of the Chief Counsel for Advocacy of the SBA to file amicus briefs in court proceedings involving an agency's violation of the RFA.

In determining the scope, or "universe" of the entities to be considered in a FRFA, NMFS generally includes only those entities, both large and small, that can reasonably be expected to be directly regulated by a proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g. user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis. NMFS interprets the intent of the RFA to address negative economic impacts, not beneficial impacts, and thus this is the focus in analyses that are designed to address RFA compliance.

Data on cost structure, affiliation, and operational procedures and strategies in the sectors potentially subject to the proposed regulatory action are insufficient, at present, to permit preparation of a "factual basis" upon which to certify that the preferred alternative does not have the potential to result in "significant adverse impacts on a substantial number of small entities" (as those terms are defined under RFA). Because, based on all available information, it is not possible to "certify" this outcome, should the proposed action be adopted, a FRFA has been prepared.

13.1 Contents of Final Regulatory Flexibility Analysis

A FRFA describes the impacts of the rule on small entities. Under 5 U.S.C., Section 603(b) and (c) of the RFA, each FRFA is required to contain:

- > A description of the reasons why the action by the agency is being considered;
- > A succinct statement of the objectives of, and legal basis for, the rule;
- > A summary of significant issues raised by the public comments in response to the IRFA, the agency's response to those comments, and a statement of any changes made to the rule as a result of the comments;
- > A description of and, where feasible, an estimate of the number of small entities to which the rule will apply, or an explanation of why no such estimate is available;

- > A description of the projected reporting, recordkeeping, and other compliance requirements of the rule;
- > An identification, to the extent practicable, of all relevant federal rules that may duplicate, overlap, or conflict with the proposed rule;
- > A description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities. (Examples of these alternatives are provided under 603(c) of the RFA); and
- > A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of factual, policy, and legal reasons for selecting the alternative adopted in the final rule.

13.1.1 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: (1) small business, (2) small non-profit organizations, and (3) small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a “small business” as having the same meaning as “small business concern” which is defined under Section 3 of the Small Business Act. “Small business” or “small business concern” includes any firm that is independently owned or operated and is not dominant in its field of operation. The SBA further defines a “small business concern” as one “organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials, or labor. A (small) business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust, or cooperative, except that where the firm is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture.”

The SBA has established size criteria for all major industry sectors in the U.S. and publishes those on its website. For example, the SBA defines an oil extraction business as a small business if it is independently owned or operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis at all of its affiliated operations worldwide. Other SBA industrial sector criteria that may be pertinent to this analysis include total receipts. Table 13-1, below, includes the categories of firms in these sectors, as defined by the SBA, as well as specific criterion to be used for RFA purposes.

The SBA established “principles of affiliation” to determine whether a business concern is “independently owned and operated.” In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or has third-party control or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern’s size. However, business concerns owned and controlled by the tribes, Alaska Regional or Village Corporations pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership (1) when a person is an affiliate of a concern if the person owns or controls, or has the power to control 50 percent or more of its voting stock or a block of stock that

affords control because it is large compared to other outstanding blocks of stock; or (2) if two or more persons each owns, controls, or has the power to control less than 50 percent of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises when one or more officers, directors, or general partners controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint ventures if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations. The RFA defines “small organizations” as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of less than 50,000.

13.1.2 Reason for Considering the Action

The MHI IFKW DPS was listed as endangered under the ESA based on the high extinction risk of the population and insufficient conservation efforts in place to reduce that risk following NMFS’s publication of a final listing, on November 28, 2012.²⁷³ The ESA requires that, to the maximum extent prudent and determinable, critical habitat be designated for endangered and threatened species based on the best scientific data available.

