



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ELEVENTH AIR FORCE (PACAF) JOINT
BASE ELMENDORF-RICHARDSON ALASKA

28 September 2022

Richard Mauser
Environmental Impact Analysis Program Coordinator
U.S. Air Force, 611th Civil Engineer Squadron/CEIE 10471
20th Street, Suite 214
Joint Base Elmendorf-Richardson, Alaska 99506 – 2201

Hawai'i Office of Environmental Quality Control 235
South Beretania Street, Suite 702
Honolulu, Hawai'I 96813

SUBJECT: Request to Post U.S. Air Force's Finding of No Significant Impact – Finding of No Practical Alternative for the Draft Environmental Assessment Entitled "Management of Invasive Vegetation on Wake Island Afield, Wake Atoll in "The Environmental Notice" on 8 October 2022.

The U.S Air Force (USAF), 611th Civil Engineer Squadron, is requesting that the Hawai'i Office of Environmental Quality Control Post a Finding of No Significant Impact – Finding of No Practical Alternative (FONSI-FONPA) for the Draft Environmental Assessment Entitled "Management of Invasive Vegetation on Wake Island Afield, Wake Atoll" to its website for the 8 October 2022 posting. The public comment period for the USAF's FONSI-FONPA will end on 7 November 2022. Once the 30 day public comment period is completed the USAF will evaluate the public comments and determine if the FONSI-FONPA is warranted.

Included with this submission is the following documentation:

- Hawai'i Office of Environmental Quality Publication Form
- USAF's draft FONSI-FONPA
- A pdf copy of the Draft EA entitled "Management of Invasive Vegetation on Wake Island Afield, Wake Atoll"

If you have any questions regarding this submission, please feel free to contact me by phone at (907)726-7981 or by e-mail at richard.mauser@us.af.mil

Sincerely,

MAUSER.RICHARD
D.JAMES.1073657
438

Digitally signed by
MAUSER.RICHARD.JAMES.10
73657438
Date: 2022.09.28 15:27:02
-08'00'

Richard Mauser
EAIP/NEPA Coordinator

3 Attachments:
as

**NEPA Action EA/EIS
Publication Form**

Project Name: Preliminary Final Environmental Assessment for the Management of Invasive Vegetation on Wake Island Airfield, Wake Atoll, Pacific Ocean - USAF FONSI-FONPA

Island: Wake Island

District: Not Applicable

TMK: Not Applicable

Permits: NPDES Construction General Permit

**Applicant or Proposing
Agency:**

Richard Mauser,
U.S. Air Force, 611th Civil Engineer Squadron/CEIE
10471 20th Street, Suite 325
Joint Base Elmendorf-Richardson, Alaska 99506

Phone: 907-726-7981

Email: richard.mauser@us.af.mil

**Approving
Agency:**

Richard Mauser,
U.S. Air Force, 611th Civil Engineer Squadron/CEIE
10471 20th Street, Suite 325
Joint Base Elmendorf-Richardson, Alaska 99506

Phone: 907-726-7981

Email: richard.mauser@us.af.mil

Consultant: Not Applicable

Status: The U.S. Air Force will accept comments for a 30-day public comment period beginning on 8 October and end on 7 November 2022. Send comments to Richard Mauser, 611th Civil Engineer Squadron, EAIP/NEPA Coordinator, 10471, 20th St., Ste 302, JBER 99506 or Email: richard.mauser@us.af.mil or call (907) 726-7981.

Summary: The proposed action includes the removal of ironwood from three areas on Wake Island Airfield (WIA) through various combinations of chainsaw, herbicide application, controlled burn, and/or removal by heavy equipment. Disposal would also be carried out by various methods including wood-chipper, controlled wood-pile burn, or in-situ controlled burn. Due to the unique challenges of performing work at this remote location, including transport of equipment and materials, and potential for equipment failure, the Preferred Alternative includes all feasible methods for ironwood removal and disposal. It is expected that one or more of the methods will be used. The activity is needed to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of WIA. Invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot WIA clear zone adjacent to the taxiway, as mandated by Air Force Instruction (AFI) 32-1015 Integrated Installation Planning.

Revised February 2012

**DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND
FINDING OF NO PRACTICABLE ALTERNATIVE (FONPA)**

**Management of Invasive Vegetation on Wake Island Airfield
Wake Atoll, Pacific Ocean**

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S. Code 4321 et seq.); the Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA, 40 Code of Federal Regulations (CFR) Parts 1500—1508; and 32 CFR §989, Environmental Impact Analysis Process (EIAP); the U.S. Air Force (Air Force) assessed the potential impacts on the natural and human environment associated with the Management of Invasive Vegetation on Wake Island Airfield (WIA). The Environmental Assessment (EA) is incorporated by reference into this finding per 40 CFR 1508.13 and 40 CFR 1502.21.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of Wake Island Airfield (WIA).

The Proposed Action is needed because invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot (ft) WIA clear zone adjacent to the taxiway, as mandated by Air Force Instruction (AFI) 32-1015 *Integrated Installation Planning*.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

Preferred Alternative

The Proposed Action would remove invasive ironwood trees from three areas on Wake Island, followed by out-planting of native vegetation in cleared areas.

Under The Preferred Alternative, ironwood trees would be removal from three areas of WIA through various combinations of chainsaw cutting, herbicide application, controlled burning and/or removal through use of heavy equipment. Disposal would also be carried out by various methods including disposal via wood-chipper, controlled wood-pile burning or in-situ controlled burning. Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under the various methods outlined within this document. Challenges include those associated with transport of equipment and materials to and from the island, as well as those associated with equipment repair in the event of failure. Due to these uncertainties, the Preferred Alternative outlines all feasible methods for removal, and it is expected that one or more of the methods outlined here would be used.

Under the Preferred Alternative, the shipment of personnel and equipment to WIA would occur on regularly scheduled transport operations. All equipment and materials that would be brought to Wake Island via vessel or aircraft would be inspected and washed down or treated (if necessary)

before shipment to Wake Island. This process would be coordinated, documented, and approved /through the 611th Civil Engineer Squadron (CES) Biosecurity Manager. All materials and/or equipment shipped via vessel to Wake Island would comply with the February 2019 “Wake Island Airfield Vessel Movement Biosecurity Requirements” and precautions would be taken to ensure that all activities comply with the Wake Island Biosecurity Management Plan.

Removal Method: Chainsaw and Herbicide Application

Chainsaws may be used to cut and fell trees at their base without disturbing the subsurface. However, cutting can induce the sprouting of ironwood suckers, or shoots that grow from buds within the tree’s root system, and thus systemic herbicide application is required for full ironwood destruction. Caution would be necessary in areas around utilities, power lines, buildings, and historic structures to ensure trees do not fall on nearby developed areas. Removal by chainsaw and herbicide would be the only method utilized within a 15-ft buffer zone of all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

Excavator-mounted shears could also be utilized to avoid uprooting trees in areas with sufficient clearance for an excavator. It is assumed that there would be potential for rutting from heavy equipment regardless of removal via chainsaw or excavator-mounted shears due to the fact that dump trucks would be necessary to remove felled trunks from the area.

Herbicide application may be used as a method to prevent cut stumps from sprouting new suckers. The Florida Exotic Pest Plant Council recommends applying herbicide to the surface of ironwood stumps, noting that the herbicide application should be concentrated on the layer of tissue immediately inside the bark. Herbicides can also be applied using the hack and squirt (frill-girdle) method in which herbicide is applied to deep cuts in the bark of the tree. Care would be exercised to avoid non-target species.

In accordance with Department of Defense (DoD) Instruction 4150.07, herbicides must be applied by a DoD certified pesticide applicator or under direct supervision of a DoD certified pesticide applicator. Herbicide labels must be provided to confirm if they meet DoD requirements and it is preferred that materials already be on the DoD approved list.

Removal Method: Bulldozer or Similar Heavy Equipment

A bulldozer or similar heavy equipment may be used to uproot and fell trees. Use of a bulldozer would not require use of herbicide, though felled trunks would still require chipping or burning for disposal. Bulldozers would be required to keep the blade raised above the ground to minimize potential impacts to cultural resources and reduce likelihood of encountering/disturbing unexploded ordnance (UXO). However, the process of tree uprooting itself would cause significant ground disturbance and could still disturb cultural resources, UXO, utilities, roads, transformers, generators, or other infrastructure. Due to this potential for disturbance, a bulldozer would not be used within a 15-ft buffer zone of all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

Disposal Method: Chipper

A chipper may be used to chip felled trees for use as mulch on WIA. Use of the chipper would also require associated use of a thumb-equipped excavator to feed felled trees into the chipper

machine. Felled trees would be placed in the designated wood pile and burning/chipping area after removal for processing. Chipped wood could be used as mulch or composted.

Disposal Method: Burning

Woodpile burning may be used as a method to dispose of ironwood trees felled via chainsaw, excavator-mounted shears, bulldozer, or similar heavy equipment. Tree trunks and branches disposed of under this alternative would be placed in the designated woodpile and burning/chipping area. Burning of the wood will be in coordination with airfield operations to ensure the associated plume does not interfere with scheduled flights.

Removal and Disposal Method: Controlled Burn

Controlled burning may be used as a method to remove and dispose of ironwood trees in-place and is most effective in dense stands with sufficient dry fuel on the ground. It is likely that getting a sustained fire capable of sufficiently burning live trees would prove difficult, however this method assumes that a fire can be started and sustained without the use of accelerants or other additional efforts to sustain the fire. Fires can be controlled by conducting burning of stands of trees along man-made or natural firebreaks such as roads or clearings. It is important that controlled burning be conducted during periods of favorable wind conditions to reduce the risk of fire spreading to infrastructure. If utilized, all controlled burn activities must be overseen by the Wake Island Fire Department. Controlled burns of ironwood are most effective when allowed to slowly smolder. Unless further subsurface UXO or munitions and explosives of concern (MEC) evaluations occur, controlled burns would only occur in areas where subterranean UXO and MEC sweeps have already been done. Controlled burning would not occur within a 15-ft buffer zone around all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

Native Vegetation Out-Planting

To the maximum extent practicable, felled ironwood would be chipped and spread across the disturbed areas. After disturbance, all areas where ironwood has been removed would be revegetated with an appropriate seed mix or native plantings, which would be conducted in a separate mobilization effort. The later mobilization is required to avoid any residual effect from the herbicides used to terminate the invasive Ironwood trees and allow time to propagate the plantings. The U.S. Fish and Wildlife Service (USFWS) would be assisting with the selection and propagation of the native plantings.

Alternatives Not Meeting the Purpose and Need

Alternative 1

An alternative considered but eliminated from detailed analysis includes girdling (completely removing a ring of bark from the circumference of the trunk) and herbicide treatment of ironwood trees. This method would not meet the project's purpose and need because it leaves dead trees in place within the WIA clear zones and near the taxiway, and thus does not mitigate associated safety concerns, particularly minimizing the threat to human health and safety from a situation such as an aircraft bird strike. This method is also unsuitable in areas outside of the WIA clear zones and near the taxiway because it leaves trees in-place, which represents an uncontrolled

fire hazard in proximity to existing structures and would eventually generate a follow-on action to cut the trees to ensure they do not fall on infrastructure or represent a fire hazard. While proponents of this method may cite earlier University of Hawai'i efforts that removed ironwood trees via girdling on Wilkes and Peale islands, these islands do not have consistent human occupation and are considered lower safety risk for impacts from fire or falling hazards to people and the built environment.

Alternative 2

Another alternative considered but eliminated from detailed analysis includes the disposal of felled ironwood trees via barging off WIA for disposal on the mainland. This method would not meet the project's purpose and need because the movement of trees represents a significant biosecurity risk to any area where the trees might be delivered. Because there is a wood-chipper on WIA which would put the trees to beneficial reuse, and burning is a viable disposal alternative, the relative impacts associated with barging trees off WIA are considered untenable.

Summary of Environmental Impacts

No Action Alternative

Under the No Action Alternative, ironwood trees would not be removed, and the trees would continue to hinder the propagation of native plant species and provide ideal habitat for invasive rats. The trees would also remain in the WIA clear zones, directly adjacent to the runway, thereby representing a potential hazard to flight operations.

SUMMARY OF ENVIRONMENTAL FINDINGS

The Air Force has concluded that the Management of Invasive Vegetation on Wake Island Airfield, Wake Atoll would not affect the following resources: socioeconomic resources, environmental justice and coastal zone management. Environmental analysis focused on the following areas: AICUZ/land use, air quality, water resources, safety and occupational health, wildlife and threatened and endangered species, cultural resources, geological and soil resources, and utilities and infrastructure. No significant adverse cumulative impacts would result from activities associated with the preferred alternative when considered with past, present, or reasonably foreseeable future projects. The following text provides a summary of the impacts that could result from implementing the proposed action and presents the environmental protection measures, also known as best management practices (BMPs) that would be implemented to avoid or minimize impacts:

Air Installation Compatible Use Zone/Land Use. The Preferred Alternative would result in temporary adverse impacts to AICUZ/Land Use resulting from the ironwood removal and disposal activities. Removal and disposal activities would be conducted using well-maintained and job-suitable machinery to minimize noise generation. Affects to traffic are expected to be minor, and given typical WIA traffic levels, are deemed minor. Following completion of removal and disposal activities, land use and noise levels would return to ambient levels.

Air Quality. During the ironwood removal phase of the Preferred Alternative, the air quality in the project vicinity is expected to be temporarily adversely impacted by dust and exhaust from the heavy equipment.

During the ironwood disposal phase of the Proposed Action, the air quality in the project vicinity is expected to be temporarily adversely impacted by smoke from the burning of ironwood trunks, controlled burning of ironwood in situ, and/or exhaust and particulates from chipping of the trunks.

BMPs would be implemented during all project activities to minimize dust generation, and may include air monitoring, watering in areas where dust is considered an issue, and running equipment only when it is needed. Air monitoring would be conducted to monitor dust and smoke levels and other potential air quality impacts. Following completion of ironwood removal, the air quality would return to ambient levels. Unavoidable adverse effects would result from implementation of the Preferred Alternative. These effects are anticipated to be minor.

Water Resources. Under the Preferred Alternative, ironwood removal activities would result in temporary adverse impacts to water resources. Herbicides utilized to treat cut stumps have the potential to run off into Wake surface water and wetlands, or infiltrate into groundwater, however water-safe herbicides such as Garlon 3A would be utilized in areas of particular sensitivity. Heavy equipment and felling trees could result in disturbance of non-jurisdictional wetlands. Implementation of BMPs, such as accessing the project site via established roads outside of wetland areas or utilizing herbicides that have been approved for use in and around wetlands would minimize adverse impacts water resources. Areas that exhibit wetland characteristics would be noted by the consultant group, the 611 CES/CEI Natural Resource Manager and the 611 CES/CEI Biosecurity Manager, and any trees in these areas would be removed by chainsaw and rolled offsite to ensure no heavy equipment enters the area. Best management practices such as exclusion of heavy equipment would be implemented as applicable.

Safety and Occupational Health. During the ironwood removal phases of the Preferred Alternative, workers would likely be exposed to materials that may result in injury or ill health, including heavy machinery, pesticides, and fire. As such, a Health and Safety Plan would be developed in accordance to regulations under OSHA; Engineer Manual 385-1-1 (USACE 2014); and AFOSH. The potential for adverse impacts to human health and safety would be minimized by implementing engineering controls, administrative measures, and the use of personal protective equipment. Due to the potential for unexploded ordnance (UXO) at the project sites, UXO safety personnel would be present onsite during all tree clearing operations. BMPs for UXO safety would be followed by all project personnel, which include having at least one UXO technician present during all ironwood clearing activities and requiring all project personnel to follow the direction of the UXO technician.

Wildlife and Threatened and Endangered Species. Under the Preferred Alternative, ironwood removal activities would result in a temporary adverse impact to wildlife and birds protected under the MBTA. Impacts to migratory birds protected under MBTA are considered in this analysis and through consultation with the USFWS as described in this EA. Ironwood removal would create a disturbance to wildlife that inhabits the area or its immediate vicinity. Natural resource managers from the USAF 611 CES will provide consult and support for actions including implementation of BMPs for wildlife and nesting birds, but are not stationed at WIA and thus may only be able to provide onsite additional support at pre-planned key periods. In addition, environmental personnel would be included on the staff of the operating contractor and other project participants. Following completion of the removal, replanting with native plant

species would help wildlife quality return to pre-construction levels. Impacts to threatened or endangered species protected under the ESA are not anticipated.

Cultural Resources. Under the Preferred Alternative, ironwood removal activities would have the potential for long-term adverse effects to cultural resources if bulldozers or similar heavy equipment are utilized. Should bulldozers or similar heavy equipment be selected for ironwood removal, activities would be monitored by a qualified archaeologist and activity would be halted if cultural resources are identified in the work area. Impacts to cultural resources can be mitigated in these areas by removing ironwood trees via chainsaw or excavator-mounted shears in areas where there is sufficient clearance for an excavator. Due to the potential for cultural resources to be present at the project sites, one cultural resource expert would be present onsite during all tree clearing operations that have the potential to impact known or unknown cultural resources (e.g., during any ground disturbing tree removal activities, or during any tree removal activities performed within 15 feet of known cultural resources). The USAF cultural resource specialist would be consulted prior to execution of any tree removal activities to determine the appropriate level of cultural resource oversight. Cultural resource impacts have been assessed in compliance with Section 106 of the NHPA to ensure any impacts to cultural resources are appropriately assessed by the Alaska SHPO and consultation is complete. There are no federally recognized tribes with connections to WIA. Per the requirements of the SHPO determination of No Adverse Effect, educational employee briefing, adherence to the bone/artifact standard operating procedure, and monitoring recommendations will be followed.

Geological and Soil Resources. Under the Preferred Alternative, ironwood removal activities, which include movement of heavy machinery, would result in minor soil disturbance. Bulldozing, or use of excavation equipment to support tree felling, may result in major soil disturbance. BMPs such as utilization of chainsaws for ironwood removal in sensitive areas would be implemented during removal to minimize environmental consequences resulting from ground-disturbing activities. Standard erosion control measures would also reduce environmental consequences related to these characteristics. Although unavoidable, effects on soil at WIA are not considered significant.

Utilities and Infrastructure. Under the Preferred Alternative, ironwood removal activities would include stockpiling of felled trees in the solid waste accumulation area. This use of the solid waste accumulation area, in excess of its typical operations, would constitute an unavoidable adverse impact to that utility. In addition, the increased use and transport of heavy equipment between the three project areas would increase traffic on WIA roads and represent an unavoidable adverse impact.

Finding of No Significant Impact

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR §989, I conclude that the preferred alternative to remove invasive ironwood trees from three areas on Wake Island will not have a significant impact on the natural or human environment, either by itself or cumulatively with other known projects.

Although, there will be minor to moderate short term impacts relating to the ground disturbance and use of herbicides, the removal of this invasive species will have long term

benefits by returning the ecosystem to a more natural state, improving habitat for indigenous species, and helping to eradicate other invasive species. Accordingly, an Environmental Impact Statement is not required. This analysis fulfills the requirements of NEPA, the President's CEQ 40 CFR §§ 1500-1508 and the Air Force EIAP regulations 32 CF.R § 989. The signing of this Finding of No Significant Impact completes the EIAP.

Finding of No Practicable Alternative

In accordance with Executive Order (EO) 11990, Protection of Wetlands, and 32 CFR 989, the USAF finds that there is no practicable alternative to the preferred action and that the preferred alternative includes all practicable measures to minimize harm to the wetlands on Wake Atoll. Early public review was published for 31 days starting 23 May and ending on 22 June 2021, in the State of Hawaii Office of Environmental Quality Control's "The Environmental Notice". No comments were received. Based on a review of the attached Environmental Assessment there is no practicable alternative to removing invasive ironwood trees in wetlands to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway on Wake Island. If not an airfield obstruction, cleared areas will be replanted with native vegetation. The preferred action includes all practicable measures to minimize harm to wetlands, such as utilizing handheld chainsaws and other hand tool to fall and process ironwoods. No tracked or wheel equipment will be used in wetlands or around historic properties. With these measures, the impacts on Wake Atoll are not found to be significant, as discussed below, yet there is no practicable alternative that would avoid them entirely.

JEFFREY R. KING, Colonel, USAF
Chief, Civil Engineer Division
Headquarters, Pacific Air Force

Date

Preliminary Final

**ENVIRONMENTAL ASSESSMENT
FOR MANAGEMENT OF INVASIVE
VEGETATION ON WAKE ISLAND
AIRFIELD, WAKE ATOLL, PACIFIC
OCEAN**

**PACIFIC AIR FORCES REGIONAL SUPPORT CENTER
611TH CIVIL ENGINEER SQUADRON
NATURAL RESOURCES PROGRAM
Joint Base Elmendorf-Richardson, Alaska**



PREPARED FOR THE 611TH CIVIL ENGINEER SQUADRON

SEPTEMBER 2022

This page intentionally left blank

TABLE OF CONTENTS

	<u>Page</u>
LIST OF TABLES	v
LIST OF ACRONYMS AND ABBREVIATIONS	vi
EXECUTIVE SUMMARY	1
1. PURPOSE AND NEED FOR THE PROPOSED ACTION.....	1-1
1.1 INTRODUCTION	1-1
1.2 PROJECT LOCATION	1-1
1.3 HISTORY AND BACKGROUND	1-1
1.4 PURPOSE, NEED, AND DECISION TO BE MADE FOR THE PROPOSED ACTION	1-2
1.4.1 Purpose.....	1-2
1.4.2 Need	1-2
1.4.3 Decision to be Made	1-2
1.5 SUMMARY OF KEY ENVIRONMENTAL QUALITY COMPLIANCE REQUIREMENTS.....	1-3
1.5.1 National Environmental Policy Act.....	1-3
1.6 COORDINATION FOR ENVIRONMENTAL PLANNING AND PUBLIC INVOLVEMENT	1-4
1.7 ORGANIZATION OF THIS DOCUMENT	1-5
2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES	2-1
2.1 PROPOSED ACTION	2-1
2.2 PREFERRED ALTERNATIVE	2-1
2.3 NO ACTION ALTERNATIVE.....	2-4
2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS.....	2-4
2.5 EFFECTS ANALYSIS OF INDEPENDENT REMOVAL AND DISPOSAL COMBINATIONS OF THE PREFERRED ALTERNATIVE	2-5
3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	3-1
3.1 AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE	3-2
3.1.1 Definition of the Resource	3-2
3.1.2 Existing Conditions.....	3-3
3.1.3 Environmental Consequences.....	3-3
3.2 AIR QUALITY.....	3-5

3.2.1	Definition of the Resource	3-5
3.2.2	Existing Air Quality	3-7
3.2.2.1	Climate.....	3-7
3.2.2.2	Conditions	3-8
3.2.3	Environmental Consequences	3-8
3.3	WATER RESOURCES	3-9
3.3.1	Surface Water.....	3-9
3.3.1.1	Definition of the Resource	3-9
3.3.1.2	Existing Conditions.....	3-9
3.3.1.3	Environmental Consequences	3-10
3.3.2	Groundwater	3-10
3.3.2.1	Definition of the Resource	3-10
3.3.2.2	Existing Conditions.....	3-10
3.3.2.3	Environmental Consequences	3-11
3.3.3	Wetlands	3-11
3.3.3.1	Definition of the Resource	3-11
3.3.3.2	Existing Conditions.....	3-12
3.3.3.3	Environmental Consequences	3-12
3.4	SAFETY AND OCCUPATIONAL HEALTH.....	3-13
3.4.1	Definition of the Resource	3-13
3.4.2	Existing Conditions.....	3-14
3.4.3	Environmental Consequences	3-14
3.5	HAZARDOUS MATERIALS AND WASTES	3-15
3.5.1	Definition of the Resource	3-15
3.5.2	Existing Conditions.....	3-16
3.5.3	Environmental Consequences	3-16
3.6	BIOLOGICAL RESOURCES	3-17
3.6.1	Vegetation.....	3-17
3.6.1.1	Definition of the Resource	3-17
3.6.1.2	Existing Conditions.....	3-17
3.6.1.3	Environmental Consequences	3-18

3.6.2	Wildlife	3-19
3.6.2.1	Definition of the Resource	3-19
3.6.2.2	Existing Conditions.....	3-19
3.6.2.3	Environmental Consequences	3-21
3.6.3	Threatened and Endangered Species and Species of Concern.....	3-22
3.6.3.1	Definition of the Resource	3-22
3.6.3.2	Existing Conditions.....	3-23
3.6.3.3	Environmental Consequences	3-25
3.7	CULTURAL RESOURCES	3-27
3.7.1	Definition of the Resource	3-27
3.7.2	Existing Conditions.....	3-28
3.7.3	Environmental Consequences	3-29
3.8	GEOLOGICAL AND SOIL RESOURCES	3-31
3.8.1	Definition of the Resource	3-31
3.8.2	Existing Conditions.....	3-31
3.8.3	Environmental Consequences.....	3-32
3.9	SOCIOECONOMIC RESOURCES AND ENVIRONMENTAL JUSTICE	3-32
3.9.1	Definition of the Resource	3-32
3.9.2	Existing Conditions.....	3-33
3.9.3	Environmental Consequences	3-33
3.10	COASTAL ZONE MANAGEMENT.....	3-34
3.10.1	Definition of the Resource	3-34
3.10.2	Existing Conditions.....	3-34
3.10.3	Environmental Consequences.....	3-34
3.11	UTILITIES AND INFRASTRUCTURE.....	3-35
3.11.1	Definition of the Resource	3-35
3.11.2	Existing Conditions.....	3-35
3.11.3	Environmental Consequences	3-36
4.	CUMULATIVE AND OTHER EFFECTS	4-1
4.1	CUMULATIVE EFFECTS	4-1
4.1.1	Projects Identified for Potential Cumulative Effects	4-1
4.1.2	Cumulative Effects Analysis.....	4-2

4.2 UNAVOIDABLE ADVERSE EFFECTS 4-3

4.3 COMPATIBILITY OF PROPOSED ACTION AND ALTERNATIVES WITH THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS..... 4-5

4.4 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY 4-5

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 4-6

5. LIST OF PREPARERS..... 5-1

6. REFERENCES 6-1

APPENDIX A: FIGURES

APPENDIX B: AGENCY COORDINATION

APPENDIX C: PUBLIC NOTICE

APPENDIX D: AIR QUALITY CONFORMITY ANALYSIS

APPENDIX E: BIRD/WILDLIFE AIRCRAFT STRIKE HAZARD (BASH) SITE VISIT AND REVIEW

LIST OF TABLES

<u>Number</u>	<u>Title</u>	<u>Page</u>
Table ES-1	Comparison of Environmental Consequences	3
Table 2-1	Relative Impacts of Various Removal and Disposal Alternatives	2-5
Table 3-1	Noise Levels of Representative Construction Equipment	3-4
Table 3-2	National Ambient Air Quality Standards.....	3-6
Table 3-3	Migratory Birds Documented on Wake Atoll.....	3-23
Table 3-4	Wake Atoll Protected Species and Species of Concern.....	3-25

LIST OF ACRONYMS AND ABBREVIATIONS

$\mu\text{g}/\text{m}^3$	Microgram per cubic meter
ACAM	Air Conformity Applicability Model
AFMAN	Air Force Manual
AFOOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AICUZ	Air Installation Compatible Use Zone
AQCR	Air quality control region
BASH	Bird/Wildlife Aircraft Strike Hazard
BCC	Bird of Conservation Concern
BEZ	Bird Exclusion Zone
BMP	Best management practice
BRA	Bird Reduction Area
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CES	Civil Engineer Squadron
CFR	Code of Federal Regulations
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	Decibel(s)
DBH	Diameter at breast height
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOI	Department of the Interior
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FONSI	Finding of No Significant Impact
ft	Foot (feet)
GHG	Greenhouse gas
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
IUCN	International Union for Conservation of Nature
JP-5	Grade 5 jet propulsion fuel
MBTA	Migratory Bird Treaty Act

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

MDA	Missile Defense Agency
MEC	Munitions and explosives of concern
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PM _{2.5}	Particulate matter equal to or less than 2.5 microns in diameter
PM ₁₀	Particulate matter equal to or less than 10 microns in diameter
ppm	Part per million
PRSC	Pacific Air Forces Regional Support Center
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Office
SSPP	Strategic Sustainability Performance Plan
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USASMDC	U.S. Army Space and Missile Defense Command
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded ordnance
WIA	Wake Island Airfield
WWII	World War II

This page intentionally left blank

EXECUTIVE SUMMARY

INTRODUCTION

The Pacific Air Forces Regional Support Center (PRSC) 611 Civil Engineer Squadron (611th CES) Natural Resources Program is addressing issues surrounding invasive vegetation management at Wake Island Airfield, (WIA), Wake Atoll (Figure 1). Invasive vegetation management, specifically, physical removal of ironwood trees (*Casuarina equisetifolia*), is critical to helping WIA and CES meet the objectives of the Integrated Natural Resources Management Plan (INRMP), the Sikes Act, Executive Order (EO) 13112 *Exotic and Invasive Species*, Department of Defense Instructions (DoDI) 4715.03 *Natural Resources Conservation*, DoDI 4150.07 *Pest Management*, Air Force Instruction (AFI) 32-1053 *Integrated Pest Management*, and AFMAN 32-7003 *Environmental Conservation* and would help WIA meet its ongoing goals for invasive Pacific Rat (*Rattus exulans*) and White-throated woodrat (*Neotoma albigula*) eradication by removing preferred rat habitat. Removal of ironwood is also an integral component of safe flight operations at WIA because the trees are encroaching past U.S. Air Force safety setbacks for woody vegetation relative to an active runway.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of WIA (Figure 2). The Proposed Action is needed because invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot WIA clear zone adjacent to the taxiway, as mandated by AFI 32-1015 dtd 4 January 2021 w/Chgs *Integrated Installation Planning* (Figures 3, 4, and 5; PRSC 2017a).

The Proposed Action is in alignment with the objectives of WIA's INRMP, approved in accordance with the Sikes Act, 16 U.S. Code 670(a)(1), which requires WIA to “protect native species and discourage non-native, invasive species” and “implement nuisance and non-native species management actions presented in the Biological Control, Survey, and Management Plan” (PRSC 2017a). The Proposed Action also helps WIA meet the goals outlined by EO 13112, DoDI 4715.03, DoDI 4150.07, AFMAN 32-1053 *Integrated Pest Management Program*, and 32-7003 dtd 20 Apr 2020 – *Environmental Conservation*, as discussed in Section 1.1.

DESCRIPTION OF THE ALTERNATIVES

Preferred Alternative—The Preferred Alternative includes the removal of ironwood in three areas of WIA through various combinations of chainsaw cutting, herbicide application, controlled burning and/or removal through use of heavy equipment. Disposal would also be carried out by various methods including disposal via wood-chipper, controlled wood-pile burning or in-situ controlled burning. Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under various methods. The unique challenges include those associated with transport of equipment and materials to and from the island, as well as those

associated with equipment repair in the event of failure. Due to these uncertainties, the Preferred Alternative outlines all feasible methods for removal, and it is expected that one or more of the methods outlined here would be used.

The schedule for implementation of the field effort is still to be determined. The cleared areas would be maintained to ensure proper compliance within the WIA clear zones.

No Action Alternative—Under the No Action Alternative, ironwood trees would not be removed, and the trees would continue to hinder the propagation of native plant species. The trees would remain in the WIA clear zones directly adjacent to the runway, thereby representing a potential hazard to flight operations.

Alternatives Not Meeting the Purpose and Need

Alternative 1

An alternative considered but eliminated from detailed analysis includes girdling (completely removing a ring of bark from the circumference of the trunk) and herbicide treatment of ironwood trees. This method would not meet the project's purpose and need because it leaves dead trees in place within the WIA clear zones and near the taxiway, and thus does not mitigate associated safety concerns, particularly minimizing the threat to human health and safety from a situation such as an aircraft bird strike. This method is also unsuitable in areas outside of the WIA clear zones and near the taxiway because it leaves trees in-place, which represents an uncontrolled fire hazard in proximity to existing structures and would eventually generate a follow-on action to cut the trees to ensure they do not fall on infrastructure or represent a fire hazard. While proponents of this method may cite earlier University of Hawai'i efforts that removed ironwood trees via girdling on Wilkes and Peale islands, these islands do not have consistent human occupation and are considered lower safety risk for impacts from fire or falling hazards to people and the built environment.

Alternative 2

Another alternative considered but eliminated from detailed analysis includes the disposal of felled ironwood trees via barging off WIA for disposal on the mainland. This method would not meet the project's purpose and need because the movement of trees represents a significant biosecurity risk to any area where the trees might be delivered. Because there is a wood-chipper on WIA which would put the trees to beneficial reuse, and burning is a viable disposal alternative, the relative impacts associated with barging trees off WIA are considered untenable.

Summary of Environmental Impacts

Table ES-1 provides a brief summary and comparison of potential impacts under each alternative.

Table ES-1 Comparison of Environmental Consequences

Resource Area	Preferred Alternative	No Action Alternative
Air Installation Compatible Use Zone/Land Use	Short-term, direct, minor, adverse Long-term, direct and indirect, major, beneficial	None – No change
Air Quality	Short-term, direct, moderate, adverse Long-term, indirect, negligible, adverse	None – No change
Water Resources	Surface Water: Short-term, indirect, minor, adverse Groundwater: Short-term, indirect, minor, adverse Long-term, indirect, minor, beneficial Wetlands: Short-term, direct and indirect, moderate, adverse Long-term, indirect, moderate, beneficial Jurisdictional Wetlands: None – No change	Surface Water: None – No change Groundwater and Wetlands: Long-term, indirect, minor, adverse Jurisdictional Wetlands: None – No change
Safety and Occupational Health	Short-term, direct, moderate, adverse Long-term, indirect, moderate, beneficial	Long-term, indirect, moderate, adverse
Hazardous Materials and Wastes	Short-term, indirect, minor, negligible	None – No change
Biological Resources	Vegetation: Short-term, direct, minor, adverse Long-term, direct, major, beneficial Wildlife: Short-term, indirect, minor, adverse Long-term, indirect, major, beneficial Threatened and Endangered Species and Species of Concern: Short-term, indirect, minor, adverse (migratory birds), no effect (listed species) Long-term, indirect, major, beneficial (migratory birds), no effect (listed species)	None – No change
Cultural Resources	Short-term, direct and indirect, minor, negligible; no adverse effects Long-term, direct and indirect, minor, negligible; no adverse effects	Long-term, indirect, minor, negligible; no adverse effects
Geological and Soil Resources	Short-term, indirect, minor, adverse Long-term, indirect, minor, adverse	None – No change
Socioeconomic Resources and Environmental Justice	None – No change	None – No change
Coastal Zone Management	None – No change	None – No change
Utilities and Infrastructure	Short-term, direct and indirect, minor, adverse	None – No Change

Unavoidable adverse effects would result from implementation of the Proposed Action. These effects are anticipated to be minor.

This page intentionally left blank

1. PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The Pacific Air Forces Regional Support Center (PRSC) 611 Civil Engineer Squadron (611th CES) Natural Resources Program is addressing issues surrounding invasive vegetation management at Wake Island Airfield, (WIA), Wake Atoll (Figure 1). Invasive vegetation management, specifically, physical removal of ironwood trees (*Casuarina equisetifolia*), is critical to helping WIA and CES meet the objectives of the Integrated Natural Resources Management Plan (INRMP), the Sikes Act, Executive Order (EO) 13112 *Exotic and Invasive Species*, Department of Defense Instructions (DoDI) 4715.03 *Natural Resources Conservation*, DoDI 4150.07 *Pest Management*, Air Force Manual (AFMAN) 32-1053 *Integrated Pest Management Program*, and AFMAN 32-7003 dtd 20 Apr 2020 – *Environmental Conservation* and would help WIA meet its ongoing goals for invasive Pacific Rat (*Rattus exulans*) and White-throated woodrat (*Neotoma albigula*) eradication by removing preferred rat habitat. Removal of ironwood is also an integral component of safe flight operations at WIA because the trees are encroaching past U.S. Air Force (USAF) safety setbacks for woody vegetation relative to an active runway. Figures are presented in Appendix A.

