BOEM 2026-007

Commercial Leasing for Minerals Offshore American Samoa Environmental Assessment

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°C	degrees Celsius
Area ID	Area Identification
ADCP	acoustic doppler current profilers
AIS	Automatic Identification Systems
AMP	Alternative Monitoring Plan
APE	Area of Potential Effects
ASV	autonomous surface vessel
AUV	autonomous underwater vehicle
BCE	Before Common Era
BMP	best management practices
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CCZ	Clarion-Clipperton Zone
CE	Common Era
CFR	Code of Federal Regulations
CH	critical habitats
CHIRP	compressed high-intensity radar pulse
cm	centimeter(s)
COCP	Critical Operations and Curtailment Plan
dB	decibel(s)
dB re 1 μPa	decibels referenced to 1 micropascal
DOI	Department of the Interior
DP	dynamic positioning
DPS	distinct population segment
EA	environmental assessment
EEZ	exclusive economic zone
EFH	Essential Fish Habitat
EMF	electromagnetic field
ESA	Endangered Species Act
FAD	fish-aggregating device
FCP	Fisheries Communication Plan
FOIA	Freedom of Information Act
FPIC	free, prior, and informed consent
FR	Federal Register
ft	foot/feet
FWR	Fish and Wildlife Refuge
gal	gallon(s)
G&G	geological and geophysical
GPS	Global Positioning System
HAPC	Habitat Areas of Particular Concern
HF	high-frequency

hp	horsepower
hr	hour
HRG	High-Resolution Geophysical
Hz	hertz
IHA	Incidental Harassment Authorization
ISA	International Seabed Authority
IUCN	International Union for Conservation of Nature
IUU	illegal, unreported, and unregulated
kg	kilogram(s)
kHz	kilohertz
km	kilometer(s)
kn	knot(s)
lbs	pounds
L	liter(s)
LF	low-frequency
LOC	Letter of Concurrence
m	meter(s)
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	multibeam echosounder
mg	milligram(s)
mi	mile(s)
mm	milimeter(s)
μmol	micromole(s)
MMPA	Marine Mammal Protection Act
MNM	Marine National Monument
μPa	micropascal(s)
MWDP	Mining Waste Discharge Plan
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
nmi	nautical mile(s)
NMS	National Marine Sanctuary
NMSAS	National Marine Sanctuary of American Samoa
NOAA	National Oceanic and Atmospheric Administration
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NRHP	National Register of Historic Places
NTL	Notice to Lessees
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OMZ	oxygen minimum zone
PATON	Private Aids to Navigation

PM	particulate matter
PSO	Protected Species Observer
psu	practical salinity unit
RMS	root mean square
ROV	remotely operated vehicle
SAS	Synthetic Aperture Sonar
SO_2	sulfur dioxide
UAV	unmanned aerial vehicles
UNCLOS	United Nations Convention on the Law of the Sea
U.S.	United States
USBL	Ultra-short baseline
U.S.C.	United States Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USV	Uncrewed Surface Vessels
UTP	underwater transponder positioning
VHF	very high-frequency
VMPA	Village Marine Protected Areas
VOC	volatile organic compounds
WBG	World Bank Group
WPRFMC	Western Pacific Regional Management Council

1 Introduction

1.1 Background

The United States (U.S.) Department of the Interior's Bureau of Ocean Energy Management (BOEM) manages the development of U.S. Outer Continental Shelf (OCS) energy, mineral, and geological resources in an environmentally and economically responsible way. The OCS is the federally managed ocean area extending across the outer boundaries of U.S. controlled waters 3 to 200 nautical miles (nmi) from shore, with some exceptions.

American Samoa has a population of approximately 49,710 people. It consists of five volcanic islands and two coral atolls. The capital and main urban center is Pago Pago, situated on Tutuila Island (Worldometer 2025). Pago Pago is notable for its deep, naturally protected harbor, which serves as the territory's primary port and a hub for tuna processing, one of the region's key industries. American Samoa has a rich Polynesian and maritime heritage (Port Administration of American Samoa 2025).

Rose Atoll, also known as Motu O Manu or Muliāva, is the easternmost island of the Samoan Archipelago. Located approximately 180 nmi east-southeast of Pago Pago, it is a remote atoll with no permanent human population. It was established as a national wildlife refuge in 1974 under a cooperative agreement with the American Samoa Territorial Government. In 1975, the submerged lands 3 mi seaward of Rose Atoll National Wildlife Refuge were set aside by presidential proclamation for the protection of the marine life in the national wildlife refuge. In 2009, the submerged lands and waters within 50 nmi of the atoll (13,451 mi^2) were designated as the Rose Atoll Marine National Monument (MNM) by another presidential proclamation. In 2014, the Rose Atoll MNM waters also were designated as the Muliāva Unit of the National Marine Sanctuary of American Samoa (NMSAS) (NOAA Fisheries 2025b).

BOEM initiated a Request for Information and Interest on June 16, 2025, with intent to potentially lease for seabed minerals within the eastern OCS of American Samoa. American Samoa is a U.S. territory located in the South Pacific Ocean. On October 15, 2025, BOEM's Acting Director signed the Area Identification (Area ID) Memorandum (**Appendix A**) describing an area covering approximately 33,136,060 acres with water depths ranging from 4,600–20,000 feet (ft) (1,400–6,000 meters [m]). This OCS area is 150 miles (mi) from Tutuila and 104 mi from Manu'a Islands. This OCS area partially borders the Rose Atoll MNM (**Figure 1-1**).

1.2 Purpose of and Need for the Proposed Action

The **purpose** of the Proposed Action is to issue up to two commercial leases for marine minerals in the American Samoa OCS (**Section 2.2**). The issuance of a lease allows a Lessee to conduct preliminary activities (e.g., high-resolution geophysical surveys, limited seabed and biological sampling, and oceanographic measurements), which can inform decision-making through early-stage data collection, consistent with the limited scope of activities evaluated in this EA. The Proposed Action aims to facilitate the potential exploration and development by collecting data to support the development of plans in areas that may contain economically recoverable mineral resources in an environmentally and economically responsible way. The action of issuing leases for OCS minerals aligns with ensuring secure and sustainable domestic supply of strategic minerals essential for manufacturing, energy technologies, and defense applications.

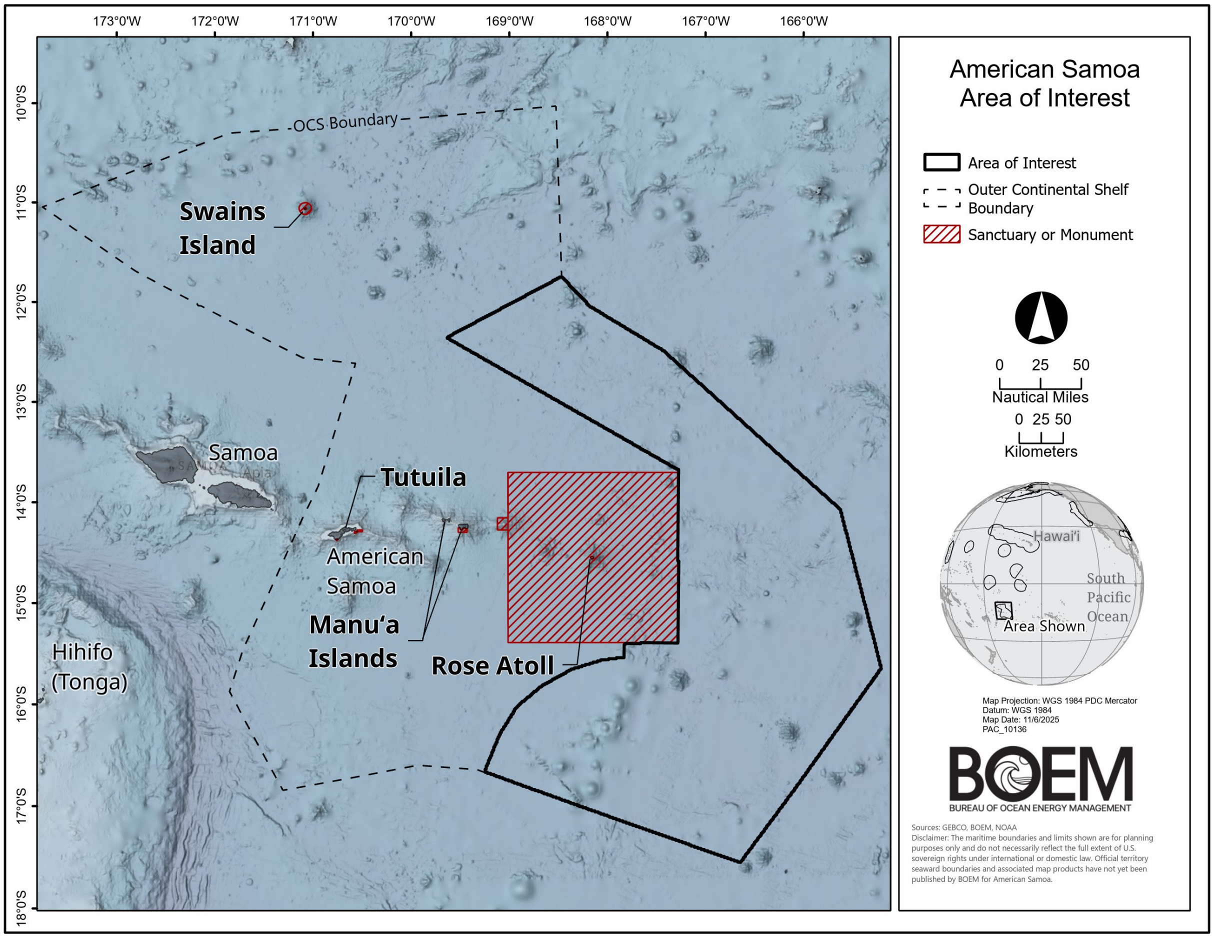

Figure 1-1. Map of focus area for this environmental assessment within the American Samoa area of interest on waters of the OCS

To help meet the U.S. demand while reducing reliance on imports, the **need** is for BOEM to issue OCS leases to provide access to marine minerals that could potentially be an important and underutilized domestic source. Issuance of these leases could support national security and economic resilience while managing development of the OCS mineral resources in an environmentally responsible manner. Section 3 of the Outer Continental Shelf Lands Act (OCSLA) (43 United States Code [U.S.C.] §1332) declares that the OCS is a vital national resource reserve held by the Federal Government, and that it is the policy of the United States for it to be developed expeditiously and in an orderly manner, while ensuring environmental protection. OCSLA Section 8 (43 U.S.C. §1337(k)) establishes a competitive leasing process for commercial mineral development. OCSLA Section 11 (43 U.S.C. §1340) allows BOEM to authorize geophysical and geological exploration for marine minerals commercial use. Many of U.S. Geological Survey's (USGS's) list of 60 critical minerals (90 Federal Register [FR] 50494, issued November 7, 2025) occur on the OCS. Seabed deposits with mineral resources may occur across the OCS, but not all deposits may be economically viable.

1.3 Regulatory Framework

OCSLA mandates the preparation of the OCS mineral leasing program pursuant to 30 Code of Federal Regulations (CFR) Chapter V, Subchapter B. Implementing regulations for OCSLA (30 CFR 580–582) and the U.S. Department of the Interior (DOI)'s National Environmental Policy Act (NEPA) implementing regulations (43 CFR Part 46) encourage orderly, safe, and environmentally responsible development of mineral resources on the OCS. BOEM's authority in the Pacific U.S. territories was granted by the Inflation Reduction Act of 2022, which amended OCSLA by adding a definition of "State" to include the Commonwealth of Puerto Rico, Guam, American Samoa, U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands and Pacific U.S. Minor Outlying Islands (Wake, Baker, Howland, and Jarvis Islands, Johnston Atoll, Kingman Reef, and Palmyra Atoll). BOEM is the only federal agency with the authority to issue leases for marine minerals on the OCS. BOEM’s regulatory authority is limited to the OCS. BOEM cannot approve activities in state waters, territory waters, or onshore areas. Under the Deep Seabed Hard Mineral Resources Act (30 U.S.C. §1401 et seq.), National Oceanic and Atmospheric Administration (NOAA) is authorized to issue exploration licenses and commercial recovery permits to U.S. entities for deep seabed mining of hard mineral resources in areas beyond national jurisdiction.

NEPA mandates that federal agencies ensure the professional and scientific integrity of environmental documents; use reliable data and resources when carrying out NEPA; and study, develop, and describe technically and economically feasible alternatives (42 U.S.C. 4332(2)(D)–(F)). The Bureau verifies that it has complied with the requirements of NEPA, including DOI regulations and procedures implementing NEPA at 43 CFR Part 46 and the DOI NEPA Handbook (516 Department Manual 1). The Bureau has also voluntarily considered the Council on Environmental Quality’s rescinded regulations implementing NEPA, previously found at 40 CFR Parts 1500–1508, as guidance to the extent appropriate and consistent with the requirements of NEPA.

BOEM may decide to issue leases within all, a portion, or none of the areas analyzed in the EA; BOEM’s decision regarding lease issuance will be memorialized in a Final Leasing Notice (30 CFR 581.17). The issuance of a lease by BOEM to a lessee conveys the right to proceed with preliminary activities and submit future plans that will be evaluated under separate environmental review(s).

1.3.1 Marine Mineral Status in the Pacific Ocean

Commercial-scale seabed mining is a new industry with few countries testing seabed mining equipment or recovery within their waters. For the ratifiers of the United Nations Convention on the Law of the Sea (UNCLOS), the International Seabed Authority (ISA) governs the mining of mineral resources in the seabed and subsurface beyond the limits of national jurisdiction, totaling approximately 60% of the ocean floor (**Table E-1**). A statute called the Deep Seabed Hard Minerals Resources Act (DSHMRA) identifies NOAA as the regulator for U.S. citizens applying for exploration licenses and commercial recovery permits for polymetallic nodules in areas beyond national jurisdiction. The region of concentrated interest is the Clarion-Clipperton Zone (CCZ), a region south of Hawaii and west of Mexico, between 115°–157°W and 7°–17°N, spanning nearly 4.5 million km^2 at depths of 4,000–5,500 m. USGS scientists estimate that the polymetallic nodules in the CCZ contain more than two times the amount of nickel and manganese and more cobalt than that occurring in all economically feasible terrestrial deposits (International Seabed Authority 2025b).

Equipment testing and baseline environmental research within these areas, and led by the ISA, gives exploration prospectors "preference and priority" when awarding seabed mining activities beyond national jurisdiction. Since the U.S. has not ratified UNCLOS, the National Oceanic and Atmospheric Administration (NOAA) (under the Deep Seabed Hard Mineral Resources Act) regulates U.S. exploration and potential commercial recovery of critical minerals like manganese, cobalt, and nickel from the ocean floor beyond national jurisdiction, balancing resource access with environmental stewardship. This process is not connected with BOEM's regulations and authorities.

2 Proposed Action and Alternatives

2.1 Background Information

NEPA requires federal agencies to analyze a range of reasonable alternatives to satisfy the Purpose and Need for this EA. To be considered a reasonable alternative, a proposed alternative must be technically and economically feasible, be within the jurisdiction of the Bureau, and, where applicable, meet the goals of the applicant.

BOEM identified two action alternatives that meet the stated purpose of the proposed federal action and thus have been analyzed in detail. BOEM also analyzed a “No Action Alternative” that allows the reader to compare the potential impacts of the action alternatives with the effects that would occur if BOEM does not issue a lease (i.e., the status quo).

2.2 Alternative A: Proposed Action

The Proposed Action is to issue up to two leases that authorize preliminary activities only; any future mining would require submission and BOEM approval of a Delineation, Testing, and/or Mining Plan subject to separate environmental review. Up to two leases is reasonable due to the need for sufficiently large lease areas to allow for mineral exploration and the number of companies that responded with interest in the Request for Information and Interest comment period. Issuing up to two leases promotes competition, accounts for the unquantified commercial value, and provides opportunity for potential commercial exploration and mining.

Each lease would be approximately 16.6 million acres or 67,000 km^2. Offering large lease areas provides flexibility for environmental and technical exclusions that may be identified as additional plan submissions are received and reviewed.

Issuing leases in the Proposed Area would authorize the lease holder to conduct a select number of preliminary activities. Preliminary activities are defined as, "bathymetric, geological, geophysical, mapping, and other surveys necessary to develop a comprehensive Delineation, Testing, and/or Mining Plan. Such activities are those which have no significant adverse impact on the natural resources of the OCS” (30 CFR 582.21d). These activities are further described in **Table 2-1**. Geological, geophysical, and other surveys classified as preliminary may indicate the presence of mineral resources and, in the case of geological sampling, may involve collection of limited samples of the seabed. The regulatory classification of these activities as preliminary is determined in part by objective, but more by the scope and intensity of potential environmental effects of the activity.

The Proposed Action Area is a globally remote and deep part of the Pacific Ocean. The deep ocean water has distinct gradients in salinity and temperature (i.e., thermocline) that stratify or separate currents and nutrients among the 'layers' of water. For the upper ~500 m of the Pacific Ocean, large-scale currents are dominated by wind-driven circulation. Below this the layer or stratification of water, in depths of 200 to 1,000 m, the water becomes increasingly colder and darker, nutrients are remineralized, and oxygen levels decrease. The characterization of the ocean water layers, or stratification, is important to the cycling of nutrients, habitat, and food for species described in more detail in **Chapter 3**.

This alternative considers the human environment directly and indirectly affected by the Proposed Action. Commercial shipping, passenger vessels, fishing vessels, and leisure or pleasure vessels are the bulk of the vessel traffic group in American Samoa. The port of Pago Pago is the closest port described in this document and has navigational aids but no formal routing measures (see also **Section 3.12**).

Table 2-1. List of potential actions fitting the preliminary activity definition and description evaluated in this environmental assessment

Type	Activity
Preliminary Activities Allowed with Lease Issuance	Use of dynamic positioning (DP) vessels, autonomous underwater vehicles (AUVs), and remotely operated vehicles (ROVs)
Bathymetric, Geophysical, and Mapping Surveys	High-Resolution Geophysical (HRG) surveys using sound sources that are documented as causing little to no impact to species, Tier 4 *de minimis*[1] sound sources[2] High-resolution video or acoustic cameras
Other Surveys Physical, Geological, Chemical and Biological Sampling	• Sampling seabed (sediments, minerals), water, and species from a ROV • Anchors on the seafloor for buoys and physical, chemical, or biological data collection • Scientific physical, chemical, and biological monitoring from a ship or moored anchor, including seabed box core sampling and use of landers • Expendable equipment such as weight, acoustic doppler current profilers (ADCPs), and underwater transponder positioning units • Focused biological surveys from the air, from the ship, or in water can utilize aerial digital imaging; visual observation; radar; thermal or acoustic monitoring

Note: [1]Sound sources are described in NMFS (2025a) [2] Center for Marine Acoustics (2023).

2.2.1 Bathymetric, Geophysical, and Mapping Surveys

Bathymetric, geophysical, and mapping surveys are an important first step for planning subsequent activities. Bathymetric surveys measure depth and elevation of the seafloor, while geophysical surveys are focused on the composition of sediments on and below the seafloor. The scientific community, several U.S. agencies, and the ISA established standard methodologies for exploring and sampling the ocean seafloor that have become less destructive as technology improved. The initial survey to an area of interest of potential mining uses a hull-mounted multibeam echosounder (MBES) to provide a roughly 100-m resolution of the seafloor, finer resolution surveys are conducted within smaller areas.

The past decade marked the commercial use of automated and robotic technologies to sample and research the deep-ocean seafloor. Modern seabed site and mineral exploration can rely on mobile technologies, including DP vessels, AUVs, ROVs, and other autonomous or robotic equipment that temporarily disturb and move across the seafloor. These technologies vastly increase the positional accuracy over the historic method of deploying equipment over the side of a vessel at the surface and allowing the equipment to drift with the current.

Most survey systems are collectively termed HRG surveys. There are many types of equipment used in these surveys. Most of the equipment used in HRG surveys generates sound, which is transmitted toward the seafloor, where it is reflected and received by the AUV or vessel. Different equipment types generate sound with varying frequencies and sound levels, which could cause harm to species if the sound emitted from the equipment is too powerful or too close to frequencies that species are sensitive to. The scientific and regulatory communities categorized the sound profiles of HRG equipment into categories or tiers of impact. BOEM uses the standardized tiering system based on Ruppel et al. (2022). Tier 4 of this categorization lists activities considered *de minimis*—defined as sources considered unlikely to result in the incidental take of protected species—and further considered in **Chapter 3**. Equipment types are described below in **Table 2-2**.

Table 2-1. HRG survey equipment considered during preliminary activities

Equipment Type	Data Collection and/or Sea Floor Survey Types	Description of the Equipment
Bathymetry (depth) sounder; multibeam echosounder (MBES)	Shallow hazards, archaeological resources, and seafloor habitats	A depth sounder is a microprocessor-controlled, high-resolution, survey-grade system that measures precise water depths in both digital and graphic formats. The system records with a sweep appropriate to the range of water depths expected in the survey area. This EA assumes the use of multibeam bathymetry systems to characterize complex bathymetry Units can be hull-mounted, mounted in an AUV or towed.
Side-scan sonar; sub-bottom profiler	Shallow hazards, hard (rock) bottoms, and archaeological resources	Side-scan sonar evaluates surface sediments, seafloor morphology, and potential surface objects (MMS 2007b). Systems typically consist of a top-side processor, tow cable, and towfish with transducers (or “pingers”) that generate and record the returning sound traveling through the water column at a known speed. This EA assumes the use of a digital dual-frequency side-scan sonar system with 300–500 kHz frequency ranges or greater to record continuous planimetric images of the seafloor. Synthetic Aperture Sonar (SAS) may also be used, are similar to side-scan sonars, and operate in the 70–100kHz frequency ranges. Side-scan sonars and SAS can be mounted in an AUV or towed. Sub-bottom profilers are used to survey for geological features, hazards, and archaeological resources present in subsurface sediments and may include high-resolution compressed high-intensity radar pulse (2-16 kHz).
Magnetometers/ Gradiometer	Archaeological resources and shallow hazards	These types of equipment detect and aid in the identification of ferrous or other objects having a distinct magnetic signature. The sensor is typically towed or flown approximately 6 m above the seafloor. This methodology is not anticipated as it is not commonly used in depths greater than 500 m. Magnetometers can be installed inside AUVs and may be present during surveys. They are passive and make no noise.

Key: kHz = kilohertz

Several survey methods can be used to collect HRG data. Typically, these methods are based on the water depth of the survey area. However, restrictions on available equipment may affect which survey methods are chosen. Additional information about autonomous underwater surveys, shallow multi-instrument tow, deep-tow, and uncrewed surface vessel surveys is provided in **Appendix E**. The instruments listed below are generally considered *de minimis* according to the standardized tiering system (Ruppel et al. 2022):

- Fathometers for navigation
- Sub-bottom profilers that are hull-mounted, towed, and parametric sub-bottom profilers
- MBES systems (hull-mounted EM120–124 [EM120, EM122, EM 124]) 12kHz, EM 302–304 (30kHz)
- MBES systems (towed/AUV) EM 2040 (200–700 kHz)
- EK60 and EK80 split-beam echosounders
- Pingers (acoustic locators) for locating over the side wireline instrumentation in the water column
- Acoustic releases (brief duration pinging), e.g., for moorings and landers
- Ultra-short baseline (USBL) and long baseline (LBL) positioning equipment, e.g., for navigation of submersibles, ROVs
- Acoustic Doppler Current Profiling (ADCP) equipment
- Instrumentation on HOVs, AUVs, and ROVs
- Pressure-equipped inverted echo sounders and Pressure Monitoring Transducers
- Electromagnetic sources

Sub-bottom profilers are HRG equipment types used to survey for geological features, hazards, and archaeological resources present below the seafloor (in subsurface sediments). Sub-bottom profilers (also known as pingers) can penetrate sediment depth ranges of 3 m to greater than 100 m, depending on frequency and bottom composition. High-resolution compressed high-intensity radar pulse (CHIRP) system sub-bottom profilers generate a profile view under the seabed to develop a geologic cross-section of subsurface sediment conditions. Although the above instruments are generally considered *de minimis*, some types of MBES systems and sub-bottom profilers can potentially cause acoustic injury and/or disturbance to marine mammals when operated at certain source levels, transmission frequencies, directionalities, beamwidths, tow depths, and pulse repetition rates. Therefore, potential impacts and best management practices (BMPs) associated with the use of some MBES systems and sub-bottom profilers are further outlined in **Section 3.7** and **Appendices C and D**.

The HRG surveys associated with the Proposed Action are not going to use medium-penetration sub-bottom profiler systems, which are also known as boomers, sparkers, bubble pulsers, or impulse-type systems. Low-frequency sources, such as the Wolfspar listed in Ruppel et al. (2022), are also not evaluated here and will not be used.

2.2.2 Other Surveys

Part of preliminary activities are other surveys to characterize the seabed condition and the surrounding environment. Geological, oceanographic, and biological surveys that collect seabed, physical, and species information are necessary for describing this deep-sea, open-ocean environment. These data are commonly collected nationally and internationally in ways determined to not significantly alter the environment or natural resources by domestic and international agencies. As listed in **Table 2-1**, other surveys include sampling sediments and species by ROV, anchoring buoys and scientific equipment to the seafloor, deploying equipment (such as box core sampling) from a ship, and using landers. Some equipment can remain on the seafloor—such as weights, ADCPs, and underwater transponder positioning (UTP) units. Focused biological surveys from the air, from the ship, or in water can utilize aerial digital imaging; visual observation; radar; and thermal or acoustic monitoring. Species collection techniques and impacts are location- and species-specific (further defined in **Chapter 3** with a focused description of endangered species). This document does not consider actions such as dredging or trawling. **Appendix E** describes the status of similar surveys in the Pacific Ocean and the standards of research to justify the undetectable or low impacts caused from these survey types.

2.2.2.1 Geological, Geotechnical and Biological Sampling

Geological and geotechnical surveys include sampling of the seabed and can utilize a variety of equipment that cause a range of impacts to the seafloor. The purpose of geological sampling during preliminary activities is multifold, to validate (ground truth) HRG surveys, to conduct environmental characterization, and to perform initial reconnaissance to the seabed to better identify site-specific exploration targets and or collect information useful to develop a Delineation, Testing, and/or Mining Plan.

The most precise method to collect a geological or biological sample is to use a ROV, which can target samples to within a centimeter and provides real-time visual control. Alternatively, a grab or scoop of sediment can be collected from a box core lowered from the surface by a vessel. A box core is lowered to the seabed by winch and penetrates the seabed; when tension is applied, the box core jaws close, sealing the sample inside. Once on deck, various tests can be performed. A free-fall grab is similar except that it is released unconnected to the vessel, descends to the seafloor, samples the seabed and releases ballast weights, and comes back to the surface via a float. A box core or free-fall grab retrieves a greater sample volume of sediment than a ROV, but pre-clearance is typically not possible. Instruments that measure conductivity, temperature, and depth; USBL pingers; cameras; and other equipment can also be mounted on a box core or free-fall sampler or additional environmental sampling.

Box core sampling can also sample species information. Species, or a portion of a species, may be collected for the purpose of characterizing the biological environment. Collections could also verify the discovery of a new species or to further document electronic DNA libraries, which reduces the need for future voucher specimens. The intent would be to further scientific understanding, rather than commercial purposes. **Chapter 3** further defines or limits the density and frequency and types of biological sampling.

BOEM assumes up to four seafloor sampling efforts collected either by box core or free-fall grab. The initial effort would be conducted at a course scale covering a larger area and then two more sampling surveys that subsequently focus on smaller areas of interest. This assumed approach maximizes the number of surveys and samples; therefore, the document analyses a greater environmental impact. The number of surveys, area, and number of samples are estimated from research-based activities, U.S. agency research, and 2023 guidance from the ISA with details available in **Appendices A and E**. The ISA's deep data website (International Seabed Authority 2025a) show that sampling grids sometimes are not constant throughout a lease; however, the below values assume a consistent survey density and values that are greater than the average number for samples in the ISA's exploration contracts. Up to four box core or free-fall grab surveys would be completed under the Proposed Action, collecting approximately 2,259 samples total (**Table 2-3,** bottom right values). Each sample could disturb 0.5 to 1.5 m^2 area of the seafloor. Together, these three surveys could disturb 1,952 m^2 of the seafloor for a two-lease scenario and represent less than 0.0000019% of the total area (**Table 2-4**).

Table 2-3. Estimated range of number of seabed box core and free-fall grab sample stations

Survey	Number of Stations for Two Leases	Number of Stations for Five Leases	Number of Stations in Total Area
Course survey using free-fall grab (15-km grid)[1]	253 (125 to 504)	101 (50 to 201)	506 (250 to 1,008)
Course survey using box core (50-km grid)[1]	27 (16 to 56)	11 (6 to 24)	54 (31 to 113)
Lease areas box core survey (10-km grid)	527 (203 to 1,572)	211 (81 to 629)	1,054 (407 to 3,143)
Area of interest box core survey (7-km grid)	261 (151 to 446)	104 (60 to 179)	521 (303 to 894)
Total	1,126 (694 to 2,170)	452 (278 to 870)	2,259 (1,389 to 4,349)

Notes: Counts of samples or stations contacting the seafloor are 50% values with a range in parenthesis of 5% to 95% the value. Totals are derived from running simulations, and not additive, from the four surveys and explained further in **Appendix A**.
[1] Course surveys could be conducted using free-fall grab and/or box core.

Table 2-4. Estimated area of disturbance per lease to the seafloor caused by box core and free-fall grab surveys

Survey	Alternative A (Two Leases, m^2)	Alternative B (Five Leases, m^2)	Total Area (m^2)
Course survey using free-fall grab (15-km grid)[1]	124 (57 to 265)	50 (23 to 106)	248 (114 to 530)
Course survey using box core (50-km grid)[1]	27 (14 to 59)	11 (6 to 24)	53 (28 to 117)
Lease areas box core survey (10-km grid)	519 (188 to 1,610)	208 (76 to 643)	1,038 (378 to 3,216)
Area of interest box core survey (7-km grid)	257 (135 to 478)	103 (54 to 190)	514 (271 to 950)
Total	977 (543 to 2,089)	390 (217 to 838)	1,952 (1,083 to 4,167)

Note: Area of disturbance to the seafloor are 50% values with a range in parenthesis of 5% to 95% the value. Totals are derived from running simulations, and not additive, from the four surveys and explained further in **Appendix A**.
[1] Course surveys could be conducted using free-fall grab and/or box core.

2.2.2.2 Moorings and Equipment Placement

Ocean environmental characterization surveys utilize anchors, clump weights or ballast weights, and the placement of scientific equipment on the seafloor. Weights and some equipment are considered expendable and released onto the seafloor, while the connected equipment is released and retrieved. Sediment plumes are a known concern from commercial-scale mining, and the only known way to understand ocean sedimentation and currents is to anchor sampling devices on or near the seafloor. AUVs also may require the use of multiple navigation devices positioned on the seafloor. A lessee would likely include placement of sampling devices and anchors to position those devices on the seafloor.

Buoys float on the surface of the water and are anchored at fixed locations with equipment attached to monitor and evaluate the water column or air. Buoys are rare in deeper waters, where a lessee is more likely to set moorings for collecting oceanographic data without a surface buoy (AMC Consultants Pty Ltd et al. 2021). However, BOEM estimates two large surface ocean buoys would be placed per lease (the Proposed Action would have a maximum of four buoys). Types most likely for deep water include discus-shaped, boat-shaped, and spar buoys (**Figure 2-1**); a large discus-shaped hull buoy has a circular hull of 10–12 m in diameter. Buoys sampling meteorological data are the most common type of larger ocean buoy deployed. Meteorological buoy anchors deployed in approximately 1,000 m of water created a buoy watch circle (i.e., excursion radius) of approximately 1,250 m and almost 3,000 m of line (Pacific Northwest National Laboratory 2019). Onboard power supply sources for buoys could include solar arrays, lithium or lead-acid batteries, and diesel generators, which require an onboard fuel storage container with appropriate spill protection and environmentally sound methods for refueling activities. Decommissioning is assumed to be essentially the reverse of the installation process, removing approved facilities. Installation and decommissioning of buoys is expected to be completed within one day per buoy and would be performed with the support of a vessel(s) equivalent in size and capability to that used for installation.

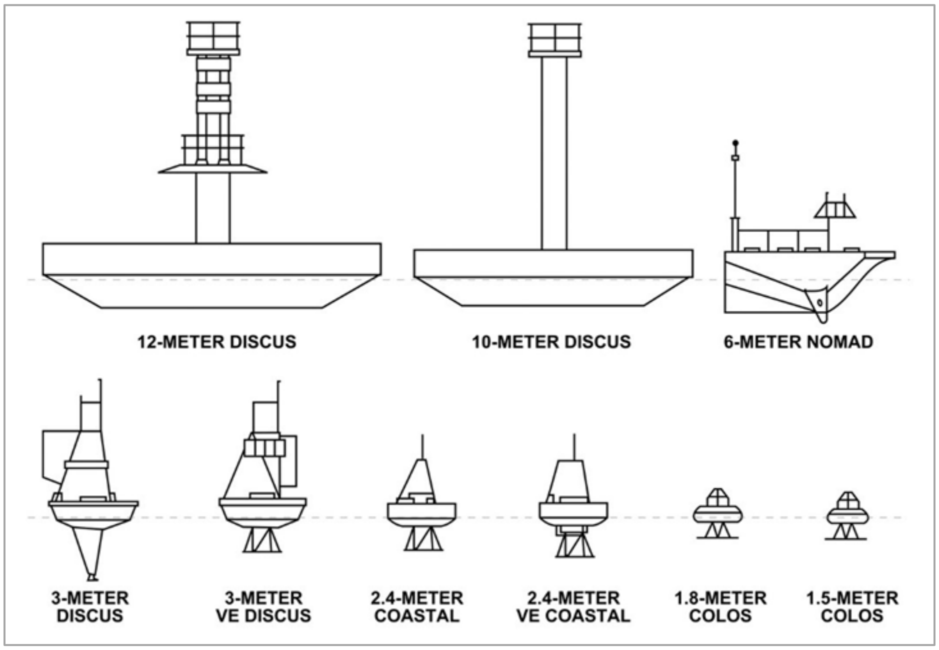

Figure 2-1. Buoy schematic
Source: National Data Buoy Center (2013)

A buoy would be anchored to the seafloor at two or three locations that would be made from materials such as solid cast iron, cement, or chain. The line connecting the buoy to the anchor consists of chain, jacketed wire, nylon rope, polypropylene rope, and subsurface floats, which keep the mooring line taut to semi-taut, reduce slack, and eliminate looping (National Data Buoy Center 2013). The chain at bottom of the mooring line could sweep and disturb the seafloor. A meteorological buoy anchor deployed at approximately 1,000-m water depth used a solid cast iron anchor weighing approximately 11,000 lbs and had a footprint of approximately 2.3 m^2 (Pacific Northwest National Laboratory 2019). Moorings for collecting oceanographic data without a metocean surface buoy are more common internationally at depths of 4,500–5,200 m. Anchors range from 3,700-6,800 lbs, with similar types of mooring lines extending approximately 500 m below the surface to avoid interference with other marine activities (Sharma and Nath 2020; AMC Consultants Pty Ltd et al. 2021; China Minmetals Corporation 2024; National Data Buoy Center 2025). BOEM estimates that mooring installation could disturb approximately 28 m^2 of seafloor per mooring (**Appendix A**). After installation, the transport vessel likely would remain in the area for several hours while technicians configure systems.

The speed and direction of ocean currents would likely be assessed with ADCPs. ADCP is a remote sensing technology that transmits sound waves at a constant frequency and measures their reflection as the waves ricochet off fine particles or zooplankton suspended in the water column. ADCPs could be mounted independently on the seafloor, attached to a buoy, or have multiple instruments deployed as a subsea current mooring. A seafloor-mounted ADCP likely would be mounted in a tripod or a trawl resistant mount. One subsea current mooring might have 8–10 ADCPs vertically suspended from an anchor, combined with several floats made of syntactic foam. These moorings do not breach the surface. A typical ADCP has three to four acoustic transducers that emit and receive acoustical pulses from different directions, with frequencies ranging from 300–600 kHz and a sampling rate of every 1 to 60 minutes. A typical ADCP is about 1–2 ft tall and 1–2 ft wide. Its mooring, base, or cage (surrounding frame) would be several feet wider. BOEM estimates that approximately 16 moorings could be installed across both lease areas, with seafloor disturbance likely around 28 m^2 per mooring, ranging from 13 to 78 m^2.