In the final listing rule, NMFS stated that critical habitat was not determinable at the time of the listing, because sufficient information was not currently available on the geographical area occupied by the species, the physical and biological features essential to conservation, and the impacts of the designation.²⁷⁴ Under Section 4 of the ESA, if critical habitat is not determinable at the time of listing, a final critical habitat designation must be published 1 year after listing.²⁷⁵ The Natural Resources Defense Council filed a complaint in July 2016 with the U.S. District Court for the District of Columbia seeking an order to compel NMFS to designate critical habitat for the MHI IFKW DPS, and a court-approved settlement agreement was filed on January 24, 2017.²⁷⁶ The settlement agreement stipulated that NMFS will submit the proposed rule to the Office of the Federal Register by October 31, 2017, and the final rule to the Office of the Federal Register by July 1, 2018. This action is being considered in compliance with Section 4 of the ESA and in efforts to best meet the conservation mandates that the ESA provides for the listed MHI IFKW DPS.

13.1.3 Objectives of, and Legal Basis for, the Action

The objective of this action is to use the best available scientific information, including historical distribution of the species, feeding and foraging behavior of the species, aggregation patterns within the habitat, and physical and biological features essential to its conservation (essential feature and associated characteristics) to characterize and, as appropriate, designate critical habitat to support recovery for this endangered DPS. Section 4(b)(2) of the ESA requires NMFS to consider the economic

²⁷³ National Oceanic and Atmospheric Administration. 50 CFR Part 224 [Docket No. 0912161432–2630–04] RIN 0648–XT37. Endangered and Threatened Wildlife and Plants; Endangered Status for the Main Hawaiian Islands Insular False Killer Whale Distinct Population Segment. Federal Register 77(229)/Wednesday, November 28, 2012/Rules and Regulations (77 FR 70915).

²⁷⁴ At 77 FR 70915; November 28, 2012.

²⁷⁵ At 16 U.S.C. 1533 (b)(6)(C)(ii).

²⁷⁶ Natural Resources Defense Council, Inc. v. Penny Pritzker, National Marine Fisheries Services, 1:16-cv-1442 (D.D.C.).

impact, impact on national security, and any other relevant impact of specifying a particular area as critical habitat. NMFS has the discretion to exclude any particular area from a critical habitat designation, if the benefits of excluding that area outweigh the benefits of including it in the designation, and exclusion will not result in extinction of the species. The ESA defines critical habitat under Section 3(5)(A) as:

“(i) the specific areas within the geographical area occupied by the species, at the time it is listed..., on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
(ii) specific areas outside the geographical area occupied by the species at the time it is listed... upon a determination by the Secretary that such areas are essential for the conservation of the species.”

The authority to designate critical habitat, including the authority to consider the impacts of designation, weigh the benefits of exclusion against the benefits of designation, and exclude particular areas, has been delegated to the Assistant Administrator of the NMFS.²⁷⁷

13.1.4 **Significant Issues Raised by Public Comments**

NMFS received no comments on the IRFA during the formal public comment period and the public hearing that was held in Honolulu, Hawaii.

13.1.5 **Description of Any Small Entities Directly Regulated Under the Action**

This section summarizes what is known about the potential adverse impacts of MHI IFKW critical habitat designation on directly regulated small entities. Table 13-1, below,²⁷⁸ summarizes those businesses and government entities that are directly regulated by the critical habitat area and potentially meet the standards set forth in the RFA.

Table 13-1 SBA Small Business Threshold Criteria for Relevant Sectors

| North American Industry Classification System Code | North American Industry Classification System U.S. Industry Title | SBA Small Business Threshold Criteria |
|---|---|---------------------------------------|
| Sector 11 – Agriculture, Forestry, Fishing, and Hunting | | |
| Subsector 112 – Animal Production and Aquaculture | | |
| 112511 | Finfish Farming and Fish Hatcheries | \$0.75 million |
| 112512 | Shellfish Farming | \$0.75 million |
| 112519 | Other Aquaculture | \$0.75 million |
| 112120 | Animal Production, specifically Dairy Cattle and Milk Production | \$0.75 million |
| Subsector 114 – Fishing, Hunting, and Trapping^a | | |
| 114111 | Finfish Fishing | \$20.5 million |
| 114112 | Shellfish Fishing | \$5.5 million |
| 114119 | Other Marine Fishing | \$7.5 million |

²⁷⁷ Department Organization Order 10-15 (5/24/04); NOAA Organization Handbook, Transmittal #34, May 31, 1993.

