



Prepared for:



DRAFT Programmatic Environmental Impact Statement

Hawaiian Monk Seal Recovery Actions

August 2011

This page intentionally left blank.

**Hawaiian Monk Seal Recovery Actions
Programmatic Environmental Impact Statement**

August 2011

Lead Agency: United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office
Division of Protected Resources
Honolulu, Hawaii

Responsible Official: Dr. Jeff Walters, Marine Mammal Branch Chief

For Further Information Contact: Division of Protected Resources
Pacific Islands Regional Office
National Marine Fisheries Service
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI 96814
(808) 944-2200

Abstract: The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Services (NMFS) is the Federal agency responsible for management of Hawaiian monk seals under the Endangered Species Act (16 United States Code [U.S.C.] 1531 et seq.) and the Marine Mammal Protection Act (16 U.S.C. 1361 et seq.). As part of their management responsibilities, NMFS funds and conducts research and enhancement activities on endangered Hawaiian monk seals in the Northwestern Hawaiian Islands and Main Hawaiian Islands. NMFS proposes to implement research and enhancement actions identified in the Hawaiian Monk Seal Recovery Plan (NMFS 2007), with the goal of conserving and recovering the species. This Programmatic Environmental Impact Statement (PEIS) provides decision-makers and the public with an evaluation of the environmental, social, and economic effects of the proposed program and alternatives to the proposed action. The agency's recommended Preferred Alternative (Alternative 4) encompasses a broad scope of research and enhancement activities that would yield greater survival benefits to the species over the long-term than would be expected under the other alternatives.

This page intentionally left blank.

TABLE OF CONTENTS

1.0	PURPOSE AND NEED	1-1
1.1	INTRODUCTION	1-1
1.2	PURPOSE AND NEED FOR ACTION	1-2
1.3	DESCRIPTION OF THE PROJECT AREA	1-2
1.4	CURRENT RESEARCH AND ENHANCEMENT AND ASSOCIATED PERMITS	1-5
1.5	FEDERAL LAWS AND ASSOCIATED PERMITS AND AUTHORIZATIONS APPLICABLE TO HAWAIIAN MONK SEAL RESEARCH AND ENHANCEMENT ACTIVITIES	1-8
1.5.1	<i>National Environmental Policy Act</i>	1-8
1.5.2	<i>Endangered Species Act</i>	1-8
1.5.3	<i>Marine Mammal Protection Act</i>	1-10
1.5.4	<i>National Historic Preservation Act</i>	1-11
1.5.5	<i>Magnuson-Stevens Fishery Conservation and Management Act</i>	1-12
1.5.6	<i>Coastal Zone Management Act</i>	1-12
1.5.7	<i>National Marine Sanctuaries Act</i>	1-13
1.5.8	<i>Migratory Bird Treaty Act</i>	1-13
1.5.9	<i>Convention on International Trade in Endangered Species of Wild Fauna</i>	1-13
1.5.10	<i>Animal Welfare Act</i>	1-13
1.5.11	<i>Administrative Procedure Act</i>	1-14
1.5.12	<i>Executive Orders</i>	1-14
1.6	WHY IS A PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT NEEDED	1-15
1.7	RELATED NATIONAL ENVIRONMENTAL POLICY ACT DOCUMENTS THAT INFLUENCE THE SCOPE OF THIS ENVIRONMENTAL IMPACT STATEMENT	1-16
1.8	REQUIRED DECISIONS AND OTHER AGENCIES INVOLVED IN THIS ANALYSIS	1-17
1.8.1	<i>Cooperating Agencies</i>	1-18