Another emerging scientific piece of equipment that rests on the seafloor is a lander. This stationary scientific monitoring device ‘lands’ on the seafloor and ranges in size. BOEM assumes approximately 26 landers could be deployed across the total area but not at the same time. Most landers would displace about 2 m^2 of seafloor, though the footprint of a newer device rated to ocean depths of 6,000 m is approximately 4 m^2 (Guo et al. 2023).

As a part of the Proposed Action, the EA also assumes one HRG AUV-based survey would use multiple AUVs and require the use of UTP units placed on the seafloor. Each UTP could displace 1 m^2 of area, with up to 416 UTPs placed across the total area (**Table 2-5**).

Table 2-5. Estimated area of disturbance per lease to the seafloor caused by placing UTP units to support AUV navigation and deploying moorings and landers for physical and biological data collections

Survey	Alternative A (Two Leases, m^2)	Alternative B (Five Leases, m^2)	Total Area (m^2)
UTP deployment for 1 multiple AUV survey	196 (99 to 349)	78 (40 to 139)	393 (197 to 695)
Moorings for equipment (26 count, 28 m^2 each)	261 (138 to 442)	104 (55 to 177)	522 (277 to 885)
Landers (11 count, 2 m^2 each)	11 (7 to 14)	4 (3 to 6)	21 (15 to 28)
Total seafloor disturbance	479 (306 to 703)	192 (122 to 280)	960 (611 to 1401)

Note: Any value that has a range is described as 50% value (5% to 95%) value. Totals are derived from running simulations, and not additive, from the three efforts and explained further in **Appendix A**.

2.2.3 Vessel Trips and Number of Days for Surveys

The survey duration in days and the number of vessel trips anticipated for Proposed Action (Preliminary Activity) surveys and equipment deployments are estimated on **Table 2-6**. The number of survey vessels at any one time is estimated to be four with a maximal statistical potential of six (**Appendix A**). A two-way vessel trip is a ship moving from Pago Pago Harbor to the survey area and then returning. BOEM assumes vessels will utilize the port at Pago Pago, but vessels could use ports from the Cook Islands to the east. Transit to American Samoa would likely be from U.S. mainland ports but could be from other energy hubs in the Pacific Ocean (Malaysia, Australia, etc.). Available ships that can access deep waters and stay in the open ocean are limited in this global market. BOEM projected vessel trips information from the initial assessment of the CCZ's Nauru Ocean Resources property and from Tonga Offshore Mining Limited Clarion-Clipperton Zone Project Exploration Area.

Previous critical mining related assessments collected varying densities of geophysical data depending on the stage of the activities, so there is a range for the survey duration estimates listed (**Table 2-6**). Survey duration combined the following factors: (1) expected duration of the actual survey work using the calculated line miles and expected velocity, (2) number and duration of line turns, (3) expected daily time for deck work, such as AUV or device deployments, retrievals, or sampling operations, and (4) amount of time when no work is conducted because of either mechanical or weather delays. The sum of these factors approximates the survey duration. More explanations and assumptions are listed in **Appendix A**.

Table 2-6. Estimated number of vessel trips for surveys and for equipment or mooring deployments for two lease areas

Surveys	Duration of Survey in Days[1] and Number of Two-way Vessel Trips[2]
MBES survey: initial or course survey with low or medium frequency (one survey)	53 (43 to 65) days across 5 trips (low frequency) 101 (83 to 125) days across 9 trips (medium frequency)
Geological, geotechnical, and biological sampling[3]: initial or course, lease areas, and fine (total of three) surveys	816 (483 to 1,716) days across 75 trips
Oceanographic/biological surveys: include deployment and retrievals of equipment, water, chemical, avian, fishes, marine mammal, and sea turtle (total of four) surveys[4]	194 (172 to 217) days across 17 trips
Total estimated number of days at sea with two-way vessel trips—medium frequency MBES[5]	1,114 (772 to 2,017) days across 98 trips

Notes:
1. Survey days and two-way vessel trip numbers and ranges were calculated using methodology explained in **Appendix A**. Values are intended to be conservative estimates of survey requirements accounting for weather and maintenance, with actual numbers likely to be lower.
2. A two-way vessel trip is a ship moving from Pago Pago Harbor to the survey area and then returning.
3. Geotechnical and biological sampling assume 24-hour survey days.
4. Avian, fish, marine mammal, and sea turtle surveys are typically conducted during daylight hours (10 hours).
5. Surveys could occur simultaneously from the same vessel but not concurrently with HRG surveys.

Vessels that install moorings and conduct surveys are typically 90 to 122 m in length (German Federal Institute for Geosciences and Natural Resources 2018; China Minmetals Corporation 2024). Crew boats used for buoy operations and maintenance are typically 16 to 17 m in length, with 100- to 400-hp engines and 1,800-gal fuel capacity. The remote location is a large cost for data collection. BOEM anticipates larger vessels would attempt to collect as much data as possible while on the water. While a cruise may have a particular category or priority, survey vessels could function as platforms for collecting HRG, geotechnical, biological, and oceanographic information. Vessels performing surveys or towing equipment are relatively slow moving at approximately 4–6 knots (kn). Specific surveys and data collection are further explained in **Chapter 3** and **Appendix A**.

2.3 Alternative B: Maximum Leasing

Under Alternative B, five leases would be issued, making each lease 26,800 km^2 in size (**Table 2-7**). Impacts would be similar to those of Alternative A but may be larger simply due to more issued leases. Consequently, a more limited level of analysis is necessary.

Table 2-7. Size of area of interest and areas of individual leases

Survey Area	Size (km^2)
Total Area	134,000
Lease Area – Two Leases	67,000
Lease Area – Five Leases	26,800

The justification for five leases is to allow for more, smaller leases, thus increasing competition and potentially reducing financial barriers to participating in the auction by reducing costs based on acreage, such as the bidding price and rent. In addition, these smaller leases would be more similar to the size of subdivided exploration contracts managed by the ISA. The ISA gives a total of 75,000 km^2 to each country; each portion is then divided into areas of approximately 15,000 km^2. The NORI-D, short for the Nauru Ocean Resources Inc. deep-sea polymetallic nodule collection project, area in the CCZ is 25,000 km^2.

This action could increase moorings for buoys, equipment, vessels, and total vessel trips to the area, with the assumption that each company would want to gather their own information.

2.4 Alternative C: No Action

Under the No Action Alternative, the proposed commercial leasing would not be authorized in the American Samoa OCS. As a result, no preliminary activities or BOEM-directed data collection would occur within the designated Proposed Action Area. The marine environment, including benthic habitats, water column ecosystems, and associated biological communities, would remain undisturbed by entities holding leases in the OCS offshore American Samoa. The No Action Alternative serves as a baseline for evaluating the environmental impacts of the Proposed Action and other alternatives. It allows decision-makers and the public to compare the consequences of proceeding with commercial leasing for marine minerals against maintaining the status quo.

This alternative represents the continuation of current conditions and trends of the natural environment.

NOAA and USGS ocean research would continue under the No Action Alternative. NOAA conducts nondestructive ocean research through its Ocean Exploration Program. Examples of actions include seafloor mapping, biological surveys, and water column studies using sonar and ROVs. Additional efforts include technology development, such as AUV and environmental DNA (eDNA) collection. USGS conducts non-invasive studies via its Coastal and Marine Hazards and Resources Program, including seafloor mapping, sediment transport, and submarine landslide analysis. USGS also has a mission to survey deep-sea mineral and biology without extraction. These serve as examples and other activities may take place in the area.

2.5 Alternatives Considered but Eliminated from Further Analysis

Dredging

Dredging equipment and use was initially considered as a preliminary activity (**Appendix A**) but dismissed from detailed analysis in this EA. A dredge is useful to identify the type of seabed sediment, such as nodules, and it is dragged along the seabed to collect larger materials, while the finer material in the upper 5–10 cm passes through. Dredges collect larger amounts of sediments than box cores. They are towed from the surface; in deep waters, the exact bottom location can range up to 8 km. Dredging impacts sensitive deep-sea habitats, and recovery of the habitat can take decades or be permanent (Ramirez-Llodra et al. 2010; Danovaro et al. 2017). Dredging may also generate extensive sediment plumes (Haalboom et al. 2022), which could result in smothering of benthic species and ecological disruption (van der Grient and Drazen 2022).

Therefore, dredging has the potential to cause significant impacts to the Proposed Action Area, which is not allowed under current regulations at this leasing stage. As such, dredging did not meet the threshold for a reasonable alternative under NEPA and was not carried forward for detailed analysis.

Preliminary Activities Omission

Another alternative, conducting a lease sale without preliminary activities, was not carried forward for detailed consideration because this alternative does not align with applicable regulatory requirements.

Buffer from Rose Atoll MNM and Rose Atoll Fish and Wildlife Refuge

An alternative considered was a 25 or 50 nmi buffer from Rose Atoll. The Proposed Action Area is 50 nmi from shorelines. This distance was specifically noted as being important in the comments received from the Request for Interest Comment Period.

The waters surrounding Rose Atoll have overlapping Federal protection. Established by Presidential Proclamation in January 2009, the Rose Atoll MNM is cooperatively managed by the Secretary of Commerce (NOAA) and the Secretary of the Interior (U.S. Fish and Wildlife Service), in cooperation with the Department of State, the Department of Defense, and the Government of American Samoa. This area also encompasses the Rose Atoll National Wildlife Refuge (FWR) and part of the NMSAS since 2014.

No part of the Proposed Action is within the Rose Atoll MNM or FWR boundaries. This alternative would have explored indirect effects that could occur to the Rose Atoll MNM, by discussing impacts to resources if no preliminary activities occurred 3, 25, and 50 nmi from the boundary of the Rose Atoll MNM or Rose Atoll FWR. Fewer vessels, days at sea, and moorings to the seafloor could occur.

For coastal and marine birds, this would be expected to have less impact. Although there is a lack of data on the at-sea distribution and abundance of coastal and marine birds in the Proposed Action Area, increased distance from the breeding areas is expected to reduce the number of birds that are encountered during Proposed Action activities.

Regarding water quality, a reduced survey area would decrease the preliminary activities and reduce the number of vessel trips, decreasing the risk of accidental releases. Fewer preliminary activities would decrease the volume of temporarily resuspended sediment. The buffer area could decrease the risk of indirect impacts to Rose Atoll MNM and FWR.

This alternative was dismissed as the lease activities are expected to have minimal impact. If Delineation, Testing, or Mining Plans are submitted in the future, further NEPA analysis would examine the potential for impact on the Rose Atoll ecosystem.

Other Leasing Configurations

Phased development, pilot-scale approaches, or additional spatial exclusions, were not carried forward at this decision point because they do not meet the purpose and need as effectively as preliminary activities that may be authorized under the Proposed Action. Preliminary review indicated that these configurations would not provide meaningful environmental advantages compared to the alternatives already under consideration given the early-stage and novel nature of this Proposed Action.

2.6 Non-Routine Events

Non-routine and low-probability events and hazards that could occur in all alternatives include the following: (1) allisions and collisions between vessels and other vessels or marine life; (2) spills from collisions or fuel spills resulting from generator refueling; and (3) recovery of lost survey equipment.

2.6.1 Allisions and Collisions

An *allision* occurs when a moving object (i.e., a vessel) strikes a stationary or moored object (e.g., meteorological buoy); a *collision* occurs when two moving objects strike each other. A buoy in the area could pose a risk to vessel navigation. An allision between a ship and buoy could result in the damage or loss of the buoy and/or the vessel, as well as loss of life and spillage of petroleum product. Vessels associated activities could collide with other vessels, resulting in damages to the vessels, petroleum product spills, or capsizing. Risk of allisions with buoys would be reduced through U.S. Coast Guard (USCG) Private Aids to Navigation (PATON) requirements.

BOEM anticipates that aerial surveys (if necessary) would not be conducted during periods of reduced visibility conditions, as flying at low elevations could pose a safety risk during storms.

2.6.2 Spills

A petroleum spill could result from allisions, collisions, accidents during the maintenance or transfer of offshore equipment and/or crew, or due to natural events (i.e., strong waves or storms). From 2000 to 2009, the average spill size for vessels other than tank ships and tank barges was 88 gallons (U.S. Census Bureau 2011). Should a spill from a vessel associated with the Proposed Action occur, BOEM anticipates that the volume would be similar. Diesel fuel is lighter than water and could float on the water's surface or be dispersed into the water column by waves. Diesel would be expected to dissipate rapidly, evaporate, and biodegrade within a few days (MMS 2007a).

BOEM used NOAA's Automated Data Inquiry for Oil Spills to predict dissipation of a maximum spill of 2,500 barrels (105,000 gallons), a spill far greater than what is assumed as a non-routine event during the Proposed Action. Results of the modeling analysis showed that dissipation of spilled diesel fuel is rapid. The amount of time it took to reach diesel fuel concentrations of less than 0.05% varied between 0.5 and 2.5 days, depending on ambient wind direction and speed (Tetra Tech Inc. 2015), suggesting that 88 gallons of diesel oil would reach similar concentrations faster and limit the potential environmental impact to negligible. Modern larger ocean surface buoys do not use petroleum, further reducing the possibility of a spill. Any vessels used to conduct survey activities would be required to comply with USCG spill prevention requirements and follow 33 CFR Parts 151, 154, and 155, which contain guidelines for spill response and shipboard oil pollution emergency plans. Further, a spill would be expected to dissipate rapidly and then evaporate and biodegrade within a day or two, limiting the potential impacts to a localized area for a short duration.

2.6.3 Lost Survey Equipment

In the event of equipment loss during surveys or a meteorological buoy disconnecting from its anchor, recovery operations may be conducted. Recovery operations could be performed in a variety of ways, including ROVs and grapnel lines, depending on water depth and equipment lost. If grapnel lines (e.g., hooks, trawls) are used to retrieve lost equipment, bottom disturbance could result from dragging the line along the bottom until it hooks the lost equipment. In addition, after the line catches the lost equipment, components are dragged along the seafloor until recovery.

Survey equipment could be carried away by currents or become embedded in the seafloor. Additional bottom disturbance could also occur. For the recovery of lost survey equipment, BOEM would work with the lessee/operator on retrieval operations. Selection of a response strategy would depend on the nature of the lost equipment, and further consultation with stakeholders could be necessary. Potential impacts associated with recovery of lost survey equipment could include vessel trips, noise and lighting, air emissions, and routine vessel discharges from a single vessel. Bottom disturbance and habitat degradation could also occur from recovery operations.

3 Affected Environment and Environmental Considerations

3.1 Environmental Resources Considered and Impacting Factors

This EA considers the potential effects of activities associated with lease issuance. This section briefly describes aspects of the natural and human environment that could be impacted by the Proposed Action. **Appendix A** describes assumptions and activities that may be used in the Proposed Action Area.

Impact analysis of each resource focuses on duration and intensity of the action and direct and indirect effects to that resource. Duration refers to whether an impact is short term, occurring only during a limited operational period, or long term, persisting throughout the life of the Proposed Action activities or beyond. Intensity describes the magnitude or severity of the impact, depending on the degree of change to the resource.

The Proposed Action for some resources includes BMPs to reduce or eliminate potential risks to or conflicts with specific environmental resources (**Appendix C**). If leases are issued, BOEM would require the lessee to comply with BMPs as part of conducting preliminary activities associated with a lease.

3.2 Air Quality

3.2.1 Affected Environment

Air Quality can be degraded by non-anthropogenic sources (e.g., dust or sea salt); however, human activity is responsible for most ambient air pollution, which includes emissions from industrial and transportation sources, such as power plants, manufacturing, resource extraction, automobiles, vessels, and aircraft. Air quality tends to be the most degraded in metropolitan areas and near other large sources of air pollutants. Additionally, dry climates and rugged terrain can capture pollutants, degrading local air quality. As an archipelago with a population under 50,000 American Samoa has low levels of air pollution.

The Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for criteria pollutants to provide protection from adverse effects of certain pollutants. There are two sets of standards. Primary standards protect public health, including the health of sensitive populations, such as people with asthma, children, and older populations. Secondary standards protect public welfare (including visibility), the health of animals and plants, and infrastructure. The criteria pollutants are nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), ozone (O_3), fine ($PM_{2.5}$) and coarse (PM_{10}) particulate matter (PM), and lead (Pb). The criteria pollutants released by OCS sources include NO_2, CO, SO_2, $PM_{2.5}$, and PM_{10}. Nitrogen oxides (NO_X) and volatile organic compounds (VOCs) are released by OCS sources and may form O_3 through photochemical reactions. Deposition of NO_2 and SO_2 may harm plants, including agriculture, as well as degrade infrastructure and water quality.

When these standards are exceeded, the USEPA designates the area as nonattainment. American Samoa is in attainment with the NAAQS (USEPA 2025); the air above the OCS is undesignated.

3.2.2 Impact Analysis

Emissions from vessels and other equipment may impact air quality in onshore areas near ports and when vessels pass close to shore. When vessels are further away from shore, emissions will dissipate before reaching shore. This dissipation will help limit the volume of emissions likely to impact people. These emissions may have been notable if they were to be released in areas with high concentrations of ambient pollution. However, American Samoa is within attainment, with no notable sources of emissions over the OCS; therefore, no notable impacts are expected.

Alternative C: No Action

If no leasing were to take place, then none of the proposed activities would take place. No changes in impacts to air resources would occur.

3.2.3 Conclusion

The impact of emissions on air quality is not expected to be notable for any of the action alternatives for two or five leases.

3.3 Oceanography and Water Quality

3.3.1 Affected Environment

The affected environment for oceanography and water quality spans within the Proposed Action Area and the navigation routes to the Port of Pago Pago, where survey vessels would likely stage. The Port of Pago Pago lies on the south side of Tutuila within the Pago Pago Harbor. The American Samoa Environmental Protection Agency monitors, assesses, and protects the territory's water quality.

A variety of land use and water-based activities influence the water quality within Pago Pago Harbor. The biggest threats are land runoff, primarily from human and pig waste disposal systems, erosion, and litter (Craig et al. 2005; Makiasi et al. 2022). The outer harbor hosts tuna canneries and a sewage treatment plant; the inner harbor has government buildings, a small shipyard, a marina, and the port (Thompson and Demirbilek 2002; Makiasi et al. 2022).

Over the past 30 years, inner harbor water quality has increased due to treatment and transport of cannery discharge beyond the harbor, improved sewage treatment, and better pollution enforcement (Makiasi et al. 2022). Commercial vessel traffic is relatively low with approximately 200 ships per year, but there is regular movement in and out of the harbor (Gill et al. 2023).

Offshore American Samoa, designated uses include fishing, scientific research, boating, and recreation (Makiasi et al. 2022). It is uncertain whether the offshore fishery affects water quality (Makiasi et al. 2022).

Surface oceanographic information for the region exists, but there are very little oceanographic data for abyssal depths within the Proposed Action Area. Overall, the Samoan Archipelago experiences small seasonal fluctuations in ocean conditions with larger interannual fluctuations (Pirhalla et al. 2011). There are two major surface currents in the region: the westward-flowing South Equatorial Current and eastward flowing South Equatorial Counter Current (Qiu and Chen 2004); overall surface current patterns in the offshore lease areas are westward flowing (Kendall and Poti 2011). Regional atmospheric drivers include persistent trade winds; the South Pacific Convergence Zone, which results in elevated rainfall (average of 120 in/yr), especially during the summer (Pirhalla et al. 2011); the El Niño Southern Oscillation (Pirhalla et al. 2011); and infrequent but severe cyclonic storms (Craig 2009).

Recent AUV *Sentry* dives 737 and 739 in the action area suggest bottom water temperatures (a few °C) and salinity (34–35 psu) typical of deepwater habitats; dissolved oxygen levels (200–220 μmol/kg) were high but not unusual. An optical backscatter sensor indicated turbidity levels of less than 0.056 mg/L. In the eastern tropical Pacific, midwater oxygen minimum zones (< 20 μmol/kg) play a key role in structuring deep-ocean systems (Gilly et al. 2013). To determine whether an oxygen minimum zone or other midwater features exist within the action area, collecting oceanographic profiles would be required.

3.3.2 Impact Analysis

Proposed Action

Routine activities associated with the Proposed Action that could impact oceanography and water quality are vessel traffic and discharges (e.g., bilge and ballast water), geotechnical and benthic sampling, mooring anchoring and decommissioning, and lander deployment. Oil and hydrocarbon spills are non-routine events that have the potential to impact water quality.

Vessel traffic and discharges are not expected to have lasting impacts to water quality. Under Section 402 of the Clean Water Act, the USEPA regulates discharges of any point source pollution into navigable waters (33 U.S.C. 1342). Any non-recreational, non-Armed Forces vessels greater than 79 ft in length must comply with vessel discharge requirements established by the USEPA's 2013 Vessel General Permit and the USCG discharge regulations (33 CFR 151.10). Discharges are prohibited within the NMSAS, which includes the Rose Atoll MNM, and from beyond the boundaries if they were to subsequently injure a NMSAS resource or quality (15 CFR 922.122(3)). Permitted vessel discharges would diffuse rapidly in the water column without settling onto the seafloor.

Geotechnical and benthic sampling, mooring anchoring and decommissioning, and lander deployment are expected to temporarily decrease water quality. See **Chapter 2** and **Appendix A** for a description of equipment and activities. These activities would resuspend sediments where equipment physically disturbs the seafloor. Upon cessation of these activities, resuspended sediment would begin to resettle onto the seafloor, but there is uncertainty about when and where resettlement would occur.

Sediment properties that influence resettlement are largely unknown, such as particle size, shape, and behavior. Abyssal nodule fields can be associated with fine-grained clays and biogenic oozes (Dutkiewicz et al. 2020; Zawadzki et al. 2020); fine and non-circular particles settle more slowly than coarse and circular particles (Komar and Reimers 1978; Dietrich 1982). Flocculation, in which particles aggregate to become larger, can reduce settlement time (Gillard et al. 2019; Elerian et al. 2023). Local physical conditions also are uncharacterized and influence resuspended sediment behavior. Ambient vertical turbulent diffusion can maintain sediment in suspension (Peacock and Ouillon 2023). Bathymetric slope and bottom currents play a role in particle propagation and transport (Gazis et al. 2025). Sample operations, such as descent speed and tilt, also factor into turbidity changes (Blomqvist et al. 2015). These site- and operation-specific would need to be resolved to more accurately model sediment dynamics.

Given data scarcity on these key factors, this analysis relies on standards established by previous deep-ocean research and assumptions that sediment behavior in the Proposed Action Area is similar to other marine systems. During modified box core field trials in the Baltic Sea (3- to 150-m water depth), Blomqvist et al. (2015) recorded turbidity inside the sampling chamber up to 60 times the ambient turbidity at a descent speed of 24 m/min. When the box core was left open on the seafloor for observation, turbidity returned to ambient levels within 1 min (Blomqvist et al. 2015). Removal of the box core would suspend additional sediment. Therefore, it is anticipated that any suspended sediment would rapidly resettle onto the seafloor in the same area as the physical disturbance, and water quality would return to ambient conditions within minutes. However, additional data collection is required to confirm or revise this expectation. This testing could involve measuring turbidity before and after sampling events to determine how long it takes to return to ambient conditions, whether resuspended sediment can be detected, and how far it is transported.

Large-scale abyssal disturbance experiments range in measured suspended sediment concentrations, settlement time, and transport. During the Global Sea Mineral Resources pre-prototype collector trial, maximum suspended sediment concentrations were recorded up to four orders of magnitude higher than ambient conditions, and seafloor within 100 m of the disturbance area was blanketed with at least 3 cm of sediment (Gazis et al. 2025). The resulting plume could be detected over an area of 9 km^2, and 4.5 km away from the impact site within 35 hours of the disturbance (Gazis et al. 2025). Within 50 m of the disturbance site, ambient conditions returned after 14 hours (Gazis et al. 2025). Spearman et al. (2020) conducted an abyssal sediment release experiment in which suspended sediment concentrations returned to ambient conditions at around 1 km from the release site; sediment redeposition was limited to 100 m due to flocculation and rotational currents caused by internal tides. Analysis of the historical Ocean Minerals Company collector vehicle test estimated that plume deposition thickness was approximately 0–10 mm over a distance of tens of meters, with detectable impacts after 44 years (Jones et al. 2025).

An accidental release of oil and hydrocarbon products (e.g., diesel, lubricates) may result in short-term impacts on water quality in the immediate vicinity of the release before it dissipates and evaporates (**Section 2.6.2**).

Alternative B: Maximum Leasing

Compared to the Proposed Action, Alternative B would increase the number of leases and the total number of vessel trips from approximately 27 to 40. All vessel discharges would still be required to comply with USEPA, USCG, and local regulations and requirements if leases are issued. The greater number of vessel trips increases risk of accidental releases. Alternative B is not expected to substantively change the total number of sampling sites.

Alternative C: No Action

Under the No Action Alternative, commercial leases would not be issued in the Proposed Action Area. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on oceanography and water quality for the timeframe considered in this EA. Oceanography and water quality in the action area are subject to a variety of ongoing impacts that overlap with the Proposed Action, including development, point and non-point pollution, shipping, and dynamic ocean conditions. Implementing the No Action Alternative would not meaningfully reduce ongoing impacts on oceanography and water quality when compared to the Proposed Action.

3.3.3 Conclusion

Oceanography and water quality impacts are expected to resolve within minutes at the disturbance site for all action alternatives, assuming the sediment behaves similarly to other regions. Vessel discharges must comply with USEPA, USCG, and local regulations and requirements if leases are issued. Based on limited existing knowledge, sediment resuspension would settle quickly after disturbance and in the immediate footprint. Data on sediment properties (particle size, shape, and behavior) and local physical conditions (e.g., vertical turbulent diffusion, bathymetric slope, bottom currents) would reduce uncertainty by supporting site-specific modeling to accurately predict resuspended sediment behavior.

3.4 Geology

3.4.1 Affected Environment

The area impacted by the Proposed Action is mostly the eastern American Samoa OCS, with the west side wrapping around the Rose Atoll MNM and the eastern edge adjacent to the Cook Islands EEZ. The seabed minerals tract is largely in the abyssalpelagic zone of the Samoa Basin, consisting of abyssal plain, seamounts, seamounds, abyssal hills, and volcanic outcrops. The Samoa Basin was created during the Upper Cretaceous (100.5 to 66 million years ago) by the divergent boundary of the Pacific and Phoenix plate (Scheibner et al. 1991). The Samoa Basin has passed over three potential hotspots, creating island chains which then subsided (Jackson et al. 2010).

Currently, the area is passing over the Samoan hotspot, creating Tutuila and Aunu'u Islands, the Manu'a Islands, and Vailulu'u seamount. Vailulu's is the youngest of structures derived from the Samoa Hotspot and is an active source for eruptions and earthquakes. Rose Atoll is isotopically different from the islands of American Samoa and was created by a separate hotspot 27.8 million years ago (Jackson et al. 2010). This area of the Pacific Plate is being subducted by the Tonga Plate ~200 km to the southwest of Tutuila. The presence of the subduction zone has allowed older volcanos of the Samoan Islands to reactivate.

The abyssal hills, when seen in survey data, are mostly located in the eastern portions of the seabed minerals tract. These features are mostly linear, trending west-northwest and east-southeast. They are the result of accumulation of lithosphere material at a spreading center, which was then pulled away from a spreading center (Buck and Poliakov 1998). This material cools and is under tension, where it makes structures similar to horst and grabens, with axial ridges and axial valleys parallel to the spreading center.

The sides and top of these features may have areas of volcanic outcrops, a thin veneer of sediment, or hardgrounds (AMC Consultants Pty Ltd et al. 2021). The lows on these features are covered in 50–100 m of sediment. Samples of this sediment are rare in the American Samoa EEZ; however, the Penrhyn Basin of the Cook Islands has been well sampled. The sediment is most likely brown clay, with little calcarious, siliceous, or terrigenous sediment. It is mostly derived from aeolian dust, clay minerals, volcanoclastics, zeolites, and micro-nodules among others (Tay & Bertoli). The sediment rates are higher near the islands, due to erosion of the islands. Sediment rates in the abyssal hills areas are very low.

Polymetallic manganese nodules form at the seabed, precipitating metals out of the seawater and pore water, around a seeding site of foreign material. These deep areas are within the lysocline, the layer where calcium carbonate begins to dissolve. Some areas of the Samoan Basin are likely to be below the calcium compensation depth, where no calcium carbonate is seen at the seabed.

The Tonga Trench and subduction zone is to the southwest of the seabed mining tract. The Tonga subduction zone is one of the most tectonically active areas in the world, with large earthquakes happening often. In September of 2009, two large earthquakes (with magnitudes of 8.1 and 8.0) struck at nearly the same moment (Lay et al. 2010). The tsunami these generated by the earthquakes had a run up of 12 m and killed 35 people in American Samoa. Other earthquakes occur in the region, usually attributed to volcanism. Most recently, an earthquake swarm occurred in July and October 2022 offshore the Manu’a Islands of American Samoa, related to the Vailulu’u Seamount (Yoon et al. 2025).

This region of the Pacific is also impacted by tropical cyclones, with the cyclone season lasting from December to March. The last large cyclone to hit American Samoa was Cyclone Val in December of 1991.

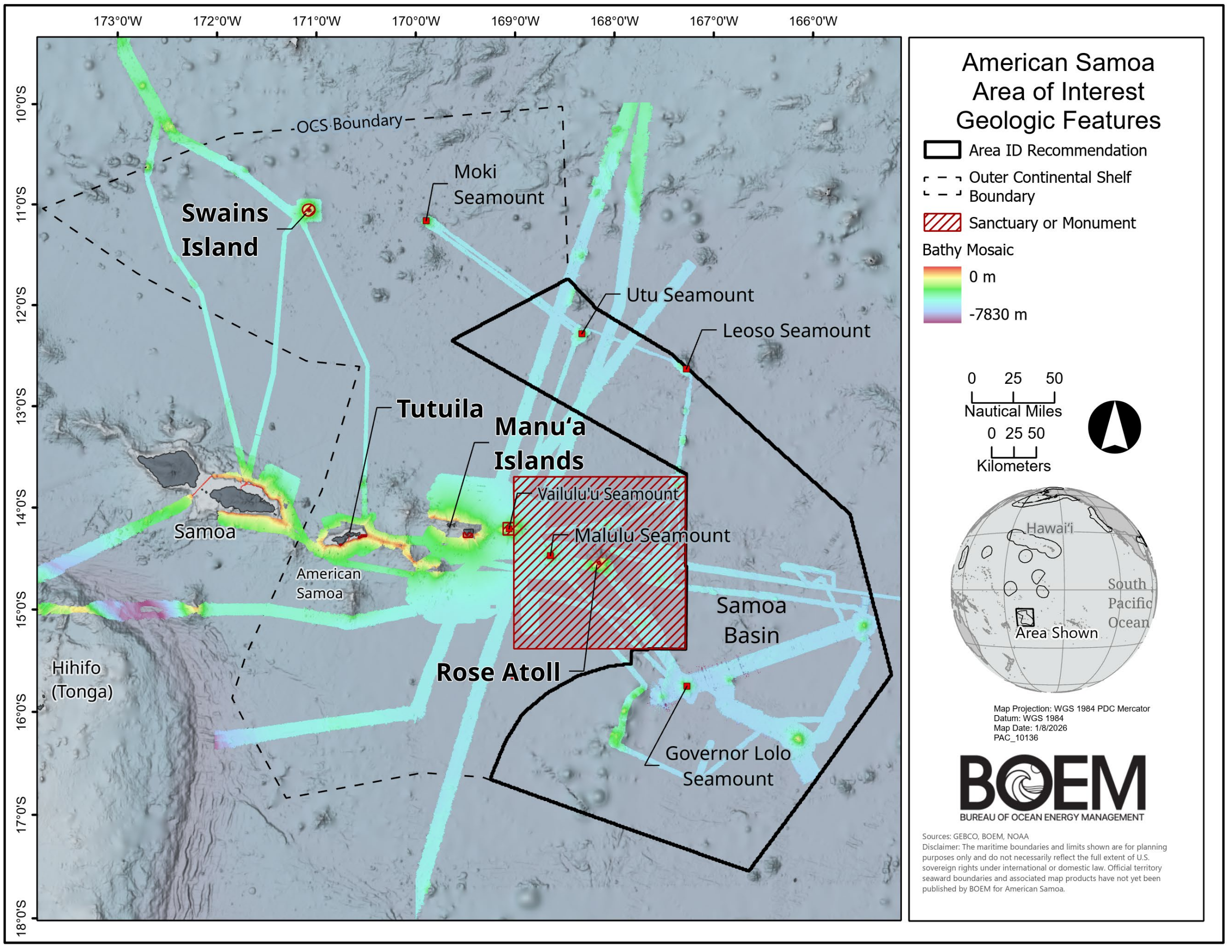

Figure 3-1. Map of geological features within the American Samoa OCS

Data were primarily collected by government surveys with a resolution of 100–150 m.

3.4.2 Impact Analysis

Anticipated impacts on the local geological resources by the preliminary activities include geotechnical sampling, deploying of sensors on the seafloor, and various types of geophysical and bathymetric survey. Geotechnical sampling in the seabed mineral tract would result in seafloor disturbance. Box cores and free-fall grab samplers would be used to collect information on the abundance and type of nodules, along with samples of the sediment for use in environmental and pore water studies. Oceanographic moorings likely would be deployed, with anchors securing the instruments to the seabed. Navigation transponders also likely would be deployed to assist navigation of AUVs and ROVs. Geophysical and bathymetric surveys likely would consist of several survey missions, with increasing resolution, over several years.

BOEM calculated the expected amount of seabed disturbance from the preliminary activities. BOEM calculated that 2,667 m^2 of seabed would likely be removed for sampling (range 1,587 to 4,973 m^2). Compared to the size of the seabed minerals tract, 134,000 km^2, the expected disturbance area (2,667m^2) is roughly 0.0000019% of the total tract area (**Appendix A**).

Alternative C: No Action

Under the No Action Alternative, no proposed activities would take place, and no disturbances to local geological resources would occur.

3.4.3 Conclusion

Geotechnical sampling is expected to result in minimal (estimated at 0.0000019%) bottom disturbance for the entire seabed minerals tract. Samples would be taken at a maximum density of a 5-km grid over a very limited area. Most geotechnical samples are expected to be taken at a 10-km grid or larger. Box cores and free-falling grab samples have a bottom disturbance of 1 m^2 to 0.5 m^2, respectively, at each sample site. Therefore, geophysical surveys are not expected to impact the geological resources. The impacts are negligible for the two- or five-lease scenarios.

3.5 Offshore Habitats

3.5.1 Affected Environment

The Proposed Action Area spans a remote region of the South Pacific Ocean and includes bathymetric features such as abyssal plains, abyssal hills, ridges, and seamounts (**Section 3.4**). Oceanographic conditions are shaped by equatorial currents and atmospheric drivers (**Section 3.3**). Vertical ecological zones structure the water column, each with specialized biological communities adapted to depth, pressure, temperature, and light availability. This analysis considers the potential effects from the Proposed Action on these distinct zones below, focusing broadly on the characteristic biota that reside within or use these habitats.

BOEM recognizes that microbes and viruses are abundant biological entities in the ocean that often drive biogeochemical processes and recycle nutrients (Cotner and Biddanda 2002; Vincent and Vardi 2023), but a lack of geographic- and habitat-specific information prevents discussion at finer resolutions. This analysis does not consider marine mammals, sea turtles, and marine and coastal birds as they are addressed in subsequent sections. Threatened and endangered species are discussed in **Section 3.10**. Some of the species that inhabit offshore environments support important fisheries and are described in **Section 3.11**.

3.5.1.1 Epipelagic (0–200 m)

The epipelagic zone, extending from the ocean surface to approximately 200-m depth, is the sunlit layer of the ocean and supports comparatively high biological productivity. The Proposed Action Area lies within the Southern Central Pacific Gyre biogeographic province (Sutton et al. 2017). Primary producers in this zone include phytoplankton (e.g., diatoms and dinoflagellates) that support a diverse zooplankton community. Common zooplankton taxa include calanoid and cyclopoid copepods, euphausiids, chaetognaths, and gelatinous organisms such as larvaceans (Reynolds 2024). These organisms form the base of the food web and are preyed upon by larger pelagic species. The epipelagic zone is a primary source of marine snow, which sinks to deeper ocean habitats, helping to regulate atmospheric CO_2 and support deep-sea ecosystems that depend on this steady rain of organic matter for energy (Middelburg 2019).