²⁷⁸ Small Business Administration. 2016. Table of Small Business Size Standards Matched to North American Industry Classification System Codes. February 26, 2016. Available at https://www.sba.gov/sites/default/files/files/Size_Standards_Table.pdf accessed May 2017.

Table 13-1 SBA Small Business Threshold Criteria for Relevant Sectors

| North American Industry Classification System Code | North American Industry Classification System U.S. Industry Title | SBA Small Business Threshold Criteria |
|---|--|---------------------------------------|
| Sectors 21 – Mining, Quarrying, and Oil and Gas Extraction | | |
| Subsector 212 – Mining (except Oil and Gas) | | |
| 21232 | Sand, Gravel, Clay and Ceramic Mining and Quarrying | 500 employees |
| Sector 22 – Utilities | | |
| Subsector 221 – Utilities | | |
| 221118 | Other Electric Power Generation | 250 employees |
| 221121 | Electric Bulk Power Transmission, Control, Distribution | 1000 employees |
| 221310 | Water Supply and Irrigation Systems | \$27.5 million |
| 221320 | Sewage Treatment Facilities | \$20.5 million |
| Sector 23 – Construction | | |
| Subsector 236 – Construction of Buildings | | |
| 236115 | New Single-family Housing Construction | \$36.5 million |
| 236116 | New Multifamily Housing Construction | \$36.5 million |
| 236117 | New Housing For-Sale Builders | \$36.5 million |
| 236118 | Residential Remodelers | \$36.5 million |
| 236210 | Industrial Building Construction | \$36.5 million |
| 236220 | Commercial and Institutional Building Construction | \$36.5 million |
| Subsector 237 – Heavy and Civil Engineering Construction | | |
| 237110 | Water and Sewer Line and Related Structures Construction | \$36.5 million |
| 237120 | Oil and Gas Pipeline and Related Structures Construction | \$36.5 million |
| 237130 | Power and Communication Line and Related Structures Construction | \$36.5 million |
| 237310 | Highway, Street, and Bridge Construction | \$36.5 million |
| 237990 | Other Heavy and Civil Engineering Construction | \$36.5 million |
| 2379901 | Dredging and Surface Cleanup Activities (subset of Other Heavy and Civil Engineering Construction) | \$27.5 million |

Table 13-1 SBA Small Business Threshold Criteria for Relevant Sectors

| North American Industry Classification System Code | North American Industry Classification System U.S. Industry Title | SBA Small Business Threshold Criteria |
|---|---|---------------------------------------|
| Sector 54 – Professional, Scientific, and Technical Services | | |
| Subsector 541 – Professional, Scientific, and Technical Services | | |
| 541712 | Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology) | 1,000 employees |

Note:

^a For NMFS fisheries management actions, \$11 million is used for all businesses primarily engaged in commercial fishing, including finfish, shellfish, and other marine (NAICS code 11411). NMFS also adds the following statement to proposed rules to clarify the use of the size standard that differs from the one on the SBA's website: For Regulatory Flexibility Act purposes only, NMFS has established a small business size standard for businesses, including their affiliates, whose primary industry is commercial fishing (see 50 CFR 200.2). A business primarily engaged in commercial fishing (NAICS code 11411) is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates), and has combined annual receipts not in excess of \$11 million or all its affiliated operations worldwide.

Within these sectors, the only entities identified with potential impacts (and for which projects are already planned) related to the critical habitat designation are NMFS, NMFS-SFD (as an action agency), U.S. Navy (DoD), USCG, USACE, BOEM, and two developers of offshore wind energy projects: AWH and Progression. Of these impacted entities, all exceed the size criterion established by SBA for entities in those particular sectors.

There are currently 145 active permit holders (with a maximum of 164 total permits) for Hawaii longline fishing.²⁷⁹ Due to limited financial and ownership information, NMFS treats each permitted vessel as an individual entity. NMFS believes that each of these vessels is a small entity. The Hawaii longline pelagic fishery is the most economically important fishery, accounting for 89 percent of Hawaii commercial fish landings.²⁸⁰ The longline fisheries (deep-set and shallow-set) combine to contribute \$94.3 million in revenue, or approximately \$0.65 million per vessel, far below the \$11 million small business threshold size used by NMFS for vessels primarily engaged in commercial fishing.