1.8.2	<i>Commenting Agencies</i>	1-18
1.9	NOAA ACTIONS NOT INCLUDED WITHIN THE SCOPE OF THIS PEIS	1-19
1.9.1	<i>National Marine Fisheries Service Hawaiian Monk Seal Critical Habitat Revision</i>	1-23
1.9.2	<i>National Ocean Service Hawaiian Islands Humpback Whale National Marine Sanctuary Management Plan Review</i>	1-23
1.9.3	<i>National Marine Fisheries Service Marine Mammal Health and Stranding Response Program</i>	1-24
1.9.4	<i>National Marine Fisheries Service Hawaiian Monk Seal Community-Based Activities, Education and Outreach</i>	1-25
2.0	ALTERNATIVES	2-1
2.1	INTRODUCTION	2-1
2.2	RELATION OF ALTERNATIVES EVALUATED TO THE STATEMENT OF PURPOSE AND NEED	2-1
2.3	RELATION OF ALTERNATIVES TO THE RECOVERY PLAN	2-2
2.4	SCOPING ISSUES CONSIDERED IN DEVELOPING ALTERNATIVES	2-2
2.5	RESEARCH AND ENHANCEMENT COMPONENTS OF THE ALTERNATIVES	2-4
2.6	ALTERNATIVES CARRIED FORWARD FOR ANALYSIS	2-17
2.6.1	<i>Elements Common to All Alternatives</i>	2-17
2.6.2	<i>Research and Enhancement Activities That Require Permits</i>	2-20
2.6.3	<i>Regulatory Requirements Applicable to Issuance of Research and Enhancement Permits Necessary for Implementation of the Preferred Alternative</i>	2-21
2.7	ALTERNATIVE 1: STATUS QUO	2-24
2.8	ALTERNATIVE 2: NO ACTION	2-24
2.9	ALTERNATIVE 3: LIMITED TRANSLOCATION	2-25
2.10	ALTERNATIVE 4: ENHANCED IMPLEMENTATION (PREFERRED ALTERNATIVE)	2-27
2.11	ALTERNATIVES NOT CARRIED FORWARD FOR ANALYSIS	2-33
2.11.1	<i>Reduction of Competition and Predation in the Northwestern Hawaiian Islands</i>	2-33

2.11.2	<i>Build a Hawaiian Monk Seal Research Facility or Aquarium in the Northwestern Hawaiian Islands</i>	2-33
2.12	ONGOING NOAA ACTIVITIES THAT ARE NOT PART OF THE PEIS ALTERNATIVES	2-34
3.0	AFFECTED ENVIRONMENT	3-1
3.1	INTRODUCTION	3-1
3.2	PHYSICAL ENVIRONMENT	3-1
3.2.1	<i>Main Hawaiian Islands</i>	3-2
3.2.2	<i>Northwestern Hawaiian Islands</i>	3-3
3.2.3	<i>Meteorology and Air Quality</i>	3-5
3.2.4	<i>Pacific Ocean Around the Hawaiian Archipelago</i>	3-5
3.2.5	<i>Water Column</i>	3-7
3.2.6	<i>Temperature and Nutrient Regimes</i>	3-7
3.2.7	<i>Marine Water Quality</i>	3-8
3.2.8	<i>Climatic Variability and Change</i>	3-10
3.2.9	<i>Interannual Variability</i>	3-10
3.3	BIOLOGICAL ENVIRONMENT	3-13
3.3.1	<i>Hawaiian Monk Seals</i>	3-13
3.3.2	<i>Sea Turtles</i>	3-42
3.3.3	<i>Cetaceans</i>	3-44
3.3.4	<i>Sharks</i>	3-46
3.3.5	<i>Other Fish Species</i>	3-48
3.3.6	<i>Birds</i>	3-50
3.3.7	<i>Coral</i>	3-58
3.3.8	<i>ESA-Listed Plant Species</i>	3-59
3.3.9	<i>Invasive Species</i>	3-59
3.3.10	<i>Other Scientific Research on Protected Species within the Project Area</i>	3-61
3.4	SOCIAL AND ECONOMIC ENVIRONMENT	3-77
3.4.1	<i>Population Trends</i>	3-77
3.4.2	<i>Area Economy</i>	3-78
3.4.3	<i>Commercial Fishing</i>	3-84
3.4.4	<i>Subsistence Fishing</i>	3-87