1.2 PROJECT LOCATION

WIA is approximately 2,300 miles southwest of Honolulu and 1,600 miles east of Guam. Wake Island is part of the Wake Atoll, located at 19° 17' N and 166° 37' E. It is composed of a lagoon with three coral islands (Peale, Wake, and Wilkes; Figure 1) in a wishbone formation, all built upon an underwater volcano. The total land area of the three islands is 7.12 square kilometers or 1,759 acres. Wilkes Island and Peale Island are uninhabited. Most of Wake Island's infrastructure (dining hall, recreational buildings, residential buildings, etc.) is located on the northern portion of the island. Typical access to WIA is gained only with prior approval and by aircraft on a flight out of Joint Base Pearl Harbor-Hickam on Oahu, Hawai'i.

The proposed project would occur in three distinct regions of Wake Island (Figure 2):

- Project Area 1: South of the Runway (Figure 3)
- Project Area 2: Lagoon/Pipeline (Figure 4)
- Project Area 3: VORTAC Area (Figure 5).

1.3 HISTORY AND BACKGROUND

The PRSC-managed installation functions in support of contingency deployments, serves as an emergency landing facility, provides fuel storage, and supports the needs of the Department of Defense (DoD). In 1962 EO 11048 designated the Secretary of the Interior responsible for all executive, legislative, and judicial authority necessary for the administration of the atoll. The civil administration of the atoll was then handed to the USAF through a 1972 Memorandum of Agreement between USAF and the Department of the Interior (DOI). To this day PRSC manages the atoll according to the terms and conditions of that 1972 Agreement, with one new caveat—the establishment of the surrounding waters of the Pacific Remote Islands Marine

National Monument on 6 January 2009 by Presidential Proclamation 8336. Authority is delegated to DOI and managed by DOI as a unit of the U.S. National Wildlife Refuge System; however, Secretary of the Interior Order 3284 maintains civil administration of emergent land on the atoll with USAF.

Ironwood has been documented on Wake Atoll since at least 1959, with specific events such as the 1970s “family tree planting days”, which were held on the atoll to set out young ironwood trees (U.S. Army Space and Strategic Defense Command 1994). In the years since, ironwood has crowded out native vegetation. Recent ironwood management activities have occurred over four separate events between December 2016 and February 2018. Management activities, overseen by the University of Hawai‘i, took place on Wake, Peale, and Wilkes islands. These activities utilized an herbicide treatment, which included the application of Garlon 4 Ultra, mixed with blue dye and diesel at a ratio of 1:4 Garlon sprayed on cut trees (cut stump method) or injected in those that had been frilled (frill-girdle method). Seedlings and saplings were also removed by the root. Overall, 71.8 acres of ironwood were treated, with a mortality rate over 95 percent (Gilardi 2017; Gilardi and Duffy 2018). The area anticipated for clearing during the proposed effort is depicted in Figures 2, 3, 4, and 5.

1.4 PURPOSE, NEED, AND DECISION TO BE MADE FOR THE PROPOSED ACTION

1.4.1 Purpose

The purpose of the Proposed Action is to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of WIA (Figure 2).

1.4.2 Need

The Proposed Action is needed because invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot (ft) WIA clear zone adjacent to the taxiway, as mandated by AFI 32-1015 *Integrated Installations* (Figures 3, 4, and 5; PRSC 2017a).

The Proposed Action is in alignment with the objectives of WIA’s INRMP, approved in accordance with the Sikes Act, 16 U.S. Code 670(a)(1), which requires WIA to “protect native species and discourage non-native, invasive species” and “implement nuisance and non-native species management actions presented in the Biological Control, Survey, and Management Plan” (PRSC 2017a). As discussed in Section 1.1, the Proposed Action also helps WIA meet the goals outlined by EO 13112, DoDI 4715.03, DoDI 4150.07, AFMAN 32-1053, and AFMAN 32-7003.

1.4.3 Decision to be Made

The decision to be made is the selection of an alternative for PRSC to support the proposed action, which includes removal of invasive ironwood trees from three areas on Wake Island (Figures 2, 3, 4, and 5), and out-plant native vegetation where clearing would take place, and

preparation of an associated Finding of No Significant Impact (FONSI). The alternatives involve the No Action Alternative, which leaves invasive ironwood trees in place on Wake Atoll, or the Preferred Alternative, which uses a combination of removal and disposal methods to reduce invasive ironwood tree populations on Wake Atoll.

1.5 SUMMARY OF KEY ENVIRONMENTAL QUALITY COMPLIANCE REQUIREMENTS

1.5.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) is a federal statute requiring the identification and analysis of potential environmental impacts associated with proposed federal actions before those actions are taken. The intent of NEPA is to help decision-makers make well-informed decisions based on an understanding of the potential environmental consequences, and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ), which was charged with the development of implementing regulations and ensuring federal agency compliance with NEPA.

The CEQ regulations mandate that all federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

The regulations established by CEQ ensuring compliance with NEPA are contained in 40 Code of Federal Regulation (CFR) Parts 1500-1508. Environmental Assessments are prepared to study the environmental impacts of the proposed action. If the analysis finds that there will be no significant environmental impacts, then no additional study is required. However, if the impacts are found to be significant, then an Environmental Impact Statement will be prepared. The Environmental Impact Analysis Process (32 CFR Part 989, as amended) outlines the process for implementing NEPA.

The regulations contained in 32 CFR Part 989 provide policy and procedures for DoD officials to review environmental considerations when evaluating major DoD actions. USAF Policy Directive 32-70 states that the USAF would comply with applicable federal, state, and local laws and regulations, including NEPA. The directive requires DoD components to integrate the NEPA process during the initial planning stages of proposed DoD actions to ensure that planning and decisions reflect environmental values. The USAF implementing regulation for NEPA is AFI 32-1015.

Upon completion of the Environmental Assessment review and consultation process, the project sponsor, USAF, would determine whether the Proposed Action would result in significant impacts to environmental or other resources. If significant impacts are expected to result, the USAF would then be required to decide whether to move forward with the development of an Environmental Impact Statement, to mitigate significant impacts to a level of insignificance, or

to abandon the Proposed Action altogether. If no significant impacts are expected, then the USAF can publish a FONSI and move forward with the Proposed Action as such.

1.6 COORDINATION FOR ENVIRONMENTAL PLANNING AND PUBLIC INVOLVEMENT

To ensure compliance with the National Historic Preservation Act (NHPA), the PRSC coordinated and consulted with the Alaska State Historic Preservation Office (SHPO). The PRSC, Cultural Resources Manager has completed this consultation, which came to a determination of “no adverse effect” so long as procedures outlined in this EA are followed. The SHPO concurrence is attached in Appendix B.

The USAF coordinated with U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and NOAA. The Draft Final EA, dated 14 November 2019, was submitted to USFWS and NOAA for review. USFWS comments were incorporated into the subsequent version of the EA and a response to comments matrix was provided to USFWS. NOAA did not provide comments on the document but did provide comment during the regulatory compliance review associated with the U.S. Environmental Protection Agency (EPA) National Pollution Discharge Elimination System (NPDES) construction general permit. A record of correspondence with these agencies is included in Appendix B.

Because a portion of the Proposed Action coincides with wetlands, it is subject to the requirements and objectives of EO 11990, *Protection of Wetlands*. As required by 32 CFR 989 and AFMAN 32-7003 implementing EO 11990, USAF published an early notice with the Hawaii Office of Environmental Quality Control on 23 May 2021 indicating that a portion of the Proposed Action would occur in a wetland. The notice identified the state and federal regulatory agencies with special expertise that would be contacted and solicited public comment on the Proposed Action and any practicable alternatives. A copy of this notice is provided in Appendix C; no comments were received on this early notice.

The Draft Final EA and FONSI were filed with the State of Hawaii Office of Environmental Quality Control on 18 November 2019 and made available for public review on 23 November 2019. Copies of the Draft Final EA and FONSI were also made available for review at the WIA Detachment Headquarters in the Passenger Terminal. No public comments were received during the review period, however due to additional changes to the Environmental Assessment, the Revised Draft Final EA and FONSI were re-filed with the State of Hawaii Office of Environmental Quality Control on 28 September 2022 and made available for public review on 8 October 2022. Copies of the Revised Draft Final EA and FONSI were also made available for review at the WIA Detachment Headquarters in the Passenger Terminal. Public and agency comments will be provided in Appendix C after the review period is closed on 7 November 2022

1.6.1 Government to Government Consultation

EO 13175, Consultation and Coordination with Indian Tribal Governments (6 November 2000), directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally

administered lands. To comply with legal mandates, federally recognized tribes that are affiliated historically with the WIA geographic region would be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. However, there are no documented Native American tribes affiliated with the WIA geographic region. Native American Tribes or Hawaiians have not historically inhabited the atoll, and there has not been any evidence discovered to indicate that any Native Polynesians, or other native groups, have ever populated the atoll.

1.7 ORGANIZATION OF THIS DOCUMENT

This Environmental Assessment is organized into six chapters and includes two appendices as follows:

- **Chapter 1** provides the background information, project location, and purpose and need for the Proposed Action.
- **Chapter 2** contains a description of the Proposed Action and alternatives, including the No Action Alternative.
- **Chapter 3** contains a description of the environmental resources and baseline conditions that could potentially be affected by the Proposed Action and alternatives and presents an analysis of the potential environmental consequences of implementing the Proposed Action and the No Action Alternative.
- **Chapter 4** includes an analysis of the potential cumulative impacts at WIA.
- **Chapter 5** lists the preparers of this Environmental Assessment.
- **Chapter 6** lists the references used in the preparation of this document.
- **Appendix A** provides the site figures.
- **Appendix B** provides a record of agency correspondence.
- **Appendix C** provides a record of Public Notice. The final draft of this document will be updated to include a record of comments received during the public review period.
- **Appendix D** provides the Air Conformity Analysis.

Appendix E provides the most recent Bird/Wildlife Aircraft Strike Hazard (BASH) Site Visit and Review Report.

This page intentionally left blank

2. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action and alternatives the USAF is considering to fulfill its purpose of and need for action. As discussed in Section 1.5.1, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for a proposed action, as defined in Section 1. In addition, CEQ regulations specify the inclusion of a No Action Alternative against which potential impacts can be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with CEQ regulations. Section 2 discusses the decision making process and identification of the Preferred Alternative.

2.1 PROPOSED ACTION

The Proposed Action would remove invasive ironwood trees from three areas on Wake Island (Figures 2, 3, 4, and 5), and out-plant native vegetation where clearing would take place. Removal of invasive ironwood trees is currently being considered to support WIA and the 611th CES in meeting the objectives of their INRMP and EO 13112 *Exotic and Invasive Species*, DoDI 4715.03 *Natural Resources Conservation*, DoDI 4150.07 *Pest Management*, AFMAN 32-1053 *Integrated Pest Management*, and AFMAN 32-7003 *Environmental Conservation and* would help WIA meet its ongoing goals for invasive rat eradication by removing preferred rat habitat. Removal of ironwood is also an integral component of safe flight operations at WIA because the trees are encroaching past USAF safety setbacks for woody vegetation relative to an active runway.

Ironwood removal activities would generally involve ground disturbance by heavy machinery that could include wood-chippers, excavators, bulldozers, graders, wheel rollers, or dump trucks as well as handheld chainsaws. The disturbances would occur between designated staging areas and each of the three project sites. Equipment would be stored overnight either at the project sites or would be parked out of the way at the project staging area within Project Area 1 (Figure 3). Removal methods as described in Section 2.2 would be selected based on the needs of each specific area, and special precautions would be taken with regard to tree uprooting and direction of felling in areas around facilities, cultural resources (known or potential), and unexploded ordinance (UXO) (known or potential) to prevent disturbance, damage, or detonation. Any remaining ironwood stumps would be treated with herbicide to prevent regrowth as described in Section 2.2 and would be cleared in areas around facilities where they could become tripping or vehicle hazards. After disturbance, the disrupted areas would be regraded and revegetated with an appropriate seed mix or native plantings to the maximum extent practicable.

2.2 PREFERRED ALTERNATIVE

Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under the various methods outlined below. Challenges include those associated with transport of equipment and materials to and from the island, as well as those associated with equipment repair in the event of failure. Due to these uncertainties, the Preferred Alternative outlines all

feasible methods for removal, and it is expected that one or more of the methods outlined here would be used.

Under the Preferred Alternative, the shipment of personnel and equipment to WIA would occur on regularly scheduled transport operations. WIA infrastructure is designed to accommodate nearly 1,000 individuals with typical monthly averages of personnel numbering in the 100-person range. As such, with the Preferred Alternative likely to temporarily add up to 10 individuals, no changes will be needed to WIA infrastructure or operations to accommodate the additional personnel. All equipment and materials that would be brought to Wake Island via vessel or aircraft would be inspected and washed down or treated (if necessary) before shipment to Wake Island. This process would be coordinated, documented, and approved through the 611th CES Biosecurity Manager. All materials and/or equipment shipped via vessel to Wake Island would comply with the February 2019 “Wake Island Airfield Vessel Movement Biosecurity Requirements” (PRSC 2019) and precautions would be taken to ensure that all activities comply with the 2015 Wake Island Biosecurity Management Plan (PRSC 2015).

The schedule for implementation of the field effort is still to be determined. The cleared areas would be maintained to ensure proper compliance within the WIA clear zones.

Removal Method: Chainsaw and Herbicide Application

Chainsaws may be used to cut and fell trees at their base without disturbing the subsurface. However, cutting can induce the sprouting of ironwood suckers, or shoots that grow from buds within the tree’s root system, and thus systemic herbicide application is required for full ironwood destruction. Caution would be necessary in areas around utilities, power lines, buildings, and historic structures to ensure trees do not fall on nearby developed areas.

Removal by chainsaw and herbicide would be the only method utilized within a 15-ft buffer zone of all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

Excavator-mounted shears could also be utilized to avoid uprooting trees in areas with sufficient clearance for an excavator. It is assumed that there would be potential for rutting from heavy equipment regardless of removal via chainsaw or excavator-mounted shears due to the fact that dump trucks would be necessary to remove felled trunks from the area.

Herbicide application may be used as a method to prevent cut stumps from sprouting new suckers (Global Invasive Species Database 2010). The Florida Exotic Pest Plant Council (2011) recommends applying a 50 percent aqueous solution of Garlon 3A or a 10–20 percent solution of Garlon 4 Ultra to the surface of ironwood stumps, noting that the herbicide application should be concentrated on the layer of tissue immediately inside the bark. The same herbicides at the same concentrations can be applied using the hack and squirt (frill-girdle) method in which herbicide is applied to deep cuts in the bark of the tree. For this method, cuts should be angled down to allow herbicide to pool. For smaller trees with a diameter at breast height (DBH) of up to 6 inches, herbicides containing triclopyr ester (such as Pathfinder II or Garlon 4) or a 10–20 percent solution of Garlon 4 Ultra in oil (mineral or citrus oil) can be applied to the bark around

the base of the tree. Spraying herbicides such as Garlon 3A or Garlon 4 Ultra in a 3–5 percent solution in water directly onto the leaves of ironwood can also be effective. Care should be taken to avoid non-target species (Pernas et al. 2013).

Triclopyr ester, or Garlon 4, is effective against woody plants such as ironwood, and provides relatively low residual control, being active in the soil for only about 46 days. However, it cannot be utilized near water as it can be toxic to fish. Garlon 3A, a form of triclopyr amine, is approved for use over water, and can be utilized in areas where there are sensitive aquatic receptors (PRSC 2017a). Garlon 4 would not be utilized within 20-ft of open water areas.

In accordance with DoDI 4150.07, herbicides must be applied by a DoD certified pesticide applicator or under direct supervision of a DoD certified pesticide applicator. Herbicide labels must be provided to confirm if they meet DoD requirements, and it is preferred that materials already be on the DoD approved list.

There is not a requirement to maintain a Clean Water Act (CWA) NPDES permit to apply herbicides on Wake Island (PRSC 2017a).

Removal Method: Bulldozer or Similar Heavy Equipment

A bulldozer or similar heavy equipment may be used to uproot and fell trees. Use of a bulldozer would not require use of herbicide, though felled trunks would still require chipping or burning for disposal. Bulldozers would be required to keep the blade raised above the ground to minimize potential impacts to cultural resources and reduce likelihood of encountering/disturbing UXO. However, the process of tree uprooting itself would cause significant ground disturbance and could still disturb cultural resources, UXO, utilities, roads, transformers, generators, or other infrastructure. Due to this potential for disturbance, a bulldozer would not be used within a 15-ft buffer zone of all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

Disposal Method: Chipper

A chipper may be used to chip felled trees for use as mulch on WIA. Use of the chipper would also require associated use of a thumb-equipped excavator to feed felled trees into the chipper machine. Felled trees would be placed in the designated wood pile and burning/chipping area (Figure 3) after removal for processing. Chipped wood could be used as mulch or composted.

Disposal Method: Burning

Woodpile burning may be used as a method to dispose of ironwood trees felled via chainsaw, excavator-mounted shears, bulldozer, or similar heavy equipment. Tree trunks and branches disposed of under this alternative would be placed in the designated wood pile and burning/chipping area (Figure 3) and burned in coordination with airfield operations to ensure the associated plume does not interfere with scheduled flights.

Removal and Disposal Method: Controlled Burn

Controlled burning may be used as a method to remove and dispose of ironwood trees in-place and is most effective in dense stands with sufficient dry fuel on the ground (Elfers 1988). It is likely that getting a sustained fire capable of sufficiently burning live trees would prove difficult, however this method assumes that a fire can be started and sustained without the use of accelerants or other additional efforts to sustain the fire. Fires can be controlled by conducting burning of stands of trees along man-made or natural firebreaks such as roads or clearings. It is important that controlled burning be conducted during periods of favorable wind conditions to reduce the risk of fire spreading to infrastructure. If utilized, all controlled burn activities must be overseen by the Wake Island Fire Department. Controlled burns of ironwood are most effective when allowed to slowly smolder (Morton 1980). Unless further subsurface UXO or munitions and explosives of concern (MEC) evaluations occur, controlled burns would only occur in areas where subterranean UXO and MEC sweeps have already been done. Controlled burning would not occur within a 15-ft buffer zone around all known cultural resources, buildings, hazardous material storage sites, and other sensitive resource areas.

2.3 NO ACTION ALTERNATIVE

CEQ regulations require consideration of the No Action Alternative for all Proposed Actions. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential alternatives can be compared.

Under the No Action Alternative, ironwood trees would not be removed, and the trees would continue to hinder the propagation of native plant species and provide ideal habitat for invasive rats. The trees would also remain in the WIA clear zones, directly adjacent to the runway, thereby representing a potential hazard to flight operations.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

As the NEPA process progresses, removal and disposal methods outlined under the preferred alternative may be eliminated if they are identified not to meet the project's purpose and need or would be unable to avoid all non-mitigable adverse effects, including those to the environment, cultural resources, or the 611th CES mission.

An alternative considered but eliminated from detailed analysis includes girdling (completely removing a ring of bark from the circumference of the trunk) and herbicide treatment of ironwood trees. This method would not meet the project's purpose and need because it leaves dead trees in place within the WIA clear zones and near the taxiway, and thus does not mitigate associated safety concerns, particularly minimizing the threat to human health and safety from a situation such as an aircraft bird strike. This method is also unsuitable in areas outside of the WIA clear zones and near the taxiway because it leaves trees in-place, which represents an uncontrolled fire hazard, and would eventually generate a follow-on action to cut the trees to ensure they do not fall on infrastructure or represent a fire hazard. While proponents of this method may cite earlier University of Hawai'i efforts that removed ironwood trees via girdling

on Wilkes and Peale islands, these islands do not have consistent human occupation and are considered lower risk for fire or falling hazards to people.

Another alternative considered but eliminated from detailed analysis includes the disposal of felled ironwood trees via barging off WIA for disposal on the mainland. This method would not meet the project's purpose and need because the movement of trees represents a significant biosecurity risk, as well as a significant negative environmental effect due to the major carbon footprint associated with barging multiple tons of trees across the ocean. Because there is a wood-chipper on WIA which would put the trees to beneficial reuse, and burning is a viable disposal alternative, the relative impacts associated with barging trees off WIA are considered untenable.

2.5 EFFECTS ANALYSIS OF INDEPENDENT REMOVAL AND DISPOSAL COMBINATIONS OF THE PREFERRED ALTERNATIVE

As discussed in Section 2.2, the unique challenges associated with performing work on a remote location such as WIA require that Preferred Alternative include execution of ironwood removal and disposal under various methods. To aid the reader in understanding the impacts of each removal and disposal combination, Table 2-1 has been developed.

Table 2-1 Relative Impacts of Various Removal and Disposal Alternatives

Removal/Disposal Alternative	Proposed Action: Remove Ironwood Trees in Three Areas of Wake Atoll and Dispose of Ironwood Trees	No Action Alternative
Removal: Chainsaw/Herbicide Disposal: Wood-Chipper	Removal of ironwood trees would occur with minimal ground disturbance, without uprooting, and disposal would have minimal air quality impacts. Removal via chainsaw/herbicide would not present a risk to unknown cultural resources, underground utilities, or hazardous materials/wastes, and would minimize impacts to biological resources. This removal method would not destabilize soil and risk erosion. Disposal of ironwood trees via wood-chipper would provide a beneficial reuse to the island as wood chips could be utilized for mulch and would not significantly impact air quality. Overall, this removal/ disposal method is the least disruptive, but most time-consuming.	Same as current conditions.
Removal: Chainsaw/Herbicide Disposal: Wood Pile Burning	Removal of ironwood trees would occur with minimal ground disturbance, without uprooting, and disposal would have moderate, adverse air quality impacts. Removal via chainsaw/herbicide would not present a risk to unknown cultural resources, underground utilities, buried UXO/MEC, or hazardous materials/wastes, and would minimize impacts to biological resources. This removal method would not destabilize soil and risk erosion. Disposal of ironwood trees via wood pile burning would have adverse air quality impacts, and would require scheduling around airfield operations; however, it would not represent a time-intensive disposal process. Overall, this removal/disposal method is not	Same as current conditions.

Table 2-1 Relative Impacts of Various Removal and Disposal Alternatives

Removal/Disposal Alternative	Proposed Action: Remove Ironwood Trees in Three Areas of Wake Atoll and Dispose of Ironwood Trees	No Action Alternative
	disruptive to sensitive ground resources but does cause greater emissions on disposal.	
Removal: Dozer/Heavy Equipment Disposal: Wood-Chipper	Removal of ironwood trees would occur with maximum ground disturbance with full uprooting, and disposal would have minimal air quality impacts. Removal via dozer/heavy equipment would not present a risk to unknown cultural resources if following proper operating procedures, but would present a risk to unknown underground utilities, and buried UXO/MEC. It would not impact hazardous materials/wastes and would minimize impacts to biological resources. Disposal of ironwood trees via wood-chipper would provide a beneficial reuse to the island as wood chips could be utilized for mulch and would not significantly impact air quality. This disposal method would present a risk to previously undetected ground and tree-nesting seabirds that had entered the area and laid an egg subsequent to the last survey and clearing of nests. Overall, this removal/disposal method is rapid in its ability to remove ironwood and poses a greater risk to unknown underground resources but does not cause significant air emissions on disposal.	Same as current conditions.
Removal: Dozer/Heavy Equipment Disposal: Wood Pile Burning	Removal of ironwood trees would occur with maximum ground disturbance with full uprooting, and disposal would have moderate, adverse air quality impacts. Removal via dozer/heavy equipment would not present a risk to unknown cultural resources if following proper operating procedures, but would present a risk to unknown underground utilities, and buried UXO/MEC. It would not impact hazardous materials/wastes and would minimize impacts to biological resources. Disposal of ironwood trees via wood pile burning would have adverse air quality impacts, and would require scheduling around airfield operations; however, it would not represent a time-intensive disposal process. This disposal method would present a risk to previously undetected ground and tree-nesting seabirds that had entered the area and laid an egg subsequent to the last survey and clearing of nests. Overall, this removal/disposal method is rapid in its ability to remove and dispose of ironwood but poses a greater risk to unknown underground resources and air quality on disposal.	Same as current conditions.
Removal: Controlled Burn Disposal: Controlled Burn	Removal of ironwood trees would occur with minimal ground disturbance, without uprooting, and disposal would have moderate, adverse air quality impacts. Removal via controlled burning would not present a risk to unknown cultural resources, underground utilities, or hazardous materials/wastes; however, it would pose greater risk to biological resources within	Same as current conditions.

Table 2-1 Relative Impacts of Various Removal and Disposal Alternatives

Removal/Disposal Alternative	Proposed Action: Remove Ironwood Trees in Three Areas of Wake Atoll and Dispose of Ironwood Trees	No Action Alternative
	<p>the burn area and could only be conducted in areas where a complete UXO/MEC sweep has been completed. This removal method would not destabilize soil and risk erosion. Disposal of ironwood trees via controlled burning would have adverse air quality impacts and would require scheduling around airfield operations and in favorable wind conditions; however, it would not represent a time-intensive disposal process. This disposal method would present a risk to previously undetected ground and tree-nesting seabirds that had entered the area and laid an egg subsequent to the last survey and clearing of nests. Overall, this method of removal/disposal is rapid in its ability to both remove and dispose of ironwood; however, it would have adverse impacts on biological resources and can only be utilized in small areas where UXO/MEC sweeps have been completed.</p>	

This page intentionally left blank

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The affected environment reviews the environmental setting or general environmental conditions of the proposed project area. It describes the environmental baseline against which the environmental effects can be evaluated. In compliance with NEPA and other relevant regulations, only those resource areas considered potentially subject to impacts, and with potentially significant issues, are discussed below. This section includes discussions of noise, air quality, land use and recreation, geological resources, water resources, coastal zone management, biological resources, human health and safety, utilities and infrastructure, hazardous materials and wastes, socioeconomic resources and environmental justice, and cultural and visual resources.

The following sections present a description of the environmental resources and baseline conditions that could potentially be affected from implementing the Proposed Action. In addition, an analysis of the potential environmental consequences of implementing the Proposed Action, as well as the No Action Alternative, is also presented. In accordance with CEQ guidelines (40 CFR Part 1508.8), each alternative considered was evaluated for its potential effect on physical, biological, and socioeconomic resources.

The impact analyses consider the alternatives discussed in Chapter 2 that have been identified as reasonable for meeting the purpose and need for action. Those alternatives include:

Preferred Alternative—The Preferred Alternative includes the full removal and disposal of ironwood trees in Project Areas 1, 2, and 3. Under the Preferred Alternative, the shipment of personnel and equipment to WIA would occur on regularly scheduled transport operations, which would temporarily impact the number of people on-island as well as the type of equipment that is used in this remote location. Mitigation measures from the Wake Island Biosecurity Management Plan (PRSC 2015) would be taken, including that all equipment and materials brought to Wake Island via vessel or aircraft would be inspected and washed down or treated (if necessary) before shipment to Wake Island. Approval by the 611th CES Biosecurity Manager would be required for all shipment operations.

No Action Alternative—Under the No Action Alternative, ironwood trees would remain in Project Areas 1, 2, and 3. Under this alternative, the ironwood would continue to crowd and shade out native vegetation, force low species richness and diversity, and present a hazard to flight operations due to ironwood presence within the WIA clear zones and adjacent to the taxiway (Figures 3, 4, and 5; PRSC 2017a).

The criteria below were used to analyze impacts on the resources. For the purposes of this report, the existing conditions are used as a baseline comparison for the Preferred Alternative, or No Action Alternative impacts. To further clarify the nature of the various impacts upon each resource in the Environmental Consequences section of this Draft Environmental Assessment, the following terms were used and are defined.

Short-Term or Long-Term—These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity, for a finite period, or only during the time required for

construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic.

Direct or Indirect—A direct impact is caused by and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a Preferred Alternative and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a water body might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish in nearby waters.

Negligible, Minor, Moderate, or Major—These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor effect is slight, but detectable. A moderate impact is readily apparent. A major impact is one that is severely adverse or exceptionally beneficial.

Adverse or Beneficial—An adverse impact is one having unfavorable or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

3.1 AIR INSTALLATION COMPATIBLE USE ZONE/LAND USE

3.1.1 Definition of the Resource

AFI 32-1015 *Integrated Installation Planning*, requires air force installations to develop, implement, and maintain an Air Installation Compatible Use Zone (AICUZ) program for each installation. This instruction promotes long-term compatible land use in the vicinity of air installations, promotes education and engagement with communities affected by military operations, and defines procedures where aircraft operations may affect public health, safety, and/or welfare or where certain uses or structures may obstruct the airspace, attract birds, create electromagnetic or thermal interference, or produce dust, smoke, steam, or light emissions that could impact a pilot's vision, or otherwise can be hazardous to or incompatible with aircraft operations. AICUZ programs also define areas of higher risk from aircraft accidents and high noise exposure and provides recommended land uses.

Land use generally refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Sound is defined as a particular auditory effect produced by a given source. Noise and sound share the same physical aspects; however, noise is considered a disturbance while sound is defined as an auditory effect. Noise is typically defined as any sound that is undesirable because it interferes with communications, is intense enough to damage hearing, or is otherwise

bothersome. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors can be specific, such as schools or hospitals, or broad, such as green space or wildlife reserves, in which occasional or persistent sensitivity to noise above ambient levels exists.

3.1.2 Existing Conditions

Wake Island has three distinct areas of activity: areas including the airfield, the industrial area, and the downtown area. The airport consists of a 9,850-ft runway, supporting taxiways, tarmacs, various navigational aids, and vacant areas between active and non-active facilities. Vacant areas are in places filled by grass, ironwood, or other vegetation. The industrial area includes aviation and airfield maintenance shops, fire and rescue, aircraft fueling support facilities, civil engineering, and supply and warehouse buildings. Other industrial facilities in the area include shops, water collection, and distribution structures. The downtown area supports a library; dining hall; medical facility; laundry facility; fire station; gym; morale, welfare, and recreation buildings; single-family housing; and billeting (USAF 2012).

Wake Atoll also includes Wilkes Island and Peale Island, which support large numbers of resident and migratory seabirds and visiting winter resident shorebirds and waterfowl. As a result, bird sanctuary has been established on Wilkes Island. Wilkes Island receives selective grounds maintenance and contains bulk fuel storage and there are no active facilities on Peale Island (PRSC 2017a).

Wind and surf contribute to relatively high natural background sound levels on Wake Island. These background levels can mask the approach of vehicles and personnel are not always aware of aircraft landings. Roosting birds also contribute to relatively high natural background sound levels.

Anthropogenic sources of noise at Wake Island are from airfield operations and base maintenance activities. The most common military aircraft are C-17s. An Air Force C-5 is the noisiest aircraft that typically operates at Wake Island. Infrequent missile launches are another noise source on Wake Island.

3.1.3 Environmental Consequences

Short-term, direct, minor, and adverse impacts to AICUZ/Land Use; and long-term, direct and indirect, major, and beneficial impacts to AICUZ/Land Use are expected from the Preferred Alternative.

The Preferred Alternative is expected to have minor, adverse, short-term impacts on AICUZ/Land Use. Removal of ironwood trees would involve an increase in use and transport of heavy equipment between the three project areas (Figures 3, 4, and 5). This would increase traffic on WIA roads associated with designated access routes (Figures 6, 7, and 8). Current traffic levels on WIA are considered sufficiently low as to deem this a minor negative impact to land use on the associated roadways. Should controlled burning be utilized as a

disposal/removal method, fire department personnel would be present throughout the entire burn and impacts to adjacent AICUZ/Land Use would be short-term and minor. Burning would be timed so that associated smoke would not impact flight operations.

Minor and adverse effects to noise resources would be expected with the Preferred Alternative due to tree removal and disposal activities. These adverse effects would be short term and, following completion of ironwood removal, the noise levels would return to ambient levels. Adverse impacts would also affect bird populations, which would be short term and minor since the affected populations are already routinely disturbed by aircraft noise. Noise that is typically associated with tree removal generally includes the movement of trucks, and operation of chainsaws, excavators, and chippers. For context, the sound of a heavy truck at 50 ft is approximately 75 dB. In comparison, a rating of 75 dB is louder than an average vacuum cleaner (approximately 70 dB at 3 ft), but quieter than a garbage disposal (approximately 80 dB at 3 ft). As such, construction noises are typically classified as “moderate” levels of noise. Typical noise levels of representative construction equipment that would be used for the Preferred Alternative are provided in Table 3-1.

All construction activities would be conducted during normal business hours (from approximately 7 a.m. to 5 p.m.), and all equipment would be outfitted with mufflers that would be in good working condition.

Table 3-1 Noise Levels of Representative Construction Equipment

Equipment	Noise Level (dB)
Backhoe ¹	80
Chain Saw ¹	85
Dozer ¹	85
Dump Truck ¹	84
Excavator ¹	85
Front End Loader ¹	80
Grader ¹	85
Wood-Chipper ²	81
Noise levels are given at a distance of 50 ft from the source. Source: ¹ Construction Noise Handbook (Federal Highway Administration 2006). ² Noise – Supplemental Information (Howard County Maryland, no date).	

During tree removal activities, the existing solid waste accumulation area (Figure 3) would be utilized as a space to pile the trunks of removed trees. The solid waste accumulation area would also be utilized to dispose of trees via burning and/or chipping. The burning of trees would also result in short-term negative impacts to airfield operations and land use due to the size of smoke plumes. These burning activities would be timed in coordination with WIA airfield operations to minimize land use impacts during scheduled flight times.

Tree removal would occur adjacent to one Installation Restoration Program site with land use controls in effect: OT013, Scrap Metal Pile No. 2/Dump Site (Figure 3; EA Engineering, Science, and Technology, Inc., PBC 2017). It is not anticipated that tree removal would occur within OT013. Should tree removal be deemed feasible within the area, project personnel would consult the installation Remedial Project Manager to ensure compliance with all land use control restrictions and monitoring, inspection, and reporting requirements. Restrictions outlined in the

2017 Land Use Control Management Plan for this site include, “No residential use of areas within Site OT013 that contain COC [contaminant of concern] concentrations above the residential RACGs [remedial action cleanup goals] for soil,” and “No removal of site soil for uncontrolled use elsewhere,” (EA Engineering, Science, and Technology, Inc., PBC 2017). Ironwood removal would not constitute residential use and coordination with the Remedial Project Manager would ensure that no removal/reuse of site soil would occur. Ingress and egress to the vehicle staging area (Figure 6) would occur along one edge of Site OT013; however, no ground-disturbing activities would occur as a result of driving on the existing roadway.

The Preferred Alternative is expected to have long-term, direct, major, and beneficial impacts to AICUZ/land use. The removal of ironwood trees in the WIA clear zones and adjacent to the taxiway would have major direct beneficial impacts to WIA airfield safety and, therefore, the use of the runway would be improved.

None of the three project areas or access routes are designated recreational facilities; therefore, recreational facilities would not be impacted. Project activities are not anticipated to alter land use designations (Figure 9). Areas cleared of ironwood trees would remain open and would be revegetated with native plantings as practicable.

No Action Alternative

The No Action Alternative is expected to have short- and long-term, indirect, moderate, and adverse impacts to AICUZ/land use. Adverse impacts in both the short and long term are associated with the continued safety hazard posed by ironwood trees in proximity to the runway and WIA clear zones. Wake Island residents have also expressed frustration with the presence of nuisance invasive rats that prefer habitat within ironwood underbrush, which in turn has a negative impact on outdoor recreation activities (PRSC 2017a).