Note that, in Hawaii, it is difficult to define a recreational fishery. According to the 2011 *Report on the Economic and Social Characteristics of the Hawaii Small Boat Pelagic Fishery*, “because of the relative ease of market access, the fine lines drawn by the federal definitions are often blurred in Hawaii. Existing legal definitions of commercial and recreational fishing are problematic because they do not accurately consider the cultural motivations of fishers toward fishing in Hawaii and may not be adequate in properly describing fishing activity, motivations, and attitudes. This makes it exceedingly difficult to classify fishers, complicating management of the fishery.”²⁸¹ The same report found that over 30 percent of small boat fishers who identified as recreational fishers had sold fish in 2011, and only 42 percent of fishers responding to the 2011 survey identified as commercial fishers, even though 60 percent of the respondents had sold fish in 2011.²⁸² The majority of fishers participating in the 2011 study sold fish to

²⁷⁹ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at http://www.wpcouncil.org/wp-content/uploads/2017/05/06_B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf accessed May 2017.

²⁸⁰ WPRFMC. 2016. Stock Assessment and Fishery Evaluation Report. Pacific Island Pelagic Fisheries. Available at http://www.wpcouncil.org/wp-content/uploads/2017/05/06_B5-Draft-2016-Annual-SAFE-Report-Pelagic.pdf accessed May 2017.

²⁸¹ Pacific Island Fisheries Science Center. 2011. Economic and Social Characteristics of the Hawaii Small Boat Pelagic Fishery. April 2011. Administrative Report H-11-01.

²⁸² Pacific Island Fisheries Science Center. 2011. Economic and Social Characteristics of the Hawaii Small Boat Pelagic Fishery. April 2011. Administrative Report H-11-01.

cover expenses, not to make a profit. Most fishers (62 percent) considered the fish they caught to be an important source of food for their family and 97 percent shared fish catches with friends and family.²⁸³

It is unlikely that the federally managed pelagic fisheries (shallow-set and deep-set longline) will be impacted by the designation of critical habitat. There remains a small, unquantifiable possibility that the take of IFKW prey (pelagic) species outside the critical habitat area will be so extensive that catch restrictions will need to be implemented for the pelagic longline fisheries. If pelagic catches were to be reduced, this could reduce the potential profit to small boat longline pelagic fishers. This could have further impacts on fisheries-dependent industries, including seafood processors, wholesalers, and distributors.

13.1.6 Reporting, Recordkeeping, and Other Compliance Requirements

During a formal Section 7 consultation under the ESA, NMFS, the action agency, and the third party applying for federal funding or permitting (if applicable) communicate in an effort to minimize potential adverse effects to the species and/or to the critical habitat. Communication between these parties may occur via written letters, phone calls, in-person meetings, or any combination of these. The duration and complexity of these communications depend on a number of variables, including the type of consultation, the species, the activity of concern, and the potential effects to the species and designated critical habitat associated with the activity that has been proposed. The third-party costs associated with these consultations include the administrative costs, such as the costs of time spent in meetings, preparing letters, and the development of research, including biological studies and engineering reports. There are no small businesses directly regulated by this action and there are no additional costs to small businesses as a result of Section 7 consultations to consider.

13.1.7 Alternatives Considered

Although this report considers the economic impacts of designating the entire area as critical habitat for MHI IFKWs, this is just one of several alternatives considered by NMFS for the designation. NMFS considers several alternatives in addition to the alternative described in this report when considering this designation. The alternatives considered by NMFS, and discussed in the final rule, include:

1. Not designating critical habitat for the MHI IFKW
2. Designating all specific areas (i.e., the alternative described throughout this report)
3. Designating all specific areas, but excluding some areas due to national security and economic impacts

The first alternative of not designating critical habitat for the MHI IFKW was considered and rejected by NMFS, because the alternative does not meet the legal requirements of the ESA. NMFS considered the alternative of designating all specific areas (i.e., no areas excluded); however, through the ESA 4(b)(2) consideration process, one additional alternative (3) was identified that may lessen the impacts of the overall designation. NMFS has selected alternative 3, designating all specific areas, but excluding particular areas based on the impacts to national security and economic considerations. This alternative was selected, because in some cases the benefits of excluding particular areas based on these impacts outweighed the benefits of including them in the designation. This alternative may help to reduce the indirect impact to small businesses that are economically involved with activities in these areas; however, there is insufficient information to monetize the benefits of these exclusions at this time.