Characteristic epipelagic fish species in the region include skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), albacore tuna (*Thunnus alalunga*), mahi-mahi (*Coryphaena hippurus*), and flying fishes (*Exocoetidae*). These species are both ecologically and economically important, supporting local and regional fisheries (Chan 2023). Larvae and juveniles of nearshore, mesopelagic, and bathypelagic organisms often inhabit the epipelagic zone before migrating to their adult habitats (Carassou et al. 2009; Bandara et al. 2021). Potential stressors from proposed activities include a fish-aggregating-device (FAD) effect, marine debris, anthropogenic noise, artificial light, and oil spills. Entanglement, vessel strike, and displacement of fishing activities are also concerns for large epipelagic fishes and are discussed in **Section 3.11**.

3.5.1.2 Mesopelagic (200–1,000 m)

The mesopelagic zone, also known as the “twilight zone,” spans depths from 200 to 1,000 m and is characterized by low light levels, decreasing temperatures, and a sharp decline in primary productivity. This zone plays a critical role in oceanic food webs and biogeochemical cycling, particularly through diel vertical migration and the biological carbon pump (Steinberg and Landry 2017).

In the waters surrounding American Samoa, the mesopelagic zone is influenced by regional oceanographic features such as the South Equatorial Current, South Equatorial Counter Current, and mesoscale eddies, which affect nutrient transport and biological distributions (Bertrand et al. 1999; Domokos et al. 2007). An oxygen minimum zone (OMZ) may be present in the Proposed Action Area, likely between 300- to 800-m depths, as it would be consistent with patterns observed elsewhere in the tropical Pacific (Fiedler and Talley 2006; Wishner et al. 2020). OMZs are zones of hypoxia that can strongly structure community composition and vertical distribution of organisms in the mesopelagic.

In general, the mesopelagic zone supports a diverse assemblage of zooplankton and micronekton, including myctophid fishes, bristlemouths (*Cyclothone* spp.), cephalopods, gelatinous zooplankton (e.g., ctenophores, medusae), and crustaceans such as euphausiids and amphipods (Choy et al. 2017; Drazen and Sutton 2017). Many of these taxa exhibit diel vertical migration, ascending into the epipelagic zone at night to feed and descending during the day to avoid predation, and this behavior contributes considerably to carbon sequestration. Piscine predators in this zone include deep-diving tunas, snake mackerels, lancetfishes, moonfishes, and cutlassfishes (Haddock and Choy 2024). The mesopelagic zone may also serve as an important habitat for the early life stages of many deep-sea species (Bandara et al. 2021). Very little is known about this habitat within the Proposed Action Area, and baseline data collection is needed to assess biodiversity, connectivity, and potential sensitivity to anthropogenic stressors.

3.5.1.3 Bathypelagic (1,000–4,000 m)

The bathypelagic zone, extending from 1,000- to 4,000-m depth, is a cold, dark, and high-pressure environment that supports a unique assemblage of deep-sea organisms. This zone lies below the reach of sunlight and is characterized by stable temperatures (typically 1–4°C), low food availability, and slow biological processes (Seibel and Drazen 2007; Black et al. 2021). In the American Samoa EEZ, this zone includes both open-ocean water column habitats and prominent bathymetric features such as seamounts, which contribute to regional biodiversity and ecological complexity.

Bathypelagic fauna are adapted to extreme conditions and include gelatinous zooplankton (e.g., medusae, siphonophores), deep-living cephalopods, amphipods, and fishes such as grenadiers (*Coryphaenoides* spp.), slickheads (Alepocephalidae), and deep-sea eels. Many species exhibit low metabolic rates, slow growth, and long lifespans (Roark et al. 2009; Drazen et al. 2021). Ontogenetic vertical migration is common, with juveniles occupying shallower depths and adults residing in the bathypelagic zone (Bandara et al. 2021).

Seamounts (defined as features that rise > 1,000 m above the seabed) within this depth range are ecologically important. They alter local hydrodynamics, enhancing vertical mixing and productivity, and serve as biodiversity hotspots and aggregation sites for pelagic species such as tuna and cetaceans (Clark et al. 2010; Morato et al. 2010; Nagai et al. 2021). Seamounts support distinct benthic communities, including deep-sea corals, sponges, and echinoderms, many of which are vulnerable to disturbance and exhibit limited dispersal (Vanreusel et al. 2016; Kennedy et al. 2019). There are seamounts within the American Samoa EEZ some of which are only predicted (Wessel et al. 2010; Yesson et al. 2021).

Despite their importance, seamount ecosystems in the American Samoa EEZ remain poorly characterized. Limited ROV and AUV surveys have reached these depths (e.g., Kennedy et al. 2019; National Centers for Environmental Information 2020), and baseline data collection is needed to assess biodiversity, connectivity, and potential sensitivity to anthropogenic stressors.

3.5.1.4 Abyssalpelagic (4,000–6,000 m)

The abyssalpelagic zone, ranging from 4,000- to 6,000-m depth, represents one of the most remote and least explored regions of the ocean. It is characterized by perpetual darkness, near-freezing temperatures (~1–2°C), high hydrostatic pressure, and extremely low food availability. These conditions result in a unique biological community adapted to extreme environmental constraints (Seibel and Drazen 2007; Black et al. 2021).

Organisms in this zone include gelatinous zooplankton, deep-living amphipods, polychaetes, and fishes such as cusk eels (*Abyssobrotula* spp.) and grenadiers. Many species exhibit slow growth, low metabolic rates, and long lifespans, with some deep-sea corals and fish living for centuries (Roark et al. 2009; Drazen et al. 2021). Biomass is generally low, but diversity can be high, particularly among meiofauna and microbial communities (Rex et al. 2006; Rabone et al. 2023).

The abyssalpelagic zone above the seafloor is tightly coupled to the benthic environment through vertical fluxes of particulate organic matter and the activities of vertically migrating species. Recent studies suggest that even small increases in turbidity or sedimentation can disrupt feeding and respiration in abyssal organisms (van der Grient and Drazen 2022). The presence of a deep scattering layer near the seafloor, composed of micronekton and zooplankton, has been observed in similar regions and may also occur in the American Samoa EEZ (Ellis et al. 2025).

Despite its ecological importance, the abyssalpelagic zone in the American Samoa region remains poorly characterized and physical factors that may drive biodiversity and productivity have not been described.

For example, the importance of the carbonate compensation process, which is the ocean depth below which calcium carbonate dissolves faster than it accumulates, limiting sedimentation and reducing habitat complexity, may be an important constraint (Simon-Lledó et al. 2023). Only a handful of AUV dives have reached these depths, no quantitative biological surveys have been conducted within the proposed lease areas, and no water column samples from this depth range have been analyzed for biodiversity or ecosystem function. Baseline data collection is needed to assess biodiversity, connectivity, and potential sensitivity to anthropogenic stressors.

3.5.1.5 Abyssal Plain (4,000–6,000 m and ~3 m Above Substrate)

The abyssal plain (defined here as the seabed and the water column immediately above the substrate) within the Proposed Action Area spans depths of 4,000- to 6,000-m and is part of one of the most extensive deep-sea habitats on Earth. This environment is characterized by soft sediments, potential polymetallic nodule fields, and complex terrain, including abyssal hills and potentially other bathymetric features. Despite its remoteness and low productivity, abyssal plain habitats generally support a diverse and highly specialized biological community that is adapted to extreme environmental conditions.

In general, abyssal plain sediments are primarily composed of fine-grained clays and siliceous or calcareous biogenic material. These sediments accumulate at extremely slow rates, typically less than 0.5 cm per thousand years (Dutkiewicz et al. 2020) and are associated with low organic carbon fluxes (0.4–6 g C m^2/yr; Smith and Rabouille 2002). Abyssal soft sediment habitats and species in American Samoa are undescribed. McCormack (2016) describes species within the Cook Islands EEZ, which abuts the Proposed Action Area. However, previous expeditions have shown that the American Samoa deep benthic communities are unique from other nearby regions (Kennedy et al. 2019). Abyssal plains typically host high species richness and low biomass, dominated by smaller size-fractions (Rex et al. 2006). In the CCZ, which shares similar environmental conditions, 88–92% of species remain undescribed, and many are known from only one or two specimens (Rabone et al. 2023). Similar patterns are expected in the Proposed Action Area.

If present, polymetallic nodules would be a defining feature of this habitat. Nodules create habitat heterogeneity and structural complexity, which can drive local ecological patterns (Simon-Lledó et al. 2019b; Durden et al. 2020; Fleming et al. 2025). Sessile fauna such as sponges, bryozoans, xenophyophores, and cnidarians colonize nodule surfaces, while meiofauna and macrofauna inhabit the interstitial spaces and crevices (Vanreusel et al. 2016; Drennan et al. 2021; Pape et al. 2021). Nodules have been shown to contribute to distinct ecosystem functions and services (Thurber et al. 2014; Purser et al. 2016; Orcutt et al. 2020; Stratmann et al. 2021). Microbial communities may be of special importance in this habitat as they play essential roles in nutrient cycling and metal oxidation on nodule surfaces and within sediments (He et al. 2025).

The abyssal plain is not uniformly flat. Abyssal hills, ridges, and other features may introduce topographic heterogeneity that influences current flow, sediment deposition, and biological community structure. Seamounts within the American Samoa EEZ may also occur at abyssal depths; none of them have been surveyed. Research in other regions demonstrates limited taxonomic overlap between seamounts and abyssal plains (Laroche et al. 2020), but they may contribute limited source populations and overall biodiversity to the latter (Leitner et al. 2021). Seamount flanks that extend into the abyssal depth range may also serve as refugia or source populations for recolonization following disturbance (Leitner et al. 2021).

In summary, abyssal benthic habitats in the Proposed Action Area remain poorly studied. Few AUV dives and box core samples have reached these depths, no comprehensive biological surveys have been conducted, and no sediment samples have been analyzed for biological characterization. Potential stressors from proposed activities include habitat disturbance, sediment plumes and turbidity, marine debris, anthropogenic noise, artificial light, and electromagnetic field (EMF) alteration.

3.5.2 Impact Analysis

Proposed Action

BOEM proposes to issue two leases for preliminary seabed mineral exploration activities in the Proposed Action Area. These activities include marine vessel traffic; HRG surveys; sediment sampling; buoy and mooring deployment, operation, and retrieval; AUV and ROV surveys; and other low-impact technologies. Although these activities would not result in commercial-scale disturbance, they may introduce a suite of potential stressors into offshore habitats from the surface to the abyssal seabed, including habitat disturbance, sediment resuspension and turbidity, FAD effect, marine debris, anthropogenic noise, artificial light, EMF alteration, and oil spills. Entanglement, vessel strike, and displacement of fishing activities also are concerns for large epipelagic fishes (**Section 3.11**).

Habitat Disturbance. Habitat disturbance would be most relevant where sampling devices, moorings, and landers make contact with the seabed. BOEM estimates that up to 2,259 box core and grab samples may be collected under the two-lease scenario, potentially disturbing about 1,952 m^2 of seafloor and affecting approximately 0.0000019% of the total Proposed Action Area. Additional disturbance from moorings, landers, and UTP units may affect approximately 960 m^2 (**Chapter 2**).

While the areal footprint is very small, the local consequences are likely to persist due to the extreme longevity and slow recovery of deep benthic communities. Experimental mining studies in and near the CCZ have shown that microbial, infaunal, and megafaunal communities may not recover to pre-disturbance levels, even after 26–44 years (Jones et al. 2017; Simon-Lledó et al. 2019a; Vonnahme et al. 2020; Jones et al. 2025). Nodules themselves take millions of years to form (Hein et al. 2020), and their removal or disturbance could result in permanent habitat loss on human timescales. However, ecosystem structure and functioning are expected to remain intact within the Proposed Action Area due to the small footprint of preliminary activities.

Seamount flanks may be affected by benthic-disturbing activities. These features often host vulnerable communities such as deep-sea corals and sponges, which are highly sensitive to physical disturbance and exhibit limited dispersal (Shank 2010). Even minor contact could damage these long-lived organisms. Avoidance of seamount habitats could minimize this risk.

Sediment Resuspension and Turbidity. Sediment sampling, buoy and mooring activities, and placement of other benthic-oriented equipment may resuspend sediments and increase turbidity. Although these are expected to be short-lived and spatially limited, even minor increases in turbidity can affect filter feeders and visual predators in the abyssal plain and abyssalpelagic zone (van der Grient and Drazen 2022). Deep-sea organisms are adapted to extremely clear waters, and small changes in suspended sediment concentrations (e.g., 0.04–0.08 mg/L) may impair feeding and respiration. Only a very small part of the Proposed Action Area will be sampled, and no population-level effects are expected from proposed activities.

FAD Effect. For the duration of their emplacement, surface buoys and moored structures may act as FADs, altering the behavior and distribution of pelagic species such as tuna, mahi-mahi, and billfish (Kramer et al. 2015). These effects are most relevant in the epipelagic and upper mesopelagic zones. FADs can increase local fish densities, potentially enhancing predation risk, altering trophic interactions, and increasing fishing pressure, including bycatch (Seto et al. 2024). While the Proposed Action limits the number of buoys to four, their presence in a remote and relatively undisturbed region could have disproportionate ecological effects. The FAD effect will be eliminated with the removal of surface structures and is not expected to cause population-level changes within the region.

Marine Debris. Observations from previous ROV dives indicate that the highest density of deep-sea debris in the Central and Western Pacific was recorded within the American Samoa EEZ (Amon et al. 2020). While the Proposed Action does not intentionally introduce debris, the deployment of expendable gear and potential loss of equipment (e.g., UTPs, mooring components) could contribute to long-term accumulation of marine litter. Lost gear may persist for decades or longer in the deep sea, where degradation is extremely slow, and may pose entanglement risks or alter benthic habitat structure. Recovery operations for lost equipment, if required, could also cause additional seafloor disturbance. To mitigate these risks, all Proposed Action-associated activities will be conducted in compliance with applicable U.S. regulations, including the Marine Debris Act (33 U.S.C. § 1951 et seq.) and relevant provisions of International Convention for the Prevention of Pollution from Ships (MARPOL) Annex V, which prohibits the discharge of plastics and other persistent solid wastes into the ocean.

Anthropogenic Noise. Noise from survey vessels, AUVs, ROVs, and acoustic equipment (e.g., MBESs, ADCPs, USBL systems) may affect species across all depth zones. Noise stressors are addressed in more detail in **Appendix D**. Preliminary activities primarily include Tier 4 *de minimis* sound sources that are unlikely to cause take; however, short-term behavioral responses may occur for sensitive species in close proximity to the sound source during sound exposure. In abyssal habitats where light is absent and visual cues are limited, acoustic and mechanosensory systems may offer a key sensory modality for organisms to perceive their environment. For example, deep-sea fishes such as macrourids may be sensitive to low-frequency noise, though data are limited (Marshall 1965; Hendricks et al. 2025). Additional studies are needed to fully understand potential effects of anthropogenic noise.

Artificial Light. Artificial lighting from surface vessels, AUVs, and ROVs may disrupt diel vertical migration patterns in the epipelagic and mesopelagic zones. Many zooplankton and micronekton migrate nightly to feed in surface waters and return to depth during the day. Artificial light can suppress this behavior, altering predator-prey dynamics and carbon flux (Berge et al. 2020; Marangoni et al. 2022).

As depth increases, the role of vision transitions from dominant (epipelagic) to highly specialized (meso- and bathypelagic) to largely diminished (abyssal habitats) (Haddock and Choy 2024). In the mesopelagic zone, visual interactions are particularly important and have driven the evolution of sensitive eyes and bioluminescent signaling. In deeper zones, the scarcity of light leads to a shift toward other sensory modalities, although bioluminescence remains a key adaptation in many midwater species. Artificial light from AUVs or ROVs may disturb visually sensitive species such as gelatinous zooplankton and deep-sea fishes, but the spatial extent and temporal duration of artificial light from Proposed Action activities would be limited. Additional studies would be needed to fully understand potential consequences in deep habitats.

EMF Alteration. Some survey equipment (e.g., ADCPs, USBL systems) and mooring components may generate or alter local EMFs. Though the intensity and spatial extent are expected to be minimal, EMF-sensitive species in all habitats may be affected during migration or foraging. However, given the limited deployment of EMF-generating gear, impacts are expected to be negligible.

Oil Spills. The risk of a petroleum spill is expected to be low but not negligible (**Chapter 2**). Nevertheless, even small spills could affect many species, especially larvae in the surface waters of the epipelagic zone. Compliance with 33 CFR Parts 151, 154, and 155 is expected to minimize this risk.

Alternative B: Maximum Leasing

Under Alternative B, there would be five leases issued compared to two leases under the Proposed Action. This alternative would increase the number of vessel trips, which may increase noise impacts, but the overall level is still considered to be minimal. Preliminary activities under Alternative B and the Proposed Action are similar in number, so impacts are expected to be similar.

Alternative C: No Action

Under the No Action Alternative, commercial leases would not be issued in the Proposed Action Area. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on offshore environments for the timeframe considered in this EA. Offshore environments in the Proposed Action Area are subject to a variety of ongoing impacts that overlap with the Proposed Action, including shipping, fishing, and dynamic ocean conditions. Implementing the No Action Alternative would not meaningfully reduce ongoing impacts on offshore environments when compared to the Proposed Action.

Environmental Protection Measures

BOEM regulates preliminary activities on OCS mineral leases to ensure environmental protection and operational oversight. These activities are described in **Chapter 2**. Lessees are required to notify BOEM at least 30 days prior to initiating any preliminary activities and provide a detailed description and schedule of the proposed operations (30 CFR 582.21d). This advance notice allows BOEM to evaluate potential environmental impacts and determine whether additional environmental review or action is necessary. Environmental protection measures a lessee should consider are outlined below and some are included as BMPs in **Appendix C**.

Future discharge activities are evaluated for environmental risk and regulatory compliance before they occur. Pursuant to the BOEM's authority under 30 CFR § 582.20–582.29 and 43 U.S.C. § 1334(a)(1), the Lessee shall submit details and analyses on discharge-related activities. BOEM will then review discharge-related activities on lease, including but not limited to midwater plumes, tailings, or process water discharges. The information shall be incorporated into Delineation, Testing, and/or Mining and Plans, as applicable, and recommends including, at a minimum: characterization of waste streams, discharge methods and locations, plume modeling and dispersion analysis, impact minimization measures, monitoring and adaptive management plans, emergency response procedures, and documentation demonstrating compliance with applicable provisions of the Clean Water Act, Marine Protection, Research, and Sanctuaries Act, Endangered Species Act, and Marine Mammal Protection Act. The information shall be reviewed and updated by the Lessee at least every five (5) years, or as required due to operational changes or new scientific information. The forward-looking recommendation supports BOEM's responsibility under OCSLA to prevent undue harm to the marine environment and provides a mechanism for adaptive oversight as technologies and scientific understanding evolve.

The public disclosure of environmental data ensures that the Lessee shall make all environmental data, information, and associated metadata collected publicly available (30 CFR 582.5). Available data minimizes the collective impacts of repeated surveys, habitat disturbance, and potential future extraction on ecological communities that may have slow recovery rates and high endemism. Public access to environmental data promotes transparency, facilitates independent scientific review, and supports regional ecosystem assessments that can reduce duplicative surveys and improve the efficiency and environmental performance of future leasing decisions. Enabling shared access to baseline and monitoring data reduces costs for industry by minimizing redundant data collection and streamlining environmental review for subsequent activities.

BMPs are proposed to safeguard marine ecosystems, consistent with OCSLA and NEPA (**Appendix C**) and are intended for planning and analytical purposes only. Their inclusion in this EA does not constitute final agency action and could be subject to further interagency consultation, public review, and formal adoption through the lease issuance process in accordance with 30 CFR 581.17 and applicable BOEM procedures. The Protection of Biological Resources BMP would (1) protect known habitats and species vulnerable to human activities, and, given the much of the Proposed Action Area is unexplored, and (2) establish an adaptive management framework that enhances environmental protection. Although the Proposed Action is limited to preliminary activities, it may establish conditions that facilitate future scientific research, delineation actions, etc. The Proposed Action does not authorize commercial mining, but there is potential for future discharge of waste streams, and early consideration of discharge-related safeguards is warranted.

3.5.3 Conclusion

The analysis considered the habitat disturbance, sediment resuspension and turbidity, a FAD effect, marine debris, anthropogenic noise, artificial light, EMF alteration, and oil spills associated with preliminary activities described in the Proposed Action. While the spatial footprint of these activities is minimal relative to the total Action Area, the persistence and sensitivity of deep-sea communities warrant careful consideration. BOEM's analysis concludes that, with implementation of the proposed lease stipulations, the Proposed Action is not expected to result in substantial adverse impacts to offshore habitats. However, the analysis also highlights data gaps, particularly in the deeper zones of the Action Area, where biodiversity, ecological function, and baseline conditions remain poorly characterized. To address these uncertainties and support adaptive management, BOEM recommends continued baseline data collection, habitat mapping, and monitoring of potential cumulative impacts.

3.6 Nearshore Habitats

3.6.1 Affected Environment

In this document, nearshore environments refer to benthic and water column habitats from the Tutuila intertidal zone (i.e., interface between terrestrial and marine zones) seaward to 3 nmi. Nearshore geomorphology and benthic biological cover of American Samoa are described in National Centers for Coastal Ocean Science (2005) and NOAA (2005). Notable habitat types include coral reefs, seagrasses, and mangroves.

Pago Pago port infrastructure represents an artificial nearshore habitat, where survey vessels may start and end. It consists of mostly sand and pavement, and hosts coralline algae, corals, macroalgae, and turf algae (National Centers for Coastal Ocean Science 2005; NOAA 2005). The dock pilings provide additional structure for sessile organisms (algae, corals, oysters, sponges) to attach (NOAA 2019). A previous study found 28 non-native marine species in American Samoa; 20 were only found in the inner harbor, likely introduced through vessels (Coles et al. 2003).

3.6.1.1 Coral Reefs

Coral reefs are highly diverse and productive systems that provide numerous functions and services. They are considered biodiversity hotspots, providing habitat for many marine species (Roberts et al. 2002). American Samoa hosts more than 300 species of coral (Birkeland et al. 2008), as well as mesophotic species (Montgomery et al. 2019). The region's corals are monitored by several programs, including long-term monitoring by the Coral Reef Advisory Group and the NOAA National Coral Reef Monitoring Program. Several coral species listed under the Endangered Species Act (ESA) occur in American Samoa (**Section 3.10**). Common reef fish include surgeonfish, parrotfish, damselfish, and butterflyfish, some of which contribute to local subsistence and artisanal fisheries (Craig 2009). Two native species of giant clam reside on the reefs (*Tridacna maxima* and *T. squamosa*), and additional species have been introduced through mariculture (*T. gigas*, *T. derasa*, and reintroduced *Hippopus hippopus*; Craig 2009). American Samoa coral reefs are in varying stages of recovery from historical and current pressures, such as tropical cyclones, development, fishing, pollution, disease and predator (*Acanthaster planci*) outbreaks, and dynamic ocean conditions (Birkeland et al. 2008; Houk et al. 2010). A status report in 2018 indicated that the coral reefs were in good condition (NOAA 2018).

3.6.1.2 Seagrass Beds

Seagrasses are aquatic, flowering plants that can form submerged meadows along the coast. They play key biological and physical roles in nearshore environments (Larkum et al. 2006; Duarte et al. 2008). Seagrass meadows provide habitat for fish and invertebrate communities—including nursery and recruitment grounds for adjacent habitats (Beck et al. 2001; Dorenbosch et al. 2005)—that can also contribute to local fisheries (Gillanders 2006). Seagrasses protect shorelines (Koch et al. 2006), increase sedimentation rates (Gacia and Duarte 2001), and act as a biological filter for nearshore waters (Marbà et al. 2006). Seagrass meadows are highly productive and contribute to carbon services (Mateo et al. 2006), as well as nutrient cycling, such as nitrogen and phosphorous (Marbà et al. 2006; Romero et al. 2006). There are three species of seagrass on American Samoa: *Halophila ovalis*, *H. ovalis ssp. bullosa*, and

Syringodium isoetifolium (Skelton and South 2006; Ellison 2009). Overall, wetland area in American Samoa is decreasing due to land use and other human activities (Haws 2006; Craig 2009).

3.6.1.3 Mangroves

Mangroves are an important nearshore habitat found in American Samoa. Mangrove forests are highly productive, serving as habitat and nursery grounds for fish and invertebrate species (Robertson and Duke 1987; Paillon et al. 2014). They have high carbon densities and support global carbon cycling (Alongi 2008; Adame et al. 2021), as well as cycling of nutrients and organic matter (Singh et al. 2005). Mangroves provide protection against storms and coastal flooding through their ability to buffer waves and winds (Alongi 2008; Zhang et al. 2012; Das and Crépin 2013). American Samoa has three species of mangrove: oriental mangrove (*Bruguiera gymnorhiza*), red mangrove (*Rhizophora mangle*), and puzzlenut tree (*Xylocarpus moluccensis*) (Bardi and Mann 2004). Mangrove habitat in American Samoa is in decline due to population growth and development pressures (Craig 2009), losing approximately 5 acres of mangrove annually (Bardi and Mann 2004). The majority of remaining mangrove habitat is in Nu’uuli Pala Lagoon (NOAA 2005), but pockets of habitat persist in Leone Pala Lagoon and Pala Lake on Aunu'u Island (Craig 2009).

3.6.2 Impact Analysis

Proposed Action

Activities associated with the Proposed Action are not expected to impact nearshore environments due to their geographic separation from where preliminary activities would occur. Any impacts that could occur would be from accidental events, such as vessel grounding or oil spill. Project vessels could introduce noise or non-native species, but these potential effects are not expected to affect viability of regional biological populations or cause long-lasting damage to habitats.

Alternative B: Maximum Leasing

Under Alternative B, there would be five leases issued compared to one or two leases under the Proposed Action. This alternative would increase the number of vessel trips, which may increase the risk of accidental events, but overall impacts to nearshore environments are still not expected.

Alternative C: No Action Alternative

Under the No Action Alternative, commercial leases would not be issued in the Proposed Action Area. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on nearshore environments for the timeframe considered in this EA. Nearshore environments in the Proposed Action Area are subject to a variety of ongoing impacts that overlap with the Proposed Action, including development, point and non-point pollution, shipping, and dynamic ocean conditions. Implementing the No Action Alternative is not expected to meaningfully reduce ongoing impacts on nearshore environments when compared to the Proposed Action.

3.6.3 Conclusion

Based on the limited scope preliminary activities and the lack of direct spatial overlap between the Proposed Action Area and nearshore environments, there are no expected impacts to nearshore environments for any action alternatives.

3.7 Protected Habitats

3.7.1 Affected Environment

3.7.1.1 Essential Fish Habitat

EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. §1802(10)). Habitat Areas of Particular Concern (HAPCs) are defined as “discrete subsets of EFH that provide extremely important ecological functions, are especially vulnerable to degradation, are particularly rare, or are already subject to substantial stress from development or fishing activities” (50 CFR § 600.815(a)(8)).

Through Fishery Ecosystem Management Plans and related documents, the Western Pacific Regional Management Council (WPRFMC) has identified and described EFH and HAPCs for the American Samoa Archipelago and for the Pelagic Fisheries of the Western Pacific, and these documents are incorporated by reference (Western Pacific Regional Fishery Management Council 2005; 2009). Broadly, EFH in the American Samoa Archipelago includes the water column down to 1,000-m depth from the shoreline out to the 200-mi EEZ boundary. The WPRFMC designated as HAPCs for managed pelagic species the upper 1,000 m of the water column above all seamounts and banks that are less than 2,000 m in the EEZ. These areas are also designated as HAPCs for Archipelago managed species: coral reefs, all escarpments and slopes between 40–280 m, and all banks with summits less than 30 m. the Proposed Action Area.

3.7.1.2 Rose Atoll Marine MNM/Rose Atoll National Wildlife Refuge

The Proposed Action Area is 50 nmi from the shoreline of Rose Atoll MNM which is the southernmost point of the United States, approximately 180 nm east of Tutuila and is managed by the Secretary of Commerce (NOAA) and the Secretary of the Interior (U.S. Fish and Wildlife Service [USFWS]). It is approximately square (1.5 mi by 1.5 mi), with two sandy islets encasing a 1.2 mi-wide lagoon and Rose Island in the eastern corner. The Monument was established in 2009 and includes the Rose Atoll National Wildlife Refuge to total approximately 13,451 mi^2 of land and water (NOAA Fisheries 2025b). The monument is also part of the NMSAS.

The Rose Atoll National Wildlife Refuge Comprehensive Conservation Plan (Rose Atoll National Wildlife Refuge and Pacific Reefs and Hawaiian and Pacific Islands Planning Team 2014) describes habitats and species in detail and is incorporated by reference. Rose Atoll coral and fish communities are distinct from those elsewhere in American Samoa, including higher densities of giant clams (Rose Atoll National Wildlife Refuge and Pacific Reefs and Hawaiian and Pacific Islands Planning Team 2014). The primary reef-building species is crustose coralline algae, with the outer reef slope dominated by coralline algae and mixed corals to approximately 150 ft. Most of the lagoon is covered in unconsolidated sand and rubble, but there are about 15 patch reefs that are dominated by *Favia*, *Acropora*, *Porites*, *Montipora*, *Astreopora*, *Montastrea*, and *Pocillopora* (NOAA Fisheries 2025b).

3.7.1.3 NMSAS

The NMSAS encompasses six distinct units (Fagatele Bay, Fagalua/Fogamaʻa, Aunuʻu, Taʻū, Swains Island, and Muliāva), covering approximately 13,581 mi^2 of marine habitat across the Samoan Archipelago (Office of National Marine Sanctuaries 2022). These areas span a range of marine ecosystems from shallow coral reefs to deep-sea hydrothermal vents, supporting some of the highest biodiversity in the Pacific. The NMSAS is co-managed with the American Samoa government and integrates traditional Samoan practices (NOAA 2025b).

Shallow coral reefs (< 30 m), such as those in Fagatele Bay and Aunuʻu, are dominated by over 340 species of stony corals and support diverse reef-associated species, including parrotfish, butterflyfish, reef sharks, and invertebrates (Office of National Marine Sanctuaries 2022). Mesophotic coral ecosystems (at 30- to 150-m depths) occur at Fagalua/Fogama’a, Aunu’u, Ta’u, and Swains, where low-light conditions support unique coral, sponge, and fish assemblages (NOAA 2025a). Deeper habitats include seamounts, hydrothermal vents, and abyssal plains—such as those at Vailuluʻu Seamount and Nafanua volcanic cone—and support deep-sea corals, echinoderms, crustaceans, and unique microbial and eel communities (NOAA 2025a). Pelagic waters provide habitat for many species, including commercially important fishes, such as albacore, yellowfin tuna, skipjack, and bigeye tuna (Office of National Marine Sanctuaries 2022).

3.7.1.4 Village Marine Protected Areas

VMPAs in American Samoa are community-managed conservation zones established under the Community-based Fisheries Management Program and administered by the Department of Marine and Wildlife Resources. These areas are typically located within 0.5 nm from shore and extend to depths of up to 150 m, encompassing fringing coral reefs, reef flats, and adjacent lagoon habitats (Poti et al. 2011; ProtectedSeas 2025). VMPAs are designed to protect nearshore reef ecosystems while reinforcing traditional Samoan stewardship practices (Raynal et al. 2016). These areas support a high diversity of reef fish, invertebrates, and culturally important species such as giant clams (*Tridacna* spp.) and sea cucumbers (Marra-Biggs et al. 2025).

3.7.2 Impact Analysis

Proposed Action

EFH. Potential impacts from the Proposed Action have already been discussed under Offshore Habitats (**Section 3.5**) and Nearshore Habitats (**Section 3.6**). The impact analysis and conclusions from these sections that have habitats which correspond to EFH and HAPCs would be the same. No substantial adverse impacts are expected.

VMPAs. Potential impacts from the Proposed Action have already been discussed under Nearshore Habitats (**Section 3.6**), where all VMPAs are located. There is no spatial overlap with the Proposed Action Area. The impact analysis and conclusions from this section for habitats which correspond to VMPAs would be the same. No substantial adverse impacts are expected.

Rose Atoll and NMSAS. While there is some information about shallow reef and lagoon habitats of Rose Atoll and NMSAS, there are fewer data on deepwater habitats and species within the NMS, so potential impacts are uncertain. More accurate analysis would require identification of sensitive habitats and species, and threshold concentrations at which they would be impacted. Other useful data are high-resolution information about oceanographic regimes within the Proposed Action Area to assess any indirect effects, such as sediment transport into Rose Atoll. Given what is known, impacts to Rose Atoll and NMSAS are not expected from preliminary activities. Any potential impacts would be from accidental events, such as vessel grounding or oil spill.

Alternative B: Maximum Leasing

Under Alternative B, there would be five leases issued compared to two leases under the Proposed Action. This alternative would increase the number of vessel trips, which may increase the risk of accidental events, such as vessel grounding or collision. Other stressor levels are expected to be similar to the Proposed Action.

Alternative C: No Action

Under the No Action Alternative, commercial leases would not be issued in the Proposed Action Area. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts to EFH, Rose Atoll, and the NMSAS for the timeframe considered in this EA. Offshore environments in the Proposed Action Area are subject to a variety of ongoing impacts that overlap with the Proposed Action, including shipping, fishing, and dynamic ocean conditions. Implementing the No Action Alternative is not expected to meaningfully reduce ongoing impacts on offshore environments when compared to the Proposed Action.

Environmental Protection Measures

The Protection of Biological Resources BMP and the public disclosure of environmental data requirement from 30 CFR 582.5, which are described under Offshore Habitats (**Section 3.5**).

3.7.3 Conclusion

This analysis considered potential impacts to protected areas such as Essential Fish Habitat (EFH), Village Marine Protected Areas (VMPAs), Rose Atoll, and the NMSAS. Based on the limited scope preliminary activities and the lack of direct spatial overlap between the Proposed Action Area and protected areas, no substantial adverse impacts to these habitats are anticipated. While some uncertainty remains regarding the potential for indirect or accidental impacts, particularly in deepwater and pelagic zones near Rose Atoll and the NMSAS, the Proposed Action includes environmental protection measures, such as avoidance and adaptive management protocols that would provide further protection.

3.8 Marine Mammals and Sea Turtles

3.8.1 Affected Environment

There are numerous marine mammal species in the Pacific—including baleen whales, toothed whales, dolphins, seals, and sea lions—some of which are listed under the ESA of 1973, as amended (**Appendix B**) and/or considered depleted under the Marine Mammal Protection Act (MMPA; Carretta et al. 2024). Five ESA-listed species of sea turtles (green, hawksbill, leatherback, loggerhead, and olive ridley) (**Appendix B**) also inhabit the Pacific region. Detailed species descriptions, including habitat ranges, population trends, predator-prey interactions, and species-specific threats are described in the U.S. Pacific Marine Mammal Stock Assessments (Carretta et al. 2024) and sea turtle status reviews (Conant et al. 2009; NMFS and FWS 2014; Seminoff et al. 2015; NMFS and FWS 2020a; 2020b). These documents are incorporated by reference throughout this EA. Critical habitats (CHs) also are present in the Pacific Ocean, but none overlap with the Proposed Action Area; thus, as described below, no effects are anticipated.

3.8.2 Impact Analysis

Proposed Action

The potential stressors and impacts associated with the Proposed Action to marine mammals and sea turtles include 1) noise from HRG, geotechnical surveys, aircrafts, and vessels; 2) potential collisions with project-related vessels; 3) potential entanglement in mooring systems associated with the installation of buoys and with the deep-tow survey systems; 4) accidental fuel spills; and 5) trash and debris. If leases are issued, BOEM requires the lessee to comply with the scope of activities presented in this EA and with BMPs in **Appendix C** and the pending Biological Assessment submitted to NMFS in January 2026 to minimize potential impacts to marine mammals and sea turtles. These BMPs have been developed through years of conventional energy operations and consultations with the National Marine Fisheries Service (NMFS) and include vessel strike avoidance, visual monitoring, and reporting BMPs. Detailed descriptions of each stressor, as well as potential impacts to marine mammals and sea turtles, are described below.