3.2 AIR QUALITY

3.2.1 Definition of the Resource

In accordance with the Federal Clean Air Act (CAA) (42 U.S. Code 7409) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological “air basin,” and the prevailing meteorological conditions.

Ambient Air Quality Standards—Under the CAA, the EPA developed National Ambient Air Quality Standards (NAAQS) for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations for ozone measured as either volatile organic compounds or total nitrogen oxides, carbon monoxide, nitrogen dioxide, sulfur dioxide, respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM10] and particulate matter equal to or less than 2.5 microns in diameter [PM2.5]), and lead (40 CFR Part 50).

Table 3-2 National Ambient Air Quality Standards

Pollutant	Average Period	Federal Air Quality Standards			
		Primary Standard		Secondary Standard	
		Level	Statistic	Level	Statistic
Carbon Dioxide	8-hour	9 ppm	Maximum	None	
	1-hour	35 ppm	Maximum		
Lead	Rolling 3-month average	0.15 $\mu\text{g}/\text{m}^3$	Maximum	Same as Primary	
Nitrogen Dioxide	Annual	0.053 ppm	Arithmetic Mean	Same as Primary	
	1-hour	0.100 ppm	3-year average	None	
PM ₁₀	24-hour	150 $\mu\text{g}/\text{m}^3$	Maximum	Same as Primary	
PM _{2.5}	Annual	12 $\mu\text{g}/\text{m}^3$	Annual Mean Averaged Over 3 Years	15 $\mu\text{g}/\text{m}^3$	Annual Mean Averaged Over 3 Years
	24-hour	35 $\mu\text{g}/\text{m}^3$	3-year average	Same as Primary	
Ozone	8-hour	0.070 ppm	3 year average	Same as Primary	
Sulfur Dioxide	3-hour	None		0.5 ppm	Maximum
	1-hour	0.075 ppm	3-year average	None	

NOTES: $\mu\text{g}/\text{m}^3$ = Microgram(s) per cubic meter.
ppm = Part(s) per million.

Attainment versus Non-Attainment and General Conformity—EPA classifies the air quality in an air quality control region (AQCR), or in subareas of an AQCR, according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas within each AQCR are, therefore, designated as either “attainment,” “non-attainment,” “maintenance,” or “unclassified” for each of the six criteria pollutants. Attainment means that the air quality within an AQCR is better than the NAAQS; non-attainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated non-attainment but is now meeting attainment; and an unclassified air quality designation by EPA means that there is not enough information to appropriately classify an AQCR, so the area is considered unclassified. Per EPA, General Conformity ensures that the actions taken by federal agencies do not interfere with a state’s plans to attain and maintain national standards for air quality. Therefore, General Conformity is only applicable to those areas considered nonattainment or maintenance.

Federal Prevention of Significant Deterioration—Federal Prevention of Significant Deterioration (PSD) regulations apply in attainment areas to a major stationary source, (i.e., source with the potential to emit 250 tons per year of any criteria pollutant), and a significant modification to a major stationary source (i.e., change that adds 15–40 tons per year to the facility’s potential to emit depending on the pollutant). Additional PSD major source and significant modification thresholds apply for greenhouse gases (GHGs). PSD regulations can also apply to stationary sources if: (1) a proposed project is within 10 kilometers of national parks or wilderness areas (i.e., Class I Areas), and (2) regulated stationary source pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 microgram per cubic meter or more (40 CFR 52.21[b][23][iii]). A Class I area includes national parks larger than 6,000 acres, national wilderness areas and national memorial parks larger than 5,000 acres, and international parks. PSD regulations also

define ambient air increments, limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's Class designation (40 CFR 52.21[c]).

Greenhouse Gas Emissions—GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The most common GHGs emitted from natural processes and human activities include carbon dioxide, methane, and nitrous oxide. GHGs are primarily produced by the burning of fossil fuels and through industrial and biological processes. On 22 September 2009, EPA issued a final rule for mandatory GHG reporting from large GHG emissions sources in the United States. The purpose of the rule is to collect comprehensive and accurate data on carbon dioxide and other GHG emissions that can be used to inform future policy decisions. In general, the threshold for reporting is 25,000 metric tons or more of carbon dioxide equivalent emissions per year but excludes mobile source emissions. Wake Island does not produce GHG's above the 25,000 metric ton threshold to report to the EPA.

EO 13514 was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, "agency activities, policies, plans, procedures, and practices" and "specific agency goals; a schedule, milestones, and approaches for achieving results; and quantifiable metrics" relevant to the implementation of EO 13514. On 26 August 2010, DoD released its SSPP to the public. This implementation plan describes specific actions DoD would take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the DoD SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to Fiscal Year 2008 emissions; and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to Fiscal Year 2008 emissions. EO 13514 was revoked by the publication of EO 13693 on 19 March 2015. EO 13693 expanded on EO 13514 and introduced new reduction targets to be achieved by 2025, as well as new requirements for facilities and operations. EO 13693 was revoked by EO 13834 on 17 May 2018, which provides updated targets and requirements.

3.2.2 Existing Air Quality

3.2.2.1 Climate

The climate at WIA affects the dispersion of air pollutants and the resulting air quality. The climate is maritime and chiefly controlled by the easterly trade winds, which dominate the island throughout the year. The winds blow steadily every month of the year with very little variation. The yearly average wind speed is 22.2 kilometers (13.8 miles) per hour (Missile Defense Agency [MDA] 2007).

3.2.2.2 Conditions

Wake Island is within the jurisdiction of EPA Region 9. There are no ambient air quality monitoring data for Wake Island, and there are no evident air pollution problems because the strong trade winds quickly disperse any local emissions. Furthermore, because there are no other islands within several hundred miles of Wake Island, there are no nearby sources from which Wake Island would receive air pollutants, and there are no nearby communities that could be affected by air pollutants from emissions generated at Wake Island (MDA 2007).

The principal pollutant emission sources are periodic firing of the power plant (a solar array has recently been constructed to provide up to 750 kilowatts of WIA's electricity), motor vehicles, aircraft operations, fuel storage tanks, incinerator emissions, and infrequent rocket launches. None of the emission sources at Wake Island meet the threshold for Title V permitting under the CAA, and no ambient air quality standards have been exceeded (USASMDC 2000 as cited in USASMDC 2002).

3.2.3 Environmental Consequences

Preferred Alternative

The USAF's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impacts associated with the preferred alternative in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*; the Environmental Impact Analysis Process (32 CFR 989); and the General Conformity Rule (40 CFR 93 Subpart B). Results of the ACAM analysis are presented in Appendix D.

Short-term, direct, moderate, and adverse impacts and long-term, indirect, negligible, and adverse impacts to air quality are expected from the Preferred Alternative.

The Preferred Alternative is expected to result in moderate temporary adverse impacts to air quality followed by negligible long-term adverse impacts to air quality. During tree removal, air quality is expected to be temporarily impacted by dust and exhaust from the operation of heavy equipment. Burning of trees as part of a controlled burn or burn pile would emit particulate matter (PM_{2.5}), along with pollutants such as carbon monoxide and nitrogen oxides. The major local effects of controlled burning or a burn pile are visibility reduction and respiratory impairment near the fire. Controlled burning would increase particulate matter in the air, thus reducing atmospheric visibility. It would also reduce air quality by emitting carbon monoxide and hydrocarbons but would not violate air quality standards. Should controlled burning or a burn pile be utilized, informal consultation with EPA Region 9 would be required (USAF 2019).

The CAA does not require EPA to establish air quality standards for carbon dioxide emissions at this time. Ninety percent of the emissions from forest fires, akin to the proposed burning of ironwood trees, are carbon dioxide and water vapor (Mobley 1976). As an odorless and colorless nontoxic gas formed abundantly in nature by the decomposition of organic substances, it is exhaled by all living organisms during breathing and absorbed from the air by plants for use in photosynthesis. Carbon dioxide's only potential as a pollutant is as a contributor to the overall greenhouse effect that is causing a rise in the Earth's air temperatures; however, given the scale

of this project and the estimated carbon dioxide emissions, projected GHG emissions are considered insignificant.

Loss of carbon sequestration associated with the loss of trees was also considered. While calculations for individual trees were not completed for this assessment, the potential long-term impacts to air quality were considered to be *de minimus* because of the number of trees that are likely to be removed.

No Action Alternative

The No Action Alternative would have no impact on air quality.

3.3 WATER RESOURCES

3.3.1 Surface Water

3.3.1.1 Definition of the Resource

Surface water resources generally consist of permanently or seasonally flooded water features including lakes, ponds, rivers, streams, and oceans.

3.3.1.2 Existing Conditions

Wake lagoon covers approximately 1.5 square miles. The lagoon is shallow and averages 10 ft in depth but ranges from 1 to 12 ft in depth depending on the tidal condition. Depths at the mouth of the lagoon are about 15 ft. The lagoon includes an intertidal zone of reefs with calcium carbonate or coral substrate and large areas of sandy bottom. Water in the lagoon is often turbid due to the ocean and tidal currents mixing the sediments. There are also a number of brackish ponds beneath highly permeable sands on Wake Island near the southeasternmost portion of the lagoon. Any fresh rainwater that infiltrates into the permeable substrate is less dense than the underlying brackish groundwater and remains segregated on top of the brackish water. Freshwater runoff in developed areas (runways, rooftops, roadways, and side) tends to drain rapidly into the lagoon or the Pacific Ocean. As a result, groundwater on the Atoll is brackish and non-potable (PRSC 2017a).

Deep water surrounds the entire atoll. Inside the lagoon, the mean tide range is approximately 1.5 ft. Low tides have a stand of 2–3 hours (PRSC 2017a). Outside the lagoon, the mean tide range is 2.02 ft, with a mean high water of 2.14 ft and a mean low water of 0.12 ft (National Oceanic and Atmospheric Administration [NOAA] 2011). Tidal flow through the lagoon has been disrupted as the result of historical activities conducted at the atoll. The solid fill causeway connecting Wake Island with Wilkes Island completely obstructs any natural flow. Re-contouring of the shoreline has likely caused the currents within the lagoon to shift. Based on *Notes on the Geography and Natural History of Wake Island* compiled by E.H. Bryan in 1959, the Tangier Expedition recorded depths of up to 15 ft in the lagoon in 1923 (Bryan 1959). Individuals stationed on Wake Island in the 1970s and 1980s indicated that large expanses of living coral occurred in the lagoon, along with a diverse assemblage of invertebrates and fishes (USAF 2008); the lagoon can no longer be qualitatively described in such a manner.

There are no surface water impoundments on Wake Atoll. There are localized areas where runoff is collected and conveyed.

3.3.1.3 Environmental Consequences

Preferred Alternative

Short-term, indirect, minor, and adverse impacts to surface water are expected from the Preferred Alternative.

The Preferred Alternative could result in short-term minor adverse effects to surface water. Herbicides utilized to treat cut stumps have the potential to run off into Wake lagoon, the brackish ponds, or the Pacific Ocean after heavy rainfall events, however, use of water-safe herbicides such as Garlon 3A (Triclopyr amine) would be utilized in areas where herbicide is most likely to impact water resources (PRSC 2017a). Best Management Practices (BMPs) would be utilized to minimize the amount of herbicide applied to each stump to prevent excess herbicide runoff into surface water, and herbicide would not be applied before predicted rainfall events to ensure that it is absorbed by ironwood stumps before a rainfall event occurs. As the area of trees to be removed would be over 1 acre, an NPDES Construction General Permit would be required. Should controlled burning or burn piles be utilized, ash from burning would run off into the ocean and negatively impact ocean water quality, but it is not anticipated that concentrations would be sufficiently high to have an impact on marine species.

No Action Alternative

Long-term, indirect, minor, and positive impacts to surface water are expected from the No Action Alternative. By leaving the ironwood trees in place they would continue to help reduce the amount of aeolian processes (wind-caused) and erosion, which impacts surface water throughout the area.

3.3.2 Groundwater

3.3.2.1 Definition of the Resource

Groundwater resources consist of water located beneath the ground surface in soil pore space, bedrock fractures, and subterranean drainage (i.e., karst dissolution features).

3.3.2.2 Existing Conditions

Due to Wake Atoll's small area, flat topography, and substrate, groundwater resources are extremely limited. Shallow brackish groundwater lenses occur in the highly permeable sands. Any fresh rainwater that infiltrates into the permeable substrate is less dense than the underlying brackish groundwater and remains segregated on top of the brackish water. Freshwater runoff in developed areas (runways, rooftops, roadways, and side) tends to drain rapidly into the lagoon or the Pacific Ocean. As a result, groundwater on the Atoll is brackish and non-potable. Drinking

water on the island is collected via well and treated at an on-island desalination plant (MDA 2015).

3.3.2.3 Environmental Consequences

Preferred Alternative

Short-term, indirect, minor, and adverse impacts to groundwater; and long-term, indirect, minor, and beneficial impacts to groundwater are expected from the Preferred Alternative.

The Preferred Alternative would result in short-term adverse impacts to groundwater. Herbicides utilized to treat cut stumps have the potential to run off treated stumps and infiltrate into groundwater. BMPs would be utilized to minimize the amount of herbicide applied to each stump to prevent excess herbicide runoff into groundwater, and herbicide would not be applied immediately before predicted rainfall events to ensure that it is absorbed by ironwood stumps before rainfall occurs. The Work Plan for the proposed action would include more specifics on water testing to ensure groundwater resources, and in turn drinking water, is not impacted by herbicide application.

The Preferred Alternative would likely result in long-term beneficial impacts to groundwater. The removal of ironwood trees would eliminate trees that currently uptake groundwater to survive, making more water available to native flora. These impacts would be minor due to the poor quality of groundwater on WIA.

No Action Alternative

Long-term, indirect, minor, and adverse impacts to groundwater are expected from the No Action Alternative.

By leaving the ironwood trees in place, the No Action Alternative would likely result in long-term negative impacts to groundwater. The continued existence of invasive ironwood trees would continue to uptake groundwater that could be used by native flora.

3.3.3 Wetlands and Floodplains

3.3.3.1 Definition of the Resource

Wetlands and waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by EPA and USACE. These agencies assert jurisdiction over traditionally navigable waters, wetlands adjacent to navigable waters, non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-around or have continuous flow at least seasonally, and wetlands that directly abut such tributaries. Section 404 of the CWA regulates the discharge of dredge or fills into waters of the United States, including wetlands. Encroachment into waters of the United States and wetlands typically requires a permit from the state and the federal government.

3.3.3.2 Existing Conditions

Hebshi and Patrick (2007) delineated and characterized wetlands on Wake Atoll in February 2007 according to USACE delineation standards. They found that 58 acres of brackish water wetlands existed on the Atoll, ranging in size from 0.11 to 42.3 acres, and are dominated by the facultative wetland plant *Pemphis* sp. along the shorelines. In addition, each wetland had mats of the obligate wetland plant seaside purslane (*Sesuvium portulacastrum*) ranging in size from small patches to extensive mats.

A Jurisdictional Determination was not obtained from USACE for the wetlands delineated by Hebshi and Patrick in 2007 (PRSC 2017a). A Jurisdictional Determination establishes concurrence from USACE regarding the delineated boundaries and establishes whether the wetlands are regulated as Waters of the United States under the CWA. No activities that could result in dredging or the placement of fill, or that could otherwise impact the wetland areas, should occur in or adjacent to the delineated areas to ensure that inadvertent impacts to jurisdictional wetlands do not occur. Any actions that could potentially impact the delineated wetlands would be coordinated with the Honolulu District of USACE prior to implementing the action. These actions would be reviewed for adequacy in terms of compliance with the 10 April 2008 Compensatory Mitigation for Losses of Aquatic Resources (USACE 33 CFR 325-332) and EPA (40 CFR Part 230). Section 8.7.1 of the INRMP includes management actions that are necessary to update the 2007 wetland delineation and obtain a Jurisdictional Determination for the delineated areas from USACE Honolulu District (PRSC 2017a).

Floodplains within WIA have not been identified and mapped are therefore not included as part of the existing conditions assessment.

3.3.3.3 Environmental Consequences

Preferred Alternative

Short-term, direct and indirect, moderate, and adverse impacts to non-jurisdictional wetlands; and long-term, indirect, moderate, and beneficial impacts to non-jurisdictional wetlands are expected from the Preferred Alternative. No impacts to jurisdictional wetlands or floodplains will occur as a result of the Preferred Alternative.

The Preferred Alternative would result in short-term, moderate, adverse impacts to non-jurisdictional wetlands. Wetlands are present throughout portions of Project Area 2 and the Lagoon/Pipeline Area (Figure 4) and have the potential to be disturbed by heavy equipment and falling trees during ironwood removal activities. The implementation of BMPs, including accessing the project site via established roads and outside of wetland areas where practicable (Figure 7), would minimize adverse impacts to wetlands. Further, in areas that may exhibit wetland characteristics, trees would be felled by chainsaw and removed; no heavy equipment would enter the area. Any herbicides used on ironwood stumps would be approved for use around wetlands, such as Garlon 3A. Wetlands adversely impacted by ironwood removal activities would be re-vegetated with native flora to the extent practicable. As the area of trees to be removed would be over 1 acre, an NPDES Construction General Permit would be required.

Consultation with USACE regarding the possibility of impacts to jurisdictional wetlands was conducted on 05 March 2021. Based on the proposed removal methods in these areas, USACE determined that these activities would not be subject to their regulatory jurisdiction and would therefore not require a formal jurisdictional determination or USACE permit authorization to perform removal activities; documentation of this determination is provided in Appendix B.

Should controlled burning or burn piles be utilized, ash from burning could run off into wetlands and negatively impact water quality, but it is not anticipated that concentrations would be sufficiently high to have an impact on freshwater or brackish species.

The Preferred Alternative would result in long-term, indirect, moderate, and beneficial impacts to wetlands. Clearing of invasive ironwood trees in Project Area 2 would help enable native flora to revegetate areas previously impacted by ironwood.

No Action Alternative

Long-term, indirect, minor, and adverse impacts to wetlands are expected from the No Action Alternative.

The No Action Alternative would likely result in long-term negative impacts to wetlands. The continued existence of invasive ironwood trees would continue to inhabit wetland areas that could be inhabited by wetland flora and fauna, and continued expansion of ironwood into these areas could result in conversion/recruitment of wetland habitat to upland conditions.

3.4 SAFETY AND OCCUPATIONAL HEALTH

3.4.1 Definition of the Resource

A safe environment is one in which there is no, or there is an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Safety and Occupational Health addresses both workers' health and public safety during demolition activities.

Construction site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and USAF regulations designed to comply with standards issued by the Occupational Safety and Health Administration (OSHA) and EPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment

carry important safety implications. Any facility or human use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

The Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program (Secretary of the Air Force 1996) implements the Occupational Safety and Health Air Force Policy Directive (Secretary of the Air Force 1993) by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the USAF Mishap Prevention Program, these standards ensure all USAF workplaces meet federal safety and health requirements. This instruction applies to all USAF activities.

3.4.2 Existing Conditions

The primary existing hazards at Wake Island are associated with aircraft refueling and base infrastructure support. Typical hazards include the handling and use of hazardous materials, exposure to noise from aircraft operations, and physical safety associated with the use of heavy equipment and support operations. These hazards are managed and controlled through implementation of safety programs, procedures, and the use of safety equipment (USASMDC 1999). Aircrafts and pilots are additionally exposed to hazards associated with potentially dangerous bird/animal wildlife strikes in the local flying area of WIA (PRSC 2016). The BASH program also includes concerns for safety and occupational health. Due to the location of nests in trees along runways, there will always be a necessity to maintain safety precautions for take-off and landing for all pilots. To ensure the safety of both the pilots and animals, knowledge about the location of the species endemic to the surrounding areas is imperative.

The missile range extending from Wake Island toward the U.S. Army Kwajalein Atoll is under the jurisdiction of the Ronald Regan Ballistic Missile Defense Test Site. In the event of a catastrophic event (e.g., natural disaster, hazardous materials spill, aircraft or missile mishap), Operations Plan 355-1, *Wake Island Disaster Preparedness Plan*, would be implemented (USASMDC 1999).

3.4.3 Environmental Consequences

Preferred Alternative

Short-term, direct, moderate, and adverse impacts are expected from the Proposed Action; and long-term, indirect, moderate, and beneficial impacts are expected from the Proposed Action.

During the demolition process, workers would likely be exposed to materials that may result in injury or ill health. As such, a Health and Safety Plan would be developed in accordance to regulations under OSHA. In addition, Safety Data Sheets for all herbicides and other hazardous materials proposed for use during the project would be available on site. Project activities would include UXO technicians who would observe potential UXO hazards during removal. In the event that UXO is discovered during operations on the island, work would cease and explosive demolition crews would dispose of the munitions. All personnel working on or visiting the site

would be required to wear the appropriate personal protective equipment. Nearby access routes and roads would be closed during work for passerby safety and action would be taken to control dust and or fugitive emissions during demolition. Should controlled burning be utilized as a disposal method, personnel from the fire department would oversee operations to prevent any risks to safety or occupational health on the island.

Transportation to and from Wake would occur during regularly scheduled rotator flights between Joint Base Pearl Harbor-Hickam on Oahu, Hawai'i, and WIA, and transportation on-base would involve electric mules, bicycles, or gasoline or diesel-powered vehicles. Project personnel would be exposed to standard hazards associated with air and ground travel and would be expected to abide by all standard safety precautions.

The Preferred Alternative is expected to result in a long-term positive effect to human health and safety. Removal of ironwood trees would reduce hazards in the WIA clear zones and near the taxiway.

No Action Alternative

Long-term, indirect, moderate, and adverse impacts to human health and safety are expected from the No Action Alternative. The health and safety risks posed by the presence of ironwood within the WIA clear zones and near the taxiway would remain. However, since the ironwood trees would not be removed, there would be no potential threat to demolition crews.

3.5 HAZARDOUS MATERIALS AND WASTES

3.5.1 Definition of the Resource

Wake Atoll is a federal facility and has several hazardous materials, waste transfer, and storage areas. As a federal facility, it complies with all applicable federal laws. Hazardous material is defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, incapacitating reversible illness, or pose a substantial threat to human health or the environment. Hazardous waste is defined by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that poses a substantial present or potential hazard to human health or the environment. In general, hazardous materials and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed (USAF, 2009).

3.5.2 Existing Conditions

Hazardous Materials

Current fuel storage areas at Wake Atoll accommodate Grade 5 jet propulsion fuel (JP-5), which is used primarily for aircraft refueling and power plant generators (PRSC 2017a). They also contain small quantities of lubricants, gasoline, and diesel stored in bulk for base operations and infrastructure support. Other potentially hazardous materials such as herbicide, rodenticide, paints, and similar materials needed for routine infrastructure upkeep on WIA are also stored in appropriately authorized locations and are managed through the WIA Hazardous Materials Management Plan. These materials are transported by ship to WIA and transferred to the onsite storage facilities. Potential spills are managed and minimized through implementation of existing Spill Prevention, Control, and Countermeasures Plans (MDA 2007).

Hazardous Waste

There are several satellite accumulation points located around the installation where waste is temporarily stored. All hazardous waste is moved from the satellite accumulation sites to a main hazardous waste accumulation site to await transportation offsite via barge. All liquid wastes are stored on spill pallets. Types of wastes generated include small quantities of used solvents, paints, cleaning fluids, asbestos-containing materials (generated during building maintenance activities), and pesticides. Waste may be placed in DOT-E-9618-approved polyethylene overpack containers for added security until shipment for treatment or disposal. Hazardous waste shipments are normally consigned to the Wake Island supply barge for shipment to Hawai'i. (USASMDC 2002).

There are also a number of Environmental Restoration Program (ERP) sites at Wake Atoll that are in various stages of investigation and/or remediation, and which may have the potential to contain hazardous wastes or impacted site media associated with historical operations.

3.5.3 Environmental Consequences

Preferred Alternative

Short-term, indirect, minor, and negligible impacts from hazardous materials and wastes are expected from the Preferred Alternative.

The Limit of Disturbance for Project Area 2, the lagoon/pipeline area, includes a hazmat storage facility. The Preferred Alternative would include removal of ironwood trees near this storage facility. A Health and Safety Plan for the project would include avoidance behaviors deemed necessary near the storage facility. All necessary precautions would be taken around areas containing hazardous materials and wastes to ensure that trees do not fall on infrastructure and that controlled burning does not occur near areas containing hazardous materials.

Herbicides, including those proposed for use in this project, are considered hazardous materials, and will only be applied in accordance with manufacturer's label directions. Application of herbicides would be managed judiciously to ensure materials are used wisely in order to meet

DoD pesticide-use reduction goals and would be approved by the installation Environmental Office. BMPs for safely using hazardous materials would be taken when applying herbicide to cut stumps including personal protective equipment, limiting application to avoid excess herbicide which can run off into the soil or water, and selecting the proper herbicide for each individual site. Herbicide would be stored in a safe location when not in use. Garlon 4 Ultra and/or Garlon 3A would be transported to WIA on regularly scheduled rotator flights and would comply with all safe shipping procedures.

The increased use and transport of heavy equipment would involve use of gasoline and diesel. All necessary documentation and materials/waste management associated with purchase and use of fuel on-island would be provided to the Defense Logistics Agency in advance of field efforts.

The proposed Project Area LODs have been cross-referenced with ERP site boundaries and no ERP sites are located within the areas of proposed ironwood clearing (Figure 3 through Figure 5). One ERP site, OT013, Scrap Metal Pile No. 2/Dump Site, is located adjacent to the proposed Vehicle Staging Area within Project Area 1; a small portion of the existing parking lot overlaps with the eastern edge of OT013 (Figure 3 and Figure 6). Site OT013 has Land Use Controls (LUCs) in effect including: “No residential use of areas within Site OT013 that contain COC [contaminant of concern] concentrations above the residential RACGs [remedial action cleanup goals] for soil,” and “No removal of site soil for uncontrolled use elsewhere.” (PRSC 2017b). The proposed use of the existing parking lot under the Preferred Alternative would comply with the LUCs.

No Action Alternative

The No Action Alternative would have no impact on hazardous materials and wastes.

3.6 BIOLOGICAL RESOURCES

Wake Atoll is a biologically diverse group of islands that includes arthropods, small mammals, marine mammals, over 30 species of birds, and over 200 species of plants. A comprehensive review of biological resources is provided in the WIA INRMP and is not repeated here (PRSC 2017a).

3.6.1 Vegetation

3.6.1.1 Definition of the Resource

Vegetation resources refer to the plant communities at any scale including grasses, herbs, forbs, shrubs, vines, and trees.

3.6.1.2 Existing Conditions

The environmental conditions conducive to developing complex and varied plant associations are lacking on Wake Atoll. The lack of soils, soil nutrients, and organic matter is made more inhospitable by rapid drainage through the porous calcareous substrate in undeveloped areas. With minimal topographic relief, there is little opportunity for the development of microclimatic

conditions. High temperatures and limited rainfall keep the island in a perpetual state of drought. An average annual rainfall of 35 inches provides little drought relief (Weatherbase 2015). Combined with harsh ambient environmental conditions, the natural vegetation of Wake Atoll has been subjected to some extreme human disturbance as well as periodic natural disturbances.

Human disturbance, including the construction of WIA and associated American and Japanese fortifications and bombardment by American planes during World War II (WWII), has ravaged the landscape since the early 20th century. Common plant communities include tournefortia forest (native), cordia forest (native), pemphis scrub (native), ironwood forest (invasive), ruderal vegetation (primarily invasive), and mowed/maintained (primarily invasive) vegetation. Invasive rats, which enjoy habitat in invasive ironwood forests, are known to forage upon native plants (PRSC 2017a).

Ironwood (*Casuarina equisetifolia*) is an aggressive invasive plant that tends to crowd and shade out native vegetation. It also has allelopathic properties, preventing seed germination of other species. As a result, ironwood forests rapidly progress to monocultures characterized by low species richness and diversity. In January 2019, EA completed a field delineation of ironwood stands in the three project areas adjacent to the airfield (Figures 10, 11, and 12). The assessment included delineation of a perimeter for the ironwood stands, as well as an assessment of tree density and tree size assessment through the measurement of DBH and tree-counts within 100-ft-radius test plots.

Within Project Area 1, South of the Runway, trees tend to be more densely concentrated closer to the side of the island facing the southern Pacific Ocean, with smaller average DBHs. Stands closer to the runway exhibit lower density but higher DBHs (Figure 10).

Within Project Area 2, the lagoon/pipeline area, trees have uniformly small DBHs and are densely concentrated (Figure 11). Within Project Area 3, the VORTAC area, trees were not surveyed for DBH, but were qualitatively observed to be low density as compared with Project Areas 1 and 2 (Figure 12). Within Project Area 3, invasive haole koa (*Leucaena leucocephala*) was also observed.

3.6.1.3 Environmental Consequences

Preferred Alternative

Short-term, direct, minor, and adverse impacts to vegetation; and long-term, direct, major, and beneficial impacts to vegetation are expected from the Preferred Alternative.

The Preferred Alternative would result in short-term adverse impacts to vegetation. Off-road transport of heavy machinery including excavators, chippers, bulldozers, similar heavy equipment, and/or chainsaws could negatively impact small native plant communities. The use of herbicides on cut tree stumps has the potential to leach into the soil and negatively impact soil quality and thus habitat for vegetation. However, soil quality on Wake Island is already low due to the lack of essential nutrients and organic matter. Furthermore, observations from Peale and Wilkes islands, where herbicide was used to kill significant numbers of ironwood trees, demonstrate that native heliotrope (*Heliotropium procumbens* var. *depressum*) has still been able

to regrow in the surrounding areas. Removal of invasive ironwood trees and invasive haole koa (as practicable) is considered to have a beneficial impact on native vegetation in the short term and long term.

Should controlled burning be utilized as a method for disposal/removal, native vegetation within the burn area would be impacted. The possible extent of burning for removal/disposal outside of the solid waste accumulation area are the project areas defined in this document, however no burning outside of the solid waste accumulation area is currently planned as part of the Proposed Action. USAF may decide in the future to use burning for removal/disposal. Impacts to native vegetation as a result of burning are considered minor as the areas selected for burning would be small and revegetated after removal/disposal.

The Preferred Alternative would result in long-term beneficial impacts to vegetation. Removal of invasive ironwood trees would create space on Wake Island for native plant communities to become re-established in areas previously dominated by ironwood, and would remove habitat for invasive rats, which prey upon native plants. Chipping ironwood trunks would produce mulch for gardens.

No Action Alternative

The No Action Alternative would have long term, indirect and direct, major, and adverse impacts to vegetation. By leaving the ironwoods in place, the invasive and non-native species would continue to affect the ecological integrity of WIA by shading out native species and continuing to spread to other areas within the atoll.

3.6.2 Wildlife

3.6.2.1 Definition of the Resource

Wildlife resources refer to the animal communities that have been specifically observed or are considered likely to utilize the habitats that occur within the site. The wildlife community typically includes fish, amphibians, reptiles, birds, and mammals.

3.6.2.2 Existing Conditions

Wildlife on Wake Atoll is dominated by a diversity of seabirds, migratory shorebirds, and waterfowl. Wilkes and Peale islands support large numbers of resident and visiting seabirds and winter resident shorebirds and waterfowl. Resident birds are present all year and are known to breed at Wake Island. Visitor birds include those that are considered passage migrant and vagrants. Winter residents are present on Wake Island during the nonbreeding season. Prior to the presence of humans on Wake Atoll, the islands likely supported a diverse assemblage of seabirds and shorebirds. More than 30 species of resident, migrant, visitor, vagrant, accidental, and exotic birds have been observed on Wake Atoll, including seabirds, shorebirds, land birds, and water birds (PRSC 2017a). Populations of Laysan and black-footed albatrosses (*Phoebastria immutabilis* and *Phoebastria nigripes*), either nascent or remnant, return to Wake Island each year in November for the courtship and nesting season (MDA 2007).

During the field delineation of ironwood stands detailed in Section 3.6.1.2, an informal assessment of bird activity was completed. The assessment merely involved documenting species noted in the area at the time of ironwood stand delineation. The presence of the following species was noted: black noddy (*Anous minutus*), brown noddy (*Anous stolidus*), white tern (*Gygis alba*), and red-tailed tropicbird (*Phaethon rubricauda*). During the observation activity, there was active and periodic disturbance of bird species within the ironwood assessment area via pyrotechnics as part of the BASH program. Other bird species were observed outside of the ironwood stands; however, these species were also harassed as part of the BASH program. The results of the 24 February 2022 to 10 March 2022 BASH Site Visit and Review is included with Appendix E.

There are no indigenous mammals on Wake Atoll. Various species of rat have been residents of the island, and it currently has a large invasive rat population despite eradication efforts conducted in May 2012 (Brown et al. 2013). Studies since the failed eradication effort have noted that rats on WIA regularly consume the fruits of ironwood trees and frequently take harbor in ironwood thatch (Teig 2013). A 2013 study recommended that ironwood tree and thatch removal would improve the success of future rat control efforts (USAF 2013).

Reptiles present on WIA include various species of geckos and skinks, including the mourning gecko (*Lepidodactylus lugubris*), house gecko (*Hemidactylus frenatus*), and the azure-eyed skink (*Emoia cyanura*) (Bryan 1959; Fritts et al., no date). Green sea turtles (*Chelonia mydas*) and Hawaiian monk seals (*Monachus schauinslandi*) are also present. No amphibians are present on WIA.

Invertebrates present on Wake Atoll include terrestrial strawberry hermit crabs (*Coenobita perlata*), and several other species of hermit crabs which occur in tidal pools. Two species of land crabs (*Geograpsus crinipes* and *Geograpsus* sp.) are also present, where they dig burrows in casuarina and tournefortia forests (PRSC 2017a).

Marine resources include coral reefs off the coast of WIA, which are protected under EO 13089, *Coral Reef Protection*, which requires federal agencies to “identify their actions that may affect U.S. coral reef ecosystems; utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and to the extent permitted by law, ensure that any actions they authorize, fund, or carry out would not degrade the conditions of such ecosystems” (MDA 2007). The lagoon supports a large population of fish and the surrounding reefs host a diverse assemblage of reef fish. Nearshore fish important for food and recreational purposes include peacock hind (*Cephalopholis argus*), bonefish (*Albula vulpes*), and jacks (*Carangidae*). Sharks are present (MDA 2007). Also present in the region are three Endangered Species Act (ESA)-listed coral species, *Acropora globiceps*, *Acropora retusa*, and *Acropora speciose*, of which *Acropora globiceps* and *Acropora retusa* have been confirmed to exist in multiple locations along the southern portion of Wake Atoll (USFWS 2017).

Marine mammals are protected under the Marine Mammal Protection Act of 1972 and may occur in the open ocean area surrounding Wake Atoll and between Wake and Kwajalein Atolls.

Marine mammals that may be present include several species of cetaceans: the blue whale (*Balaenoptera musculus*), the finback whale (*Balaenoptera physalus*), the humpback whale

(*Megaptera novaeangliae*), Cuvier's beaked whale (*Ziphius cavirostris*), and the sperm whale (*Physeter catodon*). Bottlenose (*Tursiops truncatus*) and spinner dolphins (*Stenella longirostris*) may also be present around Wake Atoll. Hawaiian monk seals (*Monachus schauinslandi*) have also previously been sighted at Wake Island on occasion (MDA 2007).

3.6.2.3 Environmental Consequences

Preferred Alternative

Short-term, indirect, minor, and adverse impacts to wildlife; and long-term, indirect, major, and beneficial impacts to wildlife are expected from the Preferred Alternative.