²⁸³ Pacific Island Fisheries Science Center. 2011. Economic and Social Characteristics of the Hawaii Small Boat Pelagic Fishery. April 2011. Administrative Report H-11-01.

13.1.8 Description of Steps Taken to Minimize Small Entity Impacts Consistent with ESA

After careful examination of the best available scientific data on MHI IFKW needs, it is NMFS's determination that only the designation of all specific areas, but excluding particular areas based on the impacts to national security and economics, has the potential to accomplish the stated objectives and legal mandates associated with critical habitat designation for this endangered population.

Retention of the "not designating critical habitat for the MHI IFKW" alternative is not a viable choice for several reasons. Retention of the status quo would not be consistent with the objectives identified by the agency for this action. In addition, adoption of the no action alternative would be contrary to the agency's obligations under the ESA. Finally, because the critical habitat designation does not have the potential to have a significant economic impact on a substantial number of small entities, the status quo/no action alternative cannot result in a smaller burden, and could conceivably impose a greater burden, if selected (i.e., would not "minimize adverse impacts" as required under RFA).

In developing the proposed action, NMFS considered the potential adverse effects on directly regulated small entities and prepared an IRFA. The IRFA did not reveal significant adverse economic effects on any of the directly regulated small entities.

13.1.9 Summary of Responses to Public Comments Received on the IRFA

NMFS received no comments on the IRFA during the formal public comment period.

13.2 Statements of Energy Effects

Pursuant to EO 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."²⁸⁴

The OMB provides guidance for implementing this EO, outlining nine outcomes that may constitute "a significant adverse effect" when compared with the regulatory action under consideration:

- > Reductions in crude oil supply in excess of 10,000 barrels per day;
- > Reductions in fuel production in excess of 4,000 barrels per day;
- > Reductions in coal production in excess of 5 million tons per year;
- > Reductions in natural gas production in excess of 25 million Mcf per year;
- > Reductions in electricity production in excess of 1 billion kWh per year or in excess of 500 MW of installed capacity;
- > Increases in energy use required by the regulatory action that exceed the thresholds above;
- > Increases in the cost of energy production in excess of 1 percent;
- > Increases in the cost of energy distribution in excess of 1 percent; or
- > Other similarly adverse outcomes.

²⁸⁴ OMB. Memorandum for Heads of Executive Department Agencies and Independent Regulatory Agencies, Guidance for Implementing E.O. 13211, M-01-27, Office of Management and Budget. Available at: <http://www.whitehouse.gov/omb/memoranda/m01-27.html>

13.2.1 Oil Supply and Natural Gas Production

Hawaii does not produce petroleum or natural gas, and has proven reserves for neither resource. There are two crude oil refineries on Oahu, in the Honolulu port area.²⁸⁵ Production at these two sites is not expected to be reduced by greater than the guidance provided by EO 13211 of 10,000 barrels per day. The designation of critical habitat is not expected to result in any additional project modification recommendations above and beyond those resulting from species listing. It is therefore unlikely for the oil and gas industry to experience a “significant adverse effect” due to the MHI IFKW critical habitat designation.

13.2.2 Electricity Production

Hawaii has a goal of 100 percent renewable electricity production by 2045. Offshore energy projects have been identified as crucial to achieving that goal, especially for Oahu.²⁸⁶ However, to date, no commercial-scale wave, OTEC, or offshore wind energy projects have been developed in the MHI IFKW critical habitat. Three lease areas have been proposed for offshore wind energy projects in the critical habitat area, as described in Chapter 8. The projects are proposed off the north and south shores of Oahu. The designation of critical habitat is not expected to result in any additional project modification recommendations or consultations above and beyond those resulting from species listing. Impacts to the electricity industry would likely be limited to potential delays in project development and possibly additional administrative costs of consultation. The critical habitat area is not expected to impact the current electricity production levels in Hawaii. Further, it appears that the designation will have little or no effect on electrical energy production decisions (other than future project location), subsequent electricity supply, or the cost of energy production. The designation is unlikely to impact the industry by greater than the 1 billion kWh per year or 500 MW of capacity provided as guidance in the EO. It is therefore unlikely for the electricity production industry to experience a significant adverse effect due to the MHI IFKW critical habitat designation.