3.4.5	<i>Recreational Fishing</i>	3-88
3.4.6	<i>Cultural Environment</i>	3-89
3.4.7	<i>Cultural Resources and Historic Properties</i>	3-90
3.4.8	<i>Recreation and Tourism</i>	3-96
3.4.9	<i>Public Safety</i>	3-115
3.4.10	<i>Environmental Justice</i>	3-123
3.4.11	<i>Sanctuaries, Monuments, and Refuges</i>	3-126
3.4.12	<i>Military Activities within the Project Area</i>	3-129
4.0	ENVIRONMENTAL CONSEQUENCES	4-1
4.1	PROJECT AREA AND SCOPE FOR ANALYSIS	4-1
4.2	DEFINITION OF TERMS	4-2
4.3	INCOMPLETE AND UNAVAILABLE INFORMATION	4-3
4.4	STEPS FOR DETERMINING LEVEL OF IMPACT	4-4
4.4.1	<i>Impact Criteria for Hawaiian Monk Seals</i>	4-6
4.4.2	<i>Impact Criteria for Other Biological Resources</i>	4-10
4.4.3	<i>Impact Criteria for Socioeconomic Resources</i>	4-15
4.5	STEPS FOR IDENTIFYING CUMULATIVE EFFECTS	4-20
4.5.1	<i>Relevant Past and Present Actions within the Project Area</i>	4-21
4.5.2	<i>Reasonably Foreseeable Future Actions</i>	4-25
4.6	RESOURCES AND CHARACTERISTICS NOT CARRIED FORWARD FOR ANALYSIS UNDER ENVIRONMENTAL CONSEQUENCES	4-39
4.6.1	<i>Physical Environment - Circulation Patterns, Water Temperatures and Nutrient Regimes, Air Quality, Climate Change</i>	4-40
4.6.2	<i>Sharks</i>	4-40
4.6.3	<i>ESA-Listed Plants</i>	4-40
4.6.4	<i>Sanctuaries, Monuments, and Refuges</i>	4-41
4.7	ELEMENTS COMMON TO ALL ALTERNATIVES	4-42
4.7.1	<i>Duration of Permits</i>	4-42
4.7.2	<i>Reporting Requirements</i>	4-42
4.7.3	<i>Mitigation and Conditions of Permits and Authorizations</i>	4-44
4.7.4	<i>Monitoring</i>	4-52

4.8	<i>BIOLOGICAL ENVIRONMENT</i>	4-52
4.8.1	<i>Hawaiian Monk Seals</i>	4-52
4.8.2	<i>Marine Water Quality</i>	4-100
4.8.3	<i>Sea Turtles</i>	4-102
4.8.4	<i>Cetaceans</i>	4-105
4.8.5	<i>Fish</i>	4-109
4.8.6	<i>Birds</i>	4-111
4.8.7	<i>Corals</i>	4-123
4.8.8	<i>Invasive Species</i>	4-125
4.9	<i>SOCIAL AND ECONOMIC ENVIRONMENT</i>	4-127
4.9.1	<i>Commercial Fishing</i>	4-127
4.9.2	<i>Subsistence Fishing</i>	4-136
4.9.3	<i>Recreational Fishing</i>	4-143
4.9.4	<i>Cultural Resources and Historic Properties</i>	4-149
4.9.5	<i>Recreation and Tourism</i>	4-155
4.9.6	<i>Environmental Justice</i>	4-163
4.9.7	<i>Military Activities</i>	4-167
4.10	<i>SUMMARY OF EFFECTS</i>	4-173
5.0	<i>NEPA COMPLIANCE, IMPLEMENTATION, AND ADAPTIVE MANAGEMENT OF THE PREFERRED ALTERNATIVE</i>	5-1
5.1	<i>IMPLEMENTATION OF THE HAWAIIAN MONK SEAL RECOVERY ACTIONS PEIS PREFERRED ALTERNATIVE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT</i>	5-1
5.1.1	<i>Need for NEPA Compliance</i>	5-1
5.1.2	<i>NEPA Compliance Review of Research and Enhancement Permit Applications Using the PEIS</i>	5-2
5.2	<i>MONITORING PLAN FOR THE TWO-STAGE TRANSLOCATION PROCESS</i>	5-4
5.3	<i>PLAN FOR THE VACCINATION PROCESS</i>	5-6
5.4	<i>PLAN FOR DEVELOPMENT OF A BEHAVIOR MODIFICATION PROGRAM</i>	5-8
5.5	<i>UNANTICIPATED DISCOVERY OF HISTORIC OR CULTURAL PROPERTIES</i>	5-10