The Preferred Alternative would result in short-term adverse impacts to wildlife. Off-road transport of heavy machinery including excavators, chippers, bulldozers, similar heavy equipment, and/or chainsaws could negatively affect breeding and roosting habitat and has the potential to cause mortality of eggs or chicks not detected and removed prior to the commencement of operations each day by displacement and disruption. Birds would be encouraged to exit areas of ironwood clearing before removal activities begin each day, though it is anticipated that birds would vacate the vicinity of the project due to the noise of heavy machinery. Active disturbance as part of the BASH program already occurs within the three project areas on a daily basis; therefore, the impacts of the Preferred Alternative are considered to be minor. These adverse impacts would be minimized or avoided by establishing a 15-ft perimeter around active nests with chicks. Ironwood removal within this perimeter of known inhabited nests would only occur via chainsaw and herbicide application or excavator-mounted shears if sufficient clearance is available for the excavator. Other minimization measures such as timing execution of work to avoid impacts to migratory birds would be implemented to minimize negative impacts to birds. Further consultation with USFWS is anticipated regarding impacts to migratory birds and other potential activities such as nest/egg destruction, temporary removal, and/or rehabilitation and fostering, which would be included in a project work plan prior to field mobilization. It is assumed that reptiles and amphibians would exit the project area as removal activities commence.

Displacement and disruption of hermit crabs and land crabs, especially *Geograpsus crinipes* and *Geograpsus* sp., that burrow in ironwood underbrush may occur. To minimize impacts to crabs, personnel from the 611th CES natural resources team would look for crabs prior to and during ironwood removal operations and would physically remove all crabs encountered during the proposed action.

The use of herbicides on cut tree stumps has the potential to leach into the soil and water and negatively impact wildlife habitat. However, observations from Peale and Wilkes islands, where herbicide was used to kill significant numbers of ironwood trees, demonstrate that many native and migratory birds still are able to nest in areas impacted by herbicide. As per Appendix B, the expectation is that the BMPs implemented for stormwater management, and the fact that herbicide will be applied directly to the stumps by hand, will minimize the potential for herbicides to impact soils or surface water, and minimize the likelihood of exposure of ESA listed species. If drift were to occur on the air, we review the likely exposure and response. In addition, Dr. Tony Hawkes of the NMFS National ESA Section 7 Pesticide Consultation Team

confirmed that compounds found within the herbicide proposed as part of the Preferred Alternative described in Section 2.2, do not have a long residual time until becoming inert, further reducing the possibility that these chemicals could run off into the water while they have maximum potency (Hawkes 2020, pers comm.).

Burning of felled ironwoods would create a plume of smoke that would temporarily adversely affect wildlife; however, burning within the boundaries of the existing solid waste accumulation area is expected to minimize impacts in wildlife habitat. Removal of invasive ironwood, and thus removal of invasive rat habitat, is not considered an adverse impact to wildlife in the short term or long term.

Controlled burning would negatively impact hermit and land crabs. Similar to removal by heavy equipment, birds would be encouraged to exit areas of ironwood clearing before burning activities take place. Adverse impacts to wildlife, including crabs, are considered minor due to the fact that controlled burning would only take place in very small areas of the island.

The Preferred Alternative would result in long-term beneficial impacts to wildlife. Removal of invasive ironwood trees would create open space on Wake Island for native plant communities to become re-established in areas previously dominated by ironwood and would remove invasive Pacific rat habitat. The White-throated woodrat has recently been detected at Wake Atoll and while little is known about this species at WIA, it is not native, a known invasive pest, and will be included in targeting for removal in the upcoming rodent eradication efforts.

The Preferred Alternative is not anticipated to impact marine mammals, coral reefs, or fish.

No Action Alternative

Long-term, indirect, minor, and adverse impacts to wildlife are expected from the No Action Alternative.

The No Action Alternative would result in long-term adverse impacts to wildlife. Sooty and gray-backed terns would not be able to nest on the ground surrounding the ironwood trees and invasive rats would continue to live within the ironwood thatch. Native vegetation, which provides beneficial impacts to wildlife, would continue to be hindered by the presence of invasive ironwood.

3.6.3 Threatened and Endangered Species and Species of Concern

3.6.3.1 Definition of the Resource

The ESA (16 U.S. Code 1531 et seq.) establishes a federal program to protect and recover imperiled species and the ecosystems upon which they depend. The ESA requires federal agencies, in consultation with USFWS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any federally protected species or result in the destruction or adverse modification of designated critical habitat of such species. An endangered species is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined by the ESA as any species

likely to become an endangered species in the foreseeable future. The ESA also prohibits any action that causes a take of any federally protected species. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or attempt to engage in any such conduct. Federally protected plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land.

Critical habitat is designated if USFWS determines that the habitat is essential to the conservation of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must ensure that their activities do not adversely modify critical habitat to the point that it would no longer aid in the species’ recovery. Areas that are currently unoccupied by the species, but which are needed for the species’ recovery, are protected by the prohibition against adverse modification of critical habitat.

Bird species at Wake Island may also be protected under the Migratory Bird Treaty Act (MBTA) (16 U.S. Code 703-712), which prohibits the kill, capture, buy, sell, import, or export of migratory birds, eggs, feathers, or other parts. USFWS implements the provisions of the Migratory Bird Protection Act.

3.6.3.2 Existing Conditions

Species Protected under the MBTA

Several species of birds found at Wake Island are classified as “migratory” and are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S. Code 703-712). Invasive rats, which use habitat within invasive ironwood stands, are known to prey upon seabird eggs and chicks (PRSC 2017a). Table 3-3 lists the migratory birds that have been documented on Wake Atoll by the 2017 INRMP and supporting surveys, as well as their status (PRSC 2017a). Species listed by USFWS as a Bird of Conservation Concern (BCC) (USFWS 2008) or by the International Union for Conservation of Nature (IUCN) (2015) as Vulnerable Near Threatened are also included in Table 3-3.

Project Area 1 is located partially within the Bird Exclusion Zone (BEZ) that is managed as part of the BASH program and covered by a USFWS depredation permit (PRSC 2016). Project Area 2 is also located partially within the BEZ and the remainder is within the Bird Reduction Area (BRA), and Project Area 3 is located entirely within the BEZ. The BEZ was established by the USAF and the USFWS and is defined as 1,000 feet from the airfield centerline. The BRA is defined as an additional 1,250-foot buffer surrounding the BEZ (Figure 13).

Table 3-3 Migratory Birds Documented on Wake Atoll

Scientific Name	Common Name	Status
<i>Actitis hypoleucos</i>	Common sandpiper	MBTA
<i>Anas acuta</i>	Northern pintail	MBTA
<i>Anas crecca</i>	Green-winged teal	MBTA
<i>Anas clypeata</i>	Northern shoveler	MBTA
<i>Anas penelope</i>	Eurasian wigeon	MBTA
<i>Anas platyrhynchos</i>	Mallard	MBTA

Table 3-3 Migratory Birds Documented on Wake Atoll

Scientific Name	Common Name	Status
<i>Anous minutus</i>	Black noddy	MBTA
<i>Anous stolidus</i>	Brown noddy	MBTA
<i>Arenaria interpres</i>	Ruddy turnstone	MBTA
<i>Anas querquedula</i>	Garganey	MBTA
<i>Asio flammeus</i>	Short-eared owl	MBTA
<i>Aythya fuligula</i>	Tufted duck	MBTA
<i>Aythya marila</i>	Greater Scaup	MBTA
<i>Branta hutchinsii leukopenia</i>	Aleutian cackling goose	MBTA
<i>Bubulcus ibis</i>	Cattle egret	MBTA
<i>Bucephala clangula</i>	Common goldeneye	MBTA
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	MBTA
<i>Calidris alba</i>	Sanderling	MBTA
<i>Calidris alpina</i>	Dunlin	MBTA
<i>Calidris melanotos</i>	Pectoral sandpiper	MBTA
<i>Charadrius mongolus</i>	Lesser sand plover	MBTA
<i>Egretta sacra</i>	Pacific reef heron	MBTA
<i>Eudynamis taitensis</i>	Long-tailed cuckoo	MBTA
<i>Gygis alba</i>	White tern	MBTA
<i>Fregata ariel</i>	Lesser frigatebird	MBTA
<i>Fregata minor</i>	Great frigatebird	MBTA
<i>Gallinago gallinago</i>	Common snipe	MBTA
<i>Haliaeetus spp.</i>	Sea-eagle	MBTA
<i>Larus atricilla</i>	Laughing gull	MBTA
<i>Larus glaucescens</i>	Glaucous-winged gull	MBTA
<i>Limnodromus scolopaceus</i>	Long-billed dowitcher	MBTA
<i>Milvus migrans</i>	Black kite	MBTA
<i>Numenius phaeopus</i>	Whimbrel	MBTA
<i>Numenius tahitiensis</i>	Bristle-thighed curlew	MBTA, BCC, IUCN Vulnerable
<i>Oceanodroma leucorhoa</i>	Leach's storm-petrel	MBTA
<i>Onychoprion fuscatus</i>	Sooty tern	MBTA
<i>Onychoprion lunatus</i>	Gray-backed tern	MBTA
<i>Philomachus pugnax</i>	Ruff	MBTA
<i>Pterodroma nigripennis</i>	Black-winged petrel	MBTA
<i>Phaethon rubricauda</i>	Red-tailed tropicbird	MBTA
<i>Phaethon lepturus</i>	White-tailed tropicbird	MBTA
<i>Phoebastria immutabilis</i>	Laysan albatross	MBTA, BCC, IUCN Near Threatened
<i>Phoebastria nigripes</i>	Black-footed albatross	MBTA, BCC, IUCN Near Threatened
<i>Pluvialis dominica</i>	Pacific golden plover	MBTA
<i>Puffinus auricularis newelli</i>	Newell's shearwater	MBTA, Federally Endangered
<i>Puffinus griseus/tenuirostris</i>	Sooty shearwater	MBTA
<i>Puffinus nativitatis</i>	Christmas shearwater	MBTA, BCC
<i>Puffinus pacificus</i>	Wedge-tailed shearwater	MBTA
<i>Sula dactylatra</i>	Masked booby	MBTA
<i>Sula leucogaster</i>	Brown booby	MBTA
<i>Sula neboxii</i>	Blue-footed booby	MBTA
<i>Sula sula</i>	Red-footed booby	MBTA
<i>Tringa brevipes</i>	Gray-tailed tattler	MBTA
<i>Tringa incana</i>	Wandering tattler	MBTA
<i>Tringa melanoleuca</i>	Greater yellowlegs	MBTA

Table 3-3 Migratory Birds Documented on Wake Atoll

Scientific Name	Common Name	Status
Sources: Rauzon et al. 2008; IUCN 2015; ASRC 2021, ASRC 2022		

Federally Threatened and Endangered Species

Federally protected terrestrial biota on Wake Atoll are limited to migratory seabirds and shorebirds. There are two records of the Newell's shearwater for Wake Atoll, which is federally endangered under ESA. Both records were presumed through observation to be immature or non-breeding female birds that strayed from the breeding colonies in the main Hawaiian Islands where laying occurs in early June (Rauzon et al. 2008). An official species list for the project area obtained from the USFWS Information for Planning and Consultation (IPaC) list on 14 Aug 2022 does not include Newell's shearwater, but notes the potential for the federally endangered band-rumped storm petrel (*Oceanodroma castro*), short-tailed albatross (*Phoebastria albatrus*), and green sea turtle (*Chelonia mydas*) to occur within the project area (USFWS 2022 and Appendix B).

Federally endangered and threatened species using marine habitats occur within the lagoon and waters surrounding Wake Atoll. Table 3-4 lists species of concern and their current federal status that have been documented on Wake Atoll in the 2017 INRMP and supporting studies. The federally threatened green sea turtle (*Chelonia mydas*) is regularly sighted in the waters surrounding Wake Island (PRSC 2017a).

Table 3-4 Wake Atoll Protected Species and Species of Concern

Scientific Name	Common Name	Status
<i>Puffinus auricularis newelli</i>	Newell's shearwater	Federally Endangered
<i>Oceanodroma castro</i> ¹	Band-rumped Storm-petrel	Federally Endangered
<i>Phoebastria albatrus</i> ¹	Short-tailed Albatross	Federally Endangered
<i>Sphyrna lewini</i>	Indo West Pacific Scalloped Hammerhead Shark	Federally Threatened
<i>Bolbometopon muricatum</i>	Humphead parrotfish	Species of Concern
<i>Cheilinus undulatus</i>	Humphead wrasse	Species of Concern
<i>Chelonia mydas</i> ³	Green sea turtle	Federally Endangered
<i>Monachus schauinslandi</i> ²	Hawaiian monk seal	Endangered Species
<i>Tridacna maxima</i>	Giant clam	Low Risk Conservation Dependent
<i>Acropora retusa</i>	Unnamed Coral	Federally Threatened
<i>Acropora globiceps</i>	Unnamed Coral	Federally Threatened
1 – The band-rumped storm-petrel and short-tailed albatross have not been observed at Wake Island (PRSC 2017a, Gilardi 2021 and 2022) 2 – Hawaiian monk seals have not been observed at Wake Island in more than two decades (PRSC 2017a) and were not identified as having the potential to occur in the project area during consultation with USFWS and NOAA (Appendix B). 3 – Green sea turtles are documented in the waters surrounding Wake Island but have not been documented basking or nesting in terrestrial areas.		

3.6.3.3 Environmental Consequences**Preferred Alternative***Species Protected under the MBTA*

Short-term, indirect, minor, and adverse impacts to birds protected under the MBTA and long-term, indirect, major, and beneficial impacts to birds protected under the MBTA are expected from the Preferred Alternative.

Off-road transport of heavy machinery including excavators, chippers, bulldozers, similar heavy equipment, and/or chainsaws could negatively affect eggs and chicks of breeding seabirds and nesting and roosting habitat of birds by displacement and disruption. Birds would be encouraged to exit areas of ironwood clearing before removal activities begin each day, though it is anticipated that birds would vacate the vicinity of the project due to the noise of heavy machinery.

Burning of felled ironwoods or controlled burning would create a plume of smoke that would temporarily adversely affect birds; however, burning within the boundaries of the existing solid waste accumulation area is expected to minimize impacts. In the case of controlled burning, birds would be encouraged to vacate the area of the burn prior to the start of operations and no long-term impacts or takes would otherwise be expected. The use of herbicides on cut tree stumps has the potential to leach into the soil and negatively impact wildlife habitat. However, observations from Peale and Wilkes islands, where herbicide was used to kill significant numbers of ironwood trees, demonstrate that birds protected under the MBTA are still able to nest in areas impacted by herbicide.

Removal of vegetation will be done in a manner that does not attract other avian species, which could create a BASH hazard. Furthermore, a habitat management plan will be included as part of the workplan and scope to ensure that the area is managed in a way that does not attract other avian species, which could increase BASH hazards. The habitat management plan will include planting schedule for native plants, species lists, revegetation methods, timelines, propagation techniques, seed sourcing, etc.

The Preferred Alternative would result in short-term adverse impacts to birds protected under the MBTA, which would be avoided to the extent practicable by timing execution of work to avoid impacts to migratory birds during peak nesting seasons. It is anticipated that the ironwood removal activities would require a USFWS MBTA Special Purpose Permit coverage under 50 CFR § 21.27, and by obtaining a MBTA Special Purpose Permit, it would allow the USFWS to provide species-specific preventative BMPs and permitted purposeful takes, which will greatly reduce incidental injurious/lethal takes during vegetation clearing.

With many projects, successfully implemented and preventative BMPs may not always completely prevent all impacts or injury to avian species. The Preferred Alternative may not be able to avoid impacts to an active nest or to adult birds as various species nest on Wake Island year-round and may be found throughout the ironwood removal project areas. Therefore the under the Preferred Alternative, a MBTA Permit authorization will be required to allow removal of active nests, temporary possession of adults and nest contents, and trapping/trap/relocation during ironwood removal activities. To minimize incidental injuries or incidental death of adult birds, authorized MBTA non-lethal Takes (e.g. “possession”, “trap/relocate”) may need to occur for some species/adult individuals where hazing is ineffective or otherwise inappropriate or infeasible. Additionally, it is reasonably likely that an adult or nest-dependent bird of any species present may become critically injured or abandoned due to project activities. To address this, the

MBTA permit authorization may also include specialized permissions for humane euthanasia of injured or orphaned birds, if deemed necessary and appropriate by the USFWS, and in association with other implemented BMPs and MBTA permit conditions.

Specific bird management activities and BMPs would be determined in consultation with the USFWS and implemented for this project. The project work plan would reflect the conclusions of that consultation and would provide the MBTA permit conditions and other avian-related BMPs that would be implemented within the Ironwood project areas.

The Preferred Alternative would result in long-term beneficial impacts to seabirds of Wake Island by promoting nesting away from airfield activities. The Preferred Alternative would also remove habitat for invasive rats that are known to prey upon seabird eggs and chicks.

Documentation of correspondence with USFWS and is provided in Appendix B.

Federally Threatened and Endangered Species

No impacts to threatened or endangered species or critical habitat are expected from the Preferred Alternative.

The Preferred Alternative is not anticipated to impact any federally endangered avian species as a no effect determination has been made for these species. This determination has been reached as no documented observations or findings, which occur on a quarterly basis, have identified Band-rumped Storm-petrel or Short-tailed Albatross as being species which are present or have been present on WIA at any time. Also, Newell's shearwater has not been listed as being present under IPaC and has not been observed by monitoring activities since 2008.

The Preferred Alternative is also not anticipated to impact any federally protected marine species. Shoreline basking and nesting activities, the only terrestrial behavior of sea turtles, has not been observed at WIA, therefore, a no effect determination has been made for green sea turtles.

Documentation of correspondence with USFWS and NOAA is provided in Appendix B.

No Action Alternative

The No Action Alternative would have no impact on threatened or endangered species at WIA.

3.7 CULTURAL RESOURCES

3.7.1 Definition of the Resource

As part of the process for compliance with NEPA, federal agencies are required to assess potential impacts on the human environment (40 CFR Part 1508.14). That analysis is generally conducted in terms of cultural resources, which includes a variety of resources that are defined by specific federal laws, regulations, EOs, and other requirements. Those include the National Historic Preservation Act, Native American Graves Protection and Repatriation Act,

Archaeological Resources Protection Act, American Indian Religious Freedom Act, and EO 13007, among other regulations. Cultural resources are subdivided into prehistoric resources, historic structures and resources, and traditional resources.

Prehistoric archaeological resources are defined as physical remnants of human activity that predate the advent of written records in a particular culture and geographic region. They include archaeological sites, structures, artifacts, and other evidence of prehistoric human behavior.

Historic resources consist of physical properties or locations postdating the advent of written records in a particular culture and geographic region. They include archaeological sites, buildings and structures, objects, artifacts, documents, and other evidence of human behavior. Historic resources also include locations associated with events that have made a significant contribution to history or that are associated with the lives of historically significant persons.

Under Section 106 of the National Historic Preservation Act, the federal agency official is charged with providing the Advisory Council on Historic Preservation and the State Historic Preservation Office an opportunity to comment on the effect of federal undertakings on historic properties. Federal agencies identify and evaluate historic properties listed or eligible for inclusion in the National Register of Historic Places within the Area of Potential Effect; determine effects of an undertaking on historic properties; and consult to avoid, minimize, or mitigate adverse effects on the historic properties in consultation with the State Historic Preservation Office and other parties including Native Tribes.

3.7.2 Existing Conditions

Despite its small area, Wake Atoll is full of significant cultural resources (Figure 14). These resources are mainly from WWII and form the Wake Island National Historic Landmark (NHL). No evidence of prehistoric cultural resources has been discovered on Wake Island. The remoteness of the island and the lack of fresh water sources other than rainfall, discouraged settlement by native Pacific populations, so there is little potential for prehistoric or traditional resources to be present. No unique paleontological or traditional use resources are known to exist on the island (Verhaaren and Kullen 2015).

Wake Island in its entirety was designated a National Historic Landmark in 1985 in order to preserve both the battlefield where important WWII events occurred, and Japanese and American structures from that period. Many of the Japanese structures were actually constructed with American labor. A group of 98 American prisoners of war were forced to build these defenses until mid-1943, when they were executed by the Japanese. These structures include several pillboxes, bunkers, and aircraft revetments. The Wake Island NHL nomination package defines the landmark's boundaries as "the outer edge of the reef that surrounds the Wake Island so as to include the reef, the three islands, and the lagoon, which includes a number of historic shipwrecks and possible other artifacts." The Pan American facilities and the U.S. Naval submarine and aircraft base, constructed prior to WWII, are also included in the NHL (Verhaaren and Kullen 2015).

Cultural resources surveys, primarily to record archaeological resources, have been conducted on Wake Atoll. The northwestern third of Peale Island and the entirety of Wilkes Island have been

completely (100 percent) inventoried and all cultural resources recorded. The central portion and southeast end of Peale Island and the Peacock Point area of Wake Island have been inventoried. Much of the atoll remains to be surveyed (Verhaaren and Kullen 2015).

In 2007, buildings constructed since WWII (between 1946 and 1989) were evaluated for historical significance. Those dating to 1957 or earlier were evaluated using the National Register evaluation criteria. Those dating from 1958 or later were evaluated for exceptional importance under Criteria Consideration (G). Only two buildings were eligible for listing on the National Register of Historic Places including Building 1502 (the terminal) and Building 1601 (the control tower) (Verhaaren and Kullen 2015).

Human remains are occasionally encountered on Wake Atoll. Most of these remains are those of participants in the WWII battle and subsequent Japanese occupation of the atoll.

3.7.3 Environmental Consequences

Preferred Alternative

Consultation with the state of Alaska's SHPO office has yielded a "No Adverse Effect" determination on historic properties (Appendix B). This determination is predicated on completion of a cultural resources protection plan as part of the Final Work Plan, and on project staff educational briefing on cultural resource concerns, adherence to the Bone and Artifact Standard Operating Procedures, and monitoring recommendations.

Wake Atoll did not support an indigenous population, so the potential to encounter prehistoric resources is extremely low (Verhaaren and Kullen 2015). The potential for historic archaeological resources is considered variable across Wake Island because the island saw extensive reuse by American forces and domestic airline personnel after the war. One cultural resource expert would be present onsite during all tree clearing operations that have the potential to impact known or unknown cultural resources (e.g., during any ground disturbing tree removal activities, or during any tree removal activities performed within 15 feet of known cultural resources). The USAF cultural resource specialist would be consulted prior to execution of any tree removal activities to determine the appropriate level of cultural resource oversight. In areas requiring oversight, and prior to construction, a designated cultural/historical monitor would perform a cursory cultural resource survey of the area daily before any ground disturbance occurs to verify that no cultural resources are present. The cultural/historical monitor would also monitor while construction is ongoing and record finds when needed and stop construction if historic features or potential human remains are encountered.

Project Area 1, South of the Runway, contains more than 20 features that contribute to the NHL (Figure 15). These features include pillboxes, blockhouses, bunkers, and aircraft revetments. Tree felling and bulldozing could damage or destroy these features of the NHL resulting in long-term, direct, moderate, adverse effect to the NHL. These adverse impacts would be minimized or avoided by relocating and establishing a perimeter around the features where heavy equipment use and tree felling would not occur. Herbicide application would not cause ground disturbance and, therefore, would not result in adverse impacts to cultural resources. Ironwood removal within a 15-ft perimeter of known cultural resources would only occur via chainsaw and

herbicide application, and could occur via excavator-mounted shears if sufficient clearance is available for the excavator.

There are no historic buildings or structures in Project Area 2, Lagoon/Pipeline, or Project Area 3, VORTAC Area identified for ironwood treatment (Figure 2). The areas to be used for chipping and burning would occur in previously disturbed areas and would not impact cultural resources. Chainsaw use and herbicide application would cause minimal to no ground disturbance and, therefore, there would be no adverse impacts to cultural resources.

Removal of the trees would also result in an indirect, beneficial effect to the NHL and its features by fulfilling the recommendation in the Integrated Cultural Resources Management Plan (ICRMP) (Verhaaren and Kullen 2015) to remove the vegetation which would allow for stabilization of the features.

In all three areas, uprooting trees with bulldozers or similar heavy equipment would cause substantial ground disturbance. This ground disturbance could unearth and expose archaeological resources and/or human remains. Per the requirements of the ICRMP (Verhaaren and Kullen 2015), excavation for construction, repair, or environmental restoration activities in close proximity to known cultural resources or in unsurveyed or undisturbed areas must be monitored by a qualified archaeologist (Section 5.2.4 of the ICRMP, Verhaaren and Kullen 2015). If intact archaeological remains are encountered, the activity would be halted in that area and the procedure for reporting unanticipated cultural resources (Leeper 2019) would be followed. If human remains are encountered, the activity would be halted and the procedure for unanticipated human remains (Section 5.2.2 of the ICRMP, Verhaaren and Kullen 2015) would be followed.

Controlled burning of trees is anticipated to cause less damage to cultural resources than uprooting trees with bulldozers or similar heavy equipment, but more damage than cutting trees with chainsaws and treating with herbicide. If utilized, controlled burning would encompass a small area of ironwood and would be short in duration, and therefore would not be expected to impact cultural resources.

No Action Alternative

Long-term, indirect, minor, and adverse impacts to cultural resources are possible from the No Action Alternative.

Under the No Action Alternative, no activities associated with ironwood removal would take place and the trees would remain. There would be no direct adverse impact to cultural resources. There would continue to be indirect adverse impacts to cultural resources in Project Area 1, South of the Runway, because the trees would continue to degrade the concrete features.

3.8 GEOLOGICAL AND SOIL RESOURCES

3.8.1 Definition of the Resource

Geological resources consist of all bedrock and soil materials within the project area. Geologic factors such as soil stability and seismic properties influence the stability of structures. Soil, in general, refers to unconsolidated earthen materials overlying bedrock and other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the ability for the ground to support structures and facilities. Soils typically are described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use.

Topography consists of the physiographic, or surface, features of an area and is usually described with respect to elevation, slope, aspect, and landforms. Long-term geological, erosional, and depositional processes typically influence topographic relief.

3.8.2 Existing Conditions

Wake Island is part of a mid-Pacific Ocean atoll that formed when a volcano rose above the ocean surface, then subsided below the surface due to deflation of the underlying magma chamber. Slow volcanic island subsidence allowed coral reefs to form around the island and grow at a rate equal to that of the subsidence, forming a ring-shaped reef with a shallow central lagoon (USASMDC 1999).

The reef rock is formed entirely from the remains of marine organisms including reef corals, coralline algae, mollusks, echinoderms, foraminifera, and green sand-producing algae. These organisms secrete external skeletons of calcium and magnesium carbonates that, as they grow and die, are either cemented in place to form hard reef rock or erode and wash down slopes to accumulate as sediment deposits, particularly in the lagoon or on deep terraces downslope on the ocean side of reefs. The reefs are growing actively as a result of vigorous development and populations of corals, coralline algae, and large mollusks. Only the thin upper veneer of the reef structure is alive and growing, accreting over the remains of prior generations of reef organisms. Although coral reefs are unique because they build and advance wave-resistant structures in the face of persistent and severe wave and storm attack, the organisms that form the reefs are vulnerable to sedimentation, burial, and changes in circulation caused by human development activities (USASMDC 1999).

The land masses at Wake Island have formed by one or both of two processes: accumulation of reef debris deposited on the lagoon side of the reef by large waves and the lowering of sea levels during periods of global cooling. The island's building process by large storm-generated waves is evidenced on the south side of Wake Island by the burial of pill boxes constructed during WWII under sand, gravel, and cobble-sized pieces of reef debris. As a result of these building processes, atoll island soils are predominantly coarse-grained and almost exclusively composed of calcium carbonate. Therefore, they are of low fertility and lacking many of the nutrients required to support many plant species (USASMDC 1999).

The ground surface on Wake Atoll is composed of disintegrated coral interspersed with coral

cobble. A typical pedogenic profile consists of sand, shells, coral, and limestone that are often intermixed. The substrate is coarse-grained and almost completely composed of calcium carbonate and is droughty and desiccating to plants. Fertility is very low due to the lack of essential nutrients and organic matter. Soil formation processes are precluded by high winds, high waves, and localized inundation of the atoll. As a result, soil formation on Wake Atoll is minimal (PRSC 2017a).

Island building by wave-deposited reef debris also limits land elevation. The maximum elevation on Wake Island is 6.4 meters (21 ft) above mean sea level, and the average elevation is only about 3 meters (10 ft) (USASMDC 1999).

3.8.3 Environmental Consequences

Preferred Alternative

Short- and long-term, indirect, minor, and adverse impacts to geological resources are expected from the Preferred Alternative.

The Preferred Alternative would likely result in short-term minor adverse effects to geological and soil resources. The potential removal of ironwood via bulldozer would result in uprooting of trees, which could destabilize surface-level soil and increase erosion if re-vegetation does not follow tree removal. All removal/disposal methods other than controlled burning are likely to cause some form of ground-rutting because dump trucks would be necessary to remove felled trunks from the location of felling, however the ground would be re-graded after ironwood removal activities are completed. Long-term impacts to soil quality could result from the use of herbicides on cut tree stumps have the potential to leach into the soil and negatively impact soil quality, however, the herbicides proposed for this project have relatively low residual control, being active in the soil for only about 46 days (PRSC 2017a). Soil quality on Wake Island is already low due to the lack of essential nutrients and organic matter. Furthermore, observations from Peale and Wilkes islands, where herbicide was used to kill significant numbers of ironwood trees, demonstrate that native heliotrope has still been able to regrow in the surrounding areas. Burning of felled ironwood trees is not anticipated to alter geological resources as burning would occur within the boundary of the existing solid waste accumulation area.

No Action Alternative

Long-term, indirect, minor, and positive impacts to geologic resources are expected from the No Action Alternative. By leaving the ironwood trees in place they would continue to help reduce the amount of aeolian processes (wind-caused) and erosion.

3.9 SOCIOECONOMIC RESOURCES AND ENVIRONMENTAL JUSTICE

3.9.1 Definition of the Resource

Socioeconomics—Socioeconomics is typically defined as the relationship between economies and social elements, such as population and economic activity. Factors that describe the socioeconomic resources represent a composite of several attributes. There are several factors

that can be used as indicators of economic conditions for a geographic area, such as demographics, income, unemployment, poverty level, and employment.

Environmental Justice—EO 12898 pertains to environmental justice issues and relates to various socioeconomic groups and the disproportionate impacts that could be imposed on them. That EO requires that federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The EO was enacted to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of a Proposed Action.

3.9.2 Existing Conditions

The region of influence for Wake Island is limited to the island itself. Since the island is an isolated military installation, actions taken there have little effect on outside employment, population immigration, or local area expenditures. Therefore, key socioeconomic indicators concerned with effects of regional employment and income data were not examined.

The military and contractor personnel who work at Wake Island include Americans and Thai nationals. Island personnel live in billets constructed on the island, which are military controlled. Some individuals live in private structures throughout the island. There are no private homes, motels/hotels, or private retail businesses on the island. The economy on the island is dominated by the military installation. Government and contractor employment are the only contributor to the island economy (USASMDC 1999).

3.9.3 Environmental Consequences

Preferred Alternative

The Preferred Alternative is not expected to impact socioeconomic resources and environmental justice.

Ironwood removal activities would require up to eight temporary personnel on the island. These transient personnel would be housed in existing military-controlled billets, which are kept vacant for these types of activities. Consequently, no impact to housing and thus socioeconomic resources is anticipated.

No Action Alternative

The No Action Alternative would have no impact on socioeconomic resources and environmental justice.

3.10 COASTAL ZONE MANAGEMENT

3.10.1 Definition of the Resource

The Coastal Zone Management Act (CZMA) (16 U.S. Code 1451 et seq.) declares a national policy to preserve, protect, develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone generally refers to the coastal waters and the adjacent shorelines, including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, and includes the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone through the development of land and water use programs in cooperation with federal and local governments. Development projects affecting land/or water use, or natural resources of a coastal zone, must ensure the project is, to the maximum extent practicable, consistent with the state's coastal zone management program.

A federal agency may review their activities, other than development projects within the coastal zone, to identify *de minimis* activities, and request state agency concurrence that these *de minimis* activities should not be subject to further state review. *De minimis* activities are activities that are expected to have insignificant direct or indirect (cumulative and secondary) coastal effects and which the state agency concurs are *de minimis*. The state agency is required to provide for public participation under Section 306(d)(14) of the CZMA when reviewing the federal agency's *de minimis* activity request.

3.10.2 Existing Conditions

Coastal zone and marine resources management is applicable at WIA; however, the atoll does not fall into any of the Coastal Zone Management Programs as outlined by NOAA Office for Coastal Management (NOAA 2019). Furthermore, there is no formal coastal zone protection program, coastal zone barrier resources, or Coastal America program involvement for WIA. No state or territory coastal management program has been established for Wake Atoll, therefore consistency with Section 307 of the CZMA is assumed.

3.10.3 Environmental Consequences

Preferred Alternative

The Preferred Alternative is not expected to affect coastal zone management at WIA.

Removal of ironwood trees via cutting would leave the tree roots in place, providing stabilization to the soil while new seeds or plantings are establishing. Should ironwood be removed via bulldozer or similar large equipment, other native species between the trees would remain in place, preventing significant erosion in coastal zones, and planting of additional native plants would occur shortly after removal to re-stabilize soil. If ironwood is removed via in situ burning, the areas to be burned would be sufficiently small so as not to pose a risk to the coastal zone or associated erosion.

No Action

The No Action Alternative would have no impact on coastal zone management at WIA.

3.11 UTILITIES AND INFRASTRUCTURE**3.11.1 Definition of the Resource**

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function, to include utility lines. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure, and the degree to which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. Utilities and infrastructure generally include water supply, storm drainage systems, sanitary sewer and wastewater systems, power supply, and solid waste management.

3.11.2 Existing Conditions

WIA infrastructure was designed for a much larger population than is currently present. In the 1970s, up to 1,600 personnel might have been on the island at a given time, while today the daily population consists of approximately 120 BOS contractor personnel comprised of Americans and Thai nationals and various other federal employees, with 5 to 20 transient persons on average, depending on mission scope and requirements (PRSC 2017a).

Electrical power is supplied to WIA by an onsite power plant located at the west end of Wake Island. The power plant was rebuilt in 2009 and consists of three generators fueled by JP-5 stored in one large storage tank and three day-tanks (PRSC 2017a). Additional power is supplied by a recently installed solar array. Many areas on the island have shallow buried electrical lines.

Drinking water is generated on the island by a desalination plant. Brackish water is collected from a well. The potable water is stored in several large tanks and piped throughout the island via shallow buried water lines (MDA 2015).

WIA maintains separate storm and sanitary sewer systems. The stormwater system flows through pipes to the lagoon or ocean or runs from roads and other developed areas into the ocean, lagoon, or more likely, seep into the porous sandy ground. The sanitary sewer system discharges into a septic field located at the southern end of Wake Island (PRSC 2017a).

Solid waste generated on the island is disposed in the island’s solid waste accumulation area, located south of the WIA runway (Figure 3). All collected domestic/recycled waste is transported to this solid waste disposal site (PRSC 2017a).

Transportation of personnel on Wake Island is primarily by gasoline and diesel vehicles, diesel mules, and bicycles. Diesel trucks, aircraft, machinery, maintenance equipment, and a bus are also utilized to support mission operations. This equipment requires extensive paved and unpaved roadways throughout WIA. There are no highways on WIA (PRSC 2017a).

3.11.3 Environmental Consequences

Preferred Alternative

Short-term, direct and indirect, minor, and adverse impacts to utilities and infrastructure are expected from the Preferred Alternative.

During tree removal activities, the existing solid waste accumulation area (Figure 3) would be utilized as a space to pile the removed trees. The solid waste accumulation area would also be utilized to dispose of trees via burning and/or chipping. This use of the solid waste accumulation area, in excess of its typical operations, would result in short-term, direct, minor and adverse impacts to routine solid waste accumulation area operations.