In compliance with Section 7 of the ESA, BOEM consults with NMFS regarding the potential impacts of the Proposed Action on ESA-listed species. The analysis presented below will be reflected in the consultation with NMFS.

Risks from Noise-Associated Activities. BOEM considered the potential for acoustic injury and disturbance from a range of HRG survey sound sources. If leases are issued, BOEM would direct the lessee to comply with BMPs (**Appendix C**), including requirements for vessel strike avoidance zones and the presence of qualified Protected Species Observers (PSOs). BOEM believes that the risk of auditory injury occurring to any protected marine mammal or sea turtle species from HRG surveys would be insignificant. The auditory injury and disturbance distances for HRG surveys depend on the equipment and the species present. Harm from periodic behavioral reactions to HRG survey noise is not expected to occur for any protected marine mammal or sea turtle species with the use of BMPs. BOEM also determined that noise effects to protected species from geotechnical surveys conducted within the Proposed Action Area would be insignificant. Potential impacts from aircraft noise for marine mammals and sea turtles are also expected to be insignificant due to the relatively low levels and short duration of aircraft activity. Given that the noise associated with the operation of project vessels would be below the thresholds that could result in injury, no auditory injury is expected to protect species from vessel noise (2026 Biological Assessment and NMFS Letter of Concurrence).

A comprehensive review of the literature on marine mammals and vessel noise (Richardson et al. 1995; Erbe 2002) revealed that changes in behavior vary widely across species. Despite several demonstrable examples of short-term biological consequences (i.e., behavioral reactions) in individuals (Holt et al. 2015), it is challenging to draw conclusions regarding potential long-term or population-level effects. Vessel noise is expected to be insignificant because of the relatively low number of expected vessel trips and vessel size (**Table 2-6**); therefore, the impacts from vessel noise on marine mammals are expected, with the use of required BMPs, to be insignificant. The unknown duration of the Proposed Action, which could span from intermittent surveys over months to years, as well as data gaps regarding the seasonal distribution and behavior of marine mammal and sea turtle species in the Proposed Action Area, lead to uncertainty surrounding the level of impact to marine mammals and sea turtles from the Proposed Action. Furthermore, there is a lack of data on the transmission of sound from the proposed activity in this deepwater area near American Samoa, leading to further uncertainty in potential impacts to protected species. The proposed action is considering sound sources, which are designated as de minimis, and found not to harm protected species (Ruppel et al., 2022). In addition, BMPs are in place to ensure compliance and include the use of PSOs and for the Lessee to notice BOEM prior to a mobilization with a complete list of equipment and methodologies. More detailed information about BMPs can be found in the related 2026 Biological Assessment and **Appendix C.**

Vessel noise also is expected to have minimal impacts on sea turtles with the use of required BMPs. More information can be found in the related 2026 Biological Assessment and NMFS Letter of Concurrence.

Vessel Strike Risks from Project-related Vessel Traffic. Vessel strikes pose a threat to the West Pacific population of leatherback sea turtles that are known to be around the Proposed Action Area. Of leatherback strandings documented in central California between 1981 and 2016, 11 were determined to be the result of vessel strikes (7.3% of total; NMFS and FWS 2020a). However, information on leatherback vessel strikes for other locations is not available (NMFS and FWS 2020a). Additionally, although vessel strikes are a known threat, specific vessel strike incidents of other sea turtle species are not documented. For marine mammals, reports of three entanglements (see below for details)—but no ship strikes—have been documented around the Proposed Action Area.

The number of vessel trips for surveys within the Proposed Action Area is a conservative estimate (**Table 2-6**), meaning that BOEM included a higher number of trips than is likely.

BMPs for Vessel Strike Avoidance and Injured/Dead Protected Species Reporting (in related 2026 Biological Assessment) are meant to minimize the risk of vessel strikes. Additionally, wherever available, lessees would be required to ensure all vessel operators check for daily information regarding protected species sighting locations. These media could include, but are not limited to, Channel 16 broadcasts, whalesafe.com, and Whale Alert.

BOEM expects that impacts on protected species from vessel interactions would be insignificant because of vessel strike avoidance BMPs and reporting requirements (in related 2026 Biological Assessment). The unknown duration of the Proposed Action, which could span from days to years, as well as data gaps regarding the seasonal distribution and behavior of marine mammal and sea turtle species in the Proposed Action Area, lead to uncertainty surrounding the level of risk of ship strikes to marine mammals and sea turtles from the Proposed Action.

Entanglement or Entrapment Risks. Observed and confirmed entanglements underestimate the true number of entangled whales, as many entangled whales go undetected (e.g., not observed while entangled and die at sea; NMFS 2024b). However, there are reports of large whales (including humpback, right, and fin whales) interacting with commercial or recreational fishing gear (e.g., buoys with identifiable marks, traps, nets, and monofilament line) and anchor moorings of yachts and other vessels; towing small yachts from their moorings; or becoming entangled in anchor chains, sometimes with lethal consequences (Blue Water Sailing 2012; Love 2013; Saez and DeAngelis 2021; NMFS 2024b). Additionally, a humpback mother (with a calf) was reported entangled in a longline in 2007 in the Cook Islands (NMFS 2009). Sea turtles have also been documented entangled in a large variety of man-made items (Duncan et al. 2017; Dodge et al. 2022). Since the Sea Turtle Disentanglement Network was formed in 2002 and through 2014, there have been 275 entanglements in vertical lines (NMFS 2015). Turtles are usually entangled around the neck and/or front flippers. Sightings of leatherback sea turtles in the eastern North Pacific are most frequently encountered off the coast of central California (Benson et al. 2007). This species faces significant threats from bycatch in fisheries (entanglement and/or hooking) (Benson et al. 2007; Dodge et al. 2022).

A photographic-based scar study of humpback whales of American Samoa stock has been initiated, and there is some indication of healed entanglement and ship strike wounds (NMFS 2009). Two false killer whales and one rough-toothed dolphin were entangled near 40-Fathom Bank south of the islands by the American Samoa-based longline fishery in 2008 (NMFS 2011b; 2011a). American Samoa longline fishery also interacted with sea turtles with documentation of 59 interactions with leatherback sea turtles between 2010 and 2017 (NMFS and FWS 2020a).

Ocean buoys with surface expression and anchoring could be used as part of the Proposed Action. A line connects the buoy to the anchor and is made of materials such as chain, jacketed wire, nylon rope, polypropylene rope, and subsurface floats (used to keep the mooring line taut to semi-taut, reduce slack, and eliminate looping). The Proposed Action also includes the use of HRG survey equipment, which includes lines that pose an entanglement risk such as deep tow lines (**Chapter 2**, **Tables 2-1 and 2-2**). BOEM would follow established protocol for minimizing potential entanglement of marine mammals and sea turtles. BOEM reviews each buoy design and method for use of HRG survey equipment to ensure that reasonable low risk designs are used. Potential impacts on marine mammal and sea turtle species from entanglement related to buoys and lines associated with HRG survey equipment are thus expected to be discountable.

Lost or derelict fishing gear could become entangled in the meteorological buoy lines and present an entanglement risk to protected species. Approximately two ocean buoys with surface float per lease area could be deployed as part of the Proposed Action. From 1982 to 2017, direct entanglements in fishing gear were most attributed to unidentifiable gear, netting, and pot/traps (Saez and DeAngelis 2021). Changes in gill-net fishing regulations helped address an increase in the 1980s, when primarily gray whales entangled with gillnets (Saez and DeAngelis 2021). With BMPs in place (in related 2026 Biological Assessment and **Appendix C**), effects from secondary entanglement related to buoy deployment and operations are expected to be discountable.

Any potential displacement of fishing effort resulting from the Proposed Action is expected to be temporary and limited in spatial scope considering the existing fishing grounds. Thus, entanglement impacts on marine mammals and sea turtles are expected to be insignificant.

Moon pools may be used in the Proposed Action Area to deploy or retrieve equipment (e.g., ROVs, AUVs). Moon pool usage presents potential for marine mammals and sea turtles to become entrapped. However, there is no known record of entrapment of protected species in the moon pools in the Pacific region. Due to the extreme unlikelihood of entrapment and reduction of impact with the use of BMPs (in related 2026 Biological Assessment and **Appendix C**), impacts from moon pool usage is expected to be discountable.

Impacts of Accidental Fuel Spills. Marine mammals and sea turtles are susceptible to oiling impacts because 1) they breathe at the surface of the water, and, if oil is present, they can inhale oil and its vapors into their lungs; 2) they can also be exposed to oil and its components by ingesting oiled prey; 3) breeding can be disturbed if sea turtle nests or breeding ground(s) for marine mammals are oiled; and 4) sufficient exposure to oil can lead to mortality events (Frasier et al. 2020). Although spills are not anticipated and are not part of the Proposed Action, if an accidental fuel spill occurred, it would be an acute event in a small area. Marine mammals and sea turtle species are injured or killed when in contact with oil either directly or by consuming contaminated food. An accidental incident could result in release of fuel or diesel by a survey vessel used as part of the Proposed Action; however, potential of an accidental spill is low, especially with the USCG spill prevention requirements in place.

Trash and Debris. Plastic is found throughout the world's oceans and could potentially pose a risk to marine mammals and sea turtles through entanglement or ingestion. Preliminary activities may generate trash comprising paper, plastic, wood, glass, and metal. However, companies operating offshore have developed and implemented trash and debris reduction and improved handling practices to reduce the amount of offshore trash that could potentially be lost into the marine environment. In addition, all authorizations for shipboard surveys would include guidance for marine debris awareness. The guidance would be similar to BSEE's Notice to Lessees (NTL) No. 2015-G03 ("Marine Trash and Debris Awareness and Elimination") or any superseding NTL. Therefore, the amount of trash and debris dumped offshore would be expected to be minimal, as only accidental loss is anticipated. Moreover, with the use of BMPs (in related 2026 Biological Assessment and **Appendix C**), risks to marine mammals and sea turtles would decrease. Addition of trash and debris from the Proposed Action is extremely unlikely, and, with BMPs and BSEE's guidance, effects to marine mammals and sea turtles are expected to be discountable.

Impacts on Critical Habitat. There are several Critical Habitats (CHs) of ESA-listed species (and one delisted ESA species) within the Pacific region: Central America distinct population segment (DPS), Mexico DPS and Western DPS of humpback whales (86FR21082), eastern and western U.S. stocks of Steller sea lions (50FR226.202, 50 FR30715), North Pacific right whale (74 FR 190000; 2008), killer whale (86FR14668), False killer whale (83 FR 35062), Hawaiian monk seals (50 CFR 226.201), and leatherback sea turtles (77FR4169). Although these CHs are within the Pacific, they do not overlap with the Proposed Action Area (**Table B-2**); thus, no effects to these CHs are expected from the Proposed Action.

NMFS and the U.S. Fish and Wildlife Service (USFWS) are proposing to designate CH for five DPS of green turtles (88 FR 46572,7/19/2023), and one of the proposed CH areas for the Central South Pacific DPS is in American Samoa (**Figure B-1**). Although this CH has been proposed, it has not been finalized. Thus, no analysis will be conducted for this proposed CH (see **Appendix B** for more information regarding the reason for the proposed CH).

Other Potential Impacts on Marine Mammals. NMFS observed several cetaceans (e.g., humpback whales, sperm whales, dwarf sperm whale, false killer whale, short-fin pilot whale, rough-toothed dolphin, spinner dolphin, bottlenose dolphin, Pantropical spotted dolphin) in American Samoa waters during ship surveys conducted in 2012 (NMFS, unpublished data). Moreover, there are marine mammal stocks specific to American Samoa: humpback whale, false killer whale, rough-toothed dolphin, and spinner dolphin. However, except for the humpback whales, available data for these American Samoa stocks are insufficient to obtain abundance estimates or understand behavior trends like feeding behavior, etc. (NMFS 2011b; 2011a; 2011c). The humpback American Samoa stock is known to breed in and around the Proposed Action Area since breeding behavior and the presence of very young calves have been documented in American Samoa waters (NMFS 2009). For example, one humpback whale sighted initially without a calf was resighted later in the season with a calf. This stock is also known to migrate through American Samoa, and the assumption is that they spend half of their time in and around the Proposed Action Area. Vessel speed restrictions of 10 kn or less may reduce total ship strike mortality risk levels to North Atlantic right whales by 80–90% (Conn and Silber 2013). This finding is applicable to reducing ship strike mortality risk for all large whales.

BOEM would direct the lessee to comply with several BMPs that control speed of vessels and require trained observers to be present and accountable. The use of long-term acoustic monitoring to evaluate the presence or absence of vocalizing marine mammals ensures that the activities associated with the Proposed Action reduce risks to humpbacks and other marine mammal species present in and around the Proposed Action Area (in related 2026 Biological Assessment). Due to the required BMPs, we expect that the impacts from the Proposed Action to breeding and migration of humpback whales and other marine mammals present within the Proposed Action Area would be insignificant. However, this determination represents the best estimate given the uncertainties—such as data gaps on the number of marine mammals, duration of breeding of humpback whales, and behavior (e.g., feeding) of other species that may be present within the Proposed Action Area when preliminary activities are taking place. Additionally, the duration of the Proposed Action and the lack of research measuring impacts from the proposed sound sources in this deepwater geographical area cause uncertainty in determining the impacts from the Proposed Action.

Other Potential Impacts on Sea Turtles. Several behaviors of sea turtle are known to occur in and around the Proposed Action Area. For example, green and hawksbill turtles nest in American Samoa (Tuato'o-Bartley et al. 1993; Grant et al. 1997; Murakawa et al. 2024), and these species also migrate and possibly feed in and around the Proposed Action Area (Becker et al. 2019; Murakawa et al. 2024). Specific behaviors of leatherbacks, olive ridleys, and loggerheads around the Proposed Action Area is uncertain, but their ranges include the Proposed Action Area (Conant et al. 2009; NMFS and FWS 2014; 2020a).

Due to the known nesting of green and hawksbill in American Samoa, breeding behavior may be affected by the Proposed Action; however, nesting typically occurs terrestrially and therefore does not overlap with the Proposed Action Area. Thus, BOEM does not expect nesting on land to be impacted.

Feeding and migration of sea turtles (including reproductively active females) may be affected by the Proposed Action. However, reduced risks to sea turtles are being discussed with NMFS in the related 2026 Biological Assessment. Thus, potential impacts to feeding, migrating, and actively breeding sea turtles are expected to be insignificant. The unknown duration of the Proposed Action, as well as data gaps regarding the seasonal distribution and behavior of sea turtle species in the Proposed Action Area lead to uncertainty surrounding the level of impact to sea turtles from the Proposed Action. Furthermore, there is a lack of data on the transmission of sound from the proposed activity in this deepwater area near American Samoa, leading to further uncertainty in potential impacts to protected species. If leases are issued, BOEM would direct the lessee to comply with BMPs. This determination is a best estimate based on the uncertainty (i.e., data gaps) of number of migrating, feeding, and actively breeding sea turtles within the Proposed Action Area.

Alternative B: Maximum Leasing

This alternative proposes to issue five leases, as opposed to two leases under the Proposed Action. The total leased acreage would remain the same, but subdividing the leased area into five leases would increase the probability and frequency of the risk factors for marine mammals and sea turtles analyzed for the Proposed Action. These include potentially greater impacts from active acoustic sound sources, vessel and equipment noise and vessel traffic, aircraft traffic and noise, ocean buoys, trash and debris, and accidental fuel spills.

Alternative C: No Action

Under this alternative, commercial leases would not be issued offshore American Samoa. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on marine mammals and sea turtles over the timeframe considered. Impacts from urban development and increasing air, vessel, and onshore traffic would have commensurate negative impacts. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to marine mammals and sea turtles from existing and potential future actions. The ongoing contributors to impacts stem from habitat disturbance and destruction as well as commercial and recreational fishing activities that could lead to vessel collision and entanglement.

3.8.3 Conclusion

Although several CHs are within the Pacific region, none of them overlap with the Proposed Action Area, and no effects to the CHs are expected from the Proposed Action. BMPs, which lessees would be required to comply with if leases are issued, protect wildlife and the environment during the proposed activities (in related 2026 Biological Assessment and **Appendix C**). As a result of these BMPs and the nature of the Proposed Action, the impacts on protected marine mammal and sea turtle species from preliminary activities (e.g., noise from vessels, aircraft, and HRG and geotechnical surveys, collisions with project-related vessels, entanglement in survey equipment, moon pools and buoy moorings, and accidental spills) are anticipated to be insignificant. BOEM cannot further estimate the extent of these impacts due to the data gaps regarding the presence and behavior of marine mammals and sea turtles within the Proposed Action Area (e.g., number and seasonal distribution of marine mammals, duration of breeding of humpback whales, behavior of other marine mammal species, number and seasonal distribution of migrating and feeding turtles, and number of actively breeding sea turtles). The unknown duration of the Proposed Action causes uncertainty surrounding the level of impact to marine mammals and sea turtles from the Proposed Action. Furthermore, there is a lack of data on the transmission of sound from the proposed activity in this deepwater environment near American Samoa, leading to further uncertainty. If leases are issued, BOEM would direct the lessee to comply with BMPs to minimize the impact on marine mammals and sea turtles from the Proposed Action. BOEM will continue to reevaluate to determine if new BMPs are necessary as new information, methodologies, and technology become available.

3.9 Marine and Coastal Birds

3.9.1 Affected Environment

The marine and coastal bird population in the region encompassing American Samoa and Rose Atoll is composed of at least 40 species (O'Connor and Rauzon 2004; Rose Atoll National Wildlife Refuge and Pacific Reefs and Hawaiian and Pacific Islands Planning Team 2014; eBird 2025) (**Appendix B**). Of the different types of birds that are expected to be in this area, marine birds are expected to be the most sensitive to the potential impacts of the Proposed Action. Marine birds in this region include species of terns, tropicbirds, albatrosses, storm-petrels, gadfly petrels, shearwaters, frigatebirds, and boobies. While some of these species breed in the area, others may spend their nonbreeding period there or may simply pass through during migration. Several species of shorebirds (e.g., plovers and sandpipers) also occur on American Samoa, Rose Atoll, and other islands in the region. Their distribution is generally coastal except for migration periods when they cross vast expanses of ocean. This analysis considers the area covered by the Area ID recommendation and the islands in the vicinity.

There are a variety of coastal and marine birds that nest on Rose Atoll, American Samoa, and other islands in the region. Information on coastal and marine birds in this area can be found in the first inventory of seabirds in the National Park of American Samoa (O'Connor and Rauzon 2004) and in the *Rose Atoll National Wildlife Refuge Comprehensive Conservation Plan* (Rose Atoll National Wildlife Refuge and Pacific Reefs and Hawaiian and Pacific Islands Planning Team 2014). Species known to breed on the islands include Black Noddy (*Anous minutus*), Brown Noddy (*Anous stolidus*), Little White-Tern (*Gygis microrhyncha*), Sooty Tern (*Onychoprion fuscatus*), Gray-backed Tern (*Onychoprion lunatus*), Black-naped Tern (*Sterna sumatrana*), White-tailed Tropicbird (*Phaethon lepturus*), Red-tailed Tropicbird (*Phaethon rubricauda*), Great Frigatebird (*Fregata minor*), Lesser Frigatebird (*Fregata ariel*), Masked Booby (*Sula dactylatra*), Brown Booby (*Sula leucogaster*), and Red-footed Booby (*Sula sula*). The higher elevations of Ta'u and Tutuila Islands in the Manu'a Group of American Samoa support breeding populations of the burrow nesting Tahiti Petrel (*Pseudobulweria rostrata*), and Tropical Shearwater (*Puffinus bailloni*). Breeding population estimates for these species are in **Appendix B**.

These species are expected to forage near the islands, but some species may move extensive distances from the islands to forage and are likely to overlap with waters included in the Proposed Action Area. There is little information available on the at-sea spatial patterns of birds in this region, but the species breeding on the islands near the Proposed Action Area could provide some context of the species that are likely utilizing this area for foraging or otherwise passing through the area. As potential marine mineral mining projects may move forward in this region, it would be valuable to collect baseline data on the at-sea distribution of birds in this region.

In addition to the local breeding species, marine birds from islands much farther away may be utilizing the Proposed Action Area as well. Many of these are highly pelagic species that generally occupy deeper waters farther from shore and predominantly comprise species that are dispersing through the South Pacific from distant breeding areas that can be hundreds or thousands of miles away. These species spend much of their time on the water surface or diving for food. In the Proposed Action Area, highly pelagic species are expected to include a variety of Procellariiformes, including albatrosses, storm-petrels, gadfly petrels, and shearwaters. These presence of the species is expected to be seasonal and primarily when they are dispersing away from distant breeding locations. However, local breeding species such as the Tahiti Petrel and Tropical Shearwater may be more regular in the Proposed Action Area. Procellariiformes are especially susceptible to light attraction and may be impacted during night operations.

In addition to seabirds, there are several species of shorebirds that occupy coastal habitats on the islands in the vicinity of the Proposed Action Area. Shorebirds wintering in the region include Pacific Golden-Plovers (*Pluvialis fulva*), Bristle-thighed Curlews (*Numenius tahitiensis*), Ruddy Turnstones (*Arenaria interpres*), Sanderlings (*Calidris alba*), and Wandering Tattlers (*Tringa incana*). These locally occurring shorebirds are migratory and breed in arctic and sub-arctic regions of North America and Asia and then migrate over long expanses of ocean to spend their nonbreeding season on islands in the South Pacific. These species occupy coastal wetlands, sandy beaches, rocky shores, and open upland habitats. The Bristle-thighed Curlew has a low global population and has been designated a Bird of Conservation Concern by the USFWS and is also ranked as vulnerable by the International Union for Conservation of Nature (IUCN). The U.S. Pacific Islands Regional Shorebird Conservation Plan identified the Bristle-thighed Curlew and Pacific Golden-Plover as species of High Conservation Concern (Engilis Jr. and Naughton 2004). The Wandering Tattler is also a Bird of Conservation Concern in the Pacific Islands. In addition to migratory shorebirds, the Pacific Reef-Heron (*Egretta sacra*) is a resident bird that forages on exposed reefs and mudflats along the coastlines of islands in the vicinity of the Proposed Action Area. These species are especially vulnerable to accidental spills if they reach any of the shorelines in the region.

Since we know little regarding the at-sea spatial patterns of marine birds in the Proposed Action Area, the following analysis of impacts discusses broadly the impacts to particular families of birds since similar species within those families are expected to be impacted in similar ways. This analysis could be refined with the collection of baseline data on the at-sea spatial distribution and abundance of coastal and marine birds in the Proposed Action Area.

3.9.2 Impact Analysis

Proposed Action

BOEM has recently conducted several NEPA reviews—for geophysical and geological surveys and offshore wind site assessment activities offshore the Pacific Coast—to evaluate impacts to birds that could occur as a result of those activities (BOEM 2022a; 2022b). The impacts to bird species considered in this EA would be similar to those considered in these recent reviews due to the similarity of potential impacts. This section discusses the potential impacts of routine events associated with the Proposed Action on marine and coastal birds. Potential sources of impacts for marine and coastal birds include (1) vessel attraction, (2) larger ocean buoys, (3) trash and debris, and (4) accidental fuel spills. Since all Proposed Action activities are performed using vessels, all activities have the potential to impact coastal and marine birds. Noise-related potential impacts for marine and coastal birds are expected to be minimal and are listed in **Appendix D**.

Vessel Attraction. A single vessel is typically involved in a site assessment-related survey. This level of vessel traffic is not expected to be a notable increase when compared to existing vessel traffic in nearshore or offshore waters. In addition, vessels performing surveys are relatively slow moving (approximately 4–6 kn), which allows for marine and coastal birds to easily move out of the way of survey vessels.

The potential for bird strikes on a vessel is not expected to be notable to individual birds or their populations. However, a number of marine bird species—including members of the terns, tropicbirds, albatrosses, storm-petrels, gadfly petrels, shearwaters, frigatebirds, and boobies—are generally attracted to offshore rigs and vessels. The attraction of some of these bird species is due to light attraction at night (Montevecchi et al. 1999; Wiese et al. 2001b; Black 2005; Montevecchi 2006).

Artificial lighting from Proposed Action activities may affect coastal and marine birds. Any lights used to aid marine navigation by the lessee during lease activities must meet USCG requirements in 33 CFR Part 66 for PATON. The holding or trapping effect of bright, artificial lighting can deplete the energy reserves of migrating birds, resulting in diminished survival and reproduction. For example, light entrapment may delay migrating birds from reaching breeding or foraging grounds or leave them too weak to forage or escape predation. Marine birds have been observed to continuously circle offshore oil and gas platforms until exhausted, whereupon they fall to the ocean or land on the platforms (Montevecchi 2006; Center for Biological Diversity 2007). Similarly, light entrapment may negatively affect breeding marine birds by increasing their time away from their nests, leaving the nests vulnerable to predation for longer periods of time, as well as causing parent chick separation of at-sea birds. In addition, time and energy spent circling lights may impede a bird's ability to successfully forage for enough food to feed their young.

Birds found within the vicinity of the proposed operations may be affected by lighting of the work area during nighttime operations. Artificial lighting may attract bird species that are susceptible to artificial light attraction during night operations. In some cases, a bird may strike a work vessel or the platform, leading to injury or death. Federally endangered or threatened birds are not expected to occur in the Proposed Action Area, and it is highly unlikely that any would be affected by the Proposed Action activities. However, several special-status species—including the albatross, gadfly petrels, and shearwaters identified in **Tables**

B-3 and B-4—may occur in the vicinity of the Proposed Action and could be attracted by vessel and platform lighting. Fledgling albatrosses, gadfly petrels, and shearwaters are more attracted to artificial lights than adults and are particularly vulnerable when they are dispersing away from their natal areas. Vessels will be compliant with the USCG navigation light requirements.

Some birds engage in ship following as a foraging strategy, especially with commercial or recreational fishing vessels. In addition, in an open environment like the ocean, objects are easy to detect, and birds locate vessels easily from long distances and approach to investigate. Bird mortality has been documented as a result of light-induced attraction and subsequent collision with vessels. Birds exhibiting this behavior are typically petrels, with bird strikes typically occurring at night and occasionally resulting in mortality (Black 2005). Vessels also are required to have down-shielded lighting to minimize the potential attraction of birds. However, even if petrels or other birds were attracted to the survey vessels or dove near a survey vessel, there is a low potential for either vessel collision or entanglement since the vessels are moving relatively slowly (4–6 kn) and the gear is towed from 1 to 3.5 m below the surface. There is no empirical evidence indicating that these types of marine birds could become entangled in HRG survey gear in spite of the potential for attraction to this gear. Given the low potential for collision or gear entanglement, the impacts are not expected to result in mortality or serious injury to individual birds, resulting in the determination that there would be negligible impact to these types of seabirds from vessel attraction.

Shorebirds that reside along the shorelines are not known to be attracted to vessels. Therefore, there would not be expected impacts to shorebirds from vessel attraction. Albatrosses, storm-petrels, gadfly petrels, and shearwaters are members of the Procellariiformes, which are highly pelagic, and could be attracted to survey vessels offshore. However, as discussed above for other pelagic bird families, there is a low potential of impact from vessel collision or gear entanglement; therefore, the impacts are expected to be negligible to individual birds and their populations.

Metocean Buoys. Potential impacts to marine and coastal birds from metocean buoys (anchored to the seabed with a float on the ocean surface) may be caused by noise disturbance, lighting, collisions, loss of habitat, and decommissioning. Noise and other disturbance generated by the installation or decommissioning of buoys are expected to be short term and localized, resulting in negligible impacts on birds. Because buoy height is anticipated to be up to approximately 12 m above the ocean surface, collisions with buoys are unlikely. Although seabirds (including terns, frigatebirds, and boobies) may roost on buoys, roosting on buoys does not pose a threat to these birds. Thus, overall impacts to birds from buoys are expected to be negligible. Although it is possible that predatory birds could use a tower as a perch to opportunistically prey on seabirds, this predation would be expected to have a negligible impact on birds overall.

Due to their excellent vision, birds flying during daytime hours are unlikely to collide with metocean buoys. However, flying at night or under other conditions that impair their vision, birds could potentially collide with buoys, leading to injury or death. Managing the type of lighting present on the buoys could minimize collisions. Because the metocean buoys would be more than 50 mi from shore, the chances of birds colliding with the buoys would be rare, and these buoys are not expected to impact marine and coastal bird populations.

Trash and Debris. Plastic is found in the surface waters of all the world's oceans and poses a potential hazard to marine birds through entanglement or ingestion (Laist 1987). The ingestion of plastic by marine and coastal birds can cause obstruction of the gastrointestinal tract and potentially result in mortality. Plastic ingestion also could cause blockage of the intestines and ulceration of the stomach. In addition, plastic accumulation in seabirds has also been shown to be correlated with the body burden of polychlorinated biphenyls, which can cause lowered steroid hormone levels and result in delayed ovulation and other reproductive problems (Pierce et al. 2004).

Preliminary activities may generate trash comprising paper, plastic, wood, glass, and metal. Most trash is associated with galley and offshore food service operations. However, over the last several years, companies operating offshore have developed and implemented trash and debris reduction and improved handling practices to reduce the amount of offshore trash that could potentially be lost into the marine environment. Trash management practices include substituting paper and ceramic cups and dishes for those made of styrofoam, recycling offshore trash, and transporting and storing supplies and materials in bulk containers when feasible; these practices have resulted in a reduction of accidental loss of trash and debris. In addition, all authorizations for shipboard surveys would include guidance for marine debris awareness. The guidance would be similar to BSEE's NTL No. 2015-G03 ("Marine Trash and Debris Awareness and Elimination") or any superseding NTL. Therefore, the amount of trash and debris dumped offshore would be expected to be minimal, as only accidental loss of trash and debris is anticipated, some of which could float on the water surface. Therefore, impacts from trash and debris on marine and coastal birds, as generated by preliminary activities, are anticipated to be negligible.

Impacts of Accidental Fuel Spills. An accidental event could result in release of fuel or diesel by a survey vessel. Spills occurring at the ocean surface would disperse and weather. Volatile components of the fuel would evaporate. Fuel and diesel used for operation of survey vessels is light and would float on the water surface. There is the potential for a small proportion of the heavier fuel components to adhere to PM in the upper portion of the water column and sink. This accidental spill could occur either offshore or nearshore, and the marine and coastal bird species affected, and the type of effect, would differ depending on the location of the spill (Wiese et al. 2001a; Castege et al. 2007).

If the accident occurred in nearshore waters close to any of the islands during transit, shorebirds (including plovers and sandpipers) and coastal seabirds (such as terns, tropicbirds, frigatebirds, and boobies) near their breeding colonies could be impacted either directly or indirectly. Direct impacts could include physical oiling of individuals. The effects of oil spills on coastal and marine birds include the potential for tissue and organ damage from oil ingested during feeding or inhaled during grooming, and stress that could result in interference with food detection, predator avoidance, homing of migratory species, and respiration issues. Indirect effects could include oiling of nesting and foraging habitats and displacement to secondary locations. The potential of a vessel collision occurring is quite low, with the potential for a resultant spill even lower. An accidental event could result in release of fuel or diesel by a survey vessel, but such an event has a remote probability of occurring. Therefore, an accidental fuel spill within nearshore waters would not be expected to result in significant impacts to these types of coastal and marine birds. Impacts on birds from accidents are unlikely; however, if they occur, there could be possible impacts on their food supply. Impacts on coastal and marine bird species would depend on timing and location. Since the populations of some special-status species are already in peril, if an accidental fuel spill occurred and affected any of these species or their food supply, impacts are anticipated on these species since birds are susceptible to oiling impacts.

If an accident occurred in offshore waters, fuel and diesel would float on the water surface. There is potential for oceanic and pelagic seabirds (such as albatrosses, storm-petrels, gadfly petrels, and shearwaters) to be directly and indirectly affected by spilled diesel fuel. Impacts would include oiling of plumage and ingestion (resulting from preening). Indirect impacts could include oiling of foraging habitats and displacement to secondary locations. The potential of a vessel collision occurring is quite low, with the potential for a resultant spill even lower. Dispersal, weathering, and evaporation would reduce the amount of fuel remaining on the sea surface. The level of impacts to marine birds from a spill incident involving survey vessels within offshore waters would depend on the timing and duration of the incident. However, since populations of special-status species are already imperiled, if an accidental fuel spill occurred that affected them, there would be a moderate impact to that species since birds are susceptible to oiling impacts.

Alternative B: Maximum Leasing

This alternative proposes to issue five leases in the 134,000 km^2 total mining tract area, as opposed to one or two leases under the Proposed Action. The resulting mining tract area would remain the same, but subdividing the area into five leases would increase the probability and frequency of the potential impacts for coastal and marine birds analyzed for the Proposed Action. These include potentially greater impacts from active acoustic sound sources, vessel and equipment noise, vessel traffic, aircraft traffic and noise, metocean buoys, trash and debris, and accidental fuel spills.

Alternative C: No Action

Under this alternative, commercial leases would not be issued offshore American Samoa. However, BOEM expects ongoing activities and planned actions to have continuing regional impacts on coastal and marine birds over the timeframe considered in this EA. Impacts from urban development and increasing air, vessel, and onshore traffic would continue to have commensurate negative impacts on coastal and marine birds. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts to coastal and marine birds from existing and potential future actions. The largest ongoing contributors to impacts on coastal and marine birds stem from habitat destruction, disturbance of marine and nearshore environments, and commercial and recreational fishing activities, primarily through bycatch.

3.9.3 Conclusion

The Proposed Action could pose minimal threats to birds. Loss of water column habitat, benthic habitat, and associated prey abundance are expected to have negligible impacts because of the area affected by the Proposed Action. Impacts on birds in nearshore waters from vessel traffic are expected to be negligible due to the amount of existing vessel traffic. Impacts on birds from preliminary activities, including attraction to vessels, are expected to be negligible. Impacts on birds from trash or debris releases and from accidental fuel spills are expected to be negligible. Potential noise impacts from the Proposed Action could have localized, short-term impacts on birds foraging near or migrating through the lease areas, and noise impacts are expected to be negligible. The risk of collision with metocean buoys is expected to be negligible because of the buoys' height and their distance from shore. Additionally, the Proposed Action includes BMPs for birds to reduce the potential for the Proposed Action to adversely impact coastal and marine birds. During leasing-related vessel activities, PSOs or trained crew members would document the presence and behavior of seabirds and avoid or minimize potential disturbance to protected avian species.

All these conclusions contain varying degrees of uncertainty due to the lack of data on the at-sea distribution and abundance of coastal and marine birds in the Proposed Action Area. This uncertainty can be reduced by filling data gaps through coastal and marine bird surveys in the Proposed Action Area.

3.10 Threatened and Endangered Species

3.10.1 Affected Environment

Blue whale (Balaenoptera musculus). The blue whale was listed as endangered in 1970 (35 FR 8491) and has no designated CH. Blue whales are found in all oceans except the Arctic Ocean. Both the Eastern North Pacific and the Central North Pacific stocks may be found in the Proposed Action Area. Their primary threats are vessel strikes and entanglements in fishing gear.

Fin whale (Balaenoptera physalus). The fin whale was listed as endangered in 1970 (35 FR 8491) and has no designated CH. They are found throughout the ocean, and three of the four stocks (Northeast Pacific, Hawaii and California/Oregon/Washington) may be observed in the Proposed Action Area. Their main threat is vessel strikes.

Sei whale (Balaenoptera borealis). The sei whale was listed as endangered in 1970 (35 FR 12222) and has no designated CH. They have a wide distribution and are found in subtropical, temperate, and subpolar waters around the world. Vessel strikes and entanglement pose the biggest threats.

Sperm whale (Physeter macrocephalus). The sperm whale was listed as endangered in 1970 (35 FR 18319) and has no designated CH. They have one of the widest global distribution and are found in all deep oceans. Their threats include vessel strikes, entanglement in fishing gear, ocean noise, marine debris, changing environmental conditions (e.g., sea level rise and warming temperatures), and oil spill and contaminants.