5.6	RECOMMENDATIONS FOR COORDINATION WITH STAKEHOLDERS AND COMMUNITIES	5-10
5.6.1	<i>Native Hawaiian and Community-Based Programs</i>	5-10
5.6.2	<i>Marine Mammal Response Network</i>	5-12
5.6.3	<i>Outreach and Collaboration with Fishers</i>	5-13
5.6.4	<i>Outreach and Collaboration with Other Community Members</i>	5-13
5.6.5	<i>Incorporating Community Feedback into Research and Enhancement Activities</i>	5-14

APPENDIX A – AGENCY CORRESPONDENCE

APPENDIX B – SCOPING REPORT

APPENDIX C – DRUGS CURRENTLY USED OR PROPOSED TO BE USED DURING HAWAIIAN MONK SEAL RESEARCH AND ENHANCEMENT ACTIVITIES

APPENDIX D – VACCINATION PLAN

APPENDIX E – PROPOSED TRANSLOCATION PLAN

APPENDIX F – HEALTH SCREENING AND QUARANTINE PROTOCOLS FOR HAWAIIAN MONK SEAL TRANSLOCATION BETWEEN SUBPOPULATIONS

APPENDIX G – PMNM 2011-001 PERMIT AND OTHER PAPA HĀUNAMOKUĀKEA BEST MANAGEMENT PRACTICES

APPENDIX H – DISPOSITION OF MARINE MAMMAL PARTS/BIOLOGICAL SAMPLES

APPENDIX I – PROPOSED LEVELS OF TAKE FOR PEIS ALTERNATIVES 1, 3, AND 4

APPENDIX J – HAWAIIAN MONK SEAL STOCHASTIC MODEL SIMULATION

APPENDIX K – HISTORICAL AND CONTEMPORARY SIGNIFICANCE OF THE ENGANGERED HAWAIIAN MONK SEAL IN NATIVE HAWAIIAN CULTURE

APPENDIX L – DRAFT SECTION 106 ANALYSIS OF PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT FOR THE HAWAIIAN MONK SEAL RECOVERY PROGRAM (2011)

LIST OF FIGURES

- Figure 1.3-1 Project Area Map*
- Figure 1.9-1 Estimated Timeline of Ongoing NOAA Actions*
- Figure 2.9-1 Alternative 3 Limited Translocation Options*
- Figure 2.10-1 Alternative 4 Translocation Options*
- Figure 3.2-1 North Pacific Ocean Circulation and Major Currents*
- Figure 3.2-2 Hawai'i Water Quality Index*
- Figure 3.3-1 Hawaiian Monk Seal Mean Total Beach Count 1960-2010*
- Figure 3.3-2 Stochastic Projection Simulation*
- Figure 3.3-3 Seasonal Field Camp of South East Pearl Island and Hermes Reef*
- Figure 3.4-1 Historic Unemployment Rates in the Counties in Hawai'i, the State of Hawai'i, and the United States*
- Figure 3.4-2 National Register of Historic Sites Within the Project Area - Hawai'i*
- Figure 3.4-3 National Register of Historic Sites Within the Project Area - Moloka'i, Lāna'i, Kaho'olawe, and Maui*
- Figure 3.4-4 National Register of Historic Sites Within the Project Area - Oahu*
- Figure 3.4-5 National Register of Historic Sites Within the Project Area - Oahu (Pearl Harbor and Waikiki)*
- Figure 3.4-6 National Register of Historic Sites Within the Project Area - Kaua'i and Ni'ihau*
- Figure 3.4-7 Shipwrecks Dangerous to Surface Navigation - Kaua'i*
- Figure 3.4-8 Shipwrecks Dangerous to Surface Navigation - Oahu*
- Figure 3.4-9 Shipwrecks Dangerous to Surface Navigation - Moloka'i, Lāna'i, Kaho'olawe, and Maui*
- Figure 3.4-10 Fishponds Within the Project Area - Hawai'i*