²⁸⁵ U.S. Energy Information Administration. 2016. Hawaii State Profile of Energy Estimates. Updated October 20. Available at: <https://www.eia.gov/state/analysis.php?sid=HI> accessed June 5, 2017.

²⁸⁶ Herrera, Karen, and Greg Sanders. 2017. Bureau of Ocean Energy Management. Personal Communication with Maul Foster & Alongi (MFA) staff, May 10.

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15 References

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- 16 U.S.C. Section 1531 (a)(1) – Congressional findings and declaration of purposes and policy.
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- 16 U.S.C. Section 1533 (b)(1)(A) – Best scientific and commercial data available.
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- 16 U.S.C. Section 1536 (a)(2) – Federal agency actions and consultations.
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MHI Insular False Killer Whale
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APPENDIX

A

EMPLOYMENT AND ECONOMIC
SECTOR DATA

Employment and Economic Sector Data

The tables on the following pages show the employment and economic activity in each of the affected counties by industrial sector.

Table A-1 2015 County Business Patterns and 2014 Non-Employer Statistics for Hawaii County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|--|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 11 | Agriculture, forestry, fishing and hunting | 1,023 | 24,991 | 9 | 115 | 3,518 |
| 21 | Mining, quarrying, and oil and gas extraction | X | X | 2 | X | X |
| 22 | Utilities | 21 | 1,015 | 12 | 457 | 44,593 |
| 23 | Construction | 1,657 | 113,769 | 396 | 2,812 | 168,405 |
| 31-33 | Manufacturing | 437 | 19,809 | 107 | 1,328 | 56,476 |
| 42 | Wholesale trade | 410 | 21,757 | 186 | 1,758 | 76,731 |
| 44-45 | Retail trade | 1,451 | 63,080 | 630 | 9,518 | 278,342 |
| 48-49 | Transportation and warehousing | 371 | 14,918 | 163 | 2,576 | 87,597 |
| 51 | Information | 162 | 5,796 | 57 | 623 | 34,611 |
| 52 | Finance and insurance | 272 | 12,195 | 174 | 1,191 | 57,008 |
| 53 | Real estate and rental and leasing | 1,646 | 130,359 | 240 | 1,066 | 40,574 |
| 54 | Professional, scientific, and technical services | 2,184 | 85,975 | 315 | 1,508 | 85,103 |
| 55 | Management of companies and enterprises | N/A | N/A | 15 | 355 | 19,224 |
| 56 | Administrative and support and waste management and remediation services | 1,737 | 46,426 | 244 | 4,819 | 138,764 |
| 61 | Educational services | 413 | 6,519 | 53 | 1,171 | 35,330 |
| 62 | Health care and social assistance | 1,164 | 51,704 | 478 | 8,262 | 359,956 |
| 71 | Arts, entertainment, and recreation | 980 | 24,740 | 73 | 954 | 30,528 |
| 72 | Accommodation and food services | 438 | 27,259 | 452 | 13,254 | 381,015 |
| 81 | Other services (except public administration) | 2,733 | 75,856 | 389 | 1,926 | 58,452 |
| 99 | Industries not classified | N/A | N/A | 7 | 12 | 241 |
| 0 | Total for all sectors | 17,101 | 726,266 | 4,002 | 53,713 | 1,956,574 |

Table A-1 2015 County Business Patterns and 2014 Non-Employer Statistics for Hawaii County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|---------------------------|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
|------------|---------------------------|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|

Notes:

Source: U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk> accessed May 2017; U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=NES_2014_00A2&prodType=table accessed May 2017.

* "X" denotes that figure is too small and would reveal private business information. "N/A" denotes that data are not available at that geographic extent.