Other listed marine mammal species. Other marine mammal species in the Pacific region listed as endangered include gray whales, North Pacific right whales, killer whales, false killer whales, Steller sea lions, and Hawaiian monk seals. Guadalupe fur seals are listed as threatened. However, the likelihood of these endangered and threatened species to be within the Proposed Action Area is low, and they are unlikely to be affected by the Proposed Action. Therefore, they are excluded from further analysis. Additionally, Oceania DPS of the humpback whales was classified as endangered under the IUCN (Childerhouse et al. 2008) but is currently classified as least concern. They also are not listed under ESA and therefore are not further discussed in this analysis.

Central South Pacific Green turtle (Chelonia mydas). Green turtles nest in over 80 countries and were listed as threatened in 1978 (43 FR 32800) throughout their Pacific range. The Central South Pacific DPS of green turtles were classified as endangered in 2016 (81 FR 20057). Bycatch in commercial and recreational fishing gear, loss of nesting habitat from coastal development, changing environmental conditions (e.g., sea level rise and warming temperatures), and vessel strikes are their biggest threats. There are several proposed CHs including Central South Pacific DPS in American Samoa (88FR46572; 2023), but these are not yet finalized.

Hawksbill turtle (Eretmochelys imbricata). Hawksbill turtles were listed as endangered in 1970 (35 FR 8491), and they inhabit the tropical and subtropical waters of all major oceans. CH was designated in 1998 (63 FR 46693), but it does not overlap with the Proposed Action Area. Their threats include bycatch in fishing gear, harvesting eggs, loss and degradation of nesting and foraging habitat, predation of eggs and hatchings, vessel strikes, and ocean pollution.

Leatherback turtle (Dermochelys coriacea). Leatherback turtles were listed as endangered 1970 (35 FR 8491). Their CH has been designated in 2012 (77 FR 4169) but is not located in the Proposed Action Area. They occur in the Atlantic, Pacific and Indian waters and nest primarily in tropical latitudes around the word. Their threats include bycatch in fishing gear, harvesting of eggs, loss and degradation of nesting habitat, vessel strikes, ocean pollution, and changing environmental conditions.

South Pacific-loggerhead turtle (Caretta caretta). Loggerhead turtles were listed as threatened in 1978 (43 FR 32800). The South Pacific DPS was listed as endangered in 2011 (76 FR 58868) and has no designated CH. Loggerhead turtles are found worldwide primarily in subtropical and temperate regions. Their threats include bycatch in fishing gear, harvesting of eggs, loss and degradation of nesting habitat, vessel strikes, ocean pollution, and changing environmental conditions.

Olive Ridley Turtle (Lepidochelys olivacea). Olive ridley turtles were listed as threatened in 1978 (43 FR 32800) and have no designated CH. They are mainly a pelagic (open-ocean) turtle that have been observed by trans-Pacific ships over 2,400 mi from shore but are also known to inhabit nearshore areas. Their threats include bycatch in fishing gear, harvesting of eggs, loss and degradation of nesting habitat, vessel strikes, ocean pollution, and changing environmental conditions.

Oceanic Whitetip Shark (Carcharhinus longimanus). The oceanic whitetip shark or apoapo (Wass 1984) was listed as globally threatened on January 30, 2018 (83 FR 4153). On March 5, 2020, NMFS determined designation of CH was not prudent at this time (85 FR 12898). Oceanic whitetip sharks are widely distributed in tropical and subtropical oceanic waters, primarily between 10°N and 10°S, with abundance decreasing farther from the equator and continental shelves (Bonfil et al. 2008). They inhabit the epipelagic zone above 20°C but may dive to depths exceeding 1,000 m (Howey-Jordan et al. 2013). Some individuals show regional site fidelity (Schultz 2025). As apex predators, oceanic whitetip sharks feed mainly on bony fishes and cephalopods but also consume invertebrates, stingrays, seabirds, sea turtles, marine mammal carrion, and garbage (Compagno 1984). Sharks hold cultural significance in American Samoa (Kleiber and Leong 2018; Jones 2020). Populations have declined due to commercial fishing (NMFS 2024a).

Giant Manta Ray (Mobula birostris). The giant manta ray, or fai-malie (Wass 1984), was listed as globally threatened on January 22, 2018 (83 FR 2916). On December 5, 2019, NMFS determined designation of CH was not prudent at this time (84 FR 66652). Found worldwide in tropical, subtropical, and temperate waters, giant manta rays can exhibit diel patterns in habitat use, moving inshore during the day to clean and socialize in shallow waters, and then moving offshore at night to feed to depths of 1,000 m or so (NOAA Fisheries 2024). Giant manta rays are obligate ram-ventilators (needing to swim to breathe), and movements track the distribution of their planktonic prey (such as euphausiids, copepods, mysids, decapod larvae, and shrimp) and occasionally small fish (NOAA Fisheries 2024). After deep dives, these large rays may display basking behavior to thermoregulate (NOAA Fisheries 2024). The main threat to the giant manta ray is commercial fishing, with the species both targeted and caught as bycatch (NOAA Fisheries 2024).

Scalloped Hammerhead Shark (Sphyrna lewini). Indo-West Pacific DPS. The scalloped hammerhead shark, or mata'italiga (Wass 1984), Indo-West Pacific DPS, was listed as threatened on July 3, 2014 (79 FR 38213). On November 17, 2015, NMFS determined that designating CH was not prudent (80 FR 71774). These sharks are highly mobile and partially migratory, occurring in warm temperate and tropical seas worldwide. They inhabit continental and insular shelves, adjacent deep waters, and often enter bays and estuaries (Compagno 1984). Scalloped hammerhead sharks frequently form aggregations, particularly around seamounts (Miller et al. 2014) and occupy depths from the surface to over 800 m (Hutchinson et al. 2023). Their diet includes a wide range of fishes and invertebrates, especially cephalopods. Sharks hold cultural significance in American Samoa (Kleiber and Leong 2018; Jones 2020). This DPS is threatened by fishing pressure and shark removal programs (Miller et al. 2014; NMFS 2020). Historically, juveniles were commonly caught by gillnets in Pago Pago Bay (Wass 1984).

Chambered Nautilus (Nautilus pompilius). The chambered nautilus was listed as threatened in 2018 (83 FR 48976). NMFS found designation of CH was not prudent (85 FR 5197 January 29, 2020). Life history information is summarized by (Miller 2018). Chambered nautiluses are native to the tropical Indo-Pacific, including the waters of American Samoa, and are typically found near coral reefs and steep fore-reef slopes. They inhabit 100- to 500-m depths during the day to avoid predators and ascend to shallower depths at night to forage. Nautiluses are long-lived (15 to 20 yrs), slow-growing, and have low reproductive rates. They use olfaction and chemotaxis to locate prey such as carrion, crustaceans, and small fish. The primary threat to this species is overharvesting their ornate shells.

Other Invertebrate Species. Five coral species (*Acropora globiceps*, *A. retusa, A. speciosa, Fimbriaphyllia paradivisa, Isopora crateriformis*) are listed as threatened, and five clam species (*Hippopus hippopus, Tridacna squamosa, T. derasa, T. Gigas, T. maxima*) are proposed for listing (NOAA Fisheries 2025a). These species limit their distribution to nearshore coral reefs, and they are unlikely to be affected by the Proposed Action. Therefore, they are excluded from further analysis. See **Section 3.6** (Nearshore Habitats) for more details.

Marine Birds. No listed species of marine birds overlap with any of the proposed activities; thus, no further analyses were conducted.

3.10.2 Impact Analysis

Proposed Action

Marine Mammals and Sea Turtles: Details of the potential impacts of marine mammals and sea turtles are discussed in **Section 3.8**.

Fishes and Invertebrates: Potential stressors analyzed here include FAD effects, noise, vessel strike, and entanglement. Other stressors are discussed in **Section 3.5** (Offshore Habitats). Preliminary activities under the Proposed Action may affect listed species as they use epipelagic to mesopelagic zones and exhibit diel vertical migrations or foraging behaviors that may overlap with proposed activities. Surface buoys may act as FADs and alter the behavior of sharks. Increased local densities could elevate predation risk, disrupt trophic interactions, or attract fishing effort. However, the limited number ($\leq$ 4) and temporary nature of buoys reduce the likelihood of effects. Acoustic sources are limited to Tier 4 *de minimis* levels and are unlikely to cause injury, but behavioral responses may occur. Exposure is expected to be brief and spatially limited. Risk from vessel strike is low due to the remote location, slow vessel speeds, and low density of large-bodied species. However, surface-oriented species (such as oceanic whitetip sharks and manta rays) may be vulnerable during basking or feeding. Mooring lines, expendable gear, and marine debris pose minimal entanglement risk due to their limited number, taut configuration, and deep deployment. No entanglement-prone gear (e.g., nets, longlines) would be used. With adherence to BMPs (**Sections 3.5 and 3.11**), the Proposed Action is not expected to result in adverse effects to listed fishes and invertebrates. Introduction of trash and debris, and other man-made substances foreign to the terrestrial or marine environment from the Proposed Action is extremely unlikely, and, with BMPs and BSEE's guidance, are expected to be discountable.

Alternative B: Maximum Leasing

Under Alternative B, five leases would be issued, potentially increasing vessel traffic, noise, and vessel strike risk. However, these impacts are still expected to be minimal. Since the scope of preliminary activities remains the same as the Proposed Action, overall impacts are anticipated to be similar.

Alternative C: No Action

Under the No Action Alternative, no commercial leases would be issued. However, ongoing and planned activities—such as shipping, fishing, and natural ocean dynamics—would continue to affect offshore environments. These impacts overlap with those of the Proposed Action, so the No Action Alternative would not substantially reduce overall environmental impacts in the region.

3.10.3 Conclusion

With requirement of lessees to comply with BMPs through BOEM's authority under 30 CFR §§ 582.20–582.29—specifically 582.22, 23, and 24, and 43 U.S.C. § 1334(a)(1)—the preliminary activities are not expected to cause adverse impacts to listed marine mammals, sea turtles, fishes or invertebrates.

3.11 Commercial and Non-Commercial Fisheries

3.11.1 Affected Environment

Fishing is central to the culture, economy, and daily life of American Samoa (Craig et al. 1993; Levine and Allen 2009; Grace-McCaskey 2015). For generations, Samoans have relied on the ocean as a primary source of food, employment, and cultural identity. The distinction between commercial, recreational, and subsistence fishing is often blurred, as some individuals may participate in all three activities depending on season, opportunity, or community needs (Dombrow and Hospital 2023). Fish caught for sale in local markets may also be distributed through customary exchange networks or shared at family gatherings, weddings, funerals, and other events (Severance et al. 2013). This sharing system reflects the importance of fishing not only as an economic activity but as a way of reinforcing social cohesion and supporting extended family obligations under the fa‘a Samoa (Samoan way of life) (Western Pacific Regional Fishery Management Council 2024). Fish are also used for chiefly position entitlements and other cultural activities during the “fa’a lalave,” or ceremonies (Western Pacific Regional Fishery Management Council 2024). Even when fish are sold, the proceeds are frequently used to support church commitments, community events, or village obligations, underscoring the overlap between the subsistence and cash economies. As such, fishing in American Samoa cannot be described simply as a commercial enterprise because it is also a cultural cornerstone and a mechanism of food security and social resilience. Summaries and studies related to the complexity and richness of American Samoa fisheries are incorporated here by reference: Craig et al. (1993); Dalzell et al. (1996); Western Pacific Regional Fishery Management Council (2005); Levine and Allen (2009); Western Pacific Regional Fishery Management Council (2009); Grace-McCaskey (2015); Kleiber and Leong (2018); Chan (2023); Dombrow and Hospital (2023).

Fisheries in American Samoa are managed under both federal and territorial authority. The WPRFMC regulates the U.S. EEZ through fishery ecosystem plans for pelagic, bottomfish, crustacean, coral reef, and precious coral fisheries (Western Pacific Regional Fishery Management Council 2005; 2009). These plans establish harvest limits, bycatch controls, gear regulations, and habitat protections under the authority of the Magnuson-Stevens Fishery Conservation and Management Act. The American Samoa government, via the Department of Marine and Wildlife Resources, manages nearshore and reef fisheries, emphasizing local priorities such as subsistence access and cultural practices. Illegal, unreported, and unregulated (IUU) fishing is a concern that undermines sustainable fisheries management and threatens the livelihoods of those who rely on legal fishing practices (Western Pacific Regional Fishery Management Council 2005).

Commercial fisheries in American Samoa are dominated by the pelagic longline fleet, which primarily targets albacore tuna (*Thunnus alalunga*) (Western Pacific Regional Fishery Management Council 2009). Longlining is conducted by larger vessels, typically between 50 and 90 ft, that operate offshore and widely throughout the American Samoa EEZ, including the Proposed Action Area, and occasionally on the high seas. Albacore tuna landed by the fleet are an essential input for the StarKist tuna cannery in Pago Pago, one of the territory’s largest private employers and a cornerstone of its export economy (**Sections 3.11 and 3.12**). In addition to albacore, the longline fishery catches yellowfin (*Thunnus albacares*), bigeye (*Thunnus obesus*), billfish such as marlin (*Makaira* spp.) and swordfish (*Xiphias gladius*), and various shark species. The primary fishing grounds for purse seine tuna fisheries are located north of the

Proposed Action Area (Lu et al. 1998; Gillett et al. 2002; emLab 2023). This fishery has historically been sensitive to fluctuations in fuel prices, global tuna market conditions, and the availability of albacore stocks in the South Pacific. Because albacore is a highly migratory species, availability depends on regional oceanic and climatic conditions such as the El Niño Southern Oscillation (Lu et al. 1998). Nevertheless, because tuna are highly migratory species and occupy broad swaths of the water column, indirect ecological effects from development of seabed minerals, such as alterations to offshore structure (see FAD discussion below), prey availability, or oceanographic conditions (e.g., sediment plumes), could potentially affect pelagic fisheries.

The tuna cannery is central to employment and government revenue, household income, and the territory's trade balance. Workers are primarily residents, though the cannery also employs migrants from neighboring Samoa. Employment at StarKist supports numerous secondary businesses, including stevedoring, fuel suppliers, packaging, shipping, and retail trade. The cannery's presence also ties American Samoa into global supply chains, making the territory's economy vulnerable to fluctuations in tuna stocks, international trade rules, and global market conditions. The closure of the Chicken of the Sea cannery in 2009 illustrates the fragility of this sector. That closure resulted in the loss of nearly 2,000 jobs, causing widespread economic disruption and accelerating outmigration (Blaha 2015). The continuing operation of StarKist Samoa is thus widely viewed as critical to the territory's socioeconomic stability.

Smaller scale commercial fisheries also contribute to the territory's economy and food supply. There are two broad categories of fisheries in nearshore habitats and managed by the WPRFMC (Western Pacific Regional Fishery Management Council 2005). The crustacean fishery, focused on spiny lobsters (*Panulirus penicillatus*), occurs in shallow nearshore reef habitats within territorial waters (0 to 3 mi), with harvests typically made by free divers at night. Coral reef fisheries operate in shallow reef habitats (0 to 50 fathoms) and lagoons, targeting a wide variety of reef-associated species using hook-and-line, spears, and nets for subsistence and small-scale commercial use. Currently, there are no precious corals fisheries in American Samoa.

Farther offshore, the alia fleet, which consists of 28- to 32-ft catamarans traditionally powered by outboard motors and captained by Indigenous American Samoans, has historically engaged in trolling and handline fishing for various pelagic species including yellowfin tuna, skipjack tuna (*Katsuwonus pelamis*), wahoo (*Acanthocybium solandri*), and mahi-mahi (*Coryphaena hippurus*) (Western Pacific Regional Fishery Management Council 2009). These fisheries operate in the epipelagic zone and occur primarily around Tutuila and the Manu‘a Islands, usually within 50 nmi of shore (Western Pacific Regional Fishery Management Council 2009; Kleiber and Leong 2018; Ayers et al. 2024). Limited fuel capacity and vessel range restrict their ability to fish farther offshore, which reduces their exposure to potential interactions with deep-sea mining.

Bottomfish fisheries, targeting deepwater snappers such as *Etelis carbunculus* and *Pristipomoides filamentosus* and various groupers, operate at depths between 50 and 400 m along seamounts, slopes, and offshore banks (Western Pacific Regional Fishery Management Council 2005). Although this fishery contributes only modestly to commercial landings, it is important for local markets and cultural uses (Western Pacific Regional Fishery Management Council 2005). While bottomfish are unlikely to be directly affected by activities at abyssal depths, they could experience indirect effects.

FADs play an important role in both commercial and non-commercial fishing in American Samoa (Buckley et al. 1989; Buckley and Miller 1994). Anchored FADs deployed around Tutuila and the Manuʻa Islands create predictable fishing grounds by concentrating pelagic species such as skipjack, yellowfin, and mahi-mahi. For alia fishermen and subsistence fishers, FADs are especially critical because they reduce search time, lower fuel costs, and provide reliable access to pelagic species that would otherwise be difficult to target with small vessels (Dalzell et al. 1996). FADs thereby enhance food security, improve the efficiency of small-scale fisheries, and sustain cultural practices of sharing fish within communities. Because many households depend on FAD-associated fishing for both nutrition and income, the availability of FADs represents an important link between community well-being and pelagic ecosystem health (Bell et al. 2015). Any disruption to pelagic species distribution, whether from oceanographic variability, shifts in prey dynamics, or other ecosystem disturbances, can reduce the effectiveness of FADs and disproportionately affect small-scale fishers.

Non-commercial and subsistence fishing forms an essential part of household economies and cultural identity (Western Pacific Regional Fishery Management Council 2005; Kleiber and Leong 2018). Families engage in handline fishing, spearfishing, gleaning, and net fishing in lagoons and nearshore reefs. They target many different fish and invertebrate species, with the palolo worm being a particular favorite (Dalzell et al. 1996). Catches are often consumed within the household or distributed widely among extended families, churches, and village networks. This distribution system reflects the Samoan cultural value of reciprocity and ensures that fishing supports not only immediate household needs but also broader community obligations (Kleiber and Leong 2018).

Aquaculture is not a dominant activity in American Samoa, but small backyard operations produce tilapia for local consumption (Pacific Community 2025) and giant clams, and a few fish species may be farmed in the future (Rippe et al. 2024; Pacific Community 2025).

Recreational and sport fishing, while smaller in scale, contributes to local tourism and community events (NMFS 2025b). Annual tournaments target billfish, tuna, and wahoo, drawing both local and off-island participants. Some charter operations also exist, though the scale is modest compared to other Pacific Islands. Recreational fishing often intersects with cultural and subsistence practices, as tournament catches may be shared or consumed within the community rather than treated solely as trophies.

Several areas of the American Samoa EEZ are closed to fishing or otherwise designated for protection (ProtectedSeas 2025). All fishing is prohibited with 12 nm of Rose Atoll (**Section 3.7**), and commercial fishing is often restricted in all National Monument waters (NOAA Fisheries 2013). NMSAS covers large portions of the American Samoa EEZ (**Section 3.7**) and has established various zones that restrict fishing activities. In addition, certain areas are designated as prohibited fishing zones for large-scale pelagic gear, providing protection for nearshore fisheries and traditional fishing grounds. These closures help distribute fishing effort, protect sensitive habitats, and concentrate activity in remaining open zones, increasing competition for accessible fishing grounds. Importantly, none of these closures overlap with the Proposed Action Area.

3.11.2 Impact Analysis

Proposed Action

BOEM proposes to issue two leases for preliminary seabed mineral exploration activities in the Proposed Action Area. These activities include HRG surveys, sediment sampling, mooring deployments, and biological monitoring using AUVs, ROVs, and other low-impact technologies. The Proposed Action Area lies approximately 150 mi from Tutuila and 104 mi from the Manuʻa Islands, overlapping with the American Samoa EEZ but not with nearshore waters or marine protected areas.

Commercial and non-commercial fishing activities—including port-based, transiting, and harvesting operations—that overlap with Proposed Action activities may experience space-use conflicts that could cause a variety of adverse outcomes, e.g., precluding fishers from fishing grounds (along with a possible reduction in landings), incurring more travel time offshore to avoid vessels, triggering entanglement events or gear loss with buoys or sampling equipment, creating congestion among fishers outside of the Proposed Action Area if fishers are displaced, and competition or congestion for port space in Pago Pago. Potential impacts to harvested populations and their habitats or food base are analyzed in **Section 3.5** (Offshore Habitats), **Section 3.6** (Nearshore Habitats), and **Section 3.7** (Protected Habitats). Potential impacts to secondary or support industries are analyzed in **Section 3.12** (Societal Factors).

Several potential benefits could arise from coordination between the fishing and offshore mining industries. A successful lease sale may prompt port upgrades in Pago Pago, which could also improve fishing infrastructure. The presence of offshore operations may serve as “eyes on the water,” helping deter IUU fishing. Additionally, if Community Benefit Agreements between lessees and local stakeholders are established, they could provide meaningful support to both the local fishing sector and the broader community.

Because the American Samoa longline fishery overlaps with the Proposed Action Area, it is the most likely to be affected. Survey vessels, moorings, and buoys could temporarily displace fishing effort, increase transit times, or result in gear entanglement or loss. If not clearly communicated, the placement of moorings and buoys may pose navigational hazards. The alia fleet, with a limited range of 50 nmi or less, is unlikely to operate in the Proposed Action Area. However, displacement of longline effort closer to shore could increase competition near FADs or cause other congestion. The bottomfish fishery, operating at depths of 50 to 400 m, is unlikely to be directly affected due to the deeper location of the Proposed Action Area (1,400 to 6,000 m), but acoustic disturbance could indirectly affect prey availability or alter species behavior. Recovery of lost survey equipment may cause localized bottom disturbance, potentially impacting benthic habitats important to bottomfish. Other fisheries are unlikely to experience notable space-use conflicts because they have minimal, no, or infrequent overlap with the Proposed Action Area.

Alternative B: Maximum Leasing

Under Alternative B, there would be five leases issued compared to two leases under the Proposed Action. This would increase the number of vessel trips, which in turn may increase the potential risk of space-use conflicts.

Alternative C: No Action

Under the No Action Alternative, no commercial leases would be issued in the Proposed Action Area. However, BOEM anticipates that ongoing and planned activities would continue to occur throughout the region during the timeframe of this EA. The fishing industry already faces overlapping pressures from marine mining projects and fishing effort outside the U.S. EEZ, existing marine protected areas, IUU fishing, vessel traffic, habitat degradation, and changing ocean conditions. The No Action Alternative would not substantially reduce these ongoing impacts compared to the Proposed Action.

Environmental Protective Measures

To support BOEM's statutory responsibilities under OCSLA and ensure that preliminary activities are conducted in a manner that minimizes conflicts and environmental harm, two fishery-related BMPs are proposed (**Appendix C**). These BMPs are provisional and intended for planning and analytical purposes only in the leasing document. Their inclusion in this EA does not constitute final agency action or regulatory approval. Final stipulations, if any, would be subject to further interagency consultation, public review, and formal adoption through the lease issuance process in accordance with 30 CFR 581.17.

The Fisheries Communication Plan (FCP) BMP is intended to proactively reduce the risk of spatial and operational conflicts between offshore mineral activities and commercial or subsistence fishing operations. By requiring early and ongoing communication with fisheries stakeholders and the development of a conflict-avoidance strategy, an FCP supports BOEM's mandate to balance resource development with other ocean uses and to prevent unreasonable interference with fishing activities. This BMP also provides a mechanism for adaptive response if repeated conflicts are documented, thereby enhancing operational accountability and stakeholder trust.

The Fisheries and Wildlife Awareness Training BMP is intended to reduce the likelihood of adverse interactions between offshore personnel and marine wildlife, as well as minimize unintentional disruption to fishing operations. Training ensures that vessel crews and contractors are informed about regional ecological sensitivities, protected species, and best practices for avoiding vessel strikes, noise impacts, and gear conflicts. This BMP promotes environmental stewardship and compliance with applicable laws such as the ESA and Marine Mammal Protection Act, while also fostering situational awareness that can prevent costly delays or enforcement actions.

3.11.3 Conclusion

Future potential plans, if submitted, such as a Delineation, Testing or Mining Plan would report on the effect of these plans and training executed for the proposed actions part of this EA. Those potential Plans should also include an analysis of the effects of its operations on the allocation and use of local dock space by fishing boats and project marine vessels. These analyses address present uses, predicted project-dependent uses which increase the level of demand, and an assessment of individual and cumulative impacts.

The Proposed Action is unlikely to cause substantial, long-term impacts to fisheries. With robust implementation of a FCP, early engagement, and adaptive management, potential negative impacts from the proposed action will be minimized.

3.12 Societal Factors

3.12.1 Affected Environment

This section provides context for societal factors for preliminary activities in the Proposed Action Area. Given the distance from shore to the lease areas and the uncertainty around employment and port usage for future surveys, no single city or county is expected to be the primary recipient of the impacts of the Proposed Action. Therefore, the societal impacts of the Proposed Action include all islands and associated communities of American Samoa, the U.S. territory most closely affiliated with the EEZ where the leasing may occur. Societal factors discussion is divided into three sub-topics: economy and demographics, land and port use, and quality of life and culture. Supplemental information can be found in **Appendix E**.

3.12.1.1 Economy and Demographics

American Samoa, an unincorporated U.S. territory located in the South Pacific, has a unique socioeconomic setting shaped by its geographic isolation, reliance on a narrow economic base, and diverse populations.

The territory's population was 49,710 people according to the decennial census in 2020 (U.S. Census Bureau 2021; DOC Statistics and Analysis Division 2023). Most residents concentrate on Tutuila, the largest island, particularly in and around the capital city of Pago Pago, while the outer islands host smaller communities, generally less than 500 individuals.

American Samoa's population has declined steadily from a peak of nearly 60,000 in 2010 to under 50,000 in 2020, largely due to outmigration to the U.S. mainland and Hawaiʻi in search of employment and education opportunities (U.S. Census Bureau 2021; DOC Statistics and Analysis Division 2023). The population is relatively young, with a median age of 27.6 years and an average household size of 5.6 people (DOC Statistics and Analysis Division 2023).

The majority of the population of American Samoa, 83%, identify as ethnically Samoan. There are also sizable populations of Tongans (2.9%), Filipinos (3.4%), and those with two or more ethnicities (10%). While 58% of the population was born in American Samoa, close to one-third of the population migrated to the territory from the neighboring country of Samoa (29%). Another 6% of the population migrated from other parts of the United States (DOC Statistics and Analysis Division 2023).

The American Samoa economy is highly trade-dependent and dominated by three main sectors: (1) tuna canning and processing, (2) government employment, and (3) retail and services. The tuna industry and the public sector together account for most jobs and economic output. Federal grants and transfer payments also provide a substantial share of household and government revenues (DOC Statistics and Analysis Division 2023). The gross domestic product of American Samoa in 2021 was $750 million in current dollars, with the private sector contributing less than half of total output (DOC Statistics and Analysis Division 2023). Exports are dominated by canned tuna, while imports consist of food, fuel, machinery, and manufactured goods. In 2021, imports were valued at $457 million, exceeding exports and producing a trade deficit (DOC Statistics and Analysis Division 2023).

The tuna cannery is the cornerstone of the private sector economy. Currently, the StarKist Samoa cannery in Pago Pago is the territory's largest private employer, with an estimated 2,500–2,700 workers in 2021 (DOC Statistics and Analysis Division 2023). The cannery processes albacore and skipjack tuna landed locally by U.S.-flagged longline vessels as well as foreign purse seine fleets operating in the Western and Central Pacific (Havice et al. 2019). Canned tuna and related products dominate the territory's exports, which were valued at $412 million in 2021 (DOC Statistics and Analysis Division 2023).

Employment patterns reflect a narrow economic base. In 2021, the government sector accounted for 37% of total employment, while the cannery and related industries accounted for roughly one-quarter (DOC Statistics and Analysis Division 2023). The remainder of the workforce was spread across retail trade, small-scale construction, transport, and services. Unemployment is persistently high, averaging 13.2% in 2020 (DOC Statistics and Analysis Division 2023). Many households rely on multiple income sources, including subsistence farming and fishing, remittances from family members abroad, and federal assistance programs. The labor market is further shaped by periodic adjustments to minimum wages under U.S. law, which have historically sparked debate due to potential impacts on cannery competitiveness (GAO 2014).

Tourism in American Samoa plays a modest but culturally and economically important role in the territory's development, contributing both to local income generation and the promotion of Samoan cultural identity. Approximately 4,000–5,000 tourists arrived annually in the decade preceding the pandemic (2010–2019) (DOC Statistics and Analysis Division 2023). Tourism expenditures provide income for small hotels, restaurants, handicraft vendors, and tour operators, while also supporting transportation and service sectors. The industry emphasizes cultural tourism, with visitors attracted to traditional village life, fa'a Samoa, and natural resources including coral reefs, national parks, and the NMSAS (Craig et al. 1993; NOAA 2024). Tourism remains vulnerable to global economic fluctuations, as, during the global pandemic between 2019 and 2021, tourist arrivals dropped over 95% (DOC Statistics and Analysis Division 2023).

3.12.1.2 Land and Port Use

This section describes the existing conditions of land and port facilities that may be directly or indirectly impacted by preliminary activities associated with the Proposed Action Area.

Land in American Samoa is predominantly communal, held in trust by extended families and administered by traditional leaders (matai). This system is protected by law and restricts land ownership to persons of Samoan ancestry. Only a small portion of land is individually owned or designated for industrial use, primarily near the Port of Pago Pago (American Samoa Bar Association 2025).

American Samoa has one main port and five additional harbors. The Port of Pago Pago on the island of Tutuila, the largest island of American Samoa, is the main commercial port of American Samoa. All vessels must first enter the territory at the Port of Pago Pago, even those ultimately bound for the smaller harbors of Auasi, Aunu'u, Ofu, Tau and Faleasao (Port Administration of American Samoa 2025).

The Port of Pago Pago, located on the island of Tutuila, is the primary maritime facility in American Samoa. It is a naturally deep and sheltered harbor capable of accommodating large commercial vessels. The port includes cargo terminals for containers and bulk shipments, berths for fishing vessels, and facilities for petroleum storage and bunkering. The port also supports customs, immigration, and basic vessel repair services. While the port plays a critical role in the territory's economy, particularly in support of the tuna fishing and canning industries, its infrastructure is limited in terms of upland storage, specialized equipment for mineral handling, and berth availability for industrial-scale operations (DOC Statistics and Analysis Division 2023).

The Port of Pago Pago and surrounding lands support subsistence and commercial fishing, tourism, and cultural activities. The harbor is designated as a Special Management Area (SMA) under the American Samoa Coastal Management Act of 1990 (P.L. 21-35, 24.0501 et seq., American Samoa Code Annotated) due to its ecological and cultural significance.

Public transportation is provided by a small fleet of buses and ferries, but these are not designed for industrial logistics. Although the Bipartisan Infrastructure Law has allocated funding to improve roads, bridges, and transportation safety in the territory; the status of project funding and timelines are uncertain (DOT 2021).

Zoning regulations are administered by the American Samoa government through the Department of Commerce and the Territorial Planning Commission. Industrial zoning is limited and concentrated in areas adjacent to the port. Any future development of land-based facilities to support deep-sea mining (such as mineral processing, dewatering, or expanded storage) would require land use permits, zoning approvals, and, potentially, compliance under local and federal laws (American Samoa Bar Association 2025). Additionally, the potential for future land-based development related to mining operations may raise concerns among local communities regarding land access, environmental quality, and cultural preservation. The Proposed Action is not expected to have onshore impacts.

3.12.1.3 Quality of Life and Culture

Samoan society is organized around extended families (ʻaiga) led by chiefs (matai) within the traditional village system. The faʻa Samoa emphasizes communal obligations, reciprocity, and respect for authority, and continues to shape daily life, decision-making, and resource use (NOAA 2024; NPS 2025).

Fishing and farming remain integral to household and village life, even as wage labor has become more prevalent. Non-commercial fishing provides protein for local diets, reduces dependence on imported foods, and supports cultural practices of sharing. Fish and agricultural products are commonly exchanged during ceremonies, church events, and communal feasts, linking subsistence activity directly to social and cultural identity (Western Pacific Regional Fishery Management Council 2009).

Religious institutions also play a central role in Samoan society, often acting as focal points of community activity. Contributions to churches represent a primary household expense, reflecting both cultural expectations and spiritual life (DOC Statistics and Analysis Division 2023).

American Samoan land governance is structured by the unique, traditional matai (i.e., family chiefs) system, and matai serve as formal community leaders. Typically, decisions that impact village life are made through a matai council, who have the authority to speak on behalf of families and extended kinship groups known as aiga (Makaneole-Manus et al. 2025).

3.12.2 Impact Analysis

Demographics and Economy. The proposed lease areas lie within the American Samoa OCS, in abyssal waters between 4,000- and 6,000-m deep and 130 to 211 nautical miles east of Pago Pago. Direct economic interactions between a lease and the current economy are likely to be limited.

Indirect linkages from the Proposed Action to demographics or economy are possible. Leasing activities that could affect the abundance or distribution of tuna stocks has potential implications for the cannery, the single largest private employer and economic driver. If lease-related activity were to generate employment, training, or service contracts for residents, modest benefits may be realized in a setting where jobs are scarce. Impacts to population and demographics are not expected, as few personnel are expected to relocate because of the Proposed Action.

Port and Land Use. The indirect impacts to land and port could be increasing demand for industrial development in areas with limited zoning and communal land ownership, and expansion of port operations may strain existing facilities. Without additional investment, the increased vessel traffic (**Section 3.13**) for the lease term may expedite the failure of vulnerable infrastructure that has entered the end-of-life phase. Proposed activities will occur offshore; no additional impacts are expected for land use apart from port maintenance and potential improvements.

Culture and Quality of Life. Impacts to culture and quality of life may include temporary changes to access and use of communal or traditional fishing areas, and culturally significant coastal sites, which could affect subsistence practices and community cohesion. Increased activity near the Port of Pago Pago may cause potential short-term disruptions to daily life. Samoan culture has adapted to modernization by incorporating imported goods into traditional practices, including food. These changes reflect a commitment to preserving life and resources while maintaining the core values of fa'a Samoa, such as community responsibility and collective work (Peau et al. 2022).

Alternative B: Maximum Leasing

This alternative would cause an anticipated increase in the number of companies conducting business in the area from two to five, subsequently increasing food and fuel purchased and the number of total vessel trips conducting preliminary activities (**Table 2-6**).

These impacts overall could benefit the local economy, such as food and fuel for vessels, but would be undetectable when taking into consideration the distribution of activities, the total ocean economy, and the time from which they would occur. The socioeconomic impacts associated with increased vessel activity and local purchases of food and fuel would be inconsequential in intensity, reflecting small, localized increases in economic activity. These effects would be short-term and intermittent, occurring only during periods of preliminary survey and mobilization work, and would not produce measurable changes in the regional economy or sociological factors. Marine minerals activities represent a small portion of the total ocean economy.

Alternative C: No Action

American Samoa's socioeconomic and cultural environment is characterized by a small but culturally resilient population, a narrow and trade-dependent economy, and deep reliance on tuna canning, government employment, and federal support. The StarKist Samoa cannery is vital in the private sector, anchoring exports and providing thousands of jobs. At the same time, the traditional cultural systems of fa'a Samoa that emphasizes communal sharing, and subsistence activities, remains vital for household survival and community cohesion. Implementation of the No Action Alternative would not meaningfully reduce ongoing impacts on sociological factors.

3.12.3 Conclusion

This alternative assumes two companies are conducting business in the area. Two offices potentially could be set up in American Samoa, and the number of vessel trips conducting preliminary activities is estimated in **Table 2-6**. The use of the port facilities would have minimal effect and completely recover after preliminary activities are complete.

The Proposed Action is not expected to substantially adversely impact the quality of life of the American Samoans as it relates to cultural values. Also see **Appendix E**.

3.13 Navigation and Vessel Traffic

3.13.1 Affected Environment

Commercial shipping, passenger vessels, fishing vessels, and leisure or pleasure vessels are the bulk of the vessel traffic type in American Samoa. For analysis of vessel traffic in the proposed action area, vessel data were downloaded from World Bank Group (WBG) data catalog for American Samoa (Cerdeiro et al. 2023). The analysis used International Monetary Fund's analysis of hourly Automatic Identification Systems (AIS) positions received between January 2015 and February 2021.