Controlled burning in small portions of the project areas may be utilized. Should this method be selected, precautions would be taken to ensure that burning would not occur too near Wake Island facilities or infrastructure, including buried utilities. The fire department would be onsite at all times to oversee burn operations.

Removal of ironwood trees would require increased use and transport of heavy equipment between the three project areas (Figures 3, 4, and 5). This would increase traffic on WIA roads associated with designated access routes (Figures 6, 7, and 8) and would cause excess wear and tear on WIA roads. These impacts to roads are expected to be short-term, indirect, minor, and adverse due to the anticipated duration of the Preferred Alternative.

No impacts to electrical power supplies, drinking water, storm sewers, or sanitary sewers are expected from the Preferred Alternative. Dig permits would be obtained prior to removal operations to ensure buried water or electrical lines are not impacted. Any unmarked utilities found during removal operations would be reported.

No Action Alternative

The No Action Alternative would have no impact on utilities and infrastructure.

This page intentionally left blank

4. CUMULATIVE AND OTHER EFFECTS

4.1 CUMULATIVE EFFECTS

CEQ regulations stipulate that the cumulative effects analysis of an Environmental Assessment should consider the potential environmental effects resulting from “the incremental impacts of the action when added to other past, present, and reasonably foreseeable future action regardless of what agency or person undertakes such other actions” (40 CFR Part 1508.7). CEQ guidance, in considering cumulative effects, affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope for the other actions and their interrelationship with a Proposed Action. The scope must consider other projects that coincide with the location and timetable of a proposed action and other actions. Cumulative effects analyses must also evaluate the nature of interactions among these actions (CEQ 1997).

To identify cumulative effects, the analysis needs to address two questions:

1. Does a relationship exist such that affected resource areas of the Proposed Action or alternatives might interact with the affected resource areas or past, present, or reasonably foreseeable actions?
2. If such a relationship exists, does an Environmental Assessment or an Environmental Impact Statement reveal any potential significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both timeframe and geographic extent in which effects could be expected to occur, and a description of what resources could potentially be cumulatively affected. For the purposes of this analysis, the temporal span of the Proposed Action is 1 year, which would encompass the ironwood removal period. For most resources, the spatial areas for consideration of cumulative effects are confined to projects in the vicinity of Project Areas 1, 2, and 3, described in Section 1.2 and depicted on Figures 3, 4, and 5, though a larger area is considered for some resources (e.g., air quality).

4.1.1 Projects Identified for Potential Cumulative Effects

An analysis of cumulative effects must consider past, present, and reasonably foreseeable future actions that may occur in the vicinity of WIA. There are other projects scheduled concurrently or in the vicinity of the Proposed Action that may add to the potential cumulative effects. The following projects are considered in the cumulative effects analysis:

- The Repair of Bravo Taxiway Project was scheduled to begin during the first quarter of 2020 and would involve considerable mobilization of equipment and personnel to Wake Island. The project involves setting up a batch concrete plant with a water intake from a well currently used by the installation for drinking water. The project also involves bringing material for the concrete plant to Wake Island by barge, housing additional workers, and an increase in solid waste and fuel usage. This project has the potential to add to cumulative impacts to water quality, air quality.

- The Repaving of Hot Cargo Pad includes the complete reconstruction of the Hazardous Cargo Apron Dispersal Area (137,152 square feet), and Taxiway (65,860 square feet). The project includes removing the existing asphalt cement (approximately 4.5 inches of resurfacing), disposing of demolished asphalt-cement off island or on-island recycling, the scarifying and re-compacting the existing base course, and restriping/painting airfield markings. The project also involves the installation of 4 inches of new asphalt-cement surfacing on the Dispersal Apron and Taxiway. The project would have potential impacts from fuel usage and storage and exposure to vehicle accidents.
- The MDA X-Band Radar Imagery project and Flight Test Standard Missile Radar Support projects were completed in 2019. The X-Band Radar Imagery project involves the siting of an AN/TPY-2 radar and associated infrastructure units on formerly disturbed ground near Peacock Point. The Flight Test Standard Missile Radar Support project involves the operation of AN/TPY-2 Forward Based Mode radar near Peacock Point and a AN/TST-5 radar near Heel Point. Operation of the AN/TPY-2 radars would require the use of generators and portable fuel tanks. The AN/TST-5 radar would be operated using existing shore power. Heel Point required the clearing of 7.5 acres of vegetated area, while Peacock Point Required the clearing of 0.55 acre. The potential environmental impacts of these projects, including ground disturbance and compaction, vegetation clearing, and potential disturbance of migratory birds, were analyzed in the *Integrated Flight Tests at Wake Atoll Environmental Assessment*, which resulted in a FONSI.
- The installation of a second incinerator and ongoing incineration operations at Wake Island have the potential to add to cumulative effects. Incineration involves the removal of ash waste created during incineration off-island via shipping container. Incineration also requires the use of fuels, and thus has the potential for fuel spills. Although no ambient air quality monitoring data is available for Wake Island it is anticipated that these projects would have negligible impacts to air quality as strong trade winds disperse winds quickly from the site.
- The Legacy Ash Pile Removal project has the potential to cause short-term air quality impacts, but controls to limit air quality impacts, such as water spray to reduce ash dust, would be employed. The project also has the potential to impact safety from the operation of additional large vehicles on roadways on Wake Island.

In addition to the above, there could be future ironwood removal actions throughout WIA, although no such projects are currently known or planned. In the event that additional ironwood removal activities are proposed, a separate analysis for NEPA compliance will be conducted or a supplemental NEPA document tiered off this document will be developed, as appropriate.

4.1.2 Cumulative Effects Analysis

In conjunction with the Proposed Action, concurrent projects would increase the total number of people on-island, including billeting needs, and would also increase traffic volumes. However, given the low year-round population of WIA and available billets, the impact of additional individuals on-island associated with these projects is anticipated to have a negligible impact on primary base operations. Some projects would have minor air quality impacts, however in conjunction with the proposed action, these are cumulatively still considered minor due to

implementation of BMPs such as dust watering and coordinating any burning activities so that they do not overlap with other projects with potential air quality impacts.

Finally, with respect to future ironwood removal actions at WIA, no single ironwood removal action is likely to have significant impacts on the natural environment. However, the broader removal of ironwoods over time are likely to result in cumulative impacts. These long-term, cumulative impacts would be considered significant but beneficial, as removal of invasive species will help WIA return to a more natural state.

Any project requiring the shipment of additional equipment and personnel to WIA carries a high biosecurity risk. All actions associated with the Proposed Action would be performed in accordance with the Wake Island Biosecurity Management Plan (PRSC 2015).

4.2 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects would result from implementation of the Proposed Action. These effects are not anticipated to be significant.

Air Installation Compatible Use Zone/Land Use—The Proposed Action would result in temporary adverse impacts to AICUZ/Land Use resulting from the ironwood removal and disposal activities. Removal and disposal activities would be conducted using well-maintained and job-suitable machinery to minimize noise generation. Affects to traffic are expected to be minor, and given typical WIA traffic levels, are deemed minor. Following completion of removal and disposal activities, land use and noise levels would return to ambient levels.

Air Quality—During the ironwood removal phase of the Proposed Action, the air quality in the project vicinity is expected to be temporarily adversely impacted by dust and exhaust from the heavy equipment. During the ironwood disposal phase of the Proposed Action, the air quality in the project vicinity is expected to be temporarily adversely impacted by smoke from the burning of ironwood trunks, controlled burning of ironwood in situ, and/or exhaust and particulates from chipping of the trunks. BMPs would be implemented during all project activities to minimize dust generation, and may include air monitoring, watering in areas where dust is considered an issue, and running equipment only when it is needed. Air monitoring would be conducted to monitor dust and smoke levels and other potential air quality impacts. Following completion of ironwood removal, the air quality would return to ambient levels. For more information on the air quality analysis and the Air Force's Air Conformity Applicability Model (ACAM) please refer to Appendix D.

Water Resources—Under the Proposed Action, ironwood removal activities would result in temporary adverse impacts to water resources. Herbicides utilized to treat cut stumps have the potential to run off into Wake surface water and wetlands, or infiltrate into groundwater, however water-safe herbicides such as Garlon 3A would be utilized in areas of particular sensitivity. Heavy equipment and felling trees could result in disturbance of non-jurisdictional wetlands. Implementation of BMPs, such as accessing the project site via established roads outside of wetland areas or utilizing herbicides that have been approved for use in and around wetlands would minimize adverse impacts water resources. Areas that exhibit wetland

characteristics would be noted by the consultant group, the 611 CES/CEI Natural Resource Manager and the 611 CES/CEI Biosecurity Manager, and any trees in these areas would be removed by chainsaw and rolled offsite to ensure no heavy equipment enters the area. Best management practices such as exclusion of heavy equipment would be implemented as applicable. An NPDES construction general permit would also be required.

Safety and Occupational Health—During the ironwood removal phases of the Proposed Action, workers would likely be exposed to materials that may result in injury or ill health, including heavy machinery, pesticides, and fire. As such, a Health and Safety Plan would be developed in accordance to regulations under OSHA; Engineer Manual 385-1-1 (USACE 2014); and AFOSH. The potential for adverse impacts to human health and safety would be minimized by implementing engineering controls, administrative measures, and the use of personal protective equipment.

Due to the potential for unexploded ordnance (UXO) at the project sites, UXO safety personnel would be present onsite during all tree clearing operations. BMPs for UXO safety would be followed by all project personnel, which include having at least one UXO technician present during all ironwood clearing activities and requiring all project personnel to follow the direction of the UXO technician.

Wildlife and Threatened and Endangered Species—Under the Proposed Action, ironwood removal activities would result in a temporary adverse impact to wildlife and birds protected under the MBTA. Impacts to migratory birds protected under MBTA are considered in this analysis and would also be addressed through consultation with the USFWS as described in this document. Ironwood removal would create a disturbance to wildlife that inhabits the area or its immediate vicinity. Natural resource managers from the USAF 611 CES will provide consult and support for actions including implementation of BMPs for wildlife and nesting birds, but are not stationed at WIA and thus may only be able to provide onsite additional support at pre-planned key periods. In addition, environmental personnel would be included on the staff of the operating contractor and other project participants. Following completion of the removal, replanting with native plant species would help wildlife quality return to pre-construction levels. Impacts to threatened or endangered species protected under the ESA are not anticipated but would be addressed through consultation with the USFWS.

Cultural Resources—Under the Proposed Action, ironwood removal activities would have the potential for long-term adverse effects to cultural resources if bulldozers or similar heavy equipment are utilized. Should bulldozers or similar heavy equipment be selected for ironwood removal, activities would be monitored by a qualified archaeologist and activity would be halted if cultural resources are identified in the work area. Impacts to cultural resources can be mitigated in these areas by removing ironwood trees via chainsaw or excavator-mounted shears in areas where there is sufficient clearance for an excavator. Due to the potential for cultural resources to be present at the project sites, one cultural resource expert would be present onsite during all tree clearing operations that have the potential to impact known or unknown cultural resources (e.g., during any ground disturbing tree removal activities, or during any tree removal activities performed within 15 feet of known cultural resources). The USAF cultural resource

specialist would be consulted prior to execution of any tree removal activities to determine the appropriate level of cultural resource oversight. Cultural resource impacts have been assessed in compliance with Section 106 of the NHPA to ensure any impacts to cultural resources are appropriately assessed by the Alaska SHPO and consultation is complete. There are no federally recognized tribes with connections to WIA. Per the requirements of the SHPO determination of No Adverse Effect, educational employee briefing, adherence to the bone/artifact standard operating procedure, and monitoring recommendations will be followed.

Geological and Soil Resources—Under the Proposed Action, ironwood removal activities, which include movement of heavy machinery, would result in minor soil disturbance. Bulldozing, or use of excavation equipment to support tree felling, may result in major soil disturbance. BMPs such as utilization of chainsaws for ironwood removal in sensitive areas would be implemented during removal to minimize environmental consequences resulting from ground-disturbing activities. Standard erosion control measures would also reduce environmental consequences related to these characteristics. Although unavoidable, effects on soil at WIA are not considered significant.

Utilities and Infrastructure—Under the Proposed Action, ironwood removal activities would include stockpiling of felled trees in the solid waste accumulation area. This use of the solid waste accumulation area, in excess of its typical operations, would constitute an unavoidable adverse impact to that utility. In addition, the increased use and transport of heavy equipment between the three project areas would increase traffic on WIA roads and represent an unavoidable adverse impact.

4.3 COMPATIBILITY OF PROPOSED ACTION AND ALTERNATIVES WITH THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL LAND USE PLANS, POLICIES, AND CONTROLS

The Proposed Action would be consistent with existing and future uses. Ironwood removal activities would not interfere with applicable land use policies or objectives and would be consistent with the goals outlined in the WIA INRMP and ICRMP.

4.4 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the biophysical components of the human environment include direct impacts, typically associated with activities that occur over a period of less than 5 years. Long-term uses of the human environment generally include those impacts that occur over a period of more than 5 years, including the permanent loss of resources.

This Environmental Assessment identifies potential short-term, adverse effects on the natural environment as a result of ironwood removal activities. These potential adverse effects include impacts to air, land use and recreation, water, biological resources, human health and safety, utilities and infrastructure, hazardous materials and wastes, and cultural and visual resources.

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The government has not made any irreversible or irretrievable commitment of resources and would not do so until the environmental analysis has been completed.

5. LIST OF PREPARERS

This Environmental Assessment was prepared for the USAF by EA Engineering, Science, and Technology, Inc., PBC (EA Engineering), under contract to the University of Guam. The individuals who contributed to the preparation of this document are listed below.

USAF 611 CES/CEIE

D. Paul Brown

Installation Biologist/Natural Resource Manager
 Technical Expert
 M.S. Marine Biology
 B.S. Zoology
 Years of Experience: 17

Laura Junge

Environmental Flight
 Air Quality Program Manager
 B.S. and M.S. Environmental Science
 Years of experience: 2

Richard Mauser

NEPA Coordinator
 M.S. Environmental Quality Science
 Years of Experience: 26

Karlene Leeper

Cultural Resource Program Manager/Archaeologist
 M.A. Anthropology/Archaeology
 Years of Experience: 31

Kristen Rex, NFE

Natural Resources Support
 Biosecurity Program
 B.S. Environmental Science
 Years of Experience: 14

James Stanford

CSU-CEMML for USAF 611 CES/CEI
 Biosecurity Manager
 M.S. Biology
 Years of Experience: 29

EA Engineering

Jayne Aaron

Cultural Resource Specialist
 M.S. Environmental Policy and Management
 B.S. Environmental Design
 Years of Experience: 28

EA Engineering (continued)

Erin Barry

Scientist
 B.A. Geology and Politics
 Years of Experience: 4

Kathryn Cerny-Chipman, PWS

Scientist
 M.E.H. Environmental Horticulture
 B.A. Environmental Biology
 Years of Experience: 11

Salvatore DeCarli, CE

Scientist
 M.S. Environmental Science and Policy
 B.A. Geography
 Years of Experience: 8

Jessica Morrissey

GIS Technician
 M.S. Geographic Information Systems
 B.A. Landscape Architecture/Art
 Years of Experience: 9

Dan Savercool, CSE, CERP

Senior Scientist
 M.S. Bioenvironmental Oceanography
 B.A. Zoology/Marine Science
 A.A.S. Natural Resources Conservation
 Years of Experience: 38

Chris VanWart

Senior Scientist
 B.S. Biology
 Years of Experience: 19

Sam Whitin, CERP

Project Manager/Senior Scientist
 B.S. Biology
 Years of Experience: 21

This page intentionally left blank

6. REFERENCES

- ASRC. 2021. *Wake Island Quarterly Bird Survey*. December.
- ASRC. 2022. *Wake Atoll Quarterly Bird Survey*. February.
- Brown, D., W. Pitt, and B. Tershy. 2013. *Wake Atoll Rat Eradication Review*. Final Draft. 5 September.
- Bryan, E.H. 1959. *Notes on the Geography and Natural History of Wake Island*. Atoll Research Bulletin No. 66. The Pacific Science Board, National Academy of Sciences, National Research Council, Washington, D.C. As referenced in USAF 2008.
- Council on Environmental Quality (CEQ). 1997. *Considering Cumulative Effects under the National Environmental Policy Act*. Executive Office of the President of the United States. January.
- EA Engineering, Science, and Technology Inc., PBC. 2017. *Land Use Control Management Plan Pacific Air Forces Regional Support Center Remote Installations*. December.
- Elfers, S.C. 1988. *Element Stewardship Abstract for Casuarina equisetifolia*. December.
- Federal Highway Administration. 2006. *Construction Noise Handbook*.
http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/index.cfm.
Accessed March 2019.
- Florida Exotic Pest Plant Council. 2011. *Florida EPPC's 2011 Invasive Plant Species List*.
<https://www.fleppc.org/list/2011/index.htm>.
- Fritts, T.A., G.H. Rodda, and M.J. McCoid. No date. *Lizards of the Marianas. A Checklist and Key to the Amphibians and Reptiles of the Marianas*.
- Gilardi, J. 2017. *Wake Atoll Ironwood Removal Project*. August.
- Gilardi, J. and D. Duffy. 2018. *Wake Atoll Ironwood Removal Project*. March.
- Global Invasive Species Database. 2010. *Casuarina equisetifolia*.
<http://www.issg.org/database/species/ecology.asp?si=365&fr=1&sts=sss&lang=EN>.
Accessed March 2019.
- Hebshi, A. and T. Patrick. 2007. *Wake Island Trip Report and annotated wetland GIS – February 2007*.
- Hirsh, H. and K. Rex. No date. *Wake Island and Pacific Remote Islands Marine National Monument Management*. NOAA.

<https://oceanexplorer.noaa.gov/oceanos/explorations/ex1606/background/monument-mgmt/welcome.html>. Accessed June 2019.

Howard County Maryland. No date. Noise – Supplemental Information.

<https://cc.howardcountymd.gov/LinkClick.aspx?fileticket=CouEppb46vQ%3D&portalid=0>. Accessed April 2019.

International Union for Conservation of Nature (IUCN). 2015. *The IUCN Red List of Threatened Species*. Version 2015.1. <http://www.iucnredlist.org>. Accessed March 2019.

Leeper, K. 2019. *Historic Property Discovery Procedures for 2019 Wake ICRMP*.

Missile Defense Agency (MDA). 2007. *Wake Island Supplemental Environmental Assessment*. February.

———. 2015. *Integrated Flight Tests at Wake Atoll Final Environmental Assessment*. May.

Mobley, H.E. 1976. *Southern Forestry Smoke Management Guidebook*. December.

Morton, Julia F. 1980. *The Australian pine or beefwood (Casuarina equisetifolia L.), an invasive "weed" tree in Florida*. In: Proceedings, Florida State Horticultural Society. 93:87–95.

National Oceanic and Atmospheric Administration (NOAA). 2011. Datums for 1890000, Wake Island, Pacific Ocean. <https://tidesandcurrents.noaa.gov/datums.html?id=1890000>. Accessed September 2020.

2019. *Protecting Coastal Communities*. <https://coast.noaa.gov/>. Accessed March 2019.

Pacific Air Forces Regional Support Center (PRSC). 2015. *Wake Island Biosecurity Management Plan. Edition 4.0*. June.

———. 2016. *Bird Aircraft Strike Hazard (BASH) Reduction Plan*. September.

———. 2017a. *Integrated Natural Resources Management Plan*. April.

———. 2017b. *Land Use Control Management Plan, Pacific Air Forces Regional Support Center Remote Installations*. December.

———. 2019. *Wake Island Airfield Vessel Movement Biosecurity Requirements*. February.

Pernas, T., G. Wheeler, K. Langeland, E. Golden, M. Purcell, J. Taylor, K. Brown, D.S. Taylor, and E. Allen. 2013. *Australian Pine Management Plan for Florida*. Florida Exotic Pest Plant Council. www.fleppc.org. Accessed March 2019.

- Rauzon, M.J. Boyle, D. Everett, W.T. and Gilardi, J. (Rauzon et al.). 2008. *The status of the birds of Wake Atoll*. Atoll Research Bulletin No. 561. Smithsonian Institution, Washington, D.C.
- Secretary of the Air Force. 1993. *Occupational Safety and Health*. Air Force Policy Directive 91-3. 27 September.
- . 1996. *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*. Air Force Instruction 91-301. 1 June.
- Teig, D. (Lieutenant Colonel United States Air Force). 2013. Trip Report – Wake Island. 29 March.
- U.S. Air Force (USAF). 2008. *Integrated Natural Resources Management Plan for Wake Atoll*. Prepared by Argonne National Laboratory for Hickam Air Force Base, 15th Civil Engineering Squadron, Environmental Planning Element. September.
- . 2012. *Wake Island Lagoon Marine Organism Testing for Brodifacoum*. Memorandum for Record. 611 CES/CEAN. 16 July.
- . 2013. *Trip Report – Wake Island – Biological Assessment*. Memorandum for: 611 CES/CEAN. From: 757AS/DOS. Department of the Air Force, Youngstown Air Reserve Station, Aerial Spray Unit, Vienna, Ohio. June.
- . 2019. *Personal Communication Regarding Air Quality Monitoring on Wake Island*. May.
- U.S. Army Corps of Engineers (USACE). 2014. *Safety and Health Requirements*. Manual No. 385-1-1. Washington, D.C. 30 November.
- USAF. 2009. *Final Environmental Assessment Addressing the Systematic Eradication of Rodents from Wake Atoll*. U.S. Air Force, Air Force Center for Engineering and the Environment, Headquarters Pacific Air Forces, Hickam Air Force Base, 15th Airlift Wing. As cited in USDA-APHIS. 2021. Wake Atoll Rat Eradication Program Draft Environmental Assessment. July.
- U.S. Army Space and Missile Defense Command (USASMDC). 1999. *Wake Island Launch Center Supplemental Environmental Assessment*. October.
- . 2002. *Theater High Altitude Area Defense Pacific Test Flights Environmental Assessment*. 20 December.
- U.S. Army Space and Strategic Defense Command. 1994. *Wake Island Environmental Assessment*. January.

U.S. Fish and Wildlife Service (USFWS). 2008. *Birds of Conservation Concern*. U.S. Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, Virginia. December.

———. 2017. *Draft Report, Phase I Marine Benthic Habitat Characterization, Wake Atoll Coral Reef Ecosystem Survey*. Prepared by Kevin Foster, Anthony Montgomery, Adam Griesemer, and Douglas Fenner. April.

———. 2022. *Information Planning and Consultation (IPaC) Online Screening Tool*. <https://ecos.fws.gov/ipac/>. Accessed on 27 April 2022.

Verhaaren, B.T and D. Kullen. 2015. *Argonne National Laboratory Integrated Cultural Resources Management Plan October 2015 – September 2020 for Wake Island Airfield, 611th Civil Engineer Squadron, PACAF Regional Support Center Alaska*. May.

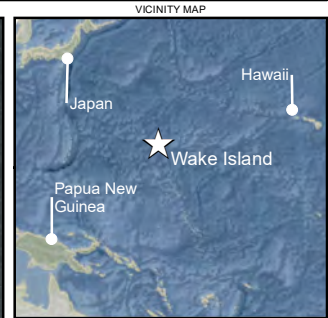
Weatherbase. 2015. *Peacock Point, Wake Island. Monthly Weather Averages Summary*. <http://www.weatherbase.com/weather/weather.php3?s=912450>. Accessed March 2019.

This page intentionally left blank

Appendix A

Figures

- Figure 1 Overview Map
- Figure 2 Wake Island Overview Map
- Figure 3 Site Resources, Project Area 1, South of the Runway
- Figure 4 Site Resources, Project Area 2, Lagoon/Pipeline Area
- Figure 5 Site Resources, Project Area 3, VORTAC Area
- Figure 6 Access Routes and Staging Area, Project Area 1, South of the Runway
- Figure 7 Access Routes, Project Area 2, Lagoon/Pipeline Area
- Figure 8 Access Routes, Project Area 3, VORTAC Area
- Figure 9 Land Use
- Figure 10 DBH and Tree Density, Project Area 1, South of the Runway
- Figure 11 DBH and Tree Density, Project Area 2, Lagoon/Pipeline Area
- Figure 12 Tree Density, Project Area 3, VORTAC Area
- Figure 13 Bird Reduction and Bird Exclusion Areas
- Figure 14 Cultural Resources
- Figure 15 Cultural Resource Buffer Zones



Map Date: 6/21/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

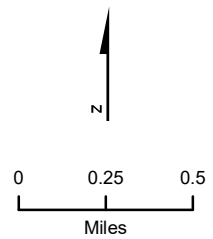


Figure 1
Overview Map
2019 Invasive
Vegetation Management
Wake Island



Legend

- Limit of Disturbance
- Mapped Ironwood Area

Map Date: 6/21/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

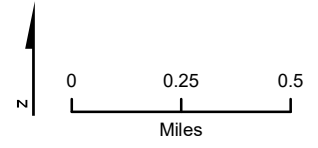


Figure 2
Wake Island Overview Map
2019 Invasive
Vegetation Management
Wake Island

\\eafp\Departments\Federal\611 CESU Wake Ironwood Control\02 GIS\IMXD\Fig 3 ResourceMap Area 1.mxd jmorrissey



Legend

- Limit of Disturbance
- Mapped Ironwood Area
- Clear Zone
- Installation Restoration Program
- ERP Site, LUC in Effect
- Buildings
- Cultural Resources Impact Minimization Area*
- Solid Waste Accumulation Area
- 2014 Nesting Areas
- Wetlands
- Road

*Area includes known sensitive cultural resources and 15 foot buffer

ERP - Environmental Restoration Program
LUC - Land Use Control

Map Date: 4/28/2022
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

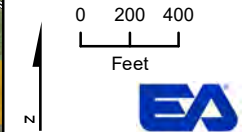


Figure 3
Site Resources
Project Area 1
South of the Runway
2019 Invasive
Vegetation Management
Wake Island



VICINITY MAP



Legend

- Limit of Disturbance
- Mapped Ironwood Area
- Installation Restoration Program
- ERP Site, LUC in Effect
- Buildings
- Cultural Resources Impact Minimization Area*
- Fuel Tanks
- 2014 Nesting Areas
- Wetlands
- Road

*Area includes known sensitive cultural resources and 15 foot buffer
 ERP - Environmental Restoration Program
 LUC - Land Use Control

Map Date: 4/28/2022
 Source: USAF, 2014, PACAF 2016
 Projection: WGS_1984_UTM_Zone_58N

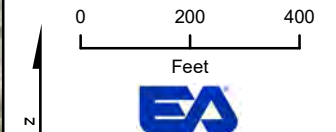









Figure 4
Site Resources
Project Area 2
Lagoon/Pipeline Area
2019 Invasive
Vegetative Management
 Wake Island

\\eap\Departments\Federal\611_CESU\Wake_Ironwood_Control\02_GIS\IMXD\Fig 5_ResourceMap_Area3.mxd |morrissey



Legend

-  Limit of Disturbance
-  Mapped Ironwood Area
-  Clear Zone
-  Installation Restoration Program
-  Buildings
-  2014 Nesting Areas
-  Road

ERP - Environmental Restoration Program
LUC - Land Use Control
Map Date: 4/28/2022
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

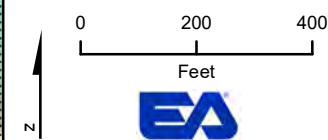







Figure 5
Site Resources
Project Area 3
VORTAC Area
2019 Invasive
Vegetation Management
Wake Island

\\eafp\Departments\Federal\611 CESU Wake Ironwood Control\02 GIS\MXD\Fig 6-8 AccessRMap.mxd |morrissey



Legend

-  Limit of Disturbance
-  Mapped Ironwood Area
-  Road
-  Vehicle Staging Area
-  Access Route

Map Date: 6/21/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

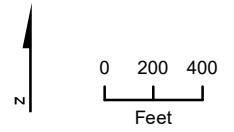






Figure 6
Access Routes and Staging Area
Project Area 1
South of the Runway
2019 Invasive
Vegetation Management
Wake Island



VICINITY MAP



Legend

-  Limit of Disturbance
-  Mapped Ironwood Area
-  Road
-  Access Route

Map Date: 6/21/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

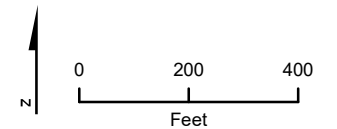






Figure 7
Access Routes
Project Area 2
Lagoon/Pipeline Area
2019 Invasive
Vegetative Management
Wake Island



VICINITY MAP



Legend

-  Limit of Disturbance
-  Mapped Ironwood Area
-  Road
-  Access Route

Map Date: 6/21/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

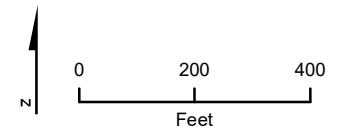
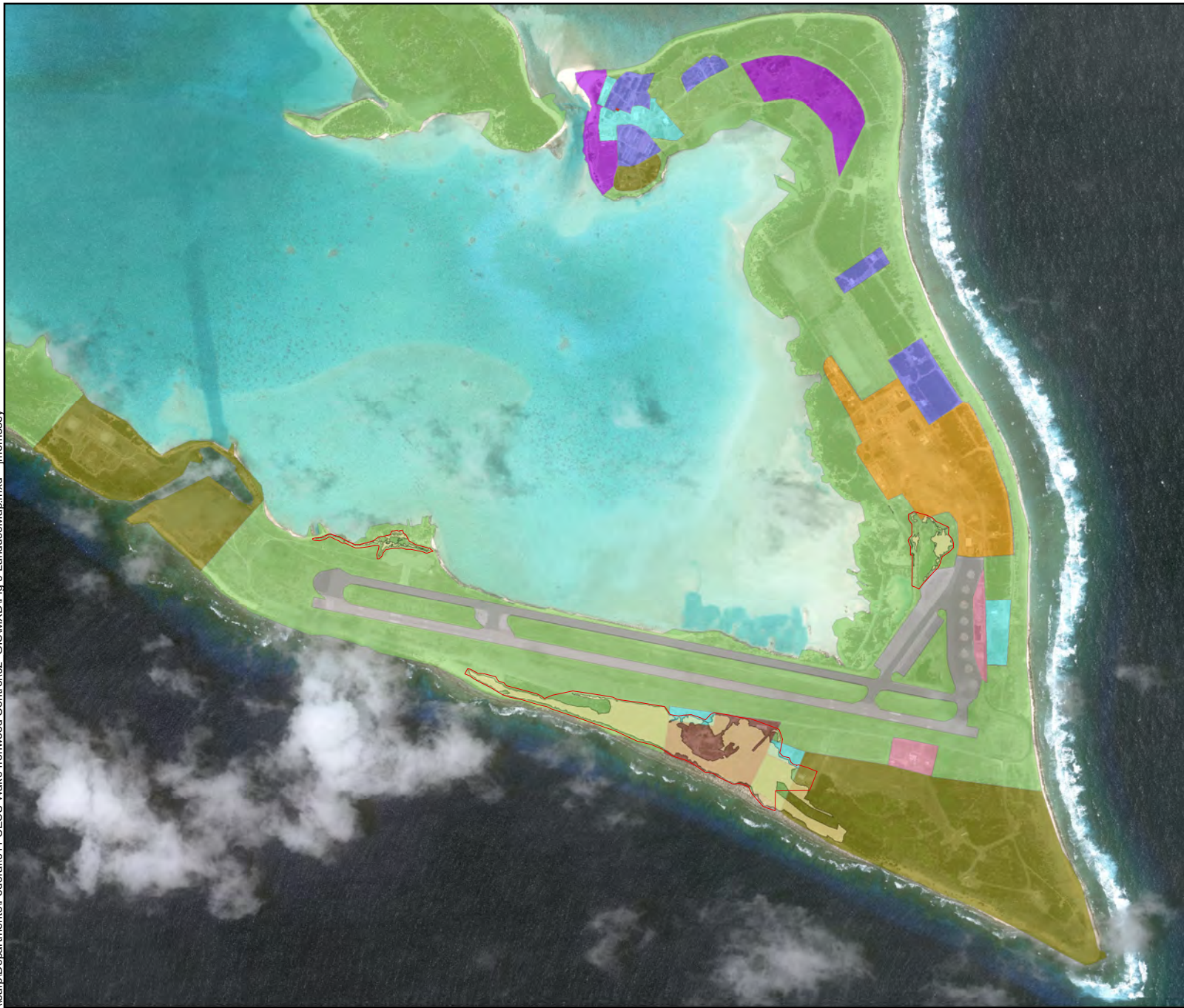


Figure 8
Access Routes
Project Area 3
VORTAC Area
2019 Invasive
Vegetation Management
Wake Island



Legend

-  Limit of Disturbance
-  Mapped Ironwood Area
- Land Use**
-  Administrative
-  Airfield
-  Community (Service)
-  Housing
-  Industrial
-  Medical
-  Open Space
-  Primary Industrial
-  Recreation
-  Solid Waste Accumulation Area

Map Date: 11/4/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

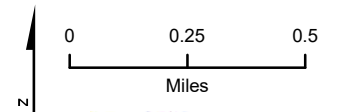
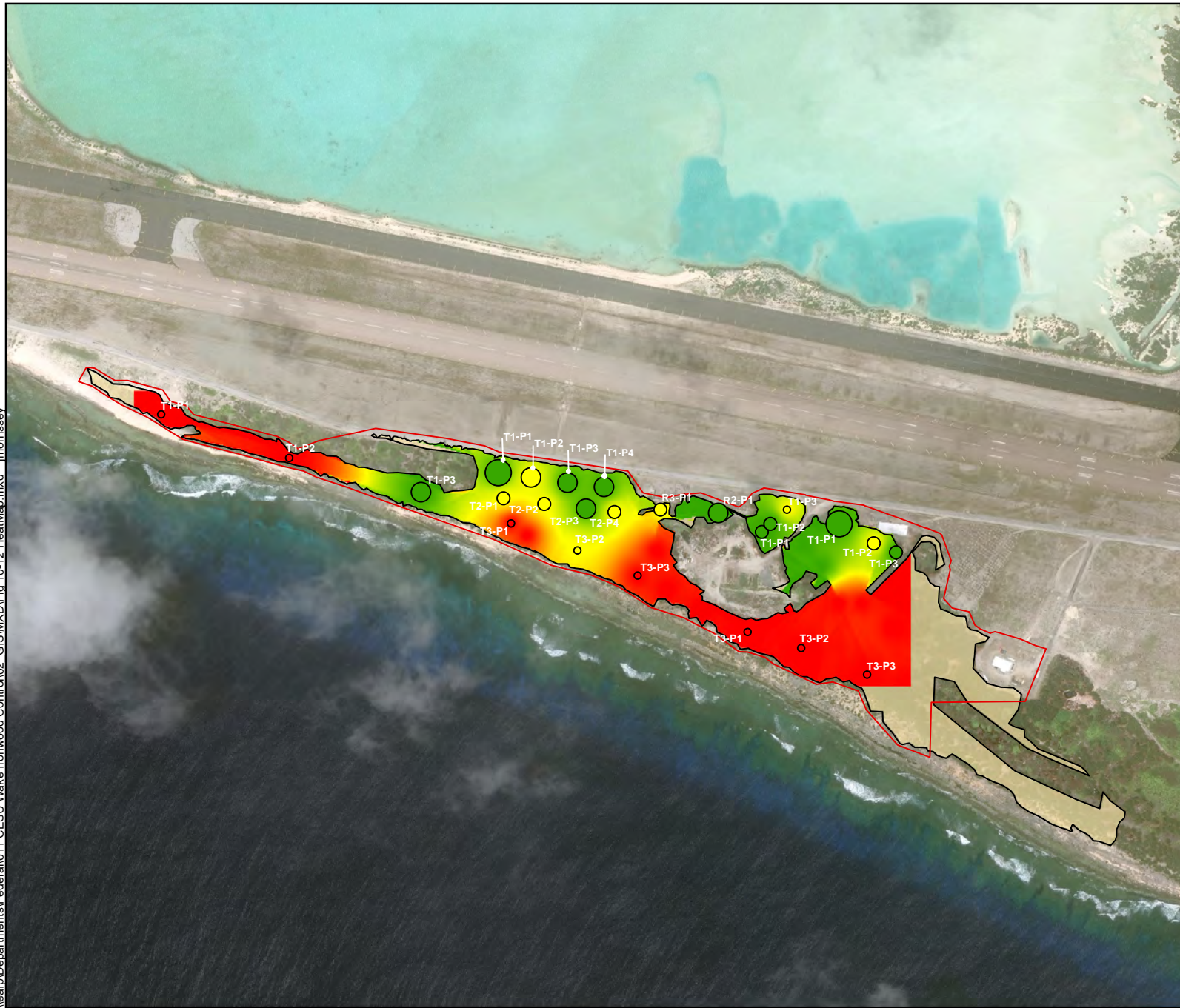