Table A-2 2015 County Business Patterns and 2014 Non-Employer Statistics for the City and County of Honolulu*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|--|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 11 | Agriculture, forestry, fishing and hunting | 607 | 50,410 | 20 | 26 | 771 |
| 21 | Mining, quarrying, and oil and gas extraction | X | X | 5 | 135 | 12,064 |
| 22 | Utilities | 118 | 9,465 | 21 | X | X |
| 23 | Construction | 3,976 | 257,319 | 1,683 | 22,371 | 1,644,925 |
| 31-33 | Manufacturing | 1,226 | 50,708 | 497 | 9,656 | 420,404 |
| 42 | Wholesale trade | 1,716 | 129,096 | 1,188 | 14,643 | 752,858 |
| 44-45 | Retail trade | 6,767 | 285,785 | 2,843 | 48,249 | 1,373,918 |
| 48-49 | Transportation and warehousing | 2,483 | 76,701 | 493 | 22,811 | 1,182,021 |
| 51 | Information | 781 | 32,628 | 337 | 6,543 | 433,109 |
| 52 | Finance and insurance | 2,156 | 151,039 | 1,022 | 16,269 | 1,096,713 |
| 53 | Real estate and rental and leasing | 7,428 | 722,783 | 1,194 | 8,462 | 478,156 |
| 54 | Professional, scientific, and technical services | 9,965 | 440,336 | 2,431 | 17,949 | 1,163,583 |
| 55 | Management of companies and enterprises | N/A | N/A | 210 | 5,687 | 459,769 |
| 56 | Administrative and support and | 4,409 | 119,826 | 1,133 | 25,482 | 826,004 |

Table A-2 2015 County Business Patterns and 2014 Non-Employer Statistics for the City and County of Honolulu*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|---|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| | waste management and remediation services | | | | | |
| 61 | Educational services | 1,800 | 32,420 | 359 | 14,500 | 536,011 |
| 62 | Health care and social assistance | 5,335 | 284,936 | 2,578 | 52,207 | 2,796,330 |
| 71 | Arts, entertainment, and recreation | 3,636 | 87,800 | 252 | 7,156 | 162,043 |
| 72 | Accommodation and food services | 966 | 57,921 | 2,403 | 61,059 | 1,589,520 |
| 81 | Other services (except public administration) | 9,497 | 293,450 | 2,466 | 19,800 | 588,134 |
| 99 | Industries not classified | N/A | N/A | 32 | 45 | 1,230 |
| 0 | Total for all sectors | 62,867 | 3,082,635 | 21,167 | 355,607 | 15,777,709 |

Notes:

Source: U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk> accessed May 2017; U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=NES_2014_00A2&prodType=table accessed May 2017.

* "X" denotes that figure is too small and would reveal private business information. "N/A" denotes that data are not available at that geographic extent.

Table A-3 2015 County Business Patterns and 2014 Non-Employer Statistics for Kauai County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|--|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 11 | Agriculture, forestry, fishing and hunting | 197 | 4,347 | 2 | X | X |
| 21 | Mining, quarrying, and oil and gas extraction | X | X | 2 | X | X |
| 22 | Utilities | 9 | 536 | 14 | 207 | 19,686 |
| 23 | Construction | 601 | 39,035 | 211 | 1,026 | 52,747 |
| 31-33 | Manufacturing | 172 | 9,345 | 43 | 308 | 8,580 |
| 42 | Wholesale trade | 143 | 7,172 | 86 | 806 | 37,126 |
| 44-45 | Retail trade | 571 | 30,334 | 348 | 4,133 | 120,333 |
| 48-49 | Transportation and warehousing | 112 | 2,896 | 75 | 1,354 | 46,626 |
| 51 | Information | 65 | 3,009 | 24 | 246 | 12,910 |
| 52 | Finance and insurance | 111 | 4,564 | 65 | 387 | 17,288 |
| 53 | Real estate and rental and leasing | 724 | 60,142 | 155 | 1,072 | 45,175 |
| 54 | Professional, scientific, and technical services | 895 | 33,953 | 149 | 922 | 59,477 |
| 55 | Management of companies and enterprises | N/A | N/A | 8 | 133 | 6,821 |
| 56 | Administrative and support and waste management and remediation services | 752 | 22,601 | 135 | 1,917 | 59,351 |
| 61 | Educational services | 130 | 2,905 | 28 | 184 | 5,564 |
| 62 | Health care and social assistance | 381 | 11,792 | 182 | 3,203 | 173,136 |
| 71 | Arts, entertainment, and recreation | 456 | 10,946 | 56 | 1,111 | 30,318 |
| 72 | Accommodation and food services | 160 | 11,091 | 254 | 8,712 | 274,101 |
| 81 | Other services (except public administration) | 1,229 | 33,954 | 175 | 959 | 29,576 |