The general interpretation of the data as shown in **Figure 3-2** below is that brighter colors indicate higher density and as the values decrease, they move closer to green. The WBG data available from January 2015 to February 2021, as shown in **Figure 3-2**, provides an aggregate of AIS-broadcasted points of fishing vessel activity concentration in the areas north and southwest of the Area ID. These images do not differentiate between commercial, recreational, and for-hire fisheries or the activities the vessels are engaged in (actively fishing, transiting, etc.). Passenger vessel transiting to and from the Port of Pago Pago are mostly concentrated between the islands. There are visible AIS-broadcasted points that mirror a track line that goes through the center of the Proposed Action Area but it is unclear if it belongs to one or more passenger vessels and if this occurred in one year or a concentration from the combined six years. Leisure vessels are active in the area, sparsely within the Area ID, but scattered around closer to American Samoa. Lastly, commercial vessels have aggregated points that mimic track lines from all directions to the island. There are four distinct routes that go across the Area ID with relatively higher densities of vessels in the west-north-west to east-south-east. It seems to be the main informal route, both indicated in bright red and green (**Figure 3-2**), for vessels heading from and/or going east of American Samoa.

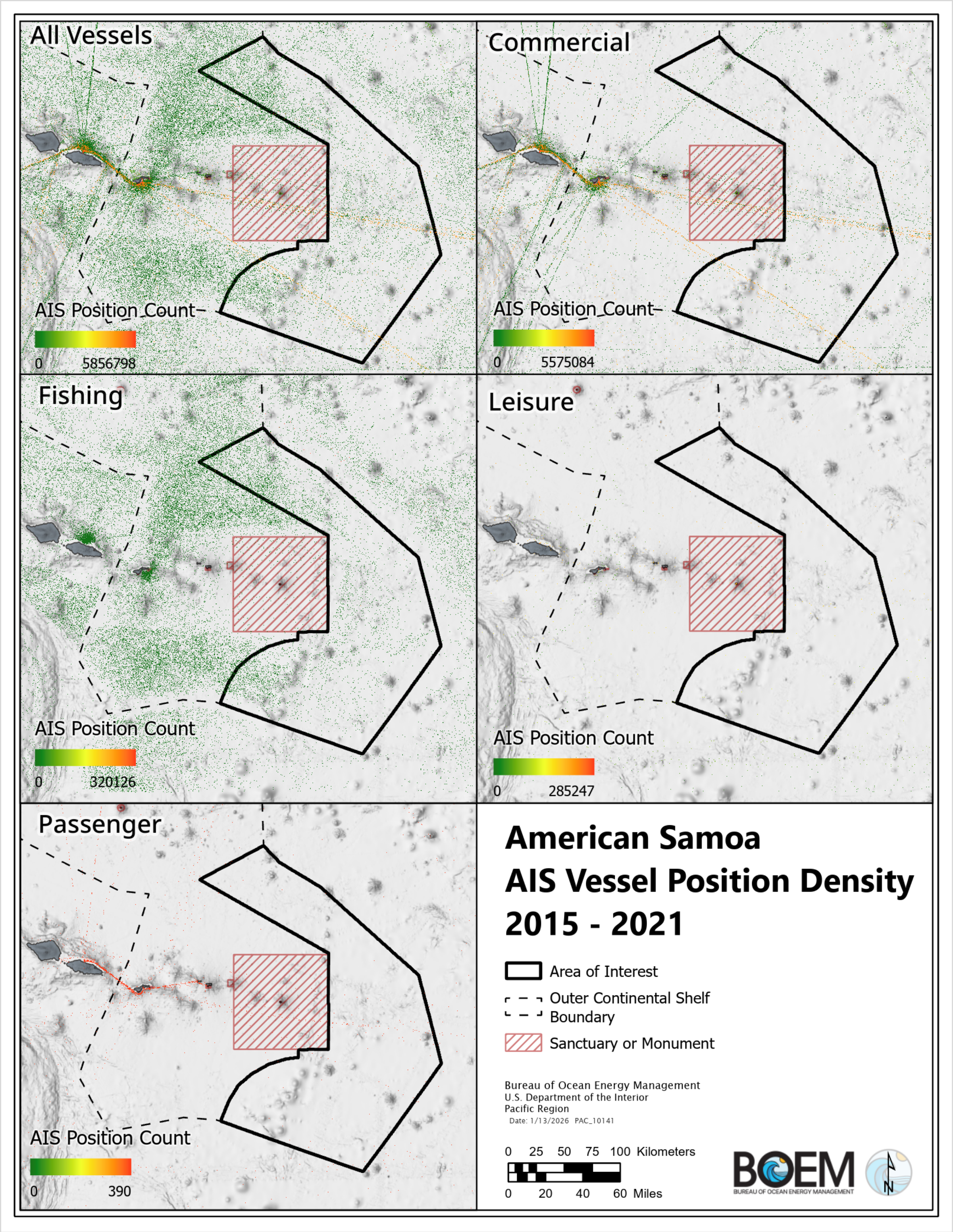

Figure 3-2. WBG data of AIS density received between January 2015 to February 2021

Port of Pago Pago is the port identified for possible use in the navigation and vessel traffic geographic analysis area. Port of Pago Pago has navigational aids (e.g., buoys, lighthouses), but no formal routing measures (e.g., traffic separation schemes, precautionary areas, safety fairways) exist in the area. The Proposed Action Area does not have seasonal management areas with federally established vessel speed regulations. Marine protected areas consist of the Rose Atoll MNM, which shares the southwestern border of the Proposed Action Area and does not have transit restrictions.

3.13.2 Impact Analysis

A comprehensive navigation safety and vessel traffic analysis was not possible because of limited available data. WBG data provided an aggregate of the combined 6 years of AIS-broadcasted pings that were separated only by vessel type. The lack of data available by each year made it impossible to view vessel track lines, get vessel counts for each vessel type, and see the activities being performed (transit, dead in water, fishing, etc.) to fully analyze the impact on navigation safety. Track line counts provide a broad overview of traffic volume by vessel type from year to year, as vessel activities can vary or shift with seasonal changes. This analysis is important for preserving existing and historical navigation routes for safety and vessel traffic.

The northeast to southwest and northwest to southeast routes (**Figure 3-2**) that cross the Proposed Action Area seem to be important to commercial shipping. Although data is limited, the vessel types most frequently transiting and conducting operations within the Proposed Action Area are fisheries and commercial shipping. The fisheries that conduct activities in the areas north and southwest of the Proposed Action Area might need to go somewhere else to fish (**Figure 3-1**). Commercial shipping vessels that use the routes mentioned above and are impacted by the Proposed Action would need to avoid the vessels conducting preliminary activities by adjusting course. **Table 2-6** anticipates a total of 98 vessel trips for operational activities across two leases with an estimated three to six vessels in the lease areas at one time. It is assumed that vessels associated with the Proposed Action would utilize the Port of Pago Pago, although some uncertainty remains. Vessels deploying equipment to the seafloor at depths in the Proposed Action Area could take a minimum of 2 hours and could be on station for multiple days. Vessels in or near this route for an extended period could cause temporary detectable impacts, particularly to transiting commercial shipping vessels and fisheries. Multiple vessels added to the north and southwest parts of the Proposed Action Area, which have a high concentration of fishing activities, could temporarily cause space-use conflicts with types of fisheries conducted in those areas. Increased activity from fishing vessels in the northwest part of the area impacts are considered in the discussion on commercial fishing (**Section 3.11**).

There are no formal routing measures in or around the Proposed Action Area. Private buoys are regulated per USCG Oceania's PATON requirement. Collision risk can be minimized or eliminated if mariners and vessel operators follow the *Convention on the International Regulations for Preventing Collisions at Sea* (International Maritime Organization 1972).

Traffic in and out of Pago Pago, including vessels relating to preliminary activities, could lead to an increase in port congestion, which could affect the port infrastructure (**Section 3.12.1.2**). Due to lack of vessel trip data, we are unable to identify how many inbound and outbound vessels use this port. Port congestion is the overcrowding of port due to infrastructure stress such as limited berth space. The presence of up to six project-related vessels at any one time would be indistinguishable from existing baseline vessel traffic levels and would not result in a perceptible change in measurable or long-term impacts to limited port infrastructure. The short-term presence is not expected to notably affect the port's ability to accommodate commercial shipping or current fisheries activities.

Alternative B: Maximum Leasing

Under the five lease alternatives, the incremental impacts from the Proposed Action, such as increased vessel presence including survey and sampling vessels and the presence of buoys would result in temporary impacts for navigation and vessel traffic that routinely use the Proposed Action Area.

Alternative C: No Action

Under the No Action Alternative, commercial shipping, passenger vessels, fishing vessels, and leisure or pleasure vessels that transit to and from American Samoa would remain unimpacted by the Proposed Action.

3.13.3 Conclusion

Port congestion (**Section 3.12.1.2**) in and out the Port of Pago Pago is a possibility due to limited infrastructure, but any effects would be temporary in nature and are not expected to result in long-term impacts. The number of vessels at sea at one time is expected to be three to six, which therefore limits the number of vessels requiring re-supply in the Port. Multiple vessels added from the Proposed Action to the north and southwest parts of the Proposed Action Area, which have a relatively higher concentrations of fishing activities compared to the rest of the Proposed Action Area, could affect the types of fisheries conducted in the Proposed Action Area. The commercial shipping industry may adjust course and routes to avoid areas where the lessee's vessel operates. Mariners and lessees may use the USCG local notice to mariners if available, to make informed decisions on planned and ongoing activities within the Area ID and inland waters to minimize navigation safety risks.

The Proposed Action in combination with ongoing activities are unlikely to result in notable temporary impacts for commercial shipping as routine functions and activities would not be disrupted. Long-term impacts for fisheries are not expected in historic fishing grounds within the Proposed Action Area, and there is minimal potential for space-use conflicts as they would be temporary and primarily in depths of 1,400–6,000 m (**Section 3.11**).

3.14 Marine Cultural Resources

3.14.1 Affected Environment

The geographic analysis area for marine cultural resources is the Area of Potential Effects (APE), defined as the depth and breadth of the seabed that could be affected by seafloor- and bottom-disturbing activities associated with preliminary activities (**Figure 3-3**). The APE for preliminary activities includes the discrete horizontal and vertical areas of the seafloor that may directly affect marine cultural resources on or below the seafloor, if present. These activities may include but are not limited to subsurface geotechnical investigations and deployment of scientific equipment.

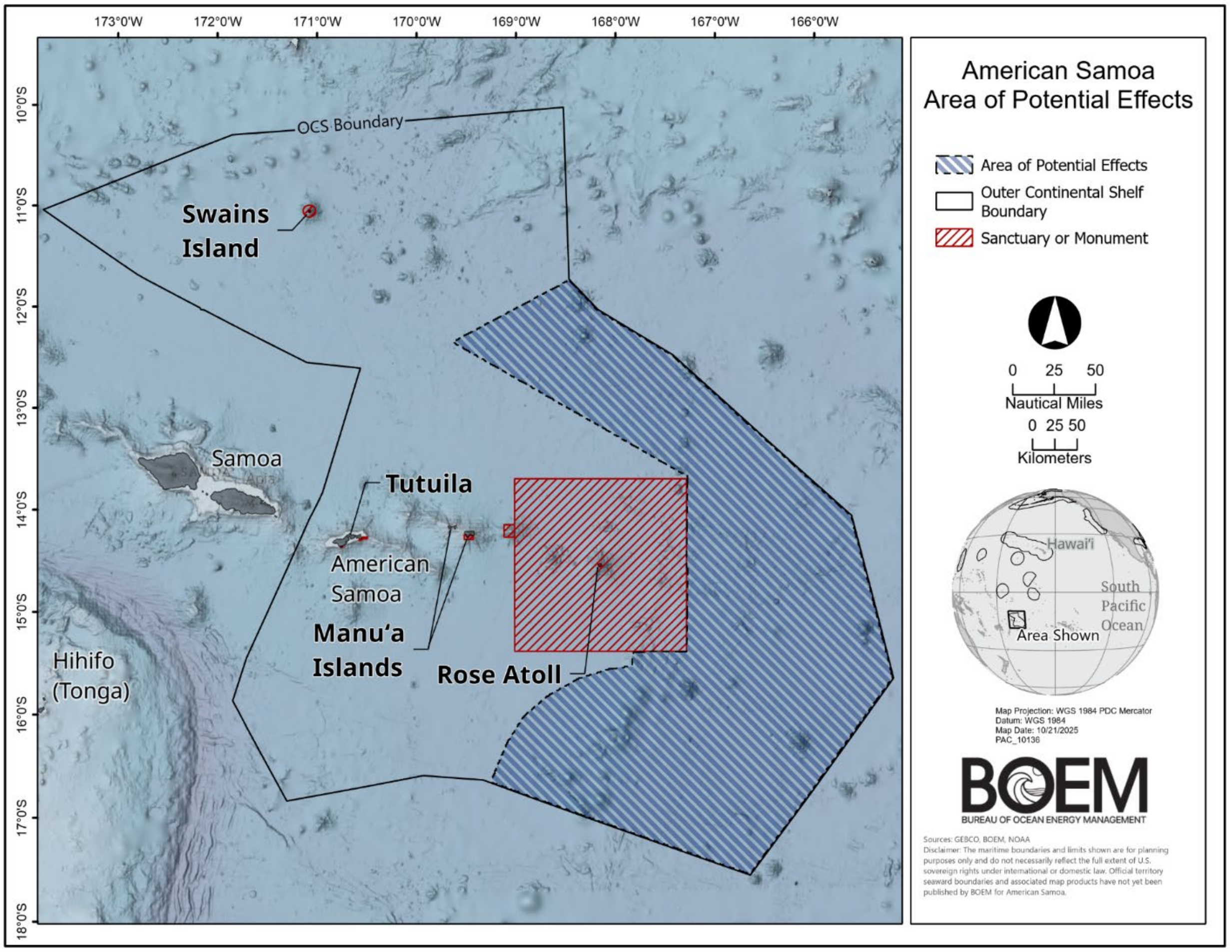

Figure 3-3. American Samoa Area of Potential Effects (APE)

BOEM will meet the reasonable and good faith effort requirements for the identification and evaluation of marine cultural resources through the evaluation of existing databases, reports, and regional studies identifying potential or nonpotential marine cultural resources, as well as consultation with the American Samoa Historic Preservation Officer and consulting parties (i.e., Navy Underwater Archaeology Branch, Naval History and Heritage Command) identified through consultation conducted pursuant to Section 106 of the National Historic Preservation Act (NHPA). BOEM reviewed existing and available information regarding marine cultural resources that may be present within the APE, including data concerning possible cultural resources not yet identified. To date, the APE has not been subjected to a complete and comprehensive marine archaeological identification survey. Submerged cultural resources that may be located within the proposed commercial lease areas may include marine archaeological resources, which are the physical remnants of past human activity that occurred at least 50 years ago and are submerged underwater. These may include both Pre-Contact Period (2000 Before Common Era [BCE] through 1722 Common Era [CE]) Indigenous archaeological sites, and Post-Contact Period (1722 CE to present) archaeological sites such as shipwrecks and downed aircraft.

BOEM conducted a review of reported shipwrecks in BOEM's Pacific OCS Shipwreck Database. Although this database does not provide a complete listing of all potential shipwrecks on the Pacific OCS, it serves as a baseline source of existing and available information for the purposes of corroborating and supporting identification efforts.

The APE has no potential for the presence of inundated Pre-Contact Period terrestrial sites because the water depths (1,400–6,000 m) are well below the lowest sea levels during human habitation of American Samoa. Polynesian watercraft and/or associated artifacts from the Pre-Contact Period or later could, however improbable, exist within the APE. Polynesian shipwrecks are extremely unlikely to be encountered mostly because of their inherent buoyancy. Pacific voyaging canoes used a double-hull design to achieve stability, instead of the use of ballast (Haddon and Hornell 1938). As a result, "[s]ubmerged wreck sites (unintentional or accidental losses while in use) for voyaging canoes may therefore be very rare, if they exist at all, in the Pacific" (Maritime Heritage Program 2017). So far, the only in situ voyaging canoes have been discovered at nearshore terrestrial wet sites, instead of in oceanic contexts (Sinoto 1983; Johns et al. 2014; Maritime Heritage Program 2017; BOEM 2024). The likelihood of discovering or encountering artifacts from lost Polynesian watercraft in the APE also is remote.

The marine heritage resources in American Samoa have been divided into five aspects: historic shipwrecks; lost World War II naval aircraft; World War II fortifications; ancient terrestrial archaeological sites; and "marine/coastal natural resources associated with the legends and folklore of American Samoa" (Van Tilburg 2007). BOEM understands the Pacific Islanders place a deep cultural significance to the ocean itself and through consultation may determine if these leases areas are or are not culturally significant to specific communities. Based on the information available at this stage, BOEM has determined that shipwrecks and downed aircraft may be encountered in the APE given its water depth and distance from land.

Maritime traffic—whether shipping, fishing, military, or recreational—at various geographic scales from local to international has been a hallmark of the Pacific for centuries. Consequently, shipwrecks could be found within the APE and could reflect a variety of vessel types. Of the 35 known historic shipwrecks in American Samoa, none were reported lost within the APE. Of these, the precise location of only two are known (Office of National Marine Sanctuaries 2022).

No submerged archaeological sites are currently known to be in the APE. In consultation with other federal partners, BOEM marine archaeologists searched or coordinated reviews of multiple cultural resources databases (Automated Wreck and Obstruction Information System, BOEM, U.S. Naval History and Heritage Command, and Defense POW/MIA Accounting Agency) and received no reports of missing vessels, aircraft, or other potential archaeological sites in the area.

Although there are no identified marine cultural resources in the APE at this time, BOEM considered details particular to deepwater environments that could affect the preservation of potential archaeological sites. These conditions are described in the following information, excerpted from Maritime Heritage Program (2017); BOEM (2024): "In extreme water depths, burial, survival, and preservation of a wreck warrants close consideration. Burial is extremely unlikely at the water depths in the APE owing to very low sedimentation rates and quiescent bottom conditions typically found in open-ocean, deepwater settings. Despite low sedimentation, conditions may also be anoxic or feature low oxygen levels that could enable preservation of wooden shipwrecks. In comparison, if there are sufficient oxygen levels, organisms that depend on organic material may destroy wooden hulls. Preservation of non-wooden shipwrecks would similarly depend on conditions. However, if a wreck is found with sufficient diagnostic artifacts in concentration, the older wooden shipwreck site may possibly be eligible for National Register of Historic Places inclusion as an archaeological site (artifact concentration) rather than relatively intact wreck or discrete object" under the NHPA.

Of the 45 aviation losses known to have occurred around American Samoa, most are military aircraft protected by the Sunken Military Craft Act of 2004 (Van Tilburg 2007). Other than one potential nearshore site, none have been located. All naval aviation losses occurred during training or patrol between 1942 and 1944, many of which were in the vicinity of Tutuila, far from the APE (Burke 1945; Van Tilburg 2007).

3.14.2 Impact Analysis

The issuance of commercial leases for marine minerals and subsequent preliminary activities in the American Samoa OCS have a potential for encountering marine cultural resources, including submerged Pre-Contact Period archaeological sites and Post-Contact Period submerged cultural resources such as shipwrecks and downed aircraft. The Proposed Action could adversely impact potentially significant marine cultural resources if present. Due to the lack of survey information in this area of the Pacific Ocean, the potential for the presence of submerged historic sites—consisting of shipwrecks, downed aircraft, or other cultural resources—remains unknown. The proposed bottom-disturbing activities located in the APE are in extremely deep water (> 1,400-m depth) in a remote location where BOEM has not found any information to suggest that historic properties exist. Additionally, the seafloor-disturbing preliminary activities allowed with lease issuance have minimal potential to adversely affect a historic property, if present. If historic properties exist but have not yet been identified or discovered, then the unanticipated discovery protocol would be followed. BMPs would require the avoidance during ground-disturbing activities of any known historic properties, if any properties are identified (**Appendix C**). Additional BMPs would require the lessee to ensure a Qualified Marine Archaeologist is involved in specific surveys and inspections of samples, to conduct visual examination with video recording of box core and free-fall grab samples collected during preliminary activities, to implement a specific HRG survey methodology and reporting of survey results, and to conduct unanticipated discovery protocols in the event of a discovery or unanticipated effect.

Considering the potential preliminary activities for the Proposed Action, BOEM anticipates that the impacts associated with ongoing and reasonably foreseeable planned actions in the geographic analysis area may result in impacts to marine cultural resources. The duration of impacts would range from temporary to permanent, but the extent and frequency of impacts is largely dependent on the unique characteristics of the individual resource. If marine cultural resources can be avoided, the overall effect would be small; if not, the overall effect would be large, and the resource is not expected be recoverable.

Alternative B: Maximum Leasing

This alternative proposes to issue five leases as opposed to two leases under the Proposed Action. The resulting leased acreage would remain the same, but subdividing the leased area into five leases would increase the probability and frequency of the potential impacts for marine cultural resources analyzed for the Proposed Action. These include potentially greater impacts from the deployment of moorings, landers, and UTP equipment, the acquisition of free-fall grab samples and box core samples, and other bottom-disturbing activities.

Alternative C: No Action

Under this alternative, commercial leases would not be issued offshore American Samoa. The impacts of ongoing activities and planned actions on marine cultural resources within the deepwater environment of the APE is largely unknown. Implementation of the No Action Alternative is not expected to meaningfully alter ongoing impacts to marine cultural resources from existing and potential future actions.

3.14.3 Conclusion

While impacts on marine cultural resources associated with planned actions could occur, BOEM anticipates that implementation under existing federal historic preservation and environmental laws and regulations would reduce the magnitude of overall impacts on cultural resources. These requirements ensure that lessees avoid, minimize, and/or mitigate project-specific impacts on cultural resources, reducing the severity of impacts in most cases.

4 Consultation and Coordination

BOEM initiated an EA process when the Area ID was finalized October 15, 2025. Guidance detailed in 40 CFR § 1501.10(f) (or cite NEPA Handbook) outlines that a public comment period on a draft EA is only included "where applicable," reinforcing that it is not required under NEPA. BOEM will not be publishing a draft EA or opening for public comments for this leasing action.

4.1 Coastal Zone Management Act

The Coastal Zone Management Act requires that federal actions that have potential to affect any land or water use or natural resource of the coastal zone be "consistent to the maximum extent practicable" with relevant enforceable policies of the state's of territory's federally approved coastal management program (15 CFR 930 Subpart C). Coastal states and territories can also review certain federal agency actions in offshore areas under the Coastal Zone Management Act (16 U.S.C. §§1451–1466).

BOEM is preparing a Negative Determination under 15 CFR § 930.35 to determine that issuing leases and related activities offshore American Samoa will not affect any coastal use or resource. The negative determination will be provided to the American Samoa Coastal Zone Management Program, a program under the American Samoa Department of Commerce, at least 90 days prior to lease issuance per 15 CFR § 930.35.

4.2 NHPA

Section 106 of the NHPA (54 U.S.C. § 306108) and its implementing regulations (36 CFR Part 800) require federal agencies to consider the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment. BOEM has determined that issuing marine minerals commercial leases on the OCS offshore American Samoa constitutes an undertaking subject to Section 106 of the NHPA and its implementing regulations, because the resulting preliminary activities have the potential to cause effects on historic properties. Additionally, it is important to note that submerged military vessels and aircraft are protected under the Sunken Military Craft Act of 2004. Cultural resources on the OCS also may be grave sites.

BOEM initiated consultation through letters sent via email on January 14, 2026, with the American Samoa Historic Preservation Office and consulting parties. BOEM further identified potential consulting parties pursuant to 36 CFR 800.3(f) through these letters to consulting parties—including American Samoa government agencies such as the American Samoa Historic Preservation Office and the Department of Local Government, American Samoa Community College, federal agencies, and other consulting parties recommended by the American Samoa Historic Preservation Officer—to notify and invite them to the Section 106 consultation; to solicit comment and input regarding the identification of, and potential effects on, historic properties for the purpose of obtaining consulting party review and input for the Section 106 review (36 CFR § 800.2(d)(3)); and to invite the recipients to participate as a consulting party.

Consistent with 36 CFR 800.4(d)(1), BOEM made a Finding of No Historic Properties Affected and sent the Finding and associated documentation to the American Samoa Historic Preservation Officer and consulting parties. BOEM also requested concurrence on the Finding from the American Samoa Historic Preservation

Officer and invited comments from consulting parties. BOEM sent the Finding of No Historic Properties Affected to consulting parties (**Appendix F**).

4.3 Endangered Species Act

Section 7(a)(2) of the ESA (16 U.S.C. § 1537) requires that federal agencies shall both "…utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of endangered species and threatened species…" and, "…ensure that any action authorized, funded, or carried out… is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species...which is determined…to be critical…". To satisfy its ESA obligations, BOEM consults with the USFWS and NMFS on projects that could affect any listed species and/or their critical habitat under the jurisdiction of the services. BOEM had discussions with NMFS and USFWS regarding the Proposed Action and completed consultations as of February 2026.

4.4 Marine Mammal Protection Act

To ensure compliance with the MMPA, BOEM lease requirements will stipulate that lease holders must not conduct any activity under their lease that may result in an incidental taking of marine mammals until the appropriate authorization has been issued under the MMPA of 1972 as amended (16 U.S.C. 1361 et seq.). The lessee must determine the need for an Incidental Harassment Authorization (IHA), which allows the incidental take of marine mammals during the specified activities. If the applicant determines the need for an IHA, they must apply to NMFS, which, after evaluation, would either authorize incidental take or deny the IHA application. BMPs apply in Federal waters of the OCS and are intended to minimize or eliminate potential impacts on resources considered in the EA, which include marine mammals.

4.5 Magnuson-Stevens Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (as amended) requires federal agencies to consult with NMFS regarding actions that could adversely affect designated EFH, and this consultation is complete. The assessment herein relies on ongoing formal EFH descriptions for managed species. BOEM combined the consultation for fishes and invertebrates listed under the ESA. BOEM and the agencies are using the estimates described in this EA to inform the consultation.

4.6 National Marine Sanctuaries Act

National marine sanctuaries provide additional protections to the important resources, such as natural, cultural, and historical resources, found in sanctuary waters. Each national marine sanctuary has its own set of regulations to facilitate, to the extent compatible with the primary objective of resource protection, all public and private uses of the sanctuary not prohibited under other authorities. American Samoa is home to the NMSAS, which protects ecologically and culturally significant marine resources. Under Section 304(d) of the National Marine Sanctuaries Act (16 U.S.C. §1434(d)), any federal agency undertaking an action that is likely to destroy, cause the loss of, or injure a sanctuary resource must consult with NOAA. The Act defines injury as “to change adversely, either in the short or long term, a chemical, biological, or physical attribute, or the viability, of a sanctuary resource.” Based on the analysis presented in the EA, BOEM determines that the Proposed Action is not likely to injure any sanctuary resources. This requirement reflects the sanctuary’s role in preserving ecological integrity and cultural values for future generations. The need for a specific NMSAS Section 304(d) consultation will be addressed later should operations occur after lease issuance in an additional NEPA process.

4.7 Other Acts and Agencies

The Jones Act

The Merchant Marine Act of 1920, also called the Jones Act, is applicable to U.S. states and Puerto Rico, but not to U.S. territories and possessions in the Pacific Ocean unless a presidential proclamation is issued. However, the Jones Act’s protections for injured seamen are enforceable in American Samoa and have been validated by local and federal courts.

U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) ensures that federal agencies thoroughly evaluate and address potential environmental impacts under NEPA. In accordance with 40 CFR Part 6, USEPA incorporates NEPA requirements into its own actions, and for this Proposed Action, oversight is provided by USEPA Region 9. Additionally, the USEPA’s Office of Federal Activities manages the filing and public availability of NEPA documents.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) is a cooperating agency for the Biological Assessment. USACE possesses jurisdiction by federal law pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403); 33 CFR § 320.2(b), Section 10 of the Rivers and Harbors Act, prohibits the unauthorized obstruction or alteration of any navigable waters of the United States. The authority of the Secretary of the Army to prevent obstructions to navigation in navigable waters of the United States was extended to artificial islands, installations, and other devices on the seabed, to the seaward limit of the OCS, by Section 4(f) of the OCSLA of 1953 as amended (43 U.S.C. § 1333(e)). Department of the Army permits are required for the construction of artificial islands, installations, and other devices on the seabed, to the seaward limit of the OCS, pursuant to Section 4(f) of the OCSLA as amended pursuant to 33 CFR § 322.3(b). In the future, USACE Section 404 permits may be required for larger surface float buoys. Activities that BOEM lease holders may undertake that involve installing devices on the seabed would require USACE authorization under Section 10 of the Rivers and Harbors Act. Geotechnical sampling is considered “work,” an activity the Corps regulates. Per 33 CFR 320.1 (b)(2), “other structures or work including excavation, dredging, and/or disposal activities, in navigable waters of the United States,” and (7) “Nationwide general permits for certain categories of activities” are regulated activities. The term work is also defined in 33 CFR 322.2(c).

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Appendix A. Bureau of Ocean Energy Area Identification and Survey Assumption Memorandums

United States Department of the Interior
BUREAU OF OCEAN ENERGY MANAGEMENT
Pacific OCS Region
760 Paseo Camarillo, Suite 102
Camarillo, CA 93010-6064

Memorandum

To: Matthew N. Giacona
Acting Director

From: Douglas P. Boren
Regional Director, Pacific Regional Office

DOUGLAS BOREN

Digitally signed by DOUGLAS BOREN
Date: 2025.10.15 07:54:29 -07'00'

Subject: Area Identification Recommendation for the American Samoa Outer Continental Shelf (OCS) Mineral Leasing Process

Area Identification (Area ID) is a major step in the Bureau of Ocean Energy Management's (BOEM) Outer Continental Shelf (OCS) mineral leasing process to develop a recommendation for an area to be carried forward for further leasing consideration and environmental analysis offshore American Samoa. Pursuant to 30 CFR 581.14, after considering the available OCS mineral resources, environmental data, and information, and the comments received from interested parties, including through the Request for Information and Interest (RFI), BOEM recommends tracts to be considered for a proposed lease offering. The recommended tracts would be considered in the forthcoming environmental analysis conducted for the activities that would be permissible under the proposed lease offering.

This memorandum documents your Area ID decision in accordance with 30 CFR 581.14. As noted above, your decision identifies the tracts to be carried forward for further leasing consideration and environmental analysis. The Area ID decision is not a final decision to lease nor is it an irreversible or irretrievable commitment of resources. The Area ID decision to support a potential OCS mineral lease sale offshore American Samoa is documented by your signature and marking your choice on the last page of this memorandum. A copy of this memorandum and the associated attachment will be made available on BOEM's website for public viewing and downloading.

I. Background

On April 8, 2025, BOEM received an unsolicited request from Impossible Metals Inc., for OCS minerals to be offered for lease in an area offshore American Samoa. After reviewing the request, BOEM determined it was appropriate to initiate the first steps that could potentially lead to a lease sale and on June 16, 2025, BOEM issued an RFI for commercial leasing for OCS seabed critical minerals offshore American Samoa (90 Fed. Reg. 25,369). The RFI requested information and comments on, and indications of interest in, the leasing of OCS minerals in and around the RFI Area. The RFI Area is the area of interest identified in the unsolicited lease sale request, located near the eastern limit of the American Samoa OCS bordering the Cook Islands Exclusive Economic Zone. It comprises approximately 18.1 million acres (73,222 square kilometers [km^2]) with approximate water depths ranging from 4,600–20,000 feet (1,400–6,000 meters). BOEM considered available OCS mineral resources, environmental data, and information and interest received in response to the RFI when considering whether to proceed with additional steps leading to a potential OCS mineral lease sale offshore American Samoa.

II. Comments Received in Response to the RFI

In response to the RFI, BOEM received comments both opposing and supporting the proposed commercial lease sale in and around the RFI Area. BOEM received a total of 76,443 public comment submissions in response to the RFI. Of the total 76,443 public submissions, 1,085 were identified as unique, 73,586 copies were associated with 27 form letter campaigns, and 1,772 were considered duplicate or not germane. Pursuant to 30 CFR 581.14, BOEM considered these comments in developing an Area ID recommendation for a proposed lease sale for OCS minerals offshore American Samoa. **Attachment 1 provides an RFI comment summary**. Key highlights of the comments received are noted below:

- Governor Pulaali'i Nikolao Pula communicated that key leaders of the American Samoa Government reached a unified position of opposition to the proposed commercial leasing within the American Samoa EEZ, consistent with the concerns raised by residents and traditional leaders.[1] The Governor also indicated that the American Samoa Government continues to support collaboration and open dialogue with the Department of the Interior (DOI) and BOEM. He urged BOEM to fully consider the territorial moratorium on seabed mining and opposition to commercial leasing in the territory's EEZ, requested that no activity proceed without territorial consent, and emphasized collaboration grounded in environmental integrity, scientific integrity, and equitable consultation.
- American Samoa Congresswoman Uifa'atali Aumua Amata Coleman Radewagen requested all OCS mineral activities occur at least 50 miles from any of the islands of American Samoa, Rose Atoll, and Swains Island.
- Commenters raised environmental concerns related to the potential impacts to marine ecosystems, fisheries, and biodiversity; potential impacts from sediment plumes; potential disruption of food webs, habitat fragmentation and destruction, and impacts to coastal resilience; and potential impacts to fish populations, migration patterns, and breeding grounds, which could affect economically important species, such as tuna.
- Commenters requested that comprehensive environmental studies be conducted before issuing a lease, including baseline studies, full environmental surveys, comprehensive science-based environmental assessments, impact modeling, an assessment of onshore and offshore logistical impacts, and a Programmatic Environmental Impact Statement for all potential exploration, development and production activities, and that any future exploration be Indigenous-led, science-based, and subject to transparent environmental safeguards aligned with global best practices.
- Commenters expressed concerns about cross-boundary effects on the Cook Island waters, Tonga's tourism and economy, and the impacts on sea life within the Phoenix Island Protected Area.

[1] American Samoa Government - PR001-06232025. Leadership United: Governor and Lieutenant Governor Lead Unified Effort on Seabed Mining. June 23, 2025. https://www.americansamoa.gov/leadershipunited.

- Commenters raised cultural concerns that the waters off American Samoa hold deep cultural significance for Pacific Islanders and are integral to Fa‘aSamoa, the Samoan way of life.
- Commenters also raised concerns about possible impacts to underwater cultural heritage, traditional use areas, and the ability to continue practicing sacred cultural practices that could be sensitive to potential environmental impacts.
- Commenters stated that meaningful consultation with the Indigenous communities of American Samoa and the American Samoa Government should be conducted before any leasing process is considered.
- Commenters emphasized that the American Samoan economy relies on tuna fishing, tuna fish processing, and related industries, which provide significant employment and food security and support the local economy and livelihoods.
- Commenters raised socioeconomic concerns related to the current federal framework which they stated offers no guaranteed benefit to the local communities and the people of American Samoa and violates Indigenous rights and Pacific Island sovereignty, and requested to incorporate revenue sharing agreements for all leases, royalties, and profits with American Samoa which could support local communities and strengthen economic resilience.
- Commenters from the deep-sea mining industry provided recommendations on royalty rates and rental payments, auction formats, lease size, and lease contraction. Other non-industry commenters suggested a lease contraction process under certain circumstances, disagreed with suspension of rental payments, and recommended a benchmarking review of royalties in other jurisdictions, including the International Seabed Authority, the Cook Islands, and relevant onshore regimes.
- Commenters raised concerns that deep-sea mining faces uncertain economic viability due to current mineral prices, emerging alternatives and recycling, untested technology, and the lack of a U.S. processing and supply chain for critical minerals.
- Commenters advocated for a balanced approach with the recommendation that facts be gathered, risks assessed, and exploration of whether deep-sea mining can be pursued responsibly to secure a diversified, sustainable future for the territory.

III. Indications of Interest Received in Response to the RFI

BOEM received comments from industry and industry groups expressing interest in the OCS mineral leasing process offshore American Samoa. In addition to Impossible Metals Inc. confirming their interest in leasing, BOEM received indications of interest from several other companies in response to the RFI. Several indications of interest identified preferences for areas in and around the RFI Area and for expanding the area of consideration to the southwest of the RFI Area, as shown in the Indications of Interest Heat Map (Figure 1).

Collectively, the indications of interest are entirely encompassed by the available acreage/blocks in the Area ID recommendation. Indications of interest and comments identified polymetallic nodules deposits as the primary target for commercial development due to their potential to contain commercially viable quantities of cobalt, nickel, copper, manganese, zinc, rare earth elements, and other minerals that may prove economically viable to extract and process in the future.