Figure 3.4-11 Fishponds Within the Project Area - Kaua'i and Ni'ihau

Figure 3.4-12 Fishponds Within the Project Area - Moloka'i, Lāna'i, Koho'oawe, and Maui

Figure 3.4-13 Fishponds Within the Project Area - O'ahu

Figure 3.4-14 Sanctuary and Conservation Areas Map

Figure 4.9-1 Total Commercial Catch Reported (Excluding Pelagic Fisheries) in Pounds for All Zones Within 100 Fathoms Bathylite 2000 to 2010

LIST OF TABLES

<i>Table 1.7-1</i>	<i>Related NEPA Documents That Influence the Scope of this PEIS</i>
<i>Table 1.8-1</i>	<i>Agency Scoping Meeting Invitation List</i>
<i>Table 2.6-1</i>	<i>Research and Enhancement Activities Requiring Permits</i>
<i>Table 2.10-1</i>	<i>Proposed Alternatives</i>
<i>Table 2.12-1</i>	<i>Ongoing NOAA Activities That Are Not Part of Alternatives</i>
<i>Table 3.2-1</i>	<i>Key Physical Attributes of the Main Hawaiian Islands</i>
<i>Table 3.2-2</i>	<i>Key Physical Attributes of the Northwestern Hawaiian Islands</i>
<i>Table 3.2-3</i>	<i>Atmosphere-Ocean Variability – Time Scales and Forcing Mechanisms</i>
<i>Table 3.3-1</i>	<i>Abundance Estimates of Hawaiian Monk Seals in the NWHI in 2009 and Method Used to Estimate Abundance At Each Site As Indicated</i>
<i>Table 3.3-2</i>	<i>All Recovery Action Categories for Hawaiian Monk Seals</i>
<i>Table 3.3-3</i>	<i>Sea Turtle Species of Hawai'i</i>
<i>Table 3.3-4</i>	<i>Cetaceans Occurring in Hawaiian Archipelago</i>
<i>Table 3.3-5</i>	<i>Inshore Shark Species of Hawai'i</i>
<i>Table 3.3-6</i>	<i>Hawaiian Coastal Bird Species of Conservation Need</i>
<i>Table 3.3-7</i>	<i>Distribution of Breeding or Brood-Rearing Seabird Species That Occur on or Near Beaches in the Hawaiian Archipelago</i>
<i>Table 3.3-8</i>	<i>Current Fisheries Permits and Authorizations for Federally Protected Species Under the ESA and MMPA</i>
<i>Table 3.3-9</i>	<i>Number of Active Permits by Permit Type 2009</i>
<i>Table 3.3-10</i>	<i>Papahānaumokuākea Marine National Monument Permitted Activities 2009</i>
<i>Table 3.4-1</i>	<i>Population and Population Change</i>
<i>Table 3.4-2</i>	<i>Employment by Industry in 2008</i>
<i>Table 3.4-3</i>	<i>Industry Employment Growth, 2001 to 2008 (% Change)</i>