Table A-3 2015 County Business Patterns and 2014 Non-Employer Statistics for Kauai County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|---------------------------|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 99 | Industries not classified | N/A | N/A | 2 | X | X |
| 0 | Total for all sectors | 6,709 | 288,917 | 2,014 | 26,708 | 1,000,423 |

Notes:

Sources: U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk> accessed May 2017; U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=NES_2014_00A2&prodType=table accessed May 2017.

* "X" denotes that figure is too small and would reveal private business information. "N/A" denotes that data are not available at that geographic extent.

Table A-4 2015 County Business Patterns and 2014 Non-Employer Statistics for Maui County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|--|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 11 | Agriculture, forestry, fishing and hunting | 283 | 6,973 | 2 | X | X |
| 21 | Mining, quarrying, and oil and gas extraction | 4 | 489 | N/A | N/A | N/A |
| 22 | Utilities | 34 | 2,227 | 15 | 467 | 41,173 |
| 23 | Construction | 1,310 | 89,901 | 481 | 3,250 | 209,169 |
| 31-33 | Manufacturing | 389 | 16,434 | 117 | 1,157 | 45,102 |
| 42 | Wholesale trade | 403 | 25,440 | 162 | 1,318 | 64,357 |
| 44-45 | Retail trade | 1,278 | 66,118 | 776 | 9,774 | 301,010 |
| 48-49 | Transportation and warehousing | 333 | 10,035 | 153 | 3,168 | 111,317 |
| 51 | Information | 160 | 4,932 | 64 | 597 | 31,436 |
| 52 | Finance and insurance | 267 | 16,640 | 149 | 900 | 42,204 |
| 53 | Real estate and rental and leasing | 1,991 | 166,870 | 323 | 2,129 | 97,483 |
| 54 | Professional, scientific, and technical services | 2,141 | 88,360 | 413 | 1,512 | 85,221 |
| 55 | Management of companies and enterprises | N/A | N/A | 9 | 67 | 4,106 |

Table A-4 2015 County Business Patterns and 2014 Non-Employer Statistics for Maui County*

| NAICS Code | Industry Code Description | Non-Employer Firms | Non-Employer Receipts (\$1,000) | Employer Establishments | Number of Employees | Annual Payroll (\$1,000) |
|------------|--|--------------------|---------------------------------|-------------------------|---------------------|--------------------------|
| 56 | Administrative and support and waste management and remediation services | 1,708 | 48,042 | 296 | 4,081 | 124,106 |
| 61 | Educational services | 333 | 7,451 | 69 | 804 | 25,599 |
| 62 | Health care and social assistance | 994 | 39,798 | 410 | 6,189 | 330,766 |
| 71 | Arts, entertainment, and recreation | 1,306 | 54,116 | 128 | 2,068 | 55,198 |
| 72 | Accommodation and food services | 323 | 25,838 | 518 | 21,718 | 738,794 |
| 81 | Other services (except public administration) | 2,709 | 90,283 | 458 | 2,768 | 82,410 |
| 99 | Industries not classified | N/A | N/A | 2 | X | X |
| 0 | Total for all sectors | 15,867 | 759,947 | 4,545 | 61,991 | 2,389,725 |

Notes:

Sources: U.S. Census Bureau. 2017. Geographic Area Series: County Business Patterns: 2015 Business Patterns. Available at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk> accessed May 2017; U.S. Census Bureau. 2017. Geographic Area Series: Nonemployer Statistics for the US, States, Metropolitan Areas and Counties: 2014 Nonemployer Statistics. Available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=NES_2014_00A2&prodType=table accessed May 2017.

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