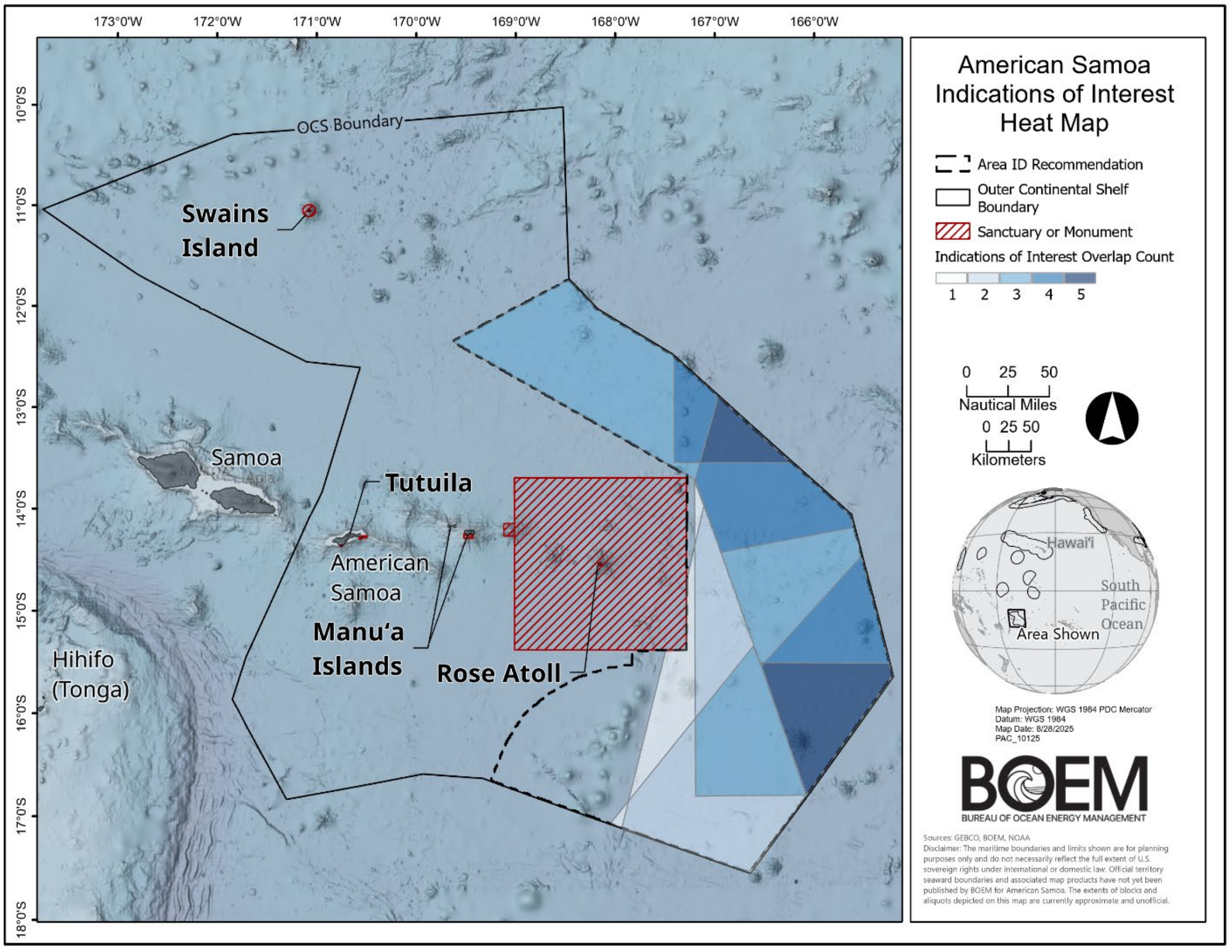

Figure 1: Indications of Interest Heat Map. The highest priority areas are shown as dark blue, lower priority areas shown in lighter shades of blue, and the lowest priority area shown in white.

IV. Recommendation

In formulating the Area ID recommendation, BOEM considered the available OCS mineral resource information, environmental data and information, comments received in response to the RFI, and indications of interest in OCS mineral leasing. The presence of any minable orebody is unknown, and additional prospecting is needed to discover and delineate OCS minerals, hence, the size of the tracts for potential leasing is relatively large. The recommended area is consistent with indications of interest and prospective seabed mineral regions identified by the U.S. Geological Survey (USGS) in and around the RFI Area for ferromanganese crusts and polymetallic nodules, as shown in the American Samoa Marine Minerals Prospective Regions

Map (Figure 2), which is based on the USGS Global Marine Mineral Prospective Regions Map.[2] With the inclusion of potentially available OCS mineral resources and the indications of interest, the recommended area is approximately 15,000,000 acres larger than the RFI Area. The selected tracts will be considered in the environmental analysis conducted for the proposed lease offering and BOEM will consider available environmental information and comments received through the RFI that inform the environmental review of activities permissible under a lease which are preliminary activities[3] needed to prepare plans for comprehensive technical and environmental review by BOEM. The comments received in response to the RFI will also inform future project specific environmental analysis if leases are issued and plans are submitted by lessees for work under their lease.

We recommend that you consider for potential leasing and environmental analysis all available blocks within the American Samoa RFI Area plus an additional contiguous area to the southwest of the RFI Area that extends to the southern boundary of the EEZ, as shown in the American Samoa Area ID Map (Figure 3). This Area ID recommendation constitutes an area of approximately 6,069 whole and partial blocks covering approximately 33,136,060 acres. This Area ID recommendation does not commit DOI to future leasing or a specific number of blocks or acreage to be offered at the lease sale stage.

- This Area ID recommendation provides flexibility as BOEM completes the required consultations, environmental analyses, and development of reasonable alternatives pursuant to NEPA and other statutes.
- The environmental analysis, which will be completed before making any decisions to hold a lease sale, will inform potential exclusions and mitigations that can be applied to leases issued in an American Samoa OCS mineral lease sale.
- The process allows for consultation with Indigenous communities of American Samoa that gives meaningful consideration to local concerns and respects self-governance.
- This Area ID recommendation is consistent with a request from American Samoa Congresswoman Aumua Amata Coleman Radewagan to ensure that any potential OCS mineral activities be located no closer than 50 miles from the islands of American Samoa, Rose Atoll, and Swains Island.

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[2] USGS Coastal and Marine Hazards and Resources Program. Global Marine Mineral Prospective Regions Map. January 31, 2025. https://www.usgs.gov/media/images/global-marine-mineral-prospective-regions-map.

[3] Preliminary activities are bathymetric, geological, geophysical, mapping, and other surveys necessary to develop a comprehensive Delineation, Testing, or Mining Plan. 30 CFR 582.21(d).

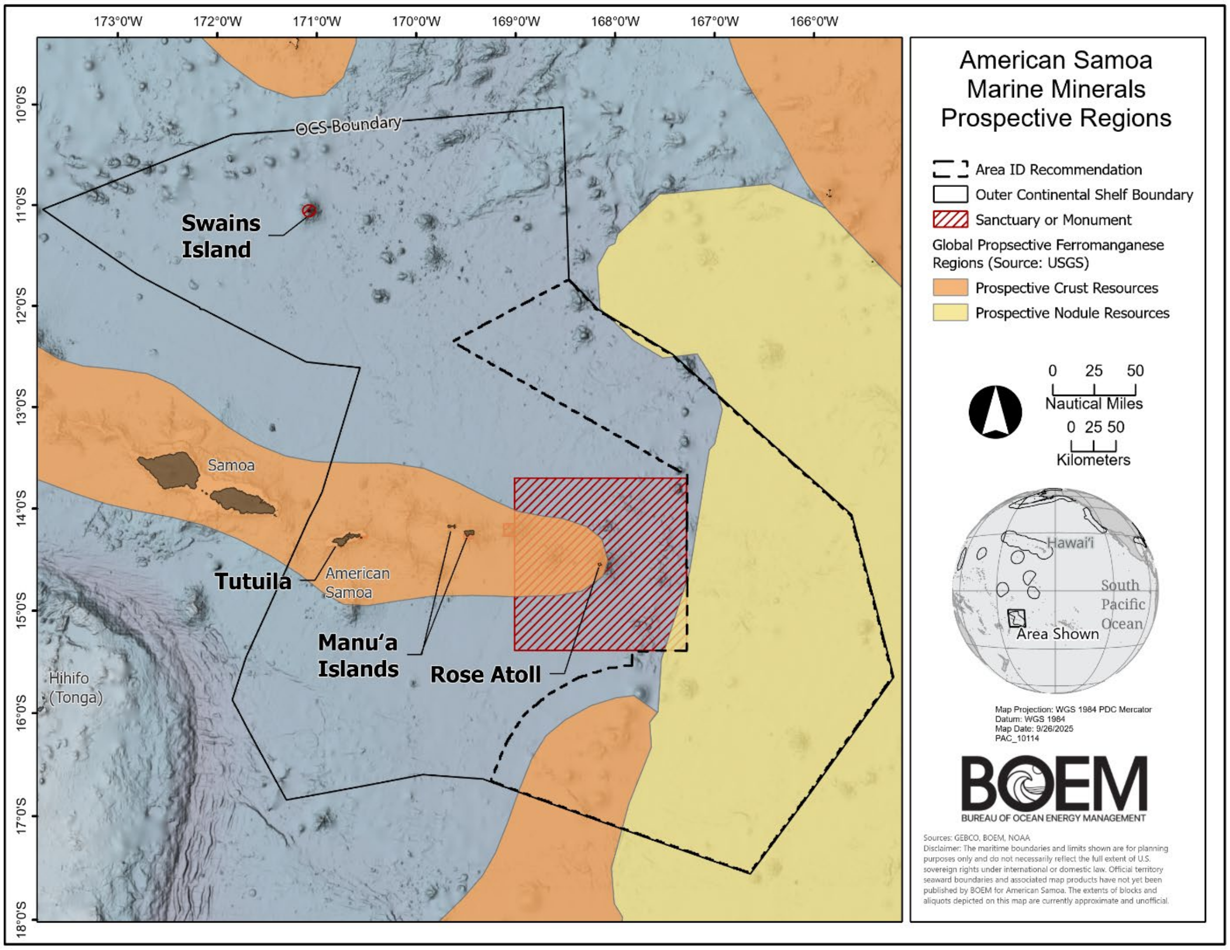

Figure 2: American Samoa Marine Minerals Prospective Regions Map. Global prospective ferromanganese regions for crusts are shown in orange, and prospective ferromanganese regions for nodules are shown in yellow, based on the USGS Global Marine Mineral Prospective Regions Map.[4]

[4] USGS Coastal and Marine Hazards and Resources Program. Global Marine Mineral Prospective Regions Map. January 31, 2025. https://www.usgs.gov/media/images/global-marine-mineral-prospective-regions-map.

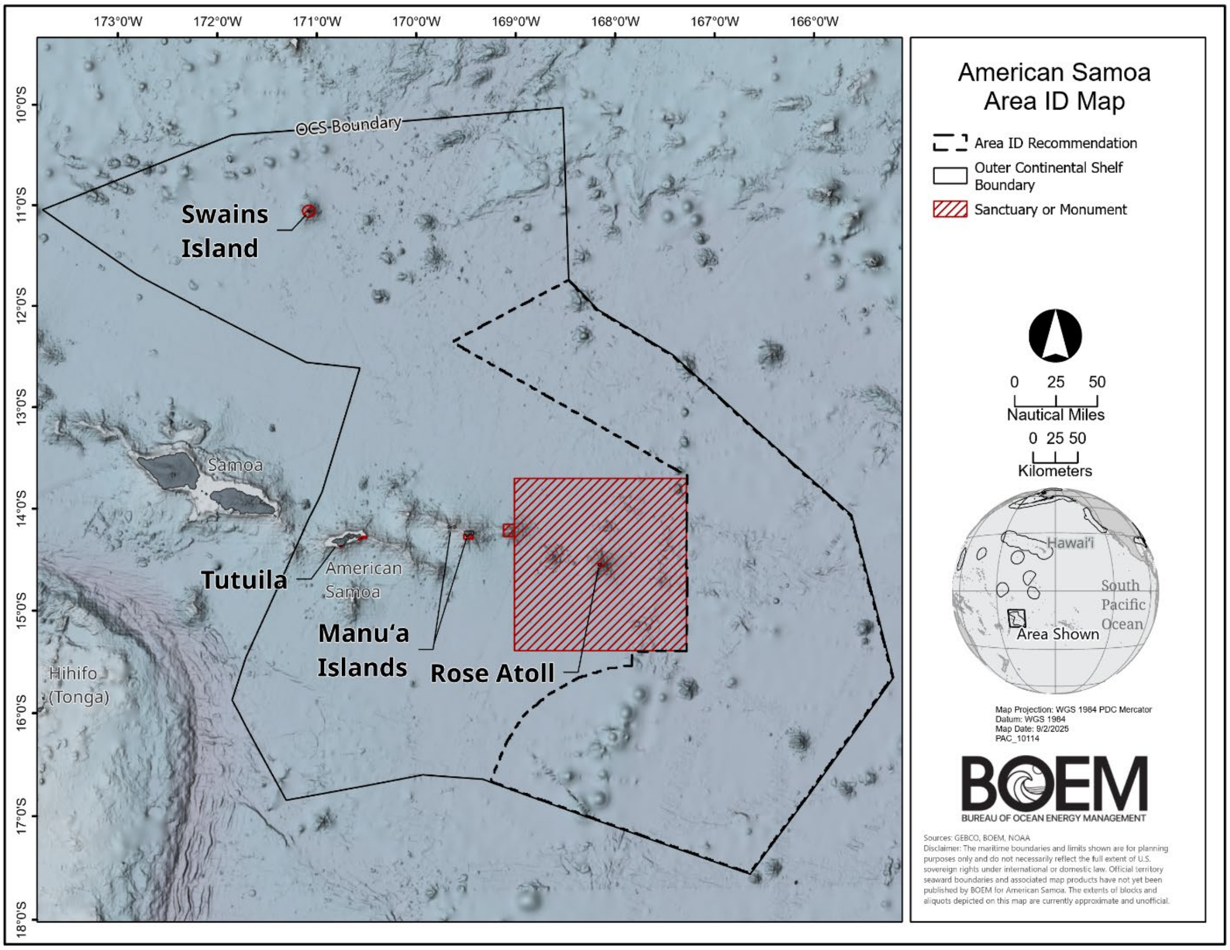

Figure 3: American Samoa Area ID Map.

V. Decision Options

Please indicate your decision by signing and dating this memorandum and marking appropriately below:

☑ I concur with the recommendation. Please continue with the Area ID announcement.

☐ I have made edits to modify the Area ID recommendation; please finalize and continue with the Area ID announcement.

☐ Please stop preparations for the Area ID announcement.

MATTHEW GIACONA
Digitally signed by MATTHEW GIACONA
Date: 2025.10.15 11:51:21 -04'00'

Matthew N. Giacona
Acting Director
Bureau of Ocean Energy Management

Attachment 1. BOEM American Samoa Request for Information and Interest (RFI) Comment Summary

U.S. Department of the Interior
Bureau of Ocean Energy Management

BOEM Commercial Leasing for Outer Continental Shelf Minerals Offshore American Samoa

Request for Information and Interest

Public Comment Period

Docket BOEM-2025-0035

Summary Report

September 29, 2025

Prepared by

ICF

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Introduction

On April 8, 2025, the Bureau of Ocean Energy Management (BOEM) received an unsolicited request for Outer Continental Shelf (OCS) minerals to be offered for lease in an area offshore American Samoa. BOEM published a notice in the Federal Register (Fed. Reg.) on June 16, 2025 (90 Fed. Reg. 25,369) requesting information and comments on, and indications of interest in, the leasing of OCS minerals in and around the area submitted in the unsolicited lease sale request. The comment period was extended on July 17, 2025, and closed on August 15, 2025.

Through August 29, 2025, BOEM received a total of 76,443 public comment submissions in response to the Request for Information and Interest (RFI) (Docket BOEM-2025-0035). Of the total 76,443 public submissions, 1,085 have been identified as unique (311 substantive and 774 non-substantive), 73,586 copies were associated with 27 form letter campaigns, and 1,772 were considered duplicative or not germane. The 311[5] substantive submissions and form letter campaigns are reflected in today's report. BOEM will use data and information received during the recent Request for Information and Interest public comment process (BOEM-2025-0035) to determine and document the proposed action's scope of environmental effects, alternatives or effects, and relevant information with respect to BOEM's action and regulatory authority.

[5] One substantive commenter submitted 15 additional submissions that only contained reference or supporting material with no additional comment text. These comments were flagged for "Cites data, reference or publications" but do not appear in this report as they are not coded to an issue. The total count of substantive comments with text included in this report is 296.

General Comments

A commenter said that they support BOEM's RFI because it acts as a critical step toward advancing U.S. national security interests, fostering economic diversification for the Territory of American Samoa, and countering growing foreign influence in the Pacific region, while emphasizing the need for robust environmental safeguards to protect vital resources such as the tuna fisheries.

Commenters referenced American Samoa Executive Order 006-2024, issued by former Governor Lemanu Peleti Mauga, which established a moratorium on deep seabed mining, extracting, removing, or any exploration activities in the waters offshore American Samoa. Several commenters stated that this moratorium remains in full force and effect and has been reaffirmed by current Governor Pulaali'i Nikolao Pula and other territorial leaders.

Several commenters stated that over 800 individuals and more than 40 organizations in American Samoa, over 37 countries, multiple U.S. states, 37 financial institutions, more than 65 major corporations, and over 940 marine experts have signed petitions opposing deep sea mining, indicating a growing global consensus for a moratorium on deep sea mining.

Many commenters called for respect of Indigenous rights and sovereignty in decision-making about ocean resources, while some commenters cited principles, such as Free, Prior, and Informed Consent (FPIC) and the United Nations Declaration on the Rights of Indigenous Peoples.

Commenters requested 30- and 120-day extensions to the comment period.

Background

Concerns Over the Necessity and Efficiency of Deep Sea Mining

Some commenters questioned the RFI's justification for the need for critical minerals, saying:

- Emerging technologies and innovations in recycling are beginning to replace the need for deep sea minerals;
- Assertions that deep sea mining is essential for the renewable energy transition are misleading because sufficient terrestrial sources of critical minerals already exist and their extraction is far more efficient; and
- Deep sea mining is unnecessary and inefficient for meeting clean energy goals.

Commenters said that deep sea mining is economically infeasible due to falling demand and prices for key minerals, rising operational costs, and advances in battery technology that reduce reliance on seabed resources. A commenter stated that seabed mining on the American Samoa OCS is not consistent with national needs, as required by Outer Continental Shelf Lands Act (OCSLA).

Multiple commenters expressed concern and skepticism about the economic benefits of deep sea mining for American Samoa. A territory agency stated that the current Federal framework offers no guaranteed benefit to the people of American Samoa, with no commitments to hire locally, share royalties, or build capacity within American Samoa. A few commenters said that the economic benefits of deep sea mining would primarily accrue to external entities rather than local communities.

Commenters expressed concerns about the technological feasibility of deep sea mining operations, particularly with regard to the high calcium carbonate content of the water. A few commenters specifically questioned the technological capabilities and financial stability of Impossible Metals.

Legal Authority and Expanded Definition of Outer Continental Shelf

A commenter stated that applying OCSLA to American Samoa through the Inflation Reduction Act's (IRA) expanded definition of "State" constitutes a unilateral imposition. The commenter remarked that this approach treats the territory as a "resource colony," enabling Federal extraction without adequate local consent or equitable benefit. A commenter said that Congress added American Samoa to OCSLA's definition of "State" only for wind leasing under the IRA and emphasized that any mineral leasing must meet OCSLA's requirements for environmental safeguards, safe operations, protection of fisheries, and alignment with national and local interests—standards that seabed mining in American Samoa cannot meet.

A commenter wrote that BOEM lacks statutory authority under OCSLA to lease the seafloor for the extraction of polymetallic nodules, cobalt-rich ferromanganese crusts, or seafloor massive sulfides. They stated that these mineral types fall outside the scope of the leasing regime established by OCSLA, which defines "mineral" narrowly to include only oil, gas, sulfur, certain geothermal resources, or minerals authorized by a separate act of Congress for production from public lands. A commenter remarked that applying this expanded interpretation to American Samoa overlooks its unique territorial status and limits local influence over decisions affecting its marine environment.

Historical, Cultural, and Indigenous Rights Considerations; Deeds of Cession

A commenter discussed the Deeds of Cession (1900, 1904) that transferred sovereignty to the United States under commitments to protect Samoan lands, customs, and governance. They said that these deeds impose an implicit trust obligation on the United States to protect Samoan communal governance and Fa'aSamoa, the Samoan way of life. A territory-level elected official asserted the American Samoa legislature's authority in defining policies that protect the land and waters entrusted to their care, ensuring that all decisions regarding resource management align with legal, scientific, and cultural mandates.

Strategic and Geopolitical Considerations

A commenter stated that there are serious geopolitical risks associated with the United States pursuing deep sea mining outside the United Nations Convention on the Law of the Sea (UNCLOS) framework. They wrote that ignoring international governance undermines the United States' ability to demand compliance from other states on issues like illegal fishing and maritime navigation and weakens our legitimacy on the international scale. A commenter expressed concern about the potential for deep sea mining to create new geopolitical vulnerabilities, suggesting that issuing permits for the potential commercial recovery of seabed minerals in international waters could open the door to a race for control over ocean resources by foreign powers.

Coordination and Consultations

Government of American Samoa and U.S. Federal Agencies

Commenters referenced specific legal requirements for consultation under the OCSLA, stating that it guarantees American Samoa a meaningful opportunity to participate in policy and planning decisions related to OCS mineral development.

A commenter said that consultation on the technical kinds of issues relevant to the RFI requires significant scientific expertise and investment; the commenter therefore recommended that BOEM provide funding and technical assistance to the Government of American Samoa to ensure full and effective participation in the consultation process.

Commenters requested that the formal opposition of the Government of American Samoa be fully considered in BOEM's decision-making process, and that no commercial leasing or exploration activity should proceed in the American Samoa Exclusive Economic Zone (EEZ) without the expressed support of the territorial government.

A Federal agency wrote that it is prepared to coordinate with BOEM to close information gaps, such as in benthic habitat mapping, protected species distribution, and small-boat fisheries, and to support risk-informed leasing decisions.

An industry commenter recommended that BOEM should establish default separation distances between mining activities and existing submarine cables, relying on guidance from the Federal Communications Commission's Communications, Security, Reliability, and Interoperability Council.

Indigenous Peoples of American Samoa and other Indigenous Groups

Many commenters generally said that BOEM must fully consult with the people of American Samoa as part of any leasing process around American Samoa and incorporate their input in any future decision, including by giving significant weight to local concerns, holding public hearings with adequate advance notice and language support, providing culturally appropriate educational resources, and generally assisting local communities in assessing risks and benefits. Another commenter wrote that to ensure equitable access to information, all documents and presentations should be translated into Samoan.

Numerous commenters wrote that the United States must respect American Samoa's right to self-governance and FPIC. A commenter said that the American Samoa Government and village councils (Fono) must have the authority to reject proposals that threaten their way of life, arguing that consultation without the power to say "no" is not true consent. A commenter recommended that BOEM should coordinate with a Pacific Indigenous Advisory Council, established under 43 U.S.C. §1344, to provide ongoing input on leasing programs.

Other Coordination and Consultations

Commenters recommended that BOEM seek input from scientists and practitioners of traditional ecological knowledge; establish a standing advisory panel with representation from American Samoa's fishing, cultural, and scientific sectors; consult with American Samoa's fishing communities; identify submarine cable operators and service providers; and build public-private partnerships, including academia, private researchers, community leaders, government representatives, and industry experts, while ensuring representation of American Samoan residents, to advise on the responsible development of offshore mineral resources.

A commenter said that BOEM should include more than one public comment and consultation opportunity in its leasing process, such as after a lease is issued and environmental impact statements are developed. A commenter urged BOEM to ensure that it sufficiently informs the public and allows meaningful participation in the National Environmental Policy Act (NEPA) environmental impact analysis phase of the leasing process.

Leasing Process

A Federal agency agreed that BOEM should develop a clear leasing schedule to allow for the incorporation of ongoing data collection efforts. A couple of commenters suggested that BOEM develop a permitting track for exploration leases, similar to that devised by the International Seabed Authority (ISA), as part of a phased leasing process.

An industry commenter proposed that BOEM follow a leasing process similar to what has been implemented in the Cook Islands, which places a greater emphasis on a due diligence phase for the screening and qualification of applicants and requires the approval of a work plan for all approved lessees, among other requirements that differ from the process defined in OCSLA.

Rental and Royalty Rates

An industry commenter expressed support for BOEM's proposal not to charge rent during the first five years of leases and encouraged BOEM to suspend rental payments while BOEM reviews testing and exploitation plans. The commenter favored a structure that relies more heavily on royalty payments, similar to the structure employed in the Cook Islands. An industry commenter and a public interest organization said that it is premature to set rental rates because there needs to be some reconnaissance work to determine whether there is profitable mineral exploitation in this area. In expressing their opposition to minerals exploration, a couple of individual commenters suggested a rate of $500 million per square meter beginning in the first year, increasing at a rate of 15 percent per year.

An individual commenter stated that there should be rent due within the first five years, citing 30 CFR 581.25(b), which states: "unless otherwise specified in the leasing notice and subsequently issued lease." The commenter said that this means that as long as the notice and lease provide for rental payments in the first five years, they can and should be charged.

Industry and other commenters suggested royalty rates:

- No higher than 3 percent, and that also incorporates a lower royalty rate of 1.5 percent for the first five years of paying royalties;
- Approaching the 12.5 percent rate in the oil and gas industry over time, but lower initial rates; and/or
- Based on revenues generated, not on the nodules themselves.

Commenters said that it is premature to recommend precise royalty percentages due to the early stage of the industry and variability in operating costs, and that calculating a fair rate for these resources is "very difficult, if not impossible" due to the lack of data on the profitability of a deep sea mining operation.

Commenter recommended a benchmarking review of both terrestrial royalties and deep sea mining royalties, including ISA proposals and Cook Islands regulations, when available.

Auction Format and Lease Size

Industry and other commenters expressed support for transparent, competitive bidding mechanisms, such as an ascending oral bid auction with low minimum bid levels. Another industry bidder favored a sealed bid format. A couple of industry commenters expressed support for allowing companies to bid on multiple tracts.

Commenters suggested potential lease sizes:

- Any lease should be limited to a very, very small area of less than 1 km^2 per every 1600 km^2 due to the potential risk of environmental damage;
- 75,000 km^2 leases would be consistent with other ISA exploration contracts; and
- Minimum areas of 25,000 km^2 if smaller areas are necessary.

Lease Contraction Clauses

Commenters reasoned that leases should include an automatic and binding contraction clause to reduce the leased area if economic, environmental, or other damage is recorded or if other hazards occur and should be allowed to be reduced if portions of the tract are shown to not be economically viable. An industry commenter said that five years seems like a reasonable amount of time for lease contraction clauses.

Liability and Bonding Concerns

Commenters raised concerns about the liability of companies for environmental, economic, and cultural damages from their actions and recommended that BOEM require all applicants to post restoration bonds sufficient to remediate plume damage if deep sea mining ever proceeds.

Baseline Data Collection and Environmental Assessment

Many commenters emphasized the lack of comprehensive baseline data in the RFI area. A commenter said that the eastern margin of American Samoa’s EEZ lacks publicly available high-resolution bathymetric data. The commenter said that there are no publicly available data on mineral contents from anywhere within the eastern American Samoa EEZ currently under consideration for leasing.

Commenters said that baseline data are needed to characterize habitats, document species and their interactions, and quantify existing anthropogenic impacts on the local deep sea ecosystem so that impacts from deep sea mining can be prevented and mitigated.

Survey Technologies and Methodologies

An industry commenter described various technologies for underwater mapping, positioning, and monitoring, including Autonomous Underwater Vehicles (AUVs), underwater positioning and communication systems, seabed mapping technology, water column acoustic technology, and inspection and monitoring technology.

RFI Area Information

A commenter said that the National Oceanic and Atmospheric Administration (NOAA) Ocean Exploration Cooperative Institute recently conducted two expeditions to map and sample the area that contains the RFI area, during which the high-resolution surveys for the eastern abyssal plain region of the American Samoa EEZ noted the presence of manganese nodules.

The same commenter recommended extending the lease sale area beyond the area of interest identified in the unsolicited request as indicated by a diagram in their comment letter. Another commenter recommended expanding the RFI area near the eastern limit of OCS Mining Area Block 1 to include additional prospective tracts as defined by the coordinates identified in their comment letter.

A commenter suggested comprehensive exclusion of seafloor sulfide and cobalt-rich crust seabed mineral resources from consideration for future mining leases and discussed the invasive effects mining would have on the area. Some commenters stated that the RFI should focus only on polymetallic nodules.

Seabed Hazards

A commenter said that the most notable hazards and environmentally and geologically sensitive areas are the shelf areas that have a significant change in bathymetry and the seamounts, which should be treated as exclusionary zones for any proposed activity. A commenter expressed concern that deep sea mining will negatively harm unidentified shipwrecks or aircraft wreck sites by either accidental extraction due to placement and activities and other possible disruptions in the seabed and ocean chemistry caused by deep sea mining. A few commenters discussed concern regarding volcanic areas and impacts of earthquakes along subduction zones.

Disruption to Subsea Cables

An industry commenter said that deep seabed mining poses risks to the Southern Cross Cable Network (SCCN), including disturbance or abrasion of the cables through contact with minerals and sediments during exploration and extraction, and impedes access to the water column and seafloor during repairs and recovery when the SCCN goes out of service. Another industry commenter stated that the installation of a subsea telecommunications cable is scheduled for September 2025. According to the commenter, the cable will traverse the southern portion of the RFI lease block area and expressed concern about the potential for deep seabed mining to damage subsea cables both within and adjacent areas of deep seabed mining operations. The commenter also provided details regarding the Bulikula subsea cable system under construction.

Other Uses of the RFI Area

Commenters stated that other uses of the RFI area include ports and shipping, marine tourism, marine trades, commercial and recreational fishing, marine navigation, and ocean recreation. Additional uses include education and research in marine science.

Impacts on Ecosystems and Species

Rose Atoll and Other Areas of Concern

Multiple commenters described the Rose Atoll as one of the most pristine atolls in the world, supporting unique ecosystems rich in biodiversity and expressed concerns about the proximity of the RFI area to the Rose Atoll. Commenters reasoned that many of the species living in the Rose Atoll are threatened or endangered, and that the area provides a critical habitat for these animals.

A few commenters asserted that areas of special concern, such as the Rose Atoll and Swains Island, also provide subsistence resources and are of cultural significance to American Samoans.

A commenter requested that any form of the process does not occur within 50 miles of any of the islands of American Samoa, Rose Atoll, and Swains Island.

Commenters expressed concerns about:

- The Phoenix Island Protected Area (PIPA);

- The Muliʻāva unit of the National Marine Sanctuary of American Samoa (NMSAS), which overlays the Rose Atoll Marine National Monument;
- The Vailulu’u Seamount, the only hydrothermally active seamount within American Samoa's waters that could eventually breach the surface within decades;
- The Malulu Seamount, saying that much less is known about this deeper feature; and
- Swains Island, Ta’u Island, and Aunu’u Island.

Air and Water Quality

A group of Indigenous Pacific Islanders, as part of a form letter campaign, stated that onshore processing facilities and increased vessel traffic could introduce respiratory and other health issues.

Several commenters described sediment plumes as detrimental to water quality first, by disturbing and redistributing sediment on the seafloor and smothering benthic communities while mining and second, by discharging any unwanted mud, silt, and debris from the above-surface mining vessel. Commenters said that, with ocean currents, sediment discharge and plumes can travel hundreds of miles or kilometers.

Several commenters said that mining could release heavy metals and toxins into the water.

Pelagic and Benthic Communities

A commenter shared concerns over the health of different phytoplankton and zooplankton species that live in the pelagic habitats of America Samoa, stating that plankton form the base of the food web, with the larvae of many marine species, including most coral reef invertebrates, feeding on them. A few commenters shared concerns over disruptions to migrations and natural movements throughout the water column caused by mining. A commenter stated that deep sea mining activities could disrupt the migratory pathways and alter foraging behaviors of pelagic species like tuna, marine mammals, and turtles.

A commenter wrote that there is a major gap in knowledge regarding the species that inhabit the abyssal, bathypelagic, and mesopelagic zones, along with the role that these species play in endangered species survival, atmospheric qualities, or the health of commercial fisheries.

Several commenters discussed the biodiversity and sensitivity of benthic communities, including endemic and rare species, as well as countless undescribed and undiscovered benthic species. Commenters referenced scientific expeditions that found American Samoa’s deep sea biological communities to be distinct from other regions in the Pacific, with unique assemblages of deep sea sponges, echinoderms, and corals. Citing the length of recovery and growth time in benthic communities and habitats, several commenters remarked that the impacts from deep sea mining will be essentially permanent.

Commenters stated that American Samoa is home to hundreds of coral species, with estimates ranging from 200 to over 300 and wrote that coral reefs provide habitat for algae and other abundant invertebrates such as crustaceans, mollusks, tunicates, and sponges. Commenters remarked that there are over 900 species of reef-associated fish in American Samoa.

Commenters likewise described the ecosystem services that nodules offer benthic communities. A commenter said that up to 50 percent of larger macrofauna, like corals and sponges, live directly on nodules. More generally, another individual said that around half of all deep water species rely on nodules for some part of their development, such as deep sea octopuses, who deposit their eggs on nodules. Considering nodules as important habitats, several commenters wrote that the disturbance of nodules could threaten different forms of marine life.

Environmental Sensitivity

Commenters generally discussed the relative environmental sensitivity and marine productivity in and around the American Samoa RFI, including but not limited to rich and biodiverse ecosystems, abundance of distinct species, some of which are endangered, and important national monuments, like Rose Atoll.

A commenter discussed in detail critical ecosystem services in the RFI area that support biodiversity and broader ocean processes, especially carbon cycling and the role of deep sea microbes in immobilizing and detoxifying metals and reasoned that deep sea mining could interrupt these processes and disrupt ecological connectivity.

Commenters generally discussed the environmental impacts of seabed mining, including but not limited to damage to habitats, sediment disturbance, impacts on fisheries and tourism, food chain disruptions, effects on fish density, lack of ecosystem recovery and even permanent ecological and biodiversity loss, and more.

Fish and Essential Fish Habitat

Commenters discussed fish species in American Samoa that could be impacted by deep sea mining:

- Species occurring within coral reefs or in Rose Atoll and Swains Island;
- International fishery-important tuna species; and
- Other migratory species like grouper and swordfish.

A Federal agency described the Essential Fish Habitat (EFH) for Pacific pelagic fisheries as the marine water column from the surface to a depth of 1,000 meters, and from the shoreline to the outer boundary of the EEZ for juveniles and adults, while the surface to 200 meters of depth is designated EFH for egg/larval stages. They added that, for the American Samoa Bottomfish fishery, the water column from the surface to a depth of 400 meters is designated EFH for all life stages.

Impact Producing Factors (IPFs)

Noise and Light Pollution, Vibrations

Several commenters said that noise from equipment, such as riser and lift systems, collector vehicles, and above-surface vessels, can impact the behavior of species who use sound to navigate and communicate. A public interest organization reasoned that further research must be done to understand if the noise transmitted by mining equipment can be mitigated. Commenters said that the lights from mining support vessels may attract and disorient seabirds and disrupt bioluminescence and disorient the behavior of diving cetaceans, vertically migrating zooplankton, and seafloor invertebrates. Commenters said that seafloor equipment will produce vibrations, which may disturb organisms that bury or attach themselves to the seafloor.

Vessel Traffic and Deep Sea Vehicles

Commenters stated that increased vessel traffic could disrupt the movements of migratory species and elevates the risk of ship strikes for marine species. Several commenters stated that the movement and impact of mining vehicles cause direct destruction to benthic communities and habitats from dredging and trawling that damages the seafloor. Several commenters referenced past studies showing little ecosystem recovery or growth following vehicle impacts.

Cross-Boundary Impacts

Commenters expressed concern about cross-boundary effects on:

- The Cook Island waters from mining in American Samoa waters;
- The island of Tonga's tourism and economy; and
- Sea life within the Phoenix Island Protected Area.