Figure 9
Land Use
2019 Invasive
Vegetation Management
Wake Island

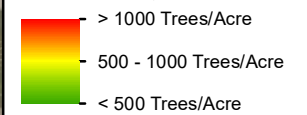
\\eap\Departments\Federal\611 CESU Wake Ironwood Control\02 GIS\MXD\Fig 10-12 HeatMap.mxd |morrissey



Legend

- Limit of Disturbance
- Mapped Ironwood Area (not surveyed)

Tree Density



Average Diameter Breast Height (DBH), inches

- < 4
- 5 - 6
- 7 - 9
- 10 - 14

Map Date: 6/21/2019
 Source: USAF, 2014, PACAF 2016
 Projection: WGS_1984_UTM_Zone_58N

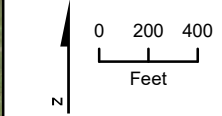


Figure 10
DBH and Tree Density
Project Area 1
South of the Runway
2019 Invasive
Vegetation Management
 Wake Island



VICINITY MAP



Legend

- Limit of Disturbance
- Ironwood Removal Area

Tree Density

- > 1000 Trees/Acre
- 500 - 1000 Trees/Acre
- < 500 Trees/Acre

Average Diameter Breast Height (DBH), inches

- < 4
- 5 - 6
- 7 - 9
- 10 - 14

Map Date: 5/28/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

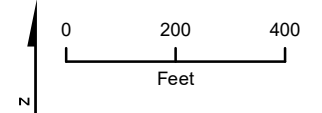




Figure 11
DBH and Tree Density
Project Area 2
Lagoon/Pipeline Area
2019 Invasive
Vegetation Management
Wake Island



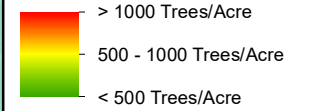
VICINITY MAP



Legend

-  Limit of Disturbance
-  Ironwood Removal Area

Tree Density



Map Date: 5/28/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

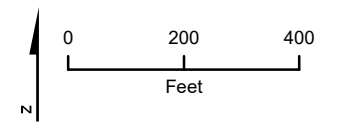
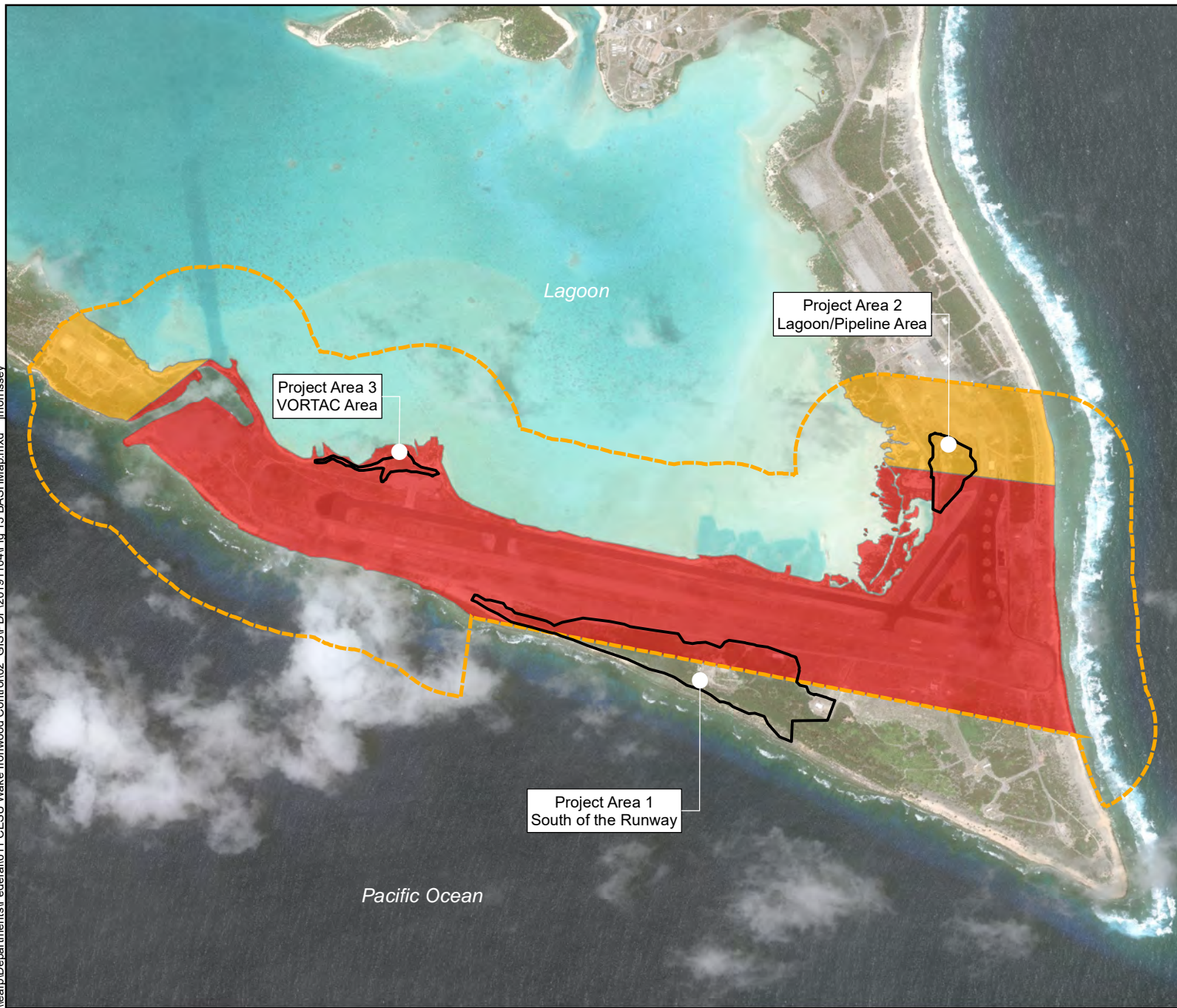






Figure 12
Tree Density
Project Area 3
VORTAC Area
2019 Invasive
Vegetation Management
Wake Island

\\eap\Departments\Federal\611 CESU Wake Ironwood Control\02 GIS\PDF\20191104\Fig 13 BASH\Map.mxd jmorrissey



Legend

-  Limit of Disturbance
-  BRA Boundary
-  BRA
-  BEZ

Key:

BRA = Bird Reduction Area
BEZ = Bird Exclusion Area

Map Date: 11/4/2019
Source: USAF 2014, PACAF 2016
Projection: WGS 1984 UTM Zone 58N Meter

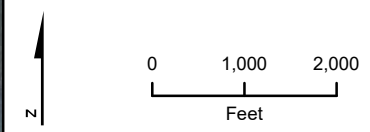
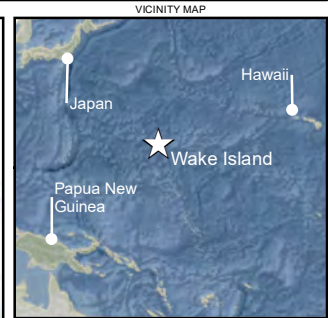
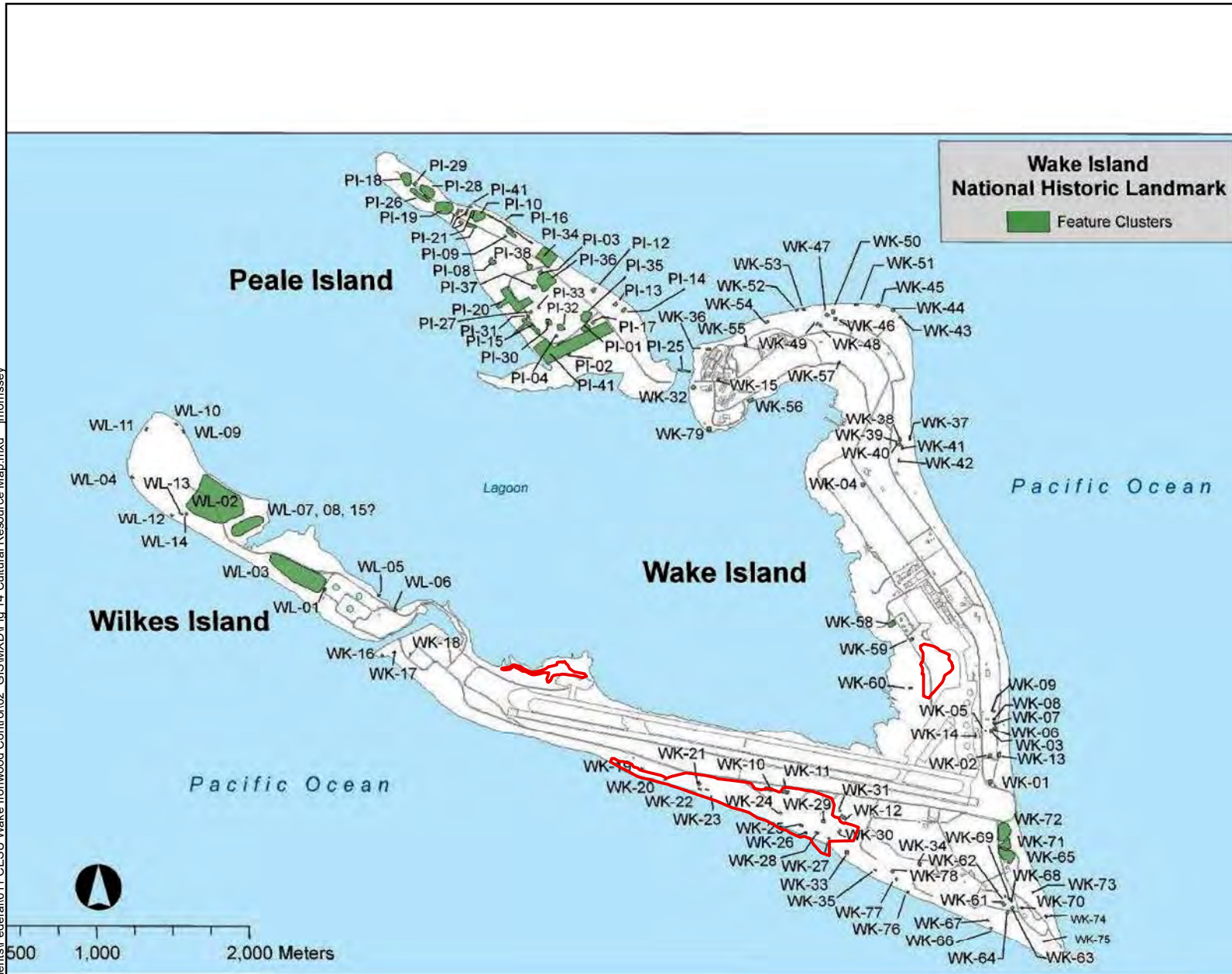


Figure 13
Bird Reduction and Bird Exclusion Areas
2019 Invasive Vegetation Management
Wake Island

\\neatp\Departments\Federal\611 CESU Wake Ironwood Control\02 GIS\MXD\Fig.14 Cultural Resource Map.mxd jmorrissey



Legend

Limit of Disturbance

Map Date: 11/4/2019
 Source: USAF, 2014, ESRI 2018
 Projection: WGS_1984_UTM_Zone_58N

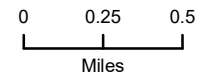






Figure 14
Cultural Resources
as Mapped in 2015 ICRMP
and Project LODs
2019 Invasive
Vegetation Management
 Wake Island



Legend

-  Limit of Disturbance
-  Mapped Ironwood
-  Cultural Resources Impact Minimization Area*
-  Road

*Area includes known sensitive cultural resources and 15 foot buffer

Map Date: 11/4/2019
Source: USAF, 2014, PACAF 2016
Projection: WGS_1984_UTM_Zone_58N

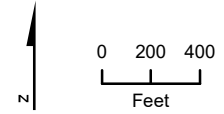


Figure 15
Cultural Resource Buffer Zones
Project Area 1
South of the Runway
2019 Invasive
Vegetation Management
Wake Island

Appendix B
Agency Coordination

This page intentionally left blank

State Historic Preservation Office

This page intentionally left blank



THE STATE
of **ALASKA**
GOVERNOR MICHAEL J. DUNLEAVY

Department of Natural Resources

DIVISION OF PARKS & OUTDOOR RECREATION
Office of History & Archaeology

550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3561
907.269-8700

<http://dnr.alaska.gov/parks/oha>

November 15, 2019

File No.: 3130-1R Air Force
2019-01331

Karlene Leeper
Cultural Resources Program Manager
611th Civil Engineering Squadron
10471 20th Street, Suite 302
JBER, AK 99501

Subject: Ironwood Tree Removal Project, Wake Island

Dear Ms. Leeper:

The Alaska State Historic Preservation Office (AK SHPO) received your letter and two attached reports regarding the subject project on November 8, 2019. We reviewed the undertaking pursuant to 36 CFR Part 800 Section 106 of the National Historic Preservation Act.

We understand that the proposed removal of the invasive trees on Wake Island involves cutting down Ironwood trees in pre-determined areas of the Island, using a bulldozer and/or a chainsaw to fell the trees, and disposing of them by either burning or by use of a woodchipper. We noted that the Project's area of potential effect is within the boundaries of the Wake Island National Historic Landmark, as shown on Figure 13 of the *Draft Environmental Assessment for Management of Invasive Vegetation on Wake Island Airfield, Wake Atoll, Pacific Ocean (Draft Assessment)*, July 2019.

To avoid adverse effect to the historic properties within the Landmark, pages 4-3 and 4-4 of the *Draft Assessment* specify that "if bulldozers or other heavy equipment is used for Ironwood removal, activities would be monitored by a qualified archaeologist with expertise in World War II artifacts. Activity would be halted if cultural resources are identified in the work area. Impacts to cultural resources can be mitigated in these areas by removing the Ironwood trees via a chainsaw [instead of a bulldozer] within a 15-foot radius of all known cultural resources."

Similarly, Section 2.2.1 of the *Draft Work Plan: Management of Invasive Vegetation at Wake Island Airfield, Wake Atoll, Pacific Ocean* (US Army Corps of Engineers-Alaska District, JBER, Alaska, August 2019) (*Project Work Plan*) states that "The USAF will provide cultural resource oversight during invasive vegetation clearing activities. In the event that a new cultural resource is identified, or a danger exists to known cultural resources from Ironwood removal activities, the cultural resources oversight staff will have the authority to issue a work stoppage order if necessary, and work will not resume until it has been approved by the cultural resources oversight staff."

Although these measures provide evidence that protection of cultural resources was considered during the project planning process, the Final version of the *Project Work Plan* needs to include a Cultural Resources Protection Plan (CRP Plan) as an appendix or attachment. The CRP Plan should specify the procedures to be followed if human remains or a previously unidentified cultural resource is discovered during tree removal activities. At a minimum, the CRP Plan should include the names and telephone numbers of US Air Force personnel on Wake Island who the archaeological monitor (or work crew supervisor) should contact if an unexpected discovery is made. The CRP Plan should also provide contact information for the

Alaska State Historic Preservation Office and, since the work will be conducted within the Wake Island National Historic Landmark, a representative from the National Park Service Regional Office in Anchorage.

We concur with your determination of *No Adverse Effect to Historic Properties* for the upcoming removal of invasive trees on Wake Island, *provided that* the Final Work Plan includes a cultural resources protection plan. Thank you for the opportunity to comment. Please contact Sylvia Elliott at 269-8724 or sylvia.elliott2@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

A handwritten signature in black ink that reads "Judith E. Bittner". The signature is written in a cursive style with a large, looping initial "J".

Judith E. Bittner
State Historic Preservation Officer

JEB:she

cc: Jenniffer Pederson Weinberger (jennifer_weinberger@nps.gov)
Darrell Lewis (darrell_lewis@nps.gov)

U.S. Army Corps of Engineers

This page intentionally left blank

RE: Vegetation clearing at Wake Island Airfield

Speerstra, Linda CIV USARMY CEPOH (USA) <Linda.Speerstra@usace.army.mil>

Fri 3/5/2021 9:48 PM

To: BROWN, DILLON P GS-12 USAF PACAF PACAF/611 CES/CEIE <dillon.brown.1@us.af.mil>

Cc: MAUSER, RICHARD J GS-12 USAF PACAF 611 CES/CEI <richard.mauser@us.af.mil>; Stanford,James <J.Stanford@colostate.edu>; ROY, LORI A GS-13 USAF PACAF 611 CES/CEI <lori.roy@us.af.mil>; SANTANA, MEGANN W GS-12 USAF PACAF 611 CES/CEI <megann.santana@us.af.mil>

Aloha all – thank you for the information and phone conversation in regards to clearing activities at the Wake Island Airfield.

As described, all vegetation clearing in these areas would not disturb the soil and would not use heavy equipment. Hand crews with chainsaws would be used to clear vegetation in these areas and the downed woody debris would be removed from the area and subsequently burned in predetermined burn pits. While the Corps has not made a determination of the jurisdictional status of the aquatic resource(s) on your property, based on the information you provided we have determined that your proposed project would not involve an activity subject to the regulatory jurisdiction of the Corps and therefore, a DA permit is not required. This determination of no permit required addresses only the proposed work activities described in your email below and does not convey.

As we discussed, you may request a geographic jurisdictional determination (JD) for this project in the future. Please use this email for your administrative record.

Have a wonderful weekend! Linda

Linda Speerstra
Chief, Regulatory Branch
U.S. Army Corps of Engineers
Honolulu District
808-835-4300

From: BROWN, DILLON P GS-12 USAF PACAF PACAF/611 CES/CEIE <dillon.brown.1@us.af.mil>

Sent: Friday, March 5, 2021 8:26 AM

To: Speerstra, Linda CIV USARMY CEPOH (USA) <Linda.Speerstra@usace.army.mil>

Cc: MAUSER, RICHARD J GS-12 USAF PACAF 611 CES/CEI <richard.mauser@us.af.mil>; Stanford,James <J.Stanford@colostate.edu>; ROY, LORI A GS-13 USAF PACAF 611 CES/CEI <lori.roy@us.af.mil>; SANTANA, MEGANN W GS-12 USAF PACAF 611 CES/CEI <megann.santana@us.af.mil>

Subject: Vegeta on clearing at Wake Island Airfield

Linda,

Per our phone conversation, we are writing to request a determination/concurrence that no USACE permits are required at Wake Island Airfield in regards to vegetation maintenance on the Atoll.

Invasive Ironwood (*Casuarina equisetifolia*) trees have encroached on the area adjacent to the runway and become a safety hazard for the operation of the airfield. The Air Force (specifically USAF/PACAF/611CES/CEIE) is currently drafting an environmental assessment in response to the need to remove these trees. Some of the areas to be cleared are adjacent to semi-permanent water bodies that have historically been described as 'wetlands'. These areas are all man-made, and as such, do not possess hydrosols or other wetlands associated soils, any obligate wetlands associated plants, and hydrologically have no surface connection to other water bodies and may dry entirely without sufficient precipitation. However, these areas have not been fully investigated or delineated, and as a precaution the USAF treats these areas as wetlands for planning purposes. The USAF will engage and consult with your office in the near future to get a formal jurisdictional determination regarding these areas.

For now, all vegetation clearing in these areas would not disturb the soil and would use no heavy equipment. Hand crews with chainsaws would be used to clear vegetation in these areas and the downed woody debris would be removed from the area and subsequently burned in predetermined burn pits. This would follow our standard vegetation management protocols. It is our understanding that cutting these trees in this way can be determined as standard vegetation management and requires no permit be issued from USACE. If this is correct, we ask that USACE responds in writing so that we may attach this information as part of the administrative record for our files. Please let me know if you need any additional information regarding this request.

U.S. Fish and Wildlife Service

U.S. Fish and Wildlife Service – Endangered Species Act, Section 7 Consultation

Per the requirements at in 50 CFR §402.12 (e), verification of current accuracy of species list, the Federal agency must (re)verify the species list if 90 days have passed since receipt of (or concurrence with) the species list. Using IPaC (<https://ipac.ecosphere.fws.gov/>). A species list was generated for the proposed action on 14 Aug 2022. The 14 Aug 2022 updated species list can be found subsequent to this text in Appendix B. The Species List identified three listed species that may occur in the action area:

1) Band-rumped Storm-petrel (*Oceanodroma castro*) Population: Species profile: <https://ecos.fws.gov/ecp/species/1226>

“No effect” Determination: Based on quarterly contracted monitoring of bird species on WIA. With no documented observations or findings that conclude this species is present or has been present on WIA at any time, USAF.

2) Short-tailed Albatross (*Phoebastria (=Diomedea) albatrus*) Species profile: <https://ecos.fws.gov/ecp/species/433>

“No effect” Determination: Based on quarterly contracted monitoring of bird species on WIA, with no documented observations or findings that conclude this species is present or has been present on WIA at any time. No Occurrence of this species has been documented.

3) Green Sea Turtle (*Chelonia mydas*) Population: Central West Pacific DPS. Species profile: <https://ecos.fws.gov/ecp/species/6199>

“No effect” Determination: Based on monitoring and proximity of action area to green sea turtle turtle habitat. No Terrestrial occurrence (basking or nesting) of this species has been documented at WIA.

Based on the requirements in 50 CFR §402.02 and using the best information available, the USAF has made a “no effect” determination for the Band-rumped Storm-petrel (*Oceanodroma castro*), Short-tailed Albatross (*Phoebastria (=Diomedea) albatrus*), and Green Sea Turtle (*Chelonia mydas*). Per the discussion on 08 Aug 2022, with USFWS DoD Coordinators James Kwon and Chelsea Dudoit, USAF can make a “no effect” determination by using available information and data. Per USFWS, during discussions on 08 Aug 2022, “If USAF makes a “no effect” determination, USFWS concurrence is not required under the ESA. USAF did consult with NOAA in 2020 for marine species.

Implementing regulations for Section 7 of the Endangered Species Act do not require a Federal action agency to obtain written concurrence from the Service if they determine that their proposed action will not affect listed species or critical habitat, nor do these regulations provide a legal mechanism for the Service to concur with such a determination and it is the action agency's responsibility to make effect determinations for compliance with Section 7(a)(2) (50 CFR §402.02). (EPA 2013). If an action agency determines that the action has “no effect”, no section 7 consultation is required. Action agencies should document the “no effect” determination to explain why section 7 consultation is not necessary. The action agency is not required to notify the regulator (USFWS) or seek concurrence with a no effect determination as they are not obligated to review it, concur with it, or otherwise provide comments on it (NOAA 2022).

Because the listed species generated from IPaC Species List are not present on WIA terrestrial areas, or within the action area, a “no effect” determination has been made. IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce. For the completed Section 7 consultation with NOAA for marine species, see Appendix B.



United States Department of the Interior



FISH AND WILDLIFE SERVICE
Pacific Islands Fish And Wildlife Office
300 Ala Moana Boulevard, Box 50088
Honolulu, HI 96850-5000
Phone: (808) 792-9400 Fax: (808) 792-9580

In Reply Refer To:

August 15, 2022

Project Code: 2022-0074780

Project Name: MANAGEMENT OF INVASIVE VEGETATION ON WAKE ISLAND
AIRFIELD, WAKE ATOLL, PACIFIC OCEAN

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened and endangered species, as well as designated critical habitat that may occur within the boundary of your proposed project and that may be affected by project related actions. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). Please contact the Service's Pacific Islands Fish and Wildlife Office (PIFWO) at 808-792-9400 if you have any questions regarding your IPaC species list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may adversely affect threatened and endangered species and/or designated critical habitat.

Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2))

(c)). For projects other than major construction activities, the Service suggests that a Biological Evaluation, similar to a Biological Assessment, be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment or Biological Evaluation are described at 50 CFR 402.12.

Due to the significant number of listed species found on each island within PIFWO's regulatory jurisdiction, and the difficulty in accurately mapping ranges for species that we have limited information about, your species list may include more species than if you obtained the list directly from a Service biologist. We recommend you use the species links in IPaC to view the life history, habitat descriptions, and recommended avoidance and minimization measures to assist with your initial determination of whether the species or its habitat may occur within your project area. If appropriate habitat is present for a listed species, we recommend surveys be conducted to determine whether the species is also present. If no surveys are conducted, we err on the side of the species, by regulation, and assume the habitat is occupied. Updated avoidance and minimization measures for plants and animals, best management practices for work in or near aquatic environments, and invasive species biosecurity protocols can be found on the PIFWO website at: <https://www.fws.gov/office/pacific-islands-fish-and-wildlife/library>.

If a Federal agency determines, based on the Biological Assessment or Biological Evaluation, that a listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: <http://www.fws.gov/endangered/esa-library/index>.

Non-federal entities can also use the IPaC generated species list to develop Habitat Conservation Plans (HCP) in accordance with section 10(a)(1)(B) of the Act. We recommend HCP applicants coordinate with the Service early during the HCP development process. For additional information on HCPs, the Habitat Conservation Planning handbook can be found at <https://www.fws.gov/sites/default/files/documents/habitat-conservation-planning-handbook-entire.pdf>.

Please be aware that wind energy projects should follow the Service's wind energy guidelines (<http://www.fws.gov/windenergy>) for minimizing impacts to migratory birds. Listed birds and the Hawaiian hoary bat may also be affected by wind energy development and we recommend development of a Habitat Conservation Plan for those species, as described above. Guidance for minimizing impacts to migratory birds for projects including communications towers can be found at:

- <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers>
- <http://www.towerkill.com>
- <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow>

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation actions that benefit threatened and endangered species into their project planning to further the purposes of the Act in accordance with section 7(a)(1).

Please include the Consultation Tracking Number associated with your IPaC species list in any request for consultation or correspondence about your project that you submit to our office. Please feel free to contact us at PIFWO_admin@fws.gov or 808-792-9400 if you need more current information or assistance regarding the potential impacts to federally listed species and federally designated critical habitat.

Attachment(s):

- Official Species List
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Pacific Islands Fish And Wildlife Office

300 Ala Moana Boulevard, Box 50088

Honolulu, HI 96850-5000

(808) 792-9400

Project Summary

Project Code: 2022-0074780

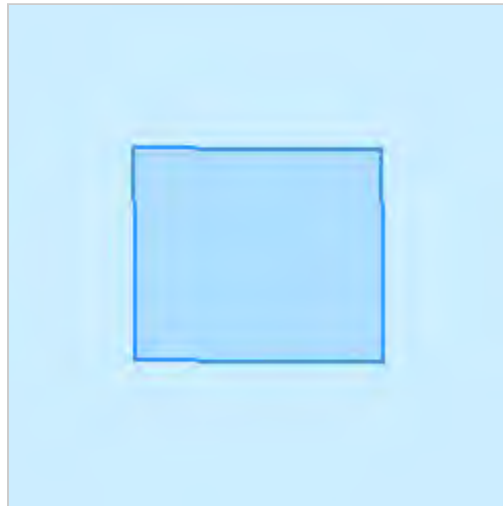
Project Name: MANAGEMENT OF INVASIVE VEGETATION ON WAKE ISLAND AIRFIELD, WAKE ATOLL, PACIFIC OCEAN

Project Type: Clearing Land

Project Description: The Pacific Air Forces Regional Support Center (PRSC) 611 Civil Engineer Squadron (611th CES) Natural Resources Program is addressing issues surrounding invasive vegetation management at Wake Island Airfield, (WIA), Wake Atoll (Figure 1). Invasive vegetation management, specifically, physical removal of ironwood trees (*Casuarina equisetifolia*), is critical to helping WIA and CES meet the objectives of the Integrated Natural Resources Management Plan (INRMP), the Sikes Act, Executive Order (EO) 13112 Exotic and Invasive Species, Department of Defense Instructions (DoDI) 4715.03 Natural Resources Conservation, DoDI 4150.07 Pest Management, Air Force Instruction (AFI) 32-1053 Integrated Pest Management, and AFI 32-7604 Integrated Natural Resources Management and would help WIA meet its ongoing goals for invasive Pacific Rat (*Rattus exulans*) and White-throated woodrat (*Neotoma albigula*) eradication by removing preferred rat habitat. Removal of ironwood is also an integral component of safe flight operations at WIA because the trees are encroaching past U.S. Air Force safety setbacks for woody vegetation relative to an active runway. The purpose of the Proposed Action is to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of WIA (Figure 2). The Proposed Action is needed because invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot WIA clear zone adjacent to the taxiway, as mandated by AFI 32-7063 Air Installations Compatible Use Zones Program (Figures 3, 4, and 5; PRSC 2017a).

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@19.29404845,166.62517619192306,14z>



Counties:

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Band-rumped Storm-petrel <i>Oceanodroma castro</i> Population: USA (HI) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1226 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LKWXPGRGD6BF5PMTLIGEPSKKAYI/documents/generated/6939.pdf	Endangered
Short-tailed Albatross <i>Phoebastria (=Diomedea) albatrus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/433	Endangered

Reptiles

NAME	STATUS
Green Sea Turtle <i>Chelonia mydas</i> Population: Central West Pacific DPS No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6199 General project design guidelines: https://ipac.ecosphere.fws.gov/project/LKWXPGRGD6BF5PMTLIGEPSKKAYI/documents/generated/6929.pdf	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: Air Force

Name: Keith Roberts

Address: 25 E St,

City: JBPHH

State: HI

Zip: 96853

Email keith.roberts.12@us.af.mil

Phone: 8083499144

This page intentionally left blank

National Oceanic and Atmospheric Administration



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1845 Wasp Blvd., Bldg 176
Honolulu, Hawaii 96818
(808) 725-5000 • Fax: (808) 725-5215

Date August 17, 2020

Jessica Morris
611th CES Water Compliance Program Manager
10471 20th Street, Suite 302
Joint Base Elmendorf-Richardson, AK 99506

RE: Request for Informal ESA Consultation on the proposed United States Air Force ironwood tree removal project at Wake Island Airfield, Wake Island Atoll (PIRO-2020-01937)

On June 16, 2020, NOAA's National Marine Fisheries Service (NMFS) received the request for concurrence that the United States Air Force's (USAF) proposed action to remove ironwood trees via cutting and application of pesticide is not likely to adversely affect (NLAA) the threatened Central West Pacific green turtles, threatened Indo-West Pacific scalloped hammerhead sharks, and two threatened species of coral: *Acropora retusa* and *Acropora globiceps*. The consultation request did not include critical habitat as none is present in the action area. The USAF seeks a permit from the United States Environmental Protection Agency (EPA) to proceed with this action, and is therefore the lead agency. EPA has not requested consultation on its action.

On July 20, 2020, NMFS requested additional information via phone as NMFS had determined that the Indo West Pacific scalloped hammerhead shark may be affected by the proposed action due to their life history and likelihood of being in the vicinity of the action area. On July 27, 2020, the USAF confirmed via email that they agreed to include the species in the consultation, although, they anticipated that scalloped hammerheads are unlikely to frequent the action area.

On July 27, 2020, NMFS initiated consultation.

This response to your request was prepared by NMFS pursuant to Section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 *et seq.*), implementing updated regulations at 50 CFR 402 (84 FR 44976; 10/28/2019), and agency guidance for the preparation of letters of concurrence. We have reviewed the information and analyses relied upon to complete this letter of concurrence in light of the updated regulations and conclude the letter is fully consistent with the updated regulations. This letter also underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554. A complete record of this consultation is on file at the Pacific Island Regional Office, Honolulu, Hawaii.



Proposed Action

The Environmental Protection Agency (EPA) proposes to permit the USAF through its Construction General Permit to remove invasive non-native ironwood (*Casuarina* spp.) trees located on and near the shoreline at Wake Island Airfield. The trees present a hazard to flight operations, therefore requiring the need for removal. Because they are an invasive species, these trees currently crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and. The trees will be cut, and subsequently pesticides will be applied to kill trunk and roots, and prevent regrowth of these trees. Construction will include the following:

Ironwood Removal:

Trees will be felled with chainsaws and excavators, limbed, and pieces will be chipped in place. Oversized trees will be placed on a dump truck and hauled to the designated woodpile area.

Herbicide Application:

Once each tree is girdled, an herbicide (a total of 20 gallons containing an aqueous solution of 10% of Garlon® 4 Ultra, 3% Stalker®, 76% biodiesel or non-toxic oil diluent, 10% Cide-Kick™ II, and 1% oil-based forestry dye) will be applied around the girdle via spray bottle. Once the tree is felled, the pesticide is then applied by brush to the stump. Enough pesticide to saturate the area will be applied, and will be applied only a single time. The majority of the treatment will occur more than 50 feet (ft) from the shoreline. For trees near shore, the herbicide will be applied by brush only and only to the exposed cut of the stump.

Disposal:

Ironwood trees and branches will be hand-fed into a wood chipper and the wood chips will be spread into a berm down gradient of the work area. After tree removal, chips will be spread evenly in the adjacent area.

Best Management Practices:

The following Best Management Practices (BMPs) will be followed

For UXO safety - by all project personnel, which include having at least one UXO technician to be on site to survey and clear the area prior to any ground disturbance, and to review any potential disturbances as the project continues/during all ironwood clearing activities. This is required for any area which has not previously been swept and cleared of explosives.

For stormwater - to prevent pollutants from reaching the lagoon and nearby waters:

- 1) Compliance with the Stormwater Pollution Prevention Plan - the applicant will avoid applying before heavy rains that could cause excess nutrients to be discharged.
- 2) Control of site stormwater - applicant or contractors will use perimeter controls throughout the duration of the project. Perimeter controls include fiber rolls along the site perimeter where trees are initially being felled and chipped. Chips from felled trees will be formed into a berm downgradient of the remainder of the site.
- 3) Observation of the berms - visual review will be conducted at the start of each day and after rain events, to ensure that they retain water.
- 4) Application of buffers - major earth-moving operations will not be conducted within 50 ft of any surface water. No sediment load reduction calculations are required when the full

50-foot buffer is present. However, minor earth disturbance may occur within 50 feet of the Pacific Ocean in Project Area 1. The Contractor will provide and maintain an undisturbed natural buffer of less than 50 ft and double perimeter control spaced a minimum of 5 ft apart. All discharges from the area of earth disturbance will be first treated by the site's erosion and sediment controls. Erosion controls may include, but are not limited to; mulching, temporary erosion control blankets, and temporary vegetative cover, and sediment controls, including silt fence, and storm drain inlet protection. The secondary area for ironwood removal within Project Area 1 is within 50 ft of the Pacific Ocean on its south west shore. To ensure compliance with natural buffers and sediment control, the Contractor will provide and maintain an undisturbed natural buffer of a minimum of 35 ft and fiber rolls for any work within the 50-ft buffer. Project Area 3 is within 50 ft of the Pacific Ocean on its northern shore. To ensure compliance, the Contractor will provide and maintain an undisturbed natural buffer of a minimum of 35 ft and fiber rolls and wood chip berms. Buffer areas will be delineated and clearly marked off with flags, tape, or other similar marking devices.