<i>Table 3.4-4</i>	<i>Personal Income in 2007</i>
<i>Table 3.4-5</i>	<i>Quantity, Value, and Price Per Pound of Commercial Landings in Hawai'i, 1990- to 2009</i>
<i>Table 3.4-6</i>	<i>Hawai'i Annual Reported Commercial Landings (Millions of Pounds) for Pelagic, Bottom, Reef, and Other Fisheries Categories, 2000 to 2009</i>
<i>Table 3.4-7</i>	<i>Key Tourism Statistics for the State of Hawai'i and its Counties - January to November 2010 and Percent Change from January to November 2009</i>
<i>Table 3.4-8</i>	<i>Select Recreation Resources in the Hawaiian Islands</i>
<i>Table 3.4-9</i>	<i>Acreage of and Visitation to National Parks in Hawai'i During 2009</i>
<i>Table 3.4-10</i>	<i>Acreage of and Visitation to Major³ State Parks in Hawai'i During 2009</i>
<i>Table 3.4-11</i>	<i>Prevention, Mitigation, and Documented Human-Seal Interactions in the MHI (1991-2009)</i>
<i>Table 3.4-12</i>	<i>Study Area Race and Ethnicity, 2009</i>
<i>Table 3.4-13</i>	<i>Study Area Income Below Poverty Level, 2008</i>
<i>Table 4.4-1</i>	<i>Impact Criteria for Hawaiian Monk Seals</i>
<i>Table 4.4-2</i>	<i>Impact Criteria for Sea Turtles</i>
<i>Table 4.4-3</i>	<i>Impact Criteria for Cetaceans</i>
<i>Table 4.4-4</i>	<i>Impact Criteria for Fish</i>
<i>Table 4.4-5</i>	<i>Impact Criteria for Birds</i>
<i>Table 4.4-6</i>	<i>Impact Criteria for Socioeconomics</i>
<i>Table 4.4-7</i>	<i>Impact Criteria for Cultural and Historic Resources</i>
<i>Table 4.4-8</i>	<i>Impact Criteria for Military Activities</i>
<i>Table 4.5-1</i>	<i>Relevant Past and Present Actions within the Project Area</i>
<i>Table 4.5-2</i>	<i>Reasonably Foreseeable Future Actions Within the Project Area</i>
<i>Table 4.8-1</i>	<i>Results of Simulated Translocations form French Frigate Shoals to Laysan Island</i>

- Table 4.8-2 Results of Simulated Translocations from French Frigate Shoals to MHI (10 Female Pups per Year for 5 Consecutive Years)*
- Table 4.8-3 Simulation Results for Lethal Takes for Alternatives 1, 3, and 4*
- Table 4.10-1 Summary of Direct/Indirect and Cumulative Effects – Hawaiian Monk Seals*
- Table 4.10-2 Summary of Direct/Indirect and Cumulative Effects – Sea Turtles*
- Table 4.10-3 Summary of Direct/Indirect and Cumulative Effects – Cetaceans*
- Table 4.10-4 Summary of Direct/Indirect and Cumulative Effects – Fish*
- Table 4.10-5 Summary of Direct/Indirect and Cumulative Effects – Birds*
- Table 4.10-6 Summary of Direct/Indirect and Cumulative Effects – Invasive Species*
- Table 4.10-7 Summary of Direct/Indirect and Cumulative Effects – Commercial Fisheries*
- Table 4.10-8 Summary of Direct/Indirect and Cumulative Effects – Subsistence Fisheries*
- Table 4.10-9 Summary of Direct/Indirect and Cumulative Effects – Recreational Fisheries*
- Table 4.10-10 Summary of Direct/Indirect and Cumulative Effects – Cultural and Historic Properties*
- Table 4.10-11 Summary of Direct/Indirect and Cumulative Effects – Recreation and Tourism*
- Table 4.10-12 Summary of Direct/Indirect and Cumulative Effects – Environmental Justice*
- Table 4.10-13 Summary of Direct/Indirect and Cumulative Effects – Military Activities*

This page intentionally left blank.