- 5) Spill Management - In the event of spills of toxic or hazardous materials, regardless of size, Pono Pacific and EA personnel will take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release.

Total construction (removal, herbicide application, and disposal) is expected to take 3-4 months. The USAF seeks consultation because the potential groundwater or surface runoff of pesticide application into the nearby water and lagoon after the trees are removed may affect listed species, but they determined that the application of BMPs ensure effects are not likely to be adverse.

Action Area

The proposed action will take place at 19.2783 N, 166.6500 W [NAD 83] on the Wake Island Airfield. The action area for the proposed activity includes the beachline, nearshore waters, and the ironwood tree removal sites, as well as areas where storm water from construction activities discharge into receiving waters. The airstation is located on the southern portion of the island, in an area largely undeveloped with commercial or residential buildings, in order to maintain air safety.

There are three project areas for tree removal and each area has a priority area for removal and a secondary area if budget and time allow (Figure 1). The size of the work area is 81.1 acres (ac), and the total area expected to be impacted by tree removal activities is approximately 9.2 ac (primary) and 14.7 ac (secondary). The action area is not located in any designated critical habitat.

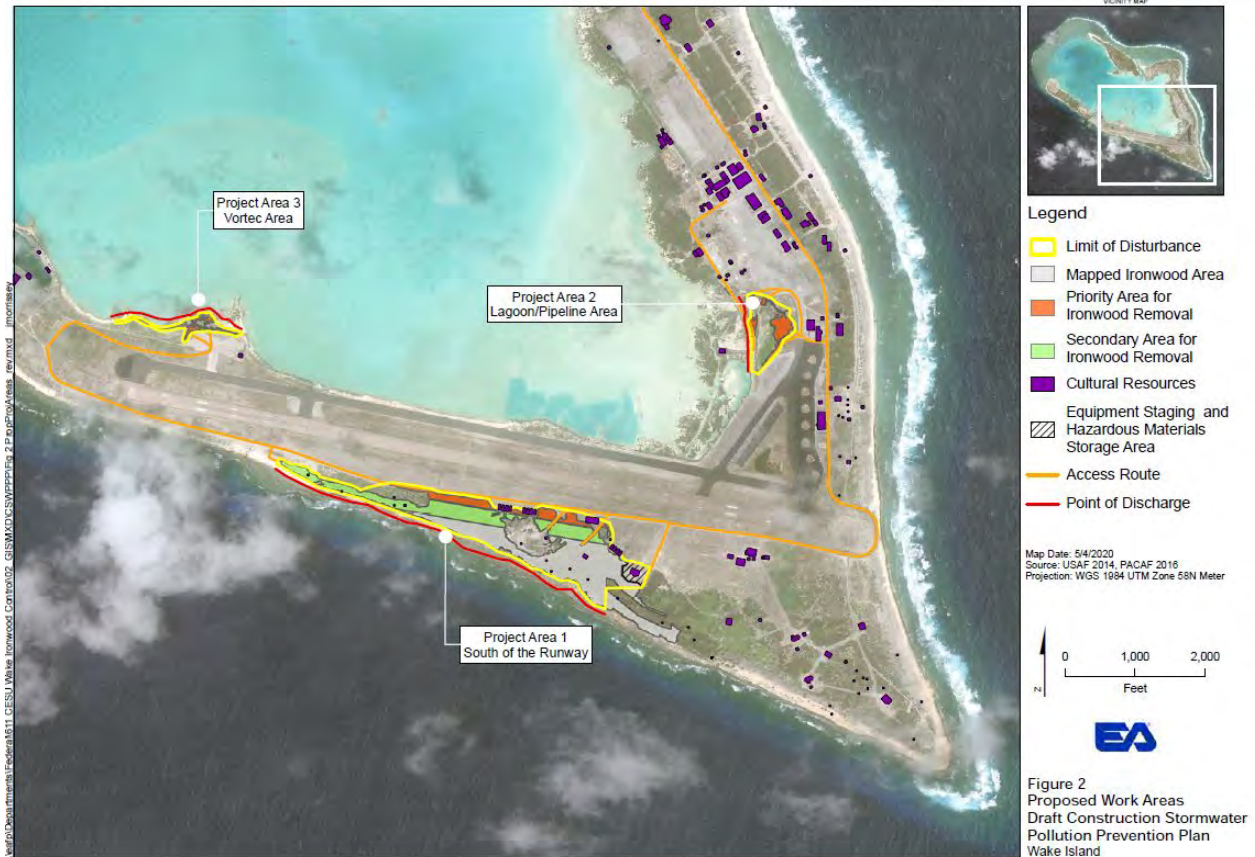


Figure 1. Wake Island Airfield proposed tree removal and herbicide application sites.

Listed Species in the Action Area

The ESA-listed threatened and endangered species under NMFS' jurisdiction listed in Table 1 are known to occur, or could reasonably be expected to occur, in the action area, and may be affected by the proposed activities. Detailed information about the biology, habitat, and conservation status of the animals listed in Table 1 can be found in their status reviews, recovery plans, federal register notices, and other sources at <https://www.fisheries.noaa.gov/topic/endangered-species-conservation>.

Table 1. Common name, scientific name, ESA status, effective listing date with Federal Register reference, and Recovery Plan status for ESA-listed species considered in this consultation.

Species	Scientific Name	ESA Status	Effective Listing Date/ FR Notice	Recovery Plan
Central West Pacific Green Sea Turtle	<i>Chelonia mydas</i>	Threatened	05/06/2016 81 FR 20057	
Indo West Pacific Scalloped Hammerhead Shark	<i>Sphyrna lewini</i>	Threatened	09/02/2014 79 FR 38213	
Corals	<i>Acropora globiceps</i>	Threatened	10/10/2014	

Species	Scientific Name	ESA Status	Effective Listing Date/ FR Notice	Recovery Plan
			79 FR 53852	
	<i>Acropora retusa</i>	Threatened	10/10/2014 79 FR 53852	

Critical Habitat

No designated or proposed critical habitat is present for any species under NMFS' jurisdiction in the action area.

Analysis of Effects

In order to determine that a proposed action is not likely to adversely affect ESA-listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable¹, or completely beneficial. As defined in the joint USFWS-NMFS Endangered Species Consultation Handbook, beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs². Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects; or 2) expect discountable effects to occur (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and potential for interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in the consultation request and draft NEPA Environmental Assessment which was provided in lieu of a biological evaluation.

The USAF identified the following stressors have the potential to affect listed marine species in the action area:

- Tree removal activities
- Ground disturbance
- Encountering Unexploded Ordnances
- Pesticide Exposure

¹ When the terms “discountable” or “discountable effects” appear in this document, they refer to potential effects that are found to support a “not likely to adversely affect” conclusion because they are extremely unlikely to occur. The use of these terms should not be interpreted as having any meaning inconsistent with our regulatory definition of “effects of the action.”

² Take” is defined by the ESA as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species. NMFS defines “harass” as to “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.” NMFS defines “harm” as “an act which actually kills or injures fish or wildlife.” Such an act may include significant habitat modification or degradation where it actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Take of species listed as endangered is prohibited at the time of listing, while take of threatened species may not be specifically prohibited unless NMFS has issued regulations prohibiting take under section 4(d) of the ESA.

NMFS evaluates the potential for species' exposure to each of these stressors – if exposure is unlikely, effects are discountable. If exposure is not unlikely, we evaluate the significance of any response to that exposure.

Tree Removal - The USAF plans to use heavy machinery to cut down ironwood trees. However, the trees are upland far from the lagoon and surrounding waters. No listed species will be exposed to sound from equipment being used to cut trees, or affected by changes in canopy cover. Exposure of ESA listed species to tree removal is unlikely, and effects from the removal activities are discountable

Ground Disturbance - Ground disturbances from tree-removal activities could reach the ESA-listed species in Table 1, if suspended sediment is transported by fresh water to marine areas where species can occur. However, given the upland location of the work the BMPs 1-4 proposed as part of the action, we expect sediment loosened during ground disturbance be retained in the upland area. Because we expect no exposure of listed species to suspended sediment or turbid conditions, this potential effect is considered discountable.

Encountering Unknown Unexploded Ordnance - There is also the possibility of equipment disturbing unidentified unexploded ordnance (UXOs) that could be in the action area. We believe this effect to the species listed above will be extremely unlikely to occur, and therefore, discountable for the following reasons. Construction activities associated with this project are not occurring in marine waters and will only be occurring in the uplands, with the majority of the action occurring more than 50 feet from the shoreline.

The USAF Statement of Work and Performance Work Statement requires the physical presence of a UXO safety personnel on site. The contracted UXO techs do not have the authority to perform any disposal actions. If an anomaly is found, work is stopped and the target anomaly is flagged. The USAF then sends an explosive ordnance disposal team to the island to inspect, and if required, mitigate the hazard. The only explosives ever used on the island are those required to mitigate a hazard found on the island. These are considered emergency situations, as the age of the explosives makes them highly unstable. The USAF does not, and will not, use explosives on the island for anything other than the mitigation of emergencies as a result of newly discovered historic ordnance. At no time would the explosives, ordnance, or any resultant by-products be allowed to migrate into the water and cause any contamination or degradation of the marine environment. These situations are extremely uncommon. However, due to the high potential threat to health and human safety if UXO is encountered, UXO clearance is included in the project planning and implementation. In the event that UXO is discovered during operations on the island requires detonation, the USAF would need request emergency consultation with NMFS because the effects of explosionsthe use of explosives are not covered under this consultation.

Pesticides Exposure

The proposed action includes herbicide application to the stumps of felled trees that have been removed. We expect that the BMPs for stormwater and the fact that herbicide sprays will be applied by hand directly to the stumps which will minimize greatly the possibility of any herbicide solutions entering the water, and together minimize the likelihood of exposure of ESA listed species. If drift were to occur on the air, we review the likely exposure and response.

The herbicide solution broken down in the proposed action is mainly made up of biodiesel or non-toxic oil diluent, Cide-Kick II™, and an oil-based forestry dye, where these are inert carriers/adjuvants approved by the EPA for aquatic use and are added to the mixture to make the pesticide more effective. However, the rest of the herbicide contains a solution of Garlon® 4 Ultra and Stalker®, which are the more active and toxic ingredients in the solution. The active ingredient in Garlon® 4 Ultra is triclopyr butoxyethyl ester, and the active ingredient in Stalker is imazapyr. The herbicide will be present in the short term, and triclopyr and imazapyr have been known to have adverse effects to listed fish (See NMFS National ESA section 7 consultations on these compounds listed here: <https://www.fisheries.noaa.gov/national/endangered-species-conservation/pesticide-consultations-summary-and-schedule>).

In addition, Dr. Tony Hawkes of the NMFS National ESA section 7 Pesticide Consultation Team confirmed that these compounds do not have a long residual time until becoming inert, further reducing the possibility that these chemicals could run off into the water while they have maximum potency (Hawkes 2020, pers comm.). Although toxic to some aquatic organisms, imazapyr is a sulfonyl urea herbicide approved by the EPA for use in aquatic habitats, which suggests lower risk to aquatic species (Hawkes 2020, pers comm.). In addition, a 2019 NMFS Programmatic biological opinion addressing the Bureau of Land Management's Integrative Invasive Plant Management Program for the Northwest Oregon District and the proposed application of imazapyr and triclopyr butoxyethyl ester to the aquatic environment found low to no-risk effects (NMFS 2019) of these compounds to aquatic species when applied directly to the water.

In that action, the District proposed to treat thousands of acres annually. Herbicides were to be spot-treated by backpack sprayers 95% of the time and broadcast-treated 5% of the time. This application rate results in a potential of exposure many orders of magnitude more than the proposed spot-treatment action analyzed here. In that opinion, NMFS came to the conclusion that there would be no risk to any aquatic fauna from the use of triclopyr, and that any potential use of imazapyr is not expected to affect fish. Furthermore, in the unlikely event that these compounds were to enter the aquatic environment, they would pose a very low toxicity risk to aquatic organisms. It is also important to note that the uses analyzed in the 2019 opinion included direct aquatic applications, where the herbicides from applications analyzed in this consultation are never expected to even enter the water.

The primary potential exposure route of these compounds to aquatic species is from stormwater runoff. However, the USAF does not anticipate, and NMFS agrees, that very little, if any, stormwater runoff will extend into the marine waters, as adequate controls will be in place to mitigate runoff. The island is a flat, highly porous, coral atoll, making sheet flow unlikely, and the majority of the stumps to be treated are located more than 50 ft from the shoreline. In the extremely unlikely event that any herbicide would enter the water, they would be at concentrations much lower than those analyzed in the 2019 biological opinion cited above for direct applications that were found to have either no effects to invertebrates or fish. Although there was no comparative analysis for sea turtles, there would be no major route of exposure for this species since they breathe air and would only be exposed to levels that would not likely to reach measurable concentrations from the consumption of seagrass or algae.

Because of the BMPs listed above to reduce the possibility of herbicide compounds entering the water, and to reduce the possibility of stormwater runoff, and we believe that the effects to ESA-listed species from potential exposures to herbicide compounds from stormwater run-off will be

extremely unlikely, and therefore discountable. If exposure occurred because of drift it would be at levels so low, and with degradation time of the compounds so brief, that response of species so exposed would be insignificant.

Conclusion

Considering the information and assessments presented in the consultation request and available reports and information, and in the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation, all effects of the proposed action are either discountable, or insignificant. Accordingly, NMFS concurs with your determination that the proposed action is not likely to adversely affect the following ESA-listed species: threatened Central West Pacific green turtles; threatened Indo-West Pacific scalloped hammerhead sharks; and two threatened species of coral: *Acropora retusa* and *Acropora globiceps*.

This concludes your consultation responsibilities under the ESA for species under NMFS's jurisdiction. If necessary, consultation pursuant to Essential Fish Habitat would be completed by NMFS' Habitat Conservation Division in a separate communication.

Reinitiation Notice

ESA Consultation must be reinitiated if: 1) Take occurs to an endangered species, or to a threatened species for which NMFS has issued regulations prohibiting take under section 4(d) of the ESA; 2) new information reveals effects of the action that may affect ESA-listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to ESA-listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the action.

If you have further questions, please contact Shelby Creager at (808) 725-5144 or shelby.creager@noaa.gov. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,

Ann M. Garrett
Assistant Regional Administrator
Protected Resources Division

Cc:
NMFS File No.: PIRO-2020-01937
PIRO Reference No.: I-PI-20-1844-AG

Literature Cited

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1998. Endangered Species Consultation Handbook. Procedures for Conducting Consultation and Conference Activities under Section 7 of the Endangered Species Act.

<https://www.fisheries.noaa.gov/webdam/download/64572719>

[NMFS. 2019. Endangered Species Act Section 7\(a\)\(2\) Programmatic Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for Integrated Invasive Plant Management for the Northwest Oregon District, Bureau of Land Management. WCRO-2019-00059](#)

DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the letter addresses these DQA components, documents compliance with the DQA, and certifies that this letter has undergone pre-dissemination review.

Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this letter are FHWA. Other interested users could include permittees listed in Table 1 and others interested in the conservation of listed species and their ecosystems. Individual copies of this were provided to the FHWA. The document will be available within two weeks at the NOAA Library Institutional Repository [<https://repository.library.noaa.gov/welcome>]. The format and naming adheres to conventional standards for style.

Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III: *Security of Automated Information Resources*, Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, and the ESA regulations, 50 CFR 402.01 et seq.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this letter contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and reviewed in accordance with Pacific Island Region ESA quality control and assurance processes.

This page intentionally left blank

Appendix C

Public Notice

This page intentionally left blank

National Environmental Policy Act (NEPA) Announcement

Intent to Prepare an Environmental Assessment (EA) for Management of Invasive Vegetation on Wake Island Airfield, Wake Atoll, Pacific Ocean

The U.S. Air Force announces their intent to prepare an EA for a proposed invasive vegetation management project that would remove invasive ironwood trees from three areas on Wake Island, followed by out-planting of native vegetation in cleared areas. The project would both improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of the airfield. Project activities would remove ironwood trees via chainsaw and herbicide application or bulldozer/other similar heavy equipment. Felled ironwood trees would be disposed via wood chipper, pile-burning, or controlled burning. It is anticipated that a majority of trees would be removed via chainsaw and herbicide application, and a majority of trees would be disposed of via wood chipper. After disturbance, all areas where ironwood was felled would be revegetated with an appropriate seed mix or native plantings, which would be conducted at a later date. As part of the Proposed Action, the Air Force is considering a No Action Alternative and the Preferred Alternative (removal and disposal of ironwood trees in three areas). The complete project area includes approximately 0.21 acres of wetland. Short-term, temporary impacts would occur to wetlands as a result of felling under the Preferred Alternative; however, removal activities would be restricted to felling via chainsaw and herbicides approved for use in wetlands, and felled trees would be removed from wetlands prior to disposal via another method. No heavy equipment would enter a wetland under the preferred alternative. Wetland impacts in the long-term would be beneficial due to the removal of invasive ironwood trees. Native vegetation would be restored in areas of ironwood removal. Under the No Action Alternative, no ironwood trees would be removed and no impacts to wetlands would be anticipated. Because the Proposed Action has the potential to result in impacts to wetlands and wetland buffers, the action is subject to the requirements and objectives of Executive Order 11990, Protection of Wetlands, as amended. The U.S. Army Corps of Engineers—Honolulu District has special expertise related to impacts to wetlands and have been notified of this project. The Air Force invites the public to provide comments on the proposal and any practicable alternatives that may reduce these impacts. **Comments should be sent by June 22, 2021** to Richard Mauser, EIAP/NEPA, 611 CES/CEIE, by mail at 10471 20th St. RM325, Joint Base Elmendorf-Richardson, AK 99506, by telephone at 907-726-7981, or via email to richard.mauser@us.af.mil.

Federal Notices

As a courtesy, listed below are some relevant entries from the Federal Register published since the last issue of *The Environmental Notice*. For more information, click on the title link, also available at www.federalregister.gov.

Notice: [Permanent Advisory Committee To Advise the U.S. Commissioners to the Western and Central Pacific Fisheries Commission; Meeting Announcement](#) (published by the National Oceanic and Atmospheric Administration on 05/13/2021)

NMFS announces a public meeting of the Permanent Advisory Committee (PAC) to advise the U.S. Commissioners to the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean on June 10, 2021. The meeting of the PAC will be held via web conference from 11 a.m. to 1 p.m. Hawai'i Standard Time. Members of the public may submit written comments on meeting topics or materials; **comments must be received by June 5, 2021**. Click on the title link of this entry for details on how to call in to the conference line or to submit comments.

Notice: [Intent To Prepare an Environmental Impact Statement for Certain Sunscreen Drug Products for Over-the-Counter Use](#) (published by the Food and Drug Administration on 05/13/2021)

The Food and Drug Administration (FDA or Agency) announces its intent to prepare an environmental impact statement (EIS) to evaluate the potential environmental effects of revised conditions for marketing certain sunscreen products for over-the-counter (OTC) use without prior approval of a new drug application (NDA). By this notice, FDA is announcing the beginning of the scoping process to solicit public comments and identify issues to be analyzed in this EIS; **the public scoping process will close on June 14, 2021**. Click on the title link of this entry for additional information and for details on how to submit comments.

Notice: [Presidential Declaration of a Major Disaster for Public Assistance Only for the State of Hawaii](#) (published by the Small Business Administration on 05/20/2021)

This is a Notice of the Presidential declaration of a major disaster for Public Assistance Only for the State of Hawaii (FEMA-4604-DR), dated 05/13/2021. Incident: Severe Storms, Flooding, and Landslides. Incident Period: 03/08/2021 through 03/18/2021. **Physical Loan Application Deadline Date: 07/12/2021. Economic Injury (EIDL) Loan Application Deadline Date: 02/14/2022**. Click on the title link of this entry for additional information on submitting loan applications.

Appendix D

Air Quality Conformity Analysis

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: NO BASE
State: U.S. Minor Outlying Islands
County(s): Wake Island
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Ironwood Removal - Wake Island

c. Project Number/s (if applicable):

d. Projected Action Start Date: 1 / 2023

e. Action Description:

The Preferred Alternative includes the removal of ironwood in three areas of WIA through various combinations of chainsaw cutting, herbicide application, controlled burning and/or removal through use of heavy equipment. Disposal would also be carried out by various methods including disposal via wood-chipper, controlled wood-pile burning or in-situ controlled burning. Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under various methods. The unique challenges include those associated with transport of equipment and materials to and from the island, as well as those associated with equipment repair in the event of failure.

Estimated 69 acres of burned ironwood.

f. Point of Contact:

Name: Sunhee Park
Title: Environmental Engineer
Organization: EA Engineering, Science, and Technology, Inc., PBC
Email: spark@eaest.com
Phone Number: 410-527-2057

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

applicable
 not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major

AIR CONFORMITY APPLICABILITY MODEL REPORT RECORD OF AIR ANALYSIS (ROAA)

source threshold for actions occurring in areas that are “Clearly Attainment” (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are “Near Nonattainment” (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action’s net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2023

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.254	250	No
NOx	1.509	250	No
CO	1.480	250	No
SOx	0.004	250	No
PM 10	59.861	250	No
PM 2.5	0.061	250	No
Pb	0.000	25	No
NH3	0.002	250	No
CO2e	398.8		

2024 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	250	No
NOx	0.000	250	No
CO	0.000	250	No
SOx	0.000	250	No
PM 10	0.000	250	No
PM 2.5	0.000	250	No
Pb	0.000	25	No
NH3	0.000	250	No
CO2e	0.0		

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQs. No further air assessment is needed.

Sunhee Park

Sunhee Park, Environmental Engineer

8/4/2022

DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location

Base: NO BASE
State: U.S. Minor Outlying Islands
County(s): Wake Island
Regulatory Area(s): NOT IN A REGULATORY AREA

- **Action Title:** Ironwood Removal - Wake Island

- **Project Number/s (if applicable):**

- **Projected Action Start Date:** 1 / 2023

- Action Purpose and Need:

The purpose of the Proposed Action is to improve habitat for native species and reduce safety concerns in three regions adjacent to the active runway of WIA. The Proposed Action is needed because invasive ironwood trees crowd and shade out native vegetation, force low species richness and diversity, provide habitat for invasive rats, and present a hazard to flight operations due to ironwood presence within the 3,000-foot WIA clear zone adjacent to the taxiway, as mandated by AFI 32-7063 Air Installations Compatible Use Zones Program.

- Action Description:

The Preferred Alternative includes the removal of ironwood in three areas of WIA through various combinations of chainsaw cutting, herbicide application, controlled burning and/or removal through use of heavy equipment. Disposal would also be carried out by various methods including disposal via wood-chipper, controlled wood-pile burning or in-situ controlled burning. Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under various methods. The unique challenges include those associated with transport of equipment and materials to and from the island, as well as those associated with equipment repair in the event of failure.

Estimated 69 acres of burned ironwood.

- Point of Contact

Name: Sunhee Park
Title: Environmental Engineer
Organization: EA Engineering, Science, and Technology, Inc., PBC
Email: spark@eaest.com
Phone Number: 410-527-2057

- Activity List:

	Activity Type	Activity Title
2.	Construction / Demolition	Ironwood Removal - Wake Island

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Wake Island

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Ironwood Removal - Wake Island

- Activity Description:

The Preferred Alternative includes the removal of ironwood in three areas of WIA through various combinations of chainsaw cutting, herbicide application, controlled burning and/or removal through use of heavy equipment. Disposal would also be carried out by various methods including disposal via wood-chipper, controlled wood-pile burning or in-situ controlled burning. Due to the unique challenges associated with performing work on a remote location such as WIA, the Preferred Alternative includes execution of ironwood removal and disposal under various methods. The unique challenges include those associated with transport of equipment and materials to and from the island, as well as those associated with equipment repair in the event of failure.

- Activity Start Date

Start Month: 1
Start Month: 2023

- Activity End Date

Indefinite: False
End Month: 2
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.253647
SO _x	0.004083
NO _x	1.508557
CO	1.480180
PM 10	59.861131

Pollutant	Total Emissions (TONs)
PM 2.5	0.060847
Pb	0.000000
NH ₃	0.001929
CO _{2e}	398.8

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration

Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 3005640
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	4	0
Graders Composite	2	8
Other Construction Equipment Composite	2	8
Rollers Composite	1	8
Rubber Tired Dozers Composite	2	8
Scrapers Composite	4	8
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rollers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0464	0.0007	0.2939	0.3784	0.0158	0.0158	0.0041	67.139
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Scrapers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.1640	0.0026	1.0170	0.7431	0.0406	0.0406	0.0148	262.85
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO ₂ e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
LDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

LDGT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDGV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
LDDT	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
HDDV	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800
MC	00.6330	00.0090	00.5200	10.3730	00.0280	00.0140		00.0950	00500.800

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$$PM_{10FD} = (20 * ACRE * WD) / 2000$$

PM_{10FD} : Fugitive Dust PM 10 Emissions (TONs)
 20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
 ACRE: Total acres (acres)
 WD: Number of Total Work Days (days)
 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$$

CEE_{POL} : Construction Exhaust Emissions (TONs)
 NE: Number of Equipment
 WD: Number of Total Work Days (days)
 H: Hours Worked per Day (hours)
 EF_{POL} : Emission Factor for Pollutant (lb/hour)
 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$$

VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 HA_{OnSite} : Amount of Material to be Hauled On-Site (yd³)
 $HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 HT: Average Hauling Truck Round Trip Commute (mile/trip)

$$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)
 VMT_{VE} : Vehicle Exhaust Vehicle Miles Travel (miles)
 0.002205: Conversion Factor grams to pounds
 EF_{POL} : Emission Factor for Pollutant (grams/mile)
 VM: Vehicle Exhaust On Road Vehicle Mixture (%)
 2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$$VMT_{WT} = WD * WT * 1.25 * NE$$

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)
 WD: Number of Total Work Days (days)
 WT: Average Worker Round Trip Commute (mile)
 1.25: Conversion Factor Number of Construction Equipment to Number of Works
 NE: Number of Construction Equipment

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$$

V_{POL} : Vehicle Emissions (TONs)

VMT_{WT} : Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds

EF_{POL} : Emission Factor for Pollutant (grams/mile)

VM : Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

Emissions Calculations for Tree Burning

Tree to be burned: 14131.2 tons (See detailed calcs. below)

Pollutants	Emission Factors ¹ (lb/ton)	Emission Rate (ton/yr)
CO	140	989.184
VOC	19	134.2464
PM ₁₀	17	120.1152
PM _{2.5}	17	120.1152

Note:

1. "Unspecified" forest residues used to select emission factors from AP-42, Section 2.5 "Open Burning"

Backup calcs for wood tonnage

1,000 trees per acre (conservative)

40' tall (conservative)

6-in DBH (Conservative – rounded up from average of 5.3 DBH from surveys, non-weighted)

6.4 ft³ of wood per tree (includes branches) (based on Table 3 in USDA Technical Bulletin 1104 and calcs prepared by Erin Barry for whole tree including branches)

Wood Density = 1,000 kg/m³ = 62.43 lbs/ft³ (multiple online sources)

Using USDA air dry weight of 64 lbs/ft³ (https://www.fpl.fs.fed.us/documnts/TechSheets/Chudnoff/SEAsian_Oceanic/new_pdf_files/Casuarina_spp.pdf)

1,000 trees/acre * 69 acres = 69,000 trees

69,000 trees * 6.4 ft³ per tree = 441,600 ft³ of wood.

441,600 ft³ * 64 lbs/ft³ = 28,262,400 lbs of wood in 69 acres.

1 lbs = 0.0005 tons

28,262,400 lbs = 14131.2 tons

Appendix E

Bird/Wildlife Strike Hazard Site Visit and Report

This page intentionally left blank

Wake Island Airfield

BASH Site Visit and Review

(24 February – 10 March 2022)



12 July 2022

Written by:

MSgt Matthew Hart 3rd Wing Flight Safety NCO

Cory Walch USDA-WS PRSC Biologist

Table of Contents

1.0	Introduction.....	1
2.0	History of Bird Hazards	2
3.0	Observation Methods	2
	3.1 Runway Incursion Surveys	2
	3.2 Nesting Surveys	3
	3.3 Marina Fly-by Surveys	3
	3.4 Off-site observations.....	3
4.0	Observation Results	4
	4.1 Runway Incursion Surveys	4
	4.2 Nest Surveys	6
	4.3 Marina Fly-by Surveys	7
	4.4 Off-site Survey.....	7
	4.5 General Observations.....	7
5.0	BASH Program Review	8
6.0	Recommendations.....	11
	6.1 Wildlife Hazard Assessment (WHA).....	11
	6.2 Performance Work Statement (PWS) Modifications.....	11
	6.3 Habitat Management	11
	6.4 Nest Removal.....	12
	6.5 Increase Harassment	12
	6.6 Remington 870 Shotgun	12
	6.7 Pyrotechnic Supply	12
	6.8 15mm Pyrotechnic Launcher	13
	6.9 Paintball Launcher	13
	6.10 Standardized Bird Surveys.....	13
	6.11 Strike Reporting.....	13
	6.12 Retention Pond.....	13
	6.13 Long term Management.....	14
7.0	Summary.....	14

Table of Contents (continued)

Appendix A. Bird Exclusion Zone (BEZ) Map 2019.

Appendix B. Survey Protocol from 2021 BASH Site Visit.

Appendix C. Wildlife Survey Datasheet Example (from DAFI 91-212).

Appendix D. USDA-WS Internal Safety Bulletin 2016-01 (Single-shot Shotgun us with Cracker rounds).

1.0 Introduction

Wake Island Airfield (PWAK) is a strategic trans-Pacific refueling depot operated by the U.S. Air Force PACAF Regional Support Center (PRSC) Detachment 1 (DET 1). Located 1,501 miles east of Guam, 2,298 miles west of Honolulu, 1,991 miles southeast of Tokyo, and 3,109.5 miles southwest of Elmendorf Air Force Base. The airfield, coordinates 19°16'57"N 166°38'12"E is located on the southern end of the island. The runway, designated 10/28, is an asphalt surface, 9,844 feet in length and 150 feet wide with a 900-foot coral overrun, making it the longest runway in the Pacific Islands. The airfield is rated for precision instrument landing and is controlled by Oakland Center for descent and approach clearance while the on-site base operations office advises aircrews on final approach and coordinates aircraft ground operations.



Figure 1. Aerial view of PWAK, with common locations. Not to scale, reference only.

The 3rd Wing Flight Safety (3WG/SE) NCO MSgt Matthew Hart, and USDA-Wildlife Services (WS) Biologist Cory Walch assigned to oversee PRSC Bird Aircraft Strike Hazard (BASH) program conducted a site visit on PWAK BASH program from 24 February through 10 March 2022. The intent of the site visit was to survey current bird activity on the airfield, conduct BASH training, evaluate the current BASH mitigation efforts, and to provide valuable recommendations to improve the overall program. The information included in this report is from direct field observations during the site visit and personal communications with DET 1, contract, and Air Force personnel familiar with PWAK BASH program.

2.0 History of Bird Hazards

Like all airfields, the risk of bird strikes has existed at PWAK for some time. From calendar year (CY) 2011- 2021 there were twenty-two reported bird strikes at PWAK according to records retrieved from AFSAS, 4 April 2022. Sooty terns account for the majority of the strikes with 8 of the twenty-two birds. This directly correlates to the large numbers of sooty terns that use the atoll for nesting/ breeding each year. The breakdown of the remaining fourteen bird strikes are as follows: five could not be identified or no bird remains were found, three noddies (Black or Brown), two pacific golden plover, one great frigatebird, one northern pintail, one masked booby, and one red-tailed tropicbird.

In CY 2021, there were five reported bird strikes that occurred at PWAK, all non-damaging. In-keeping with historic trends the majority (three of five) of strikes involved sooty terns. The remaining two, for the year involved, one where the aircrew was aware of a strike in-flight and no bird remains were found, and the other was identified as a northern pintail, carcass found on the airfield but no strike reported by aircrews. All of these strikes occurred from February through May, which could be an indication of increased bird activity or increase aircraft movements during that time.

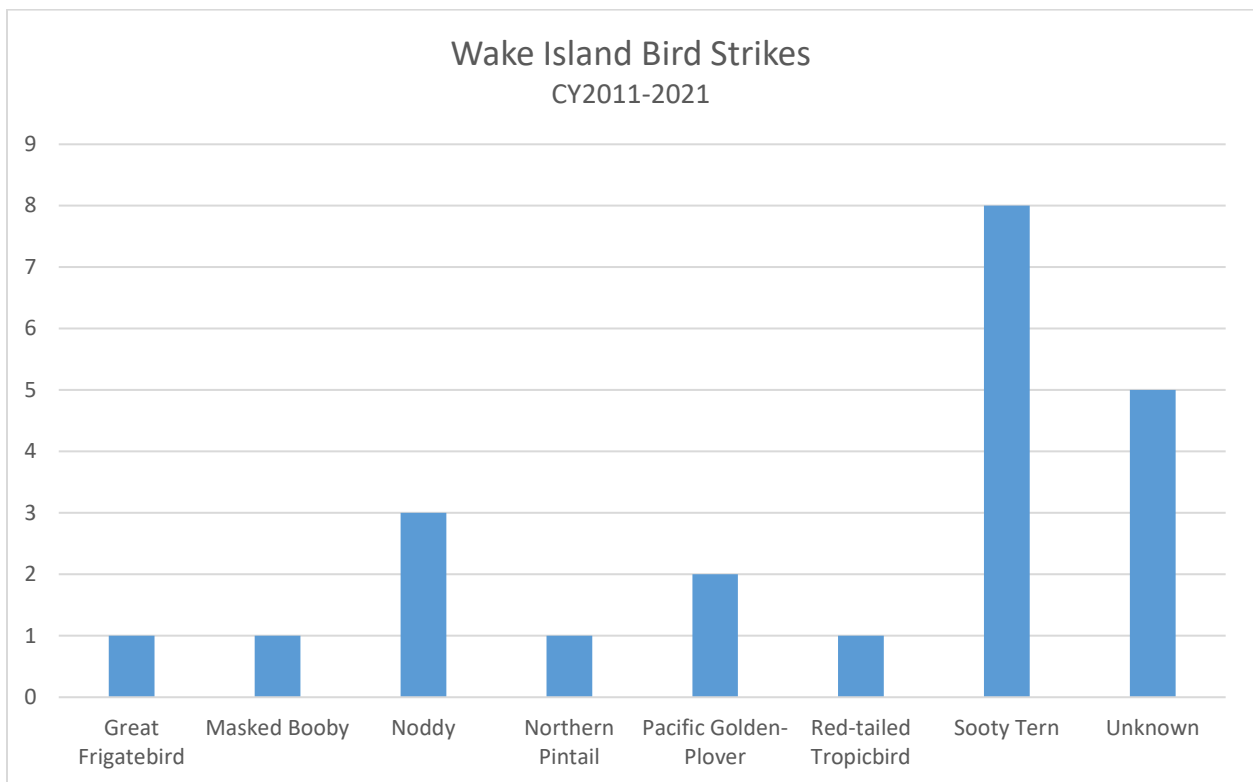


Figure 2. Reported bird strikes from PWAK, data from AFSAS February 2022.

3.0 Observation Methods

3.1 Runway Incursion Surveys

To gauge the current bird activity level on the airfield, runway incursion surveys were conducted during the visit. These surveys were designed to identify wildlife movement patterns on or near

the runway that pose a direct hazard to aircraft operations. The surveys were conducted with similar methodology as they were during the February 2021 site visit (Appendix B). Except for the following adjustments; Survey Point (SP) 4 was relocated 700 feet to the south (Figure 3) to enable the surveyors a closer view of the overrun and the runway areas. Survey times were shortened (30 minutes in 2021 site visit) to 15 minutes per survey point. The shorter times allowed the surveyors the ability to visit all four points in a survey period (morning sunrise until 1100L, mid-day 1100L-1500, evening 1500L until sunset). Only birds within approximately 1000 feet of the runway centerline were recorded for the surveys, to get the most accurate representation of the risk to flight safety posed by the local bird activity.

3.2 Nesting Surveys

Nest search surveys were conducted on and in the area immediately surrounding the airfield over multiple days during the site visit. Primary focus of these searches was to locate red-tailed tropicbirds that were nesting in the approach-end of runway 10, and within the designated bird exclusion zone (BEZ) (attached 2019 BEZ Map). Surveys were completed by physically examining potential nesting habitat (i.e. plemphis, koa loa shrub areas). In thicker areas the two observers walked approximately 15 yards apart, parallel with each other, in over lapping transects. This ensured that each section was completely searched and that nest counts were not duplicated. Only active nests were counted during the searches. A nest was considered active if an egg was present, an adult was seen sitting on an egg, or if a young of the year chick was present on a nest. Areas identified with significant areas around the VorTac, Hot Cargo Pad, and Old ATC building were also searched for Laysan albatross nests using identical searching techniques.

3.3 Marina Fly-by Surveys

Fly-by surveys were conducted to provide an index of all bird movements across of the west approach/departure end of the runway. The entrance to the marina offered a location (Figure 3) that the observers could see east and west along the coast and offshore as birds flew by. Each survey was conducted for 10 minutes, during which time every bird that passed the observer's field of view was counted. One observer was dedicated to counting and verbally relaying to the second observer who in turn recorded the information.

3.4 Off-site observations

The primary focus of the site visit was the airfield and the direct impact local bird populations have on flight safety. However, because of the small geographic footprint of the atoll, surveying all attractants and bird activity at off-site areas was crucial to understanding the complex nature of BASH issues at PWAK. Informal walking surveys were conducted on both Wilkes and Peale islands once during the site visit. These surveys consisted of traversing each island to get a firsthand account of species abundance, locations, and current activity, no formal counts were conducted.



Figure 3. Survey locations, attractive habitat, nesting areas on PWAK, Not to scale, reference only.

4.0 Observation Results

4.1 Runway Incursion Surveys

Runway Incursion Surveys were conducted on four days (28 Feb, 2, 4, and 9 Mar) and a total of 2,776 individual birds were recorded (10.5 hours of survey time). Birds were observed anywhere from 0 to 500 feet above ground level (AGL). Of those 41% (1,136 individuals) were sooty terns, most often they were observed flying east or west over the runway. During the site visit sooty terns appeared to be at the end of a nesting cycle, with young of the year chicks present on Wilkes Island. With the high caloric cost of fledging a chick, often adult terns were seen flying off-shore to forage, and returning to the nesting area. The most abundant activity was observed during morning (Sunrise until 1100L) survey periods, with greatest activity observed at SP 3 and 4.

Tropicbirds (red-tailed and white-tailed were combined for analysis due to similarities in size and nesting habits) accounted for 18.6% (516 individuals) of the total birds observed. Tropicbirds were almost exclusively active during mid-day survey periods, with 87% observed during this period. Just prior to the beginning of the site visit Wake Atoll experienced an abnormal high tide. It appeared during that event many tropicbird nests in low lying areas had been inundated with water and the eggs had been spoiled. As a result tropicbirds were observed displaying breeding behavior

in which they “hover” or “circle” their nesting habitat in the west and east overrun sections of the BEZ, and along the northern edge of the airfield.

Black and brown noddy survey numbers we combined for analysis due to their similarities in approximate size and nesting habits on Wake Island. Of the survey totals 16.8% (467 individuals) were noddys, with the most activity observed during the morning and evening survey periods. Noddys were observed loafing and nesting in the Ironwood trees along the south of the airfield. Most notably they were observed flying north and south across the runway.

White terns accounted for 10.52% (292 individuals) of the survey totals. White terns were also more active during mid-day and evening survey periods. Most often they were observed flying north and south from the Ironwood forest (Figure 3, *White tern_Noddy nesting*), at SP2 and SP3, across the airfield towards the lagoon.

Laysan albatross accounted for 2.74% (76 individuals) of the surveyed birds. The albatross were often observed flying low (<50' AGL) in swooping flight patterns around the airfield. When not airborne albatross were most often observed loafing and engaging in breeding displays on the ground in groups of 2-8 individuals west of the hot cargo pad/VorTAC and north of the old air traffic control building (breeding area in Figure 3).

Great frigatebirds totaled 1.77% (49 individuals) of the total surveyed birds. They were observed transiting east and west across the airfield at or below 200' AGL. However on several occasions they were seen swooping/ circling the retention pond on the airfield during mid-day survey periods.

Red footed, masked, and brown booby species were combined for analysis due to relative size and habits on PWAK. Of the survey totals booby's accounted for 7.1% (197 Individuals). They were most active during morning and evening survey periods. Most often they were observed flying east (morning) or west (evening) presumably to/from off-shore foraging areas.

Several small groups of Pacific golden plovers were observed loafing on the runway/taxiways during morning survey period, accounting for .79% (22 individuals) of the survey totals.



Figure 4. Red-tailed tropicbird nesting in RWY 28 overrun. Photo taken on 16 March 2022.

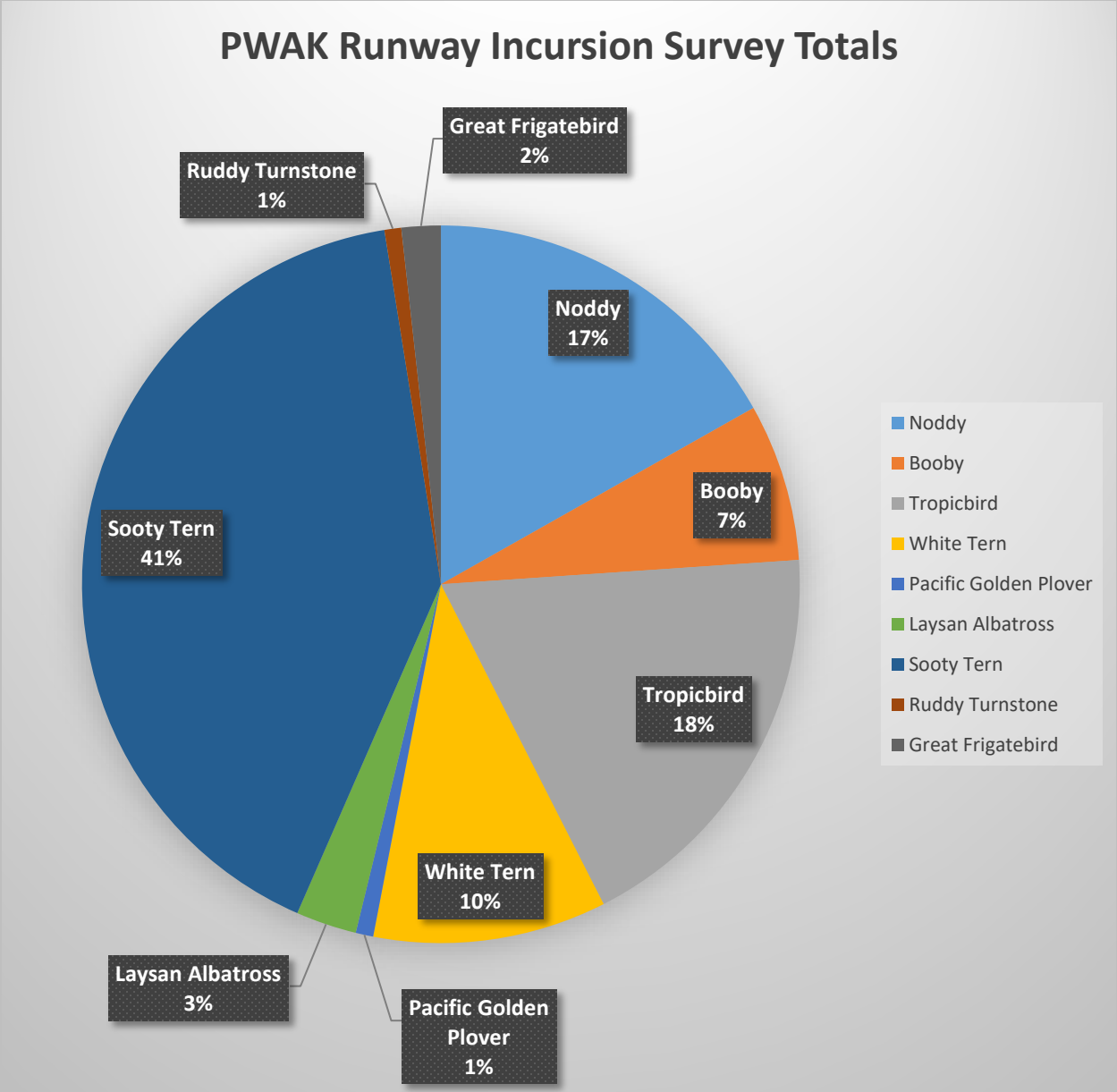


Figure 5. Runway incursion survey data from 2022 Site Visit by species and percentage observed.

4.2 Nest Surveys

Nest search surveys uncovered 60 active Red-tailed tropicbird nests inside the BEZ. Nests were found in multiple stages of development from young of the year fledglings to single eggs. The largest concentration of tropicbirds were utilizing the tall Koa Haole (*Leucana leucophala*), and miscellaneous stored equipment located in the west overrun area of the runway (Figure 3). Nests were also found around the hot cargo pad and VorTAC. No active nests were found in the eastern overrun, ramp and north/south areas of the airfield (low_density_nesting Figure 3). However, adult tropicbirds were observed displaying their mating behavior presumably preparing for nesting or re-nesting after the previously mentioned high tide event.

Additionally, White terns and noddies were observed actively nesting in the ironwood trees along the southern edge of the airfield. No systematic counts were conducted in these areas. Terns and noddys were observed carrying nest materials into this section of trees, and presumed to be in various stages of nesting.

Laysan albatross were observed throughout the visit, courting and loafing in areas west of hot cargo pad, west of taxiway Echo, and the around the old ATC building. Nest searches were conducted in these area both during day and night (with FLIR unit), but no active nests were discovered within the BEZ.

4.3 Marina Fly-by Surveys

Fly-by surveys were conducted on five separate occasions (28 Feb, 5, 7, 9 Mar), each at various times during the day. An average of 249 individual birds were surveyed during the 10 minute sample period. A high count of 423 individuals was counted on 9 March at 0827L, and low of 52 was counted on 5 March at 0947L. This variation could be attributed to daily movement patterns of the different bird species as they fly off-shore to forage. The most common species observed were Sooty terns. Individuals from all of the most common species found at PWAK were present during each survey event.

4.4 Off-site Survey

Wilkes Island was visited on 6 March, starting at approximately 0730L. Upon accessing the island a group of approximately 300 sooty terns were observed airborne at 200' AGL heading southeast. Sooty terns, red-footed boobys, masked boobys, brown, boobys, white terns, black noddys, and brown noddys were all observed in various stages of nesting on the island. A large portion of the field, which typically hosts the breeding colony of sooty terns, appeared to be vacant. Most sooty tern activity was isolated towards the western section of the open field. There were many young of the year fledglings seen on the ground that were on the verge of taking flight.



Figure 6. Bristle-thighed curlew observed on Peale Island, 8 March 2022

Peale Island was visited on 8 March, beginning at approximately 0800L. Peale had significantly less bird activity than observed on Wilkes. Nesting white terns and noddies were both seen during time on the island. Several red-tailed tropicbirds were observed flying overhead, potentially indicating nesting activity on the island. Three bristle-thighed curlews (*Numenius tahitiensis*) were observed in different locations around the island.

4.5 General Observations

A section of koa haole vegetation on the airfield, west of the hot cargo pad (Figure 3 Vegetation_Growth zone) had been allowed to grow to a height of 36" to 48". The taller vegetation was grown an exclusion for the loafing albatross near the west end of the runway and hot cargo pad. The vegetation appeared to be effective at excluding the albatross from this area of the airfield.

The vegetation could provide “new” nesting habitat areas for Red-tailed tropicbirds very close to the active runway.

5.0 BASH Program Review

The Base Operational Support (BOS) contractor Arctic Slope Regional Corporation Federal was operating under Performance Work Statement (PWS) Installation Support Services ISS2 Revision 2 (10/06/2020) during the time of the site visit. The following is an evaluation of the performance standards listed in the PWS, for the BASH program based on first hand observations and discussions with contract and DET 1 personnel during the site visit.

3.2.1.4 The Contractor shall implement Government provided BASH plan for airfield operations. Performance Standards

- a) **Standard: Maintain the required Federal and State permits for non-lethal hazing and lethal taking of birds for wildlife hazard management.**

Satisfactory: Currently the 611th CE Commander is the principle on the U.S. Fish and Wildlife Services (USFWS) Bird Depredation Permit (MB0077566-0). The contractor operates as a sub-permittee on the permit and conducts the day to day BASH operations at PWAK. The contract BASH specialist does maintain all records onsite in accordance with the issued permit. All depredation actions taken by the contractor appeared to be in compliance with the current permit stipulations. Further discussion is needed with USFWS to determine legal precedence if contractor is to become the Principle on the permit.

- b) **Standard: Implement and maintain Government BASH plan In Accordance With (IAW) AFPAM 91-212, BASH Management Techniques.**

*AFPAM 91-212 was updated to DAFI 91-212 (1 June 2021)

Unsatisfactory: The current BASH plan for PWAK is Bird Aircraft Strike Hazard (BASH) Reduction Plan Dated 1 Oct 17. At the time of the site visit a new comprehensive PRSCI 91-212 was in coordination and review with 673 Base Publications at JBER but was not certified for use. The following are “Operations to be Conducted” taken from the current BASH plan and used to evaluate for this performance standard.

Operations specific to the BASH Plan include:

Report and disseminate information regarding increased potential for aircraft/wildlife strikes to all base assigned and transient personnel affected, including real time airfield BASH updates as required to inbound aircraft.

Observation: On-site BASH specialist does monitor airfield conditions for hazardous wildlife, however the conditions are continuously noted as less severe than real-world. See PWS f) Standard explanation below for more information.

Eliminate or reduce environmental conditions that attract birds to the airfield through habitat modifications, ensure proper coordination with the PRSC/611 CES/CEIE.

Observation: The runway clear zone is mowed as needed to remove attractive habitat to bird species. However habitat outside of the clear zone, but within the BEZ are not

maintained or monitored for bird activity. See Nest Search Survey results (above) and d) Standard (below).

Act to harass or depredate birds and other wildlife to reduce potential for aircraft strikes.

Observation: Direct observations during the site visit exhibited minimal harassment efforts on the airfield even with numerous birds in the area. Harassment data from CY 2021 revealed a consistent low effort of bird hazard mitigation. During the 3rd Wing Safety 2021 site visit, 140 red-tailed tropic bird nest were found inside the BEZ. The depredate summary from CY2021 provided that 15 eggs were destroyed. During this site visit, 60 red-tailed tropicbird nest were found within the BEZ further illustrating a failure to reduce potential for aircraft strikes.

An inventory count completed on 1 February 2022 indicated the available bird scare pyrotechnics, see table below for counts. This inventory is maintained by DET 1 personnel but is available for use by the contract airfield personnel.

Description	Quantity
12Gauge 2 3/4" #7.5 Shot	500
12 Gauge 2 3/4" #2 Shot	296
12 Gauge 2 3/4" Cracker shell	1060
15mm Bird Screamer	2393
15mm Bird Banger	2243
6mm Blanks	5073

This level of inventory should be sufficient for the current level of deterrence effort on the airfield. With the recommended increase in overall deterrence there may be a need to increase the on-hand supply.

Perform airfield/runway checks prior to planned aircraft arrivals for bird and other wildlife hazards, harassing or depredate as required to ensure safety of flight.

Observation: BASH Specialist and airfield manager scan the airfield for FOD, and hazardous birds before each airfield movement. The BWC was consistently classified lower by the specialist and airfield manager that conditions warrant. There was minimal harassment observed even with birds visible within the BEZ. No bird depredate was observed.

Perform airfield/runway checks for bird remains after a reported strike.

Observation: BASH Specialist and Airfield management do patrol the airfield before and after each aircraft movement regardless if a strike is reported or not.

c) Standard: Designate, train, and document BASH patrol members on wildlife dispersal and use of hazing equipment. Provide documentation to the Government when requested.

Satisfactory: The BASH specialist is currently trained and has sufficient knowledge in airport wildlife dispersal techniques and procedures. During the site visit, the 3rd WG/SE team was

able to conduct some training with the BASH specialist and the newly stationed Airfield Manager. In the future BASH training will be delivered by the 3rd WG USDA-WS biologist IAW PRSC MOA-302.

d) **Standard:** Determine Bird Exclusion Zone (BEZ) IAW 11 AF Supplement 1 to AFI 91-202, The US Air Force Mishap Prevention Program.

Unsatisfactory: IAW DAFI 91-212 paragraph 2.3.3. a “Wildlife Exclusion Zone is a locally defined, airfield specific, area of zero tolerance for wildlife, encompassing the aircraft movement area, clear zones and any additional habitat attractants (e.g. water treatment facilities, golf courses, and athletic fields) in proximity to the airfield and low-level flight corridors (approach/departure)”. The Wake Island BASH Plan (dated 1 Oct 17) establishes a BEZ on the airfield. Additionally, the 2019 USFWS Migratory Bird Depredation Permit Application (submitted on 24 August 2021), and the issued permit #MB0077566-0 included a map (Appendix A) that illustrates the established BEZ, and Bird Reduction Zone for the airfield. The BEZ established on paper is sufficient to minimize hazards from birds, however in-practice it is non-functioning. A total of sixty active red-tailed tropicbirds nests were observed within the BEZ, during the site visit. Laysan albatross were observed loafing for prolonged periods of time around the hot cargo pad, and old ATC building within the BEZ.

*Note: there is no 11AF Supplement 1 to AFI 91-202 on record at the 3rd WG or 11th Air Force/SE.

e) **Standard:** Maintain wildlife reduction actions log on site and provide to Government on request. Log shall include Date, Bird location within the BEZ, Dispersal method used, Species, Estimated numbers, and Number and species of birds taken lethally.

Unsatisfactory: No record (digital or hard copy) of wildlife interactions was provided from the contractor to the government prior to the site visit. Subsequent to the visit the contractor provided a record of BASH management activities from March through April 2022, but a comprehensive yearly record was not provided.

f) **Standard:** Within an hour preceding scheduled aircraft arrivals and departures, conduct a visual inspection of the BEZ to determine the bird watch condition (BWC). Immediately after determining the BWC, notify the aircraft commander to include bird type, activity, estimated numbers, and location. Keep aircraft commander advised of dispersal actions and changes in BWC.

Unsatisfactory - During the site visit the contract BASH specialist did relay the bird conditions on and around the airfield prior to aircraft arrivals/departures. The BWC was always described as “Low” over the local radio channel, even when groups of birds and/or large birds were observed directly in the flight path of the aircraft. The intent of BWC system is to rapidly communicate local bird hazards to aircrews with standardized terminology. Allowing them ample time to take corrective actions if needed.

g) Standard: In the event of a bird strike on aircraft, provide aircrews and/or maintenance personnel with the BASH information required on AF Form 853, Air Force Wildlife Strike Report.

Satisfactory - On 19 February 2022, a Marine C-130J struck a bird 3NM out on approach to PWAK. The BASH specialist did provide aircrew with AF Form 853, and bird remains/feathers were collected. The information was relay to the 3WG/SE office in a timely manner, and an AFSAS investigation was opened. The 3WG/SE provided the required “Shipping Sheet” and the BASH specialist was able to send the remains to the Smithsonian (AFSAS Event #125943) for positive identification.

6.0 Recommendations

The following recommendations are intended to improve the PWAK BASH program. Mitigating bird hazards is a complex problem that involves a multitude of factors, and for that reason there is no single solution. Instead an adaptive integrated approach that incorporates various techniques provide the best answer to lower the overall risk to flight safety. These techniques must be applied in a relentless and consistent manner to realize meaningful results.

6.1 It is strongly recommended that a 12-month Wildlife Hazard Assessment (WHA) be conducted on PWAK by a Qualified Airport Biologist (FAA AC 150/5200-36B). IAW DAFI 91-212 paragraph 1.3.9.11 *Conduct a stand-alone, year-long, to include all seasons, formal wildlife hazard assessment every 72 months that specifically inspects the immediate Wildlife Exclusion Zone, airfield infrastructure components and perimeter fencing within a 5-mile perimeter from any point of the runway center line.* A WHA has never been completed at PWAK and would provide valuable data, on species abundance, movements, habits, hazardous attractants in/around the airfield, and recommended actions for reducing hazards.

6.2 Updates and modification to the PWS as needed to ensure that all best management practices are incorporated into the PWAK BASH program. BASH is an ever evolving science and as conditions change and milestone are accomplish is will be important to keep the PWS requirements relevant to on the ground conditions. The 3WG/SE and PRSC stakeholders should ensure PWS applicability to Department of the Air Force Instructions (DAFI) and federal regulations.

6.3 Habitat management is considered the cornerstone to most BASH programs, and an essential part in an integrated approach to wildlife damage management. By effectively managing the habitat, airfields can become less attractive to birds, thus reducing the risk of a strike. Habitat management must be carried out on PWAK to see long lasting reduction in risks to flight safety. Areas around the runway overrun, and marina should be cleared of any staged or abandoned equipment that could provide nesting cover for birds. Only short-term storage of equipment should be allowed. Additionally, these areas should be mowed/brush hogged as needed to remove the *pemphis/river* tamarind shrub vegetation that provides nesting habitat. Constant monitoring to identify new areas with nesting activity and subsequent habitat manipulations should be carried out as needed. Every effort should be made to ensure that habitat modifications are conducted during periods of low nesting activity.

The vegetation growth area (Figure 3) should be eliminated and maintained in the same fashion as the remainder of the airfield vegetation. The growth area appeared to be somewhat effective at excluding Laysan albatross from the hot cargo pad and taxiways, it also appeared to move the birds closer to the active approach/departure corridor of Runway 28. In general, it is best management practice to avoid “edge” habitat where varying vegetation types, heights, and densities create a transition (edge) that is attractive to birds/wildlife. Additionally, if not maintained the vegetation growth area will provide nesting habitat for red-tail tropicbirds closer to the runway, greatly increasing the risk to flight safety.

6.4 If habitat modifications are not successful at eliminating all nesting activity, then nest and egg removal must be conducted. By allowing birds to nest within close proximity to the airfield, it unnecessarily increases the risk to flight safety. No birds should be allowed to nest within the BEZ. As mating behaviors are observed for the respective bird species, increased daily efforts are required to identify and remove possible nests. Egg addling or use of “decoy” eggs does not provide an effective deterrence and permits the adult bird to remain in the BEZ for long periods of time. Once discovered, all nests (inactive, and active) must be removed. By successfully and continuously removing nests/eggs, birds will naturally seek other areas. Chicks will not be allowed to fledge in unwanted areas and ultimately will not return to nest as adults.

6.5 Non-lethal harassment efforts should be increased for all birds in the BEZ. The depredation permit limits lethal take to within 30-minutes of aircraft movement, but there is no such limit to non-lethal hazing. All birds should be promptly and persistently harassed until they have left the exclusion zone. By allowing birds to become comfortable (i.e. loaf, nest, roost, etc.) in the BEZ it unnecessarily causes an increased hazard to flight safety. All non-lethal methods of harassment should be considered. If certain species of birds do not respond to particular hazing stimulus then alternate tools should be used. Additionally, some alternative or novel methods could be effective and should be investigated. Such methods could include but are not limited to:

- Night time roost dispersal of noddys and White terns with lights, lasers, pyrotechnics, sirens, etc.
- Low pressure water (i.e. water gun) to move loafing birds from around the airfield.
- Capture of birds on the airfield, and translocation to other areas of the atoll.

6.6 The two Remington 870 pump shotguns should be retained for use with lethal shot shells. However, the two pump shotguns should be supplemented with a break-action single shot 12-gauge shotgun for personnel safety. The shell cracker manufacturer advises that an open-choke shotgun be used when deploying cracker shells, however effective use of shot shells typically includes the use of some type of restrictive choke in the shotgun. During the site visit both shotguns were found to have a restrictive choke installed. Additionally, USDA-WS internal safety policy (Appendix D) requires the use of a single shot break action for 12-gauge cracker rounds due to risk of explosion within the gun’s barrel.

6.7 The supply of all pyrotechnics, and 12 gauge ammunition is sufficient for the current level of BASH mitigation on the airfield. If the effort is increased as recommended then there may be a need to have additional pyrotechnic supply on hand. Also with nationwide ammunition shortages

and supply chain issues any commercial off the shelf purchases should be made well in advance to maintain a minimal stock on island.

6.8 Revolver style 15mm pyrotechnic launchers should be purchased to increase efficacy in application of non-lethal 15mm pyrotechnics. The BASH specialist currently has a double shot launcher that allows for safe use of the pyrotechnics. A revolver style launcher such as the Margo Supply Record Maxx, or Reed Joseph RJ6 Six Shot, allows for quicker and more efficient dispensing of 15mm pyrotechnics ultimately making better use of the specialist's time on the airfield.

6.9 The regulated air pressure on the paintball markers should be returned to factory operating ranges to restore effectiveness as a harassment tool. There are no USFWS Depredation permit restrictions on the air pressure used in paintball markers, only that they should be used if other methods are ineffective. Every precaution should be taken as to not hit birds while using and should never be used on birds at close range. Paintball markers are used successfully in numerous situations to haze various species of birds without causing any undue harm.

6.10 Standardized bird surveys are required IAW AFI 91-212 (paragraph 2.4.1) and should be established to gather useful bird data at PWAK. Bird surveys should be conducted at least twice a month from established survey points and include but not limited to: species, number, direction of movement, cover type (Appendix C). The collection of data allows for analysis to illustrate effectively bird movements throughout the year and helps to identify trends or problem species. Data can also effectively communicate any safety issues that may be occurring and subsequently will aid in resolving such issues.

6.11 Continue reporting of all bird strikes at PWAK, regardless of owning organization, through 3WG/SE office IAW DAFI 91-212 paragraph 2.5. Strikes provide an important index for the BASH program by allowing for long term tracking and identification of problem species. Bird strike remains should be collected and sent to the Smithsonian Bird and Feather Laboratory in a timely manner to ensure sample integrity. When possible photos of whole struck bird carcasses can be used for identification purposes and is the preferred method for PWAK.

6.12 The retention pond located adjacent to the runway and taxiway (Figure 3) is a significant attractant and should be excluded from bird activity. Previous attempts to exclude the area included the use of collected beach debris being placed into the pond, which was ineffective. Filling in the pond would provide a permeant exclusion to birds and reduce the threat to aircraft. The use of permeable coral gravel would still provide for ample water flow underground, while eliminating the surface water attractant. Coordination with USFWS, and USACE would be necessary prior to any fill placement, to ensure all applicable permits are in place. In lieu of permanently filling in the pond, an exclusion system of overhead perpendicular cables (gridwire) could be installed above the water's surface.

6.13 Long term management efforts should continue to be developed and implemented to move nesting birds off Wilkes Island and onto Peale Island. Wilkes Island serves as a “source” population of bird activity for Wake Atoll. The large breeding colonies of seabirds associated with this island combined with their invariable movements around the area, creates an undeniable risk to flight safety. Relocation to Peale Island, which is located farther from the airfield, should decrease the likelihood of bird strikes. All available techniques should be used in an attempt to attract birds to Peale including but not limited to habitat management (both islands), attractive sounds, and hazing/depredation on Wilkes.

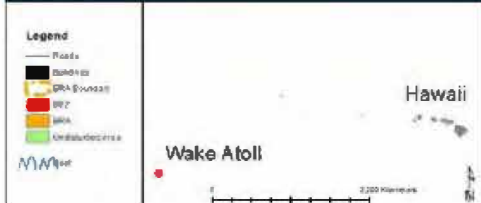
7.0 Summary

The overall status of the PWAK BASH program needs improvement. Management and deterrence efforts are low across the airfield resulting in large numbers of birds in the area. Habitat management within the airfield is sufficient to reduce attractiveness to birds but management efforts must be extended to the west overrun areas, the south Ironwood forest, and to the areas around the hot cargo pad. Non-lethal deterrence efforts by the contractor need to be increased across the airfield, with a constant level of effort. No birds should be allowed to nest or persist within the BEZ. Novel deterrence techniques should be explored to realize meaningful reductions in risks to flight safety.

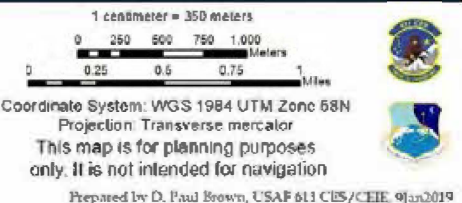
If there are any questions or concerns, please contact via email 3WG/SE at 3WG.SEF@us.af.mil or USDA-WS at arthur.walch.ctr@us.af.mil.

Appendix A

Bird Exclusion Zone (BEZ) Map 2019



2019 bird exclusion zone (BEZ) and bird reduction area (BRA) at Wake Island Airfield (WIA). BEZ derived as a 1000 feet buffer surrounding the runway. BRA based on 1250 feet buffer surrounding the BEZ. BRA area on western side extended slightly beyond 1250 to make geographical and logistically feasible by incorporating entire tank area. Undisturbed zone includes all other areas of the atoll.



Appendix B

Survey Protocol from 2021 BASH Site Visit

4.0 Observations Methods

4.1 Runway Incursion Surveys

Runway incursion surveys are designed to identify wildlife movement patterns on or near a runway that pose a direct hazard to aircraft operations. Runway incursion surveys were conducted from four separate observation points (SP1, SP2, SP3, and SP4) (Figure 6). SP1 was located on the east end of the runway, to best capture bird movement in the ramp area, south across the runway, and the east overrun. SP2 was on the eastern half of the runway, and gave a view of the runway, north to the taxiway edge with the lagoon, and back towards the east overrun. SP3 was on the western half of the runway, with views across the runway and taxiway to the north-east/north-west, and towards the west overrun. SP4 was on the west end of the runway located near the marina looking towards the south. This location provided views of the west end of the runway and overrun areas. Surveys were conducted on six days during the site visit. Each day surveys were completed morning, mid-day, and evening. The first two survey days (13, and 15 February) all four points (SP1, SP2, SP3, and SP4) were completed morning midday, and evening. However, due to lack of available daylight during the evening surveys the schedule was modified. The remaining four survey days (17, 19, 23, and 25 February) only two points (either SP1 and SP3 or SP2 and SP4) were completed each day. Each runway incursion survey lasted 30 minutes, the starting location was rotated between the four points so that each location was surveyed at different times each day. During each 30-minute survey the species, number, behavior, altitude, direction of movement, and cover type were recorded for each bird(s) that were observed. Typically, one observer would scan for birds, and then verbally relay the information to the other observer, who would then record the information onto datasheets. This allowed for almost continuous observations of the airfield during the 30-minute surveys. Only birds within approximately 2000 feet of the airfield were recorded for the surveys, to get the most accurate representation of the risk to flight safety posed by the local bird activity.

4.2 Nesting Surveys

Nest search surveys were conducted on and in the area immediately surrounding the airfield over multiple days during the site visit. Primary focus of the searches were red-tailed tropicbirds that were nesting in the approach-end of runway 10, and within the designated bird exclusion zone (BEZ). Surveys were completed by physically examining potential nesting habitat (i.e. shrubby areas). In thicker areas the two observers walked approximately 15 yards apart, parallel with each other. This ensured that each section was completely searched and that nest counts were not duplicated. Only active nests were counted during the searches. A nest was considered active if an egg was present, or an adult was seen sitting on an egg, or if a young of the year chick was present on a nest. Areas identified with significant Laysan Albatross activity were also searched for nests using identical searching techniques. Other species were observed nesting around the airfield, and throughout the island. However, time precluded an exhaustive search/count of their nesting areas. General observations and runway incursion data support the use of these other nesting areas by white terns, noddies (black and brown), and provide a general index to nesting activity.

4.3 Marina Sooty Tern Fly-by Surveys

Fly-by surveys were conducted at the mouth of the marina (see figure 6). Fly-by surveys were set-up to provide an index of sooty tern movement across the west-end of the approach/departure end of the runway on their way to/from Wilkes Island. The entrance to the marina offered a location (figure 6) that the observer could see east and west along the coast and offshore as birds flew by. Each survey was conducted for 10 minutes, during which time every tern that passed the observer's

field of view was counted. One observer was dedicated to counting and verbally relaying to the second observer who in turn recorded the information.

4.4 Off-site observations

The primary focus of the site visit was the airfield and the direct impact local bird populations have on flight safety. However, because of the small geographic footprint of the atoll, surveying all attractants and bird activity at off-site areas is crucial to understanding the complex nature of BASH issues at Wake airfield. Off-site walking surveys were conducted on both Wilkes and Peale island once during the site visit. These surveys consisted of traversing each island to get a firsthand account of species abundance, locations, and current activity. Formal counts were not conducted on either island, due to the fact that extensive surveys are completed on a quarterly basis by a contract ecologist (see Appendix B), and provide a detailed account of species populations, and activities.

4.5 General Observations

General observations were made about different bird habits, and unique occurrences that were seen during the visit. General observations also include identification of attractive habitat, current BASH deterrence efforts/techniques, and other conditions attractive to birds on the airfield.

Appendix C

Wildlife Survey Datasheet Example
(from DAFI 91-212)

Table A2.1. Bird Survey Data Sheet.

Page ____ of ____

BIRD SURVEY DATA SHEET

Date: _____ Time: _____ Weather/Temp: _____ Initials: _____
 BWC: _____ Wind speed /Direction: _____

Location _____ Location _____

Species	Number	Behavior	Comments	Species	Number	Behavior	Comments
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Location _____ Location _____

Species	Number	Behavior	Comments	Species	Number	Behavior	Comments
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Behavior Codes:
 1- Loafing on ground 2-Loafing on water 3-Perched on vegetation
 4- Perched on manmade structure 5- Feeding 6- Flying over observation area 7-Aerial hunting
 8-On ground in or adjacent to runway 9-Flying over runway

Appendix D

USDA-WS Internal Safety Bulletin 2016-01
(Single-shot Shotgun use with Cracker rounds)

Firearms Safety Bulletin: 2016-01

To: All Wildlife Services Employees

Date: August 1, 2016

Subject: **ShellCracker Safety Guidance**



This safety bulletin is intended to provide safety recommendations when using 12 gauge ShellCrackers. There have been multiple reports of the projectile detonating inside the barrel and also immediately after leaving the muzzle. Many times the plastic “wads” have been found lodged in the barrel after firing. These premature explosions can lead to employee injury and damaged firearms, even while wearing proper personal protective equipment.



Detonation of ShellCracker inside shotgun barrel results in shell casing melting.

It is highly recommended to only use shotguns of “hinged-action” design. This will allow operator to visually inspect chamber/bore/barrel of the shotgun after each shot. Employees should not use pump/semi-automatic shotguns for ShellCrackers. The bolt lock-up mechanisms are not designed for ShellCracker use, and an accidental detonation in the barrel may cause structural damage to the shotgun.



The WS Firearms Committee would like to reiterate the importance of employees wearing hearing and eye protection at all times when using pyrotechnics or firearms.

Always check the barrel for obstructions after every shot!

Remember the three fundamental gun safety rules:

- 1. Always keep the gun pointed in a safe direction.***
- 2. Always keep your finger off the trigger until you are ready to shoot.***
- 3. Always keep the gun unloaded until ready to use.***