LIST OF ACRONYMS

λ	lambda
%	percent
ACHP	Advisory Council on Historic Preservation
APA	Administrative Procedure Act
APE	Area of Potential Effect
AWA	Animal Welfare Act
BCC	Birds of Conservation Concern
BMP	Best Management Practices
C	Celsius
CALFEX	combined arms live-fire exercise
CDPs	Census-Designated Places
CDV	canine distemper virus
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CI	co-investigator
CITES	Convention on International Trade in Endangered Species
cm	centimeters
CML	commercial marine license
CWB	Clean Water Branch
CWCS	Comprehensive Wildlife Conservation Strategy
CZMA	Coastal Zone Management Act
DAR	Division of Aquatic Resources
DBEDT	Department of Business, Economic Development and Tourism
DDT	dichlorodiphenyltrichloroethane

DLNR	Department of Land and Natural Resources
DOC	Department of Commerce
DOD	Department of Defense
DOH	Department of Health
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENSO	El Niño-Southern Oscillation
EO	Executive Order
EPA	Environmental Protection Agency
ERM	ERM-West, Inc.
ESA	Endangered Species Act
F	Fahrenheit
FEP	Fishery Ecosystem Plan
fm	fathom
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	feet
FWCA	Fish and Wildlife Conservation Act
g	grams
GC	glucocorticoids
GIS	Geographic Information System
GnRH	gonadotropin-releasing hormone
GPS	Global Positioning System

HDLNR	Hawai`i Department of Land and Natural Resources
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
HIISC	Hawaiian Invasive Species Council
HMRFS	Hawai`i Marine Recreational Fishing Survey
HMSRT	Hawaiian Monk Seal Recovery Team
HRS	Hawai`i Revised Statutes
IACUC	Institutional Animal Care and Use Committee
IBA	Important Bird Area
INRMP	Integrated Natural Resource Management Plans
IPCC	Intergovernmental Panel on Climate Change
IQF	Individually Quick Frozen
IUCN	International Union for the Conservation of Nature
K	carrying capacity
kg	kilograms
km	kilometers
km ²	square kilometers
lb	pound
LFX	live-fire exercise
$\lambda_{realized}$	realized growth rate
m	meters
mb	millibar
MBTA	Migratory Bird Treaty Act
MCBH	Marine Corps Base Hawai`i
MHI	Main Hawaiian Islands
ml	milliliters

MLCD	Marine Life Conservations Districts
mm	millimeters
MMC	Marine Mammal Commission
MMHSRP	Marine Mammal Health and Stranding Response Program
MMPA	Marine Mammal Protection Act
MMR	Makua Military Reservation
Monument	Papahānaumokuākea National Monument
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
N	North
<i>N</i>	mean final abundance
NAO	National Oceanic and Atmospheric Administration Administrative Order
NEPA	National Environmental Policy Act
<i>N_fmature</i>	number of mature females
NGO	Non-Governmental Organization
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
nm	nautical miles
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOS	National Ocean Service
NPS	National Park Service
NRHP	National Register of Historic Places

NW	Northwest
NWHI	Northwestern Hawaiian Islands
°	degrees
OIRC	Offshore Islet Restoration Committee
ONMS	Office of National Marine Sanctuaries
OTC	Office in Tactical Command
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
PDO	Pacific Decadal Oscillation
PDV	Phocine Distemper Virus
PEIS	Programmatic Environmental Impact Statement
PI	principal investigator
PIBHMC	Pacific Islands Benthic Habitat Mapping Center
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
PIT	Passive Integrated Transponder
PMNM	Papahāunamokuākea Marine National Monument
POP	persistent organic pollutants
ppt	parts per thousand
PRCP	Polluted Runoff Control Program
QFASA	quantitative fatty acid signature analysis
RA	Research Assistant
RFFA	reasonably foreseeable future actions
ROD	Record of Decision
S	South

SGCN	Species of Greatest Conservation Need
SHPD	Hawai'i State Historic Preservation Division
SW	Southwest
SWFSC	Southwest Fisheries Science Center
TAC	total allowable catch
U.S.	United States
U.S.C.	United States Code
UDP	Unanticipated Discovery Plan
UH	University of Hawai'i
UME	Unusual Mortality Even
UNESCO	United Nations Education, Scientific, and Cultural Organization
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
VHF	very high frequency
V_{pop}	population reproductive value
v_x	age-specific reproductive value
W	West
WNV	West Nile Virus
WPRFMC	Western Pacific Regional Fishery Management Council
yr	year