Mitigation

A commenter said that it would be difficult to mitigate the pollution of intertidal zone habitats. A public interest organization asked that BOEM take appropriate measures to minimize the adverse and cumulative effects of deep sea mining. An individual asserted that there are no "scientifically validated methods" to mitigate damage from deep sea mining. A public interest organization asserted that the mitigation strategies proposed by Impossible Metals are "lacking in substantive detail." An industry commenter discussed their core technology program for minimizing ecological disruption while mining critical minerals, which includes low-impact system design, environmental monitoring via an autonomous underwater vehicle, and a collaborative oversight framework.

Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), NEPA, Coastal Zone Management Act (CZMA), National Historic Preservation Act (NHPA)

Commenters generally discussed the intent and need of the ESA and the incidence of endangered species in and around the waters of American Samoa, including green, hawksbill, leatherback, and olive ridley sea turtles, numerous species of dolphins and whales, the bumphead parrotfish, coral species, and several "candidate species" being considered for listing as endangered or threatened. A commenter asserted that deep sea mining in the RFI area would require consultation with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service under the ESA due to the presence of numerous ESA-protected species, federally protected critical habitat for ESA-listed species, and likely harm to ESA-listed species from deep sea mining.

A commenter asserted that the proposed deep sea mining in the project area would violate the MMPA, unless BOEM were to specifically obtain take authorization.

Commenters reasoned that BOEM should prepare a programmatic Environmental Impact Statement (EIS) to comply with NEPA before issuing mineral leases. They added that under NEPA, BOEM must also include measures to potentially mitigate adverse effects from deep sea mining, and that it cannot "short-circuit" the NEPA process under any emergency procedures. An industry commenter recommended that BOEM consider a comprehensive assessment of the costs/benefits of deep sea mining versus traditional, land-based mining during the NEPA required alternatives analysis.

A couple of commenters expressed concern that deep sea mining and OCS mineral leasing would likely conflict with the goals of the American Samoa Coastal Zone Management Program, which protects marine resources and cultural heritage. The commenters stated that such activities could present a legal barrier under the CZMA, which requires Federal actions affecting the coastal zone to be consistent with approved territorial programs.

A couple of commenters asserted that the proposed program would trigger Section 106 of the NHPA, under which BOEM is required to consider the effects of its actions on historic properties and to consult with relevant stakeholders. Some commenters added that consultation with American Samoa's historic preservation office and other Samoan parties must occur before any issuing of leases, and that consultation must be coordinated with NEPA review.

Cultural and Socioeconomic Information

Cultural Significance of the Ocean to Samoan Identity; Traditional Governance and Sovereignty

Several commenters remarked that the ocean is not only a resource but a fundamental part of Samoan identity (Fa’asinomaga) and cultural heritage. The commenters described the ocean as an ancestor, provider, protector, and living entity that connects Samoans across generations and islands. Commenters stated that Fa’aSamoa (Samoan way of life) is deeply intertwined with the ocean through traditional practices, ceremonies, legends, and spiritual beliefs that date back approximately 3,000 years.

Several commenters described the traditional Matai system (chiefly system) and Fa’amatai as governance structures that have managed marine resources sustainably for generations. A commenter remarked on Customary Marine Tenure as a traditional approach where village Matai maintain stewardship over marine resources from shoreline to reef flat, including spatial and temporal bans on specific areas or species and protocols for outsiders requesting permission to harvest resources.

Subsistence and Commercial Fisheries

Numerous commenters expressed concern that deep sea mining would threaten subsistence fishing practices that are essential for food security in American Samoa, stating that fishing provides a significant portion of protein in traditional diets.

Several commenters stated that fishing accounts for approximately 20 percent of all jobs in the territory and 18 percent of total labor income, with each dollar’s worth of fish landed generating $3.30 in additional output in the local economy. A few commenters stated that the cannery accounts for 99.5 percent of American Samoa’s exports and 84 percent of private employment in the territory. A commenter said that in 2023, the American Samoa longline fishery generated an estimated $2.82 million in landed value. A commenter stated that American Samoa exports roughly $353 million in tuna annually, with a projected value of $17.65 billion over 50 years.

Numerous commenters expressed concern about the potential impacts of deep sea mining on fisheries, including from sediment plumes that could increase the concentration of suspended particles in the water column, directly disrupting tuna physiology and harming the plankton and micronekton that form the base of their food supply. Other concerns include release of metals and toxins, noise and light pollution, and disruption to EFH and HAPC.

A few commenters expressed support for deep sea mining as a means of economic diversification away from the tuna canning industry on which it is heavily reliant. A commenter stated that leasing and development of critical minerals in the EEZ offshore American Samoa could create skilled jobs, support critical infrastructure, and generate sustained economic value in the region.

Impacts on Other Industries

A commenter stated that the National Park of American Samoa attracted 28,893 visitors in 2016, generating $1.68 million in spending and supporting 21 local jobs, with visitor spending increasing in 2022. The commenter further stated that neighboring Samoa has seen strong gross domestic product (GDP) growth (9.2 percent in Fiscal Year 2023, 9.4 percent in Fiscal Year 2024) driven by a tourism rebound, and that visitors are drawn by the culture, history, relaxing atmosphere, and the clean environment.

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Information Memorandum

Subject: Calculation of Geotechnical Sampling and Geophysical Survey Effort for Deep Water Critical Mineral Development.

Summary: The Bureau of Ocean Energy Management (BOEM) Pacific Region's Engineering and Technical Review Section (ETRS) has developed a model to calculate the amount of geotechnical sampling and geophysical survey that would likely be conducted by lessees as approved preliminary activities in their leased areas, in preparation of a delineation, testing, or mining plan. This model produces estimates of survey effort (days and trips), and bottom disturbance (in m^2 and % of lease) for these preliminary activities. These estimates are required for production of an environmental analysis of OCS mineral leasing actions.

Background: Federal actions resulting in critical mineral leasing in American Samoa's Exclusive Economic Zone (EEZ) require an environmental analysis. In support of this, a model was produced by BOEM Pacific ETRS to calculate an estimate for geophysical survey and geotechnical sampling effort that would provide enough data to inform a delineation, testing or mining plan submission. This model is based on surveys and assessments designed to locate and determine the abundance of polymetallic manganese nodules (PMN) in both the Cook Island EEZ and the Clarion Clipperton Zone (CCZ). In addition, this model uses public bathymetry data, reprocessed by BOEM, to determine the performance of hydrographic instruments in the deep Pacific Ocean.

BOEM currently doesn't have published geophysical and geotechnical (G&G) guidelines for critical mineral surveys. In addition, the International Seabed Authority (ISA) doesn't provide guidelines on the survey methods required for submission to them. However, critical mineral assessments have been made throughout the Pacific, and those reports detail the surveys that were conducted. In summary, most prospecting efforts include large scale surveys with low resolution deepwater multibeam bathymetry (MBES) in conjunction with seabed sampling, typically in the form of free fall grab samplers. Once the presence of polymetallic nodules (PMN) is determined, additional surveys detailing the seabed resource are conducted with higher resolution. It is common to have multiple surveys efforts conducted over several years to identify mining resources, develop technical plans, and meet permitting requirements. Detailed below are the three PMN assessments ETRS used to create the model.

<u>Cook Islands Polymetallic Nodule Deposit</u>: Over several decades the Cook Islands Seabed Minerals Authority has partnered with other nations for seabed PMN exploration. Some 33 individual surveys were conducted over 58 years. These surveys were conducted for a variety of reasons and with different technologies. Free fall grab samplers and box cores were the preferred method for geotechnical sampling. The first surveys, used to determine the general location of a deposit were spaced on a 100x100km grid pattern. Interestingly, at each site a free fall grab sampler was deployed three times, likely to determine a more statically relevant abundance of nodules. Once the general location of a deposit was determined a finer sampling grid was used to

delineate a resource. As multibeam echosounder (MBES) didn't exist until the late 1980s, most of these early surveys were heavy on direct sampling of the seabed and camerawork. Later surveys did employ more modern G&G work, and work still continues. (Tay, Brown, Bertoli, 2023)

Initial Assessment of the NORI Property, Clarion-Clipperton Zone: Nauru Ocean Resources Inc (NORI) hold exploration rights to areas of the CCZ granted by the International Seabed Authority (ISA). These leases are sponsored by the Republic of Nauru. In 2012 NORI began exploration surveys in their four areas. The initial exploration survey used an EM120 12kHz hull mounted MBES and collected almost 100% coverage of multibeam in four areas. A dredge was deployed by the same vessel in two of the areas. Follow on surveys focused on a smaller section in one of the leased areas, NORI-D. In this section "reconnaissance" level HRG survey was conducted with an AUV, collecting sidescan sonar (SSS), subbottom profiler (SBP), MBES, and photos of the seabed. These reconnaissance surveys were conducted as a 7x7km grid and did not get 100% sonar coverage. Box cores were taken at the intersection of the 7km spaced lines. Camera work from the AUV was also conducted on the same grid, but during a different AUV dive as the vehicle needs to be closer to the seabed for photography. A smaller area was then chosen for a future equipment testing effort. This area was surveyed with the AUV at 3.5km line spacing, with box cores at the intersections of the grid, and camerawork from the AUV. The remaining NORI-D area, outside of the reconnaissance survey was sampled with box cores on a 10x10km grid. In addition, two mooring sights for current meters and two preservation reference zones (PRZ) were surveyed with the AUV. (Deep Green Metals, 2021)

TOML Clarion Clipperton Zone Project, Pacific Ocean: Tonga Offshore Mining Limited (TOML), has an ISA Exploration Area in the CCZ. They are sponsored by the government of the Kingdom of Tonga. TOML has five areas, four of which were explored in 2013 and 2015 on two different surveys. The first survey was an MBES survey, using an EM120, of all the areas with nearly 100% coverage. The second was a box coring, deep tow photo, dredging, and deep-tow sonar survey. In four of the surveyed areas, a smaller area of interest (AOI) was chosen from the MBES backscatter and was investigated in closer detail. Box cores were collected in the AOI on a 7x7km grid. Camera, deep tow HRG, and dredge were all used outside the AOI, in a much coarser fashion. (Lipton et al, 2019)

Differences in ISA's regulations and BOEM 30 CFR 580. 581 and 582: Using surveys conducted for applications to the ISA might differ to surveys conducted for BOEM, it is useful to understand the goals of each organization. The aim of the ISA as described in **"**The Law of the Sea" is to run the seabed mineral extraction "for the benefit of mankind" (ISA, 2001, Article 140). For developed states wishing to use "The Area" (the area of the sea that is not in an EEZ) for mineral exploration they must apply for exploration contract (ISA, 2015, Part III). The ISA doesn't hold lease sales, instead a developed state must prove to the ISA that a section of The Area contains seabed minerals in a mineable abundance. The developed state achieves this by conducting prospecting surveys (ISA, 2015, Regulation 2). Using a prospecting survey, the applying state needs to find a suitable 150,000km^2 "Reserve Area" of the Area that, when split, is "Sufficiently large and of sufficient estimated commercial value to allow two mining operations."(ISA, 2015, Regulation 17) Half of this area will become an exploration contract for the contributing state; the other half becomes a reserved area for a developing state. Exploration surveys follow, which are higher resolution surveys, eventually determining the mineable areas of the exploration contract.

The ISA effectively mandates that developed states conduct their own prospecting surveys first. Once an exploration contract is issued these states remain in control of the exploration area. Typically, a state will sponsor a private mining company to conduct the "plans of work" in the exploration area at this time (ISA, 2015, Regulation 11). The sponsored mining company does get access to the prospecting data and therefore has an indication of the size and quality of the resource in the exploration area. This differs from BOEMs current process where there is a lack of available data on the available resources, and it is left to private companies to conduct the prospecting and exploration after leasing. ISA exploration surveys are higher resolution and similar to the BOEM preliminary activities and activities that would take place under a Delineation Plan (30 CFR 582.22). The ISA does allow some testing of mining equipment with an exploration contract, and recovery of a "reasonable amount of nodules" for assay.

Methods: The ISA does not detail the exact survey methods for a prospecting survey. These guidelines are currently being written for the "mining code". The ISA relies on the "Legal and Technical Commission", an organ of the ISA, to determine if submissions are acceptable (ISA, 2015, Regulation 17). Without direct guidance from the ISA, and a lack of guidance from BOEM, ETRS had to reverse engineer the assessments mentioned above to determine what a typical prospecting survey consists of and to what to expect during preliminary activities before submission of a delineation, testing, or mining plan.

ETRS then designed a model that would determine bottom disturbance and survey duration. The model is based on several parameters (Table 1). Most parameters were assigned a low, most likely, and high value. For instance, "Vessel Speed while MBES Surveying" was assigned a low of 6 knots, a most likely of 8 knots, and a high of 10 knots. The most likely value was determined from experience processing MBES deepwater surveys from the Pacific. Almost every parameter was assigned a range. These values were used in MS Excel with an @Risk plugin. @Risk would then make a pert distribution of values that could exist for each parameter. ETRS then designed a calculation for each of the various survey efforts. A latin hypercube simulation was then run with 50,000 iterations. The end product is a range of probability. As an example, the output for "Duration of a EM122 Multibeam Prospecting survey over the entire tract", the simulation gave the following probabilities: 5% chance that the survey would take *less than* 41.6 days, 50% chance *less than* 51.5 days, and 95% chance *less than* 64.4 days. This range of values is helpful as the exact survey method, the amount of weather downtime, the speed of operations, and many more variables, are unknown and not constant throughout the survey. Throughout the rest of this document any value that has a range will be described as %50 value (5% to 95%) value. With the above example of survey days, the duration of a prospecting survey using a EM122 MBES was less than 51.4 (41.6 to 64.4) days. Assumptions for an oceanographic survey area also presented in Table 2 and Table 3.

A Table of Assumptions

Assumptions	Low	Most Likely	High	Units
Length of mineral tract - x		1340		km
Length of mineral tract - y		100		km
Percent of Lease for Preliminary Activities (PA) AOI Fine Survey	10	20	30	percent
EM124 MBES line spacing	8	10	12	km
EM304 MBES Line Spacing	4	5	6	km
Prospecting Free Fall Grab Grid	10	15	30	km
Free Fall Grab Retrieve/Deploy	0.25	0.5	1	hours
Prospecting Box Core Grid	25	50	75	km
PA Box Core Grid - Medium Survey - Entire Lease	5	10	25	km
PA Box Core Grid - Fine Survey - AOI	5	7	10	km
Vessel Speed While MBES Surveying	6	8	10	knots
Vessel Speed While Transiting	8	10	11	knots
Vessel Speed While Dredging	1	1.5	1.75	knots
Number of Dredges per Lease		8		count
Dredge length	0.5	2	8	km
Dredge width	0.75	1	1.5	m
AUV survey speed	3	4	5	knots
AUV Daily Turnaround	2	4	6	hours
Preliminary Activities AUV linespacing - Medium Survey	0	15	30	km
Preliminary Activities AUV Fine Survey AOI Survey Grid	5	7	10	km
Survey Maintenance %	5	10	25	percent
Survey Weather %	5	10	25	percent
Days Per CTD	2	4	6	count
Hours Per CTD/Core	6	8	10	hours
Bottom Disturbance per Box Core	0.5	1	1.5	m sq
Bottom Disturbance per Free Falling Grab Sample	0.25	0.5	0.75	m sq
Multiple AUVs count	2	4	5	count
UTP Grid	6	8	10	km
Transit Distance for Mobilization	2895	7600	9000	km
Length of Transit from Pago Pago to Survey Area	300	450	600	km
Days between Crew Changes	20	30	42	days
Days between Failures Requiring Return to Port	20	25	30	days

Table 1:Assumptions of various values used in the calculations.

A Table of Assumptions for Oceanographic Surveys

Assumptions - Oceanographic Surveys	5 Lease	2 Lease	Tract	Units
Mooring Per Lease	3.1	8	15.9	count
Water Sampling Stations	5.3	13.3	26.2	count
Landers	2.1	5.3	10.6	count

Table 2: Assumptions for preliminary activities concerning oceanographic surveys.

A Table of Assumptions for the Bottom Disturbance of Oceanographic Survey Deployments

Assumptions - Oceanographic Surveys Bottom Disturbance	Low	Most Likely	High	Units
Bottom Disturbance Moorings	12.6	28.3	78.5	m sq
Bottom Disturbance Landers	1	2	3	m sq

Table 3: Assumed amounts of oceanographic moorings and environmental landers.

Research into previous critical mining assessments has shown that depending on the stage of the project, different densities of geophysical data would be collected. A calculation was run to see the expected duration of the surveys. For geophysical survey work this was calculated by combining the following factors: (1) the expected duration of the actual survey work using the calculated line miles and expected velocity, (2) the number and duration of line turns, (3) the expected daily time for deck work, such as AUV retrieval or CTD operations, and (4) the amount of downtime, both mechanical and weather. The sum of these factors would approximate the survey duration.

Calculating the duration of geotechnical work was similar. The expected transit distance between sample locations was calculated. The transit duration was calculated with an expected transit velocity. The duration of each sampling deployment, plus any additional mechanical and weather downtime.

Calculating "trips" between the survey area and a port in American Samoa was determined via the length of the survey, the expected days till crew change, and the expected days till a critical failure would require the vessel to return to port.

Calculating bottom disturbance for each survey effort was also straightforward. Once the model determined the number of geotechnical stations for a survey, a bottom disturbance could be calculated from a range of potential values of bottom disturbance.

ETRS Representative Survey Plan: Using the history of the three assessments efforts BOEM Pacific ETRS designed a likely survey effort that would be employed by a lessee under approved preliminary activities. This includes a coarse, medium, and fine survey in preparation for submission of a delineation, testing, or mining plan. In addition, oceanographic surveys, for deployment of current meters, water sampling, and environmental monitoring of PRZs were considered.

Sizes of the Survey Areas: While the Cook Islands effort was for their entire EEZ, the two efforts in the CCZ were on exploration contracts sanctioned by the ISA. These exploration contracts are not above 75,000 km^2 in total and can be in several separate areas of the CCZ. Generally, the assessments seemed to indicate that only about 20% of the exploration area was of interest, with test areas being significantly smaller than that. During the American Samoa Request for Information comment period, one industry commenter suggested they only believed that 5% of the lease area would be commercially mineable (BOEM-2025-0035-1577). For this memo ETRS proposes that preliminary activities extend to an AOI of about 20% of the leased area. Delineation of the actual mining site, estimated at approximately 5% of the lease, is expected to occur with submission of a Delineation Plan, and is not covered in this memo.

Estimated sizes for the tract and the potential leases are included in Table 4. The lease areas were determined by dividing from the total km as defined in the BOEM American Samoa Area Identification Memo, and have been calculated for two cases, one with two leases and one with five. The reasoning for the two and five lease scenario is that two leases provide each lessee with an area approximately the size of an ISA exploration contract. Five leases provide the lessee with an area about the size of the NORI-D area.

Assumed Sizes of Federal Leasing Tract

Survey Area Size	Sq KM
Mining Tract	134,000
Lease Area – Two Leases	67,000
Lease Area – Five Leases	26,800
Area Of Interest – Two Leases	13400 (9240 to 17560)
Area Of Interest – Five Leases	5360 (3690 to 7030)

Table 4: Assumed sizes of the federal mining tract as identified in BOEM's area identification memo. Lease size given anticipating two or five lease scenarios. Area of Interest is a smaller area within the lease.

Coarse Survey: The coarse survey is expected to be very similar to what an ISA prospecting survey would entail. Seabed samples at this stage of the program are critical, however they are more widely spaced. Box cores are used in a limited fashion as the time to deploy them to the seabed is a limiting factor. The ISA has suggested that most of their samples were provided by use of free floating grab samplers. Preliminary activities for the mining tract are also given in this table, in case a state would want to survey about 134,000km^2 of deepwater pacific. Table 5 presents the calculated values for a coarse survey. These estimates were developed using the three assessments described above along with an assessment of performance of publicly available bathymetric datasets (KM1009 and NA167). ERTS determined appropriate ranges for linespacing for 100%+ coverage with the EM122 and/or EM302 MBES systems.

Calculated values for Preliminary Activities during the Coarse Survey

Preliminary Activities - Coarse Survey	**Entire Tract**	**2 Lease**	**5 Lease**	**Units**
Line Spacing - Low Frequency MBES	10 (8.8 to 11.2)	10 (8.8 to 11.2)	10 (8.8 to 11.2)	km
Line Spacing - Medium Frequency MBES	5 (4.4 to 5.6)	5 (4.4 to 5.6)	5 (4.4 to 5.6)	km
Number of Free Fall Grab Samples (15km grid)	506 (250.1 to 1008.1)	253 (125 to 504.1)	101 (50 to 201.6)	count
Number of Box core 50km	54 (31.2 to 112.8)	27 (15.6 to 56.4)	11 (6.2 to 22.6)	count
Survey Duration Low Freq MBES	51.4 (41.6 to 64.4)	26.4 (21.5 to 33.1)	11.5 (9.4 to 14.2)	days
Survey Duration Medium Freq MBES	101.1 (83.2 to 124.7)	52.5 (43 to 65)	22.6 (18.6 to 27.7)	days
Survey Duration Free Fall Grab	76.4 (49.7 to 118.5)	38.2 (24.8 to 59.5)	15.3 (9.9 to 23.7)	days
Survey Duration 50km Box Core	28.8 (17.6 to 56.9)	14.4 (8.8 to 28.4)	5.8 (3.5 to 11.4)	days
Trips - Low Frequency MBES	4.8 (4 to 5.9)	2.9 (2.5 to 3.5)	1.8 (1.7 to 2.1)	trips
Trips - Medium Frequency MBES	8.5 (6.9 to 10.5)	4.9 (4.1 to 6)	2.7 (2.3 to 3.1)	trips
Trips - Free Fall Grab Samplers	6.6 (4.6 to 9.9)	3.8 (2.8 to 5.4)	2.1 (1.7 to 2.8)	trips
Trips - Box Cores	3.1 (2.3 to 5.2)	2.1 (1.6 to 3.1)	1.4 (1.3 to 1.8)	trips

Table 5: Calculated values for preliminary activities, for the entire tract, 2 and 5 lease scenarios.

Medium Survey: ETRS used the layout of the Deep Sea Vision AUV survey (DSV) conducted by The Government of American Samoa as a potential example survey that might happen at this stage. An AUV, flying at 30-40m above the seabed, conducts a HRG survey with SSS, SBP, and MBES. As with the DSV survey the AUV would take long 20km transects to a "node" where a box of HRG data would be collected, with 200% coverage on the SSS and 100%+ for the MBES. A series of very close lines would then be flown for low altitude camera work. There are no crosslines in this survey. The AUV would then continue to the next node. Table 6 gives the survey durations, AUV line miles, number of box cores, and trips calculated for these surveys.

Calculated values for medium survey – Per Lease

Preliminary Activities - Lease Area - Medium Survey	Entire Tract	2 Lease	5 Lease	Units
Lease Area AUV 15km Survey Duration	79.4 (47.3 to 212.2)	38.5 (22.9 to 102.4)	15.9 (9.5 to 42.4)	days
LeaseArea AUV 15km Survey Linemiles	8933.2 (5509.2 to 23599.2)	4466.6 (2754.6 to 11799)	1786.6 (1101.8 to 4719.8)	km
Lease Area Number of 10km Box Core	1053.8 (406.8 to 3143.5)	527 (203.4 to 1571.8)	210.8 (81.4 to 628.7)	count
Lease Area Survey Duration 10km Box Core	462.1 (182.8 to 1352.6)	230.6 (91.2 to 676.4)	92.4 (36.6 to 270.5)	days
Trips - Lease Area 10km Box Core	39 (18.4 to 105.5)	18 (7.7 to 50.9)	7.8 (3.7 to 21.1)	trips
Trips - Lease Area AUV 15km Survey	10.9 (8.4 to 20.8)	3.8 (2.7 to 8.6)	2.2 (1.7 to 4.2)	trips

Table 6: Calculated values for the medium survey, using the 2 and 5 lease scenarios.

Area of Interest Survey: Once a lessee has determined that an area is likely to have suitable abundance of nodules, they will likely proceed to a higher resolution survey. ETRS believes a AUV survey on a 7 km grid, with one pass as an HRG survey, and a second pass for camera work. Then box cores at the intersections of the 7km AUV grid. Multiple AUVs would likely be used at this stage, requiring the use of underwater transponder positioning (UTP). Calculated values are presented in Table 7.

Table of calculated values for the Area of Interest Fine Survey – Per Lease

Preliminary Activities - Area of Interest- Fine Survey	Entire Tract	2 Lease	5 Lease	Units
AOI AUV Survey Linemiles	7484.1 (4928.4 to 10721.5)	3740.7 (2472.6 to 5354.3)	1496.8 (985.7 to 2144.3)	km
AOI AUV Survey Duration	313.1 (237.4 to 394.3)	122.1 (90.9 to 157.9)	62.6 (47.5 to 78.9)	days
AOI Multiple AUV Survey Duration	81.7 (56.9 to 120.7)	31.9 (21.8 to 48)	16.3 (11.4 to 24.1)	days
Number of UTP stations for Multiple AUV	416.3 (261.8 to 647.7)	208.1 (131.1 to 323.4)	83.3 (52.4 to 129.5)	count
Number AOI Box Core	521.1 (303 to 893.8)	261 (151.5 to 446.1)	104.2 (60.6 to 178.8)	count
Duration AOI Box Core	222.6 (127.4 to 387.9)	111.3 (63.9 to 194)	44.5 (25.5 to 77.6)	days
Trips - AOI AUV Survey	28 (22.1 to 35)	10 (7.5 to 13)	5.6 (4.4 to 7)	trips
Trips - AOI Multiple AUV Survey	11 (9.1 to 14.1)	3.3 (2.6 to 4.6)	2.2 (1.8 to 2.8)	trips
Trips - AOI Box Cores	21.4 (14.2 to 34)	9.2 (5.6 to 15.4)	4.3 (2.8 to 6.8)	trips

Table 7: Calculated values for the Area of Interest Fine Survey

Oceanography survey: The NORI-D assessment also highlighted chemical and physical oceanographic work that was conducted. They deployed two oceanographic moorings, with a suite of instruments. Seven ADCPs were attached, along with three single point current meters, and two sediment traps. In addition, 5 sites were selected for water sampling with a CTD and niskin bottle rosette. NORI-D also performed HRG surveys over the mooring sites with an AUV, and selected two sites for Preservation Reference Zones (PRZ). It was suggested in the NORI-D assessment that landers for a long term monitoring camera were to be deployed in the PRZ. ETRS used these values to calculate the duration of the oceanographic surveys for both the 2 and 5 lease scenarios. Table 8 presents the calculated values.

Table of calculated values for the Oceanographic survey – Per Lease

Oceanography Survey	Entire Tract	2 Lease	5 Lease	Units
Water Sampling, Current Meter Deployments, Lander Deployments	125.3 (105.5 to 146.3)	62.7 (52.7 to 73.2)	25.1 (21.1 to 29.3)	days
Water Sampling, Current Meter Retrieval, Lander Retrieval	125.3 (105.5 to 146.3)	62.7 (52.7 to 73.2)	25.1 (21.1 to 29.3)	days
Mooring AUV Survey	9.9 (9 to 11.2)	4.9 (4.5 to 5.6)	2 (1.8 to 2.2)	days
PRZ AUV Survey	58.3 (51.4 to 67.9)	29.2 (25.7 to 33.9)	11.7 (10.3 to 13.6)	days
Water Sampling, Current Meter Deployments, Lander Deployments	10.2 (8.5 to 12.3)	5.6 (4.7 to 6.6)	2.8 (2.5 to 3.3)	trips
Water Sampling, Current Meter Retrieval, Lander Retrieval	10.2 (8.5 to 12.3)	5.6 (4.7 to 6.6)	2.8 (2.5 to 3.3)	trips
Mooring AUV Survey	1.7 (1.6 to 1.9)	1.4 (1.3 to 1.4)	1.1 (1.1 to 1.2)	trips
PRZ AUV Survey	5.3 (4.6 to 6.2)	3.6 (2.8 to 3.6)	1.9 (1.7 to 2)	trips

Table 8: Calculated values for the oceanographic survey in 2 and 5 lease scenarios.

Types of samples: Various methods have been used for direct sampling of PMN. Nearly every standard geotechnical sampling method has been deployed to sample manganese nodules: free fall grab samplers, box cores, gravity cores, dredges, ROV/manned submersible manipulator. Free fall grab samplers have been used extensively and will likely be used again as they are much faster than a box core lowered to the seabed with a winch. The free fall grab sampler is a device that has flotation (glass spheres) and carries ballast so it will sink to the seabed. The grab sampler operates after it impacts the seabed and the ballast is released. Once positively buoyant it returns to the surface for recovery. There are several issues with free fall grab samplers, first, they deposit ballast on the seafloor, and second, grab sampling methodology is not as rigorous as a box core. Material can leak out of a grab sampler, or the grab sampler might not retrieve larger PMN. Once a resource is found the most popular method in the literature is the "spade corer" a box core that has a large blade that rotates under the box core and seals the sample in the box. These types of box cores can sample up to 1m^2 of seabed. For this simulation we used a range of bottom disturbance for box core stations of 1.0 (0.5 to 1.5) m^2 and 0.5 (0.25 to 0.75) m^2 for free fall grab samplers. Cameras, CTDs, Optical Back Scatter (OBS), fluorometers, and dissolved oxygen sensors have been attached to both devices. A box core will typically also have a USBL transponder, while a free fall grab sampler might have a GPS transmitter, radar reflector, and a flag for positioning.

Dredges are also used in prospecting. A dredge is simply lowered to the seafloor and towed for some distance where it collects material that is larger than a certain size. The finer material will pass through. Dredges can collect a large amount of critical minerals; however, the exact location of the deposit is somewhat unknown. Cameras have been added to most modern dredges. The typical length of the sampling run is unknown for this method. ETRS went with a large range of 0.5 to 8km. The opening of the dredge was given a range of 0.75 – 1.5m. The ISA requires an environmental analysis for dredge lengths over 10km.

Bottom Disturbance: ETRS calculated a range of bottom disturbance for each survey and method, including the use of UTPs. Table 9 and Table 10 present the simulated amount of bottom disturbance.

Number of Ships required: A question brought up during the calculating of the survey effort was "how many ships would be used". It is unknown how fast lessees will want to develop their leases. A safe assumption would be within five years. If all the possible surveys in this document were conducted, on the entire tract, the total survey effort in days would be 1776.5 (1326.7 to 2819.7) days. If only half the year was suitable for surveys, weather wise, that would leave only 912.5 days of survey. Therefore, it would take 1.9 (1.5 to 3.1) ships working over five years to complete the entire surveys proposed in this document. It is likely that these ships will have tenders that would assist with consumables, with one being assigned per working vessel. Doubling the number of ships comes out to be 3.9 (2.9 to 6.2) ships working in the tract, on average, during the survey seasons that are available.

To calculate the peak number of vessels that could potentially be in the tract at any time is more difficult. ETRS came to the consensus that operationally there could be two to three ships working in a lease during a moment of peak effort. These moments where multiple ships working in the tract would likely to be brief and perhaps unplanned. Additional vessels working as supply vessels and crew boats would likely be present as well, perhaps doubling this number. At a peak ETRS believes that there could be four to six survey vessels working in the tract with associated tender vessels. This is based on ETRS experience with offshore surveys and BOEM experience with offshore energy development.

Conclusion: Out of the potential seabed sampling methods, dredging is by far most likely to disturb the most amount of seabed. The other sampling methods, while they might have large numbers of stations associated with them, simply don't disturb the seabed much when compared to the size of federal seabed mineral tracts. Time is also an issue, with large amounts of box cores taking up to 230.6 (91.2 to 676.4) days for the 2-lease scenario. Lessees are likely to pick methods, like the free fall grab sampler, that decreases their exposure to lengthy offshore surveys. It has been noticed, on ISA's deepdata website, a repository for sampling data, that sampling grids are sometimes not constant throughout a lease. Many of the exploration areas are sampled very coarsely, with samples taken in a very concentrated pattern over a resource. This model didn't account for that, however the number of samples we have determined is slightly more than the average number for samples in the ISAs exploration contracts. The remoteness of American Samoa, the size of the leases, and the depth of the mineral resources will all be issues for future surveys. However, massive amounts of work has been completed inside the CCZ for the ISA, and in the Cook Islands EEZ, proving that exploration is very possible and safe.

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Bottom disturbance for the various bottom disturbing methods

Bottom Disturbance	**2 Leases**	**5 Leases**	**Total For Tract m^2**
Dredging	85698.2 (34347.5 to 171883.9)	34334.4 (13662.2 to 68666.4)	171672.2 (68311 to 343332.2)
Free Fall Grab - Coarse Survey	124.4 (56.9 to 265)	99.7 (45.8 to 211.4)	248.6 (114.2 to 527.6)
Box Core - Coarse Survey	26.7 (13.9 to 58.7)	10.6 (5.6 to 23.5)	53.2 (27.8 to 117.6)
Box Core - Medium Survey	518.9 (188.5 to 1610.2)	207.6 (75.9 to 644.3)	1037.8 (379.6 to 3221.7)
Box Core - Fine Survey	256.6 (134.9 to 477.9)	102.7 (54.2 to 190.5)	513.4 (270.9 to 952.4)
UTP Deployments	196.1 (98.6 to 348.3)	78.4 (39.5 to 139.5)	392 (197.5 to 697.5)
Moorings	261.1(138.4 to 442.4)	104.4 (55.4 to 177)	522.2 (276.8 to 884.9)
Landers	10.7 (7.3 to 14)	4.3 (2.9 to 5.6)	21.3 (14.7 to 27.9)
Total Bottom Disturbance (Incl. Dredging)	87075.8 (35550.6 to 173364.5)	34914.8 (14241 to 69267.8)	174573.9 (71204.9 to 346339)
Total Bottom Disturbance (Without Dredging)	1190.6 (717.4 to 2305.7)	533.4 (317.1 to 995.5)	2666.8 (1585.3 to 4977.5)

Table 9: Bottom disturbance for the 2 and 5 lease scenarios.

Percentage bottom disturbance vs the size of the lease

Percentage Bottom Disturbance	Entire Tract
Dredging	0.000119403%
Free Fall Grab - Coarse Survey	0.000000222%
Box Core - Coarse Survey	0.000000040%
Box Core - Medium Survey	0.000001000%
Box Core - Fine Survey	0.000000408%
UTP Deployments	0.000000313%
Moorings	0.000000337%
Landers	0.000000016%
Total w/o Dredging	0.000001928%

Table 10: Percentage bottom disturbance vs the size of the leases.

Citations:

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Tay S, Browne R, Bertoli O. 2023. Cook Islands polymetallic nodule deposit. rsc Mining & Mineral Exploration; Cook Islands Seabed Minerals Authority. 217 p.

Appendix B. Protected Species Lists

Table B-1. Marine mammal species in the Pacific and their critical habitat (CH), Endangered Species Act (ESA), and Marine Mammal Protection Act (MMPA) status

Common Name	Scientific Name	ESA/MMPA Status	Stock Location	CH
Blue whale	*Balaenoptera musculus*	Endangered/Depleted	Central N Pacific, Eastern N Pacific	NA
Fin whale	*Balaenoptera physalus*	Endangered/Depleted	CA/OR/WA, Hawaii, NE Pacific	NA
Sei whale	*Balaenoptera borealis*	Endangered/Depleted	Eastern North Pacific, Hawaii	NA
Sperm whale	*Physeter macrocephalus*	Endangered/Depleted	CA/OR/WA, Hawaii, North Pacific	NA
Gray whale	*Eschrichtius robustus*	Endangered/Depleted	Western North Pacific, Eastern North Pacific	NA
Dwarf sperm whale	*Kogia sima*	-	CA/OR/WA, Hawaii	NA
Pygmy sperm whale	*Kogia breviceps*	-	CAOR.WA, Hawaii	NA
Bryde's whale	*Balaenoptera edeni*	-	Eastern Tropical Pacific, Hawaii	NA
Humpback whale	*Megaptera novaeangliae*	Endangered*/Depleted	American Samoa	NA
Humpback whale	*Megaptera novaeangliae*	Endangered/Depleted	Central America/Southern Mexico, CA/OR/WA, Western North Pacific	86 FR 21082; 2021; Alaska and West Coast regions
Humpback whale	*Megaptera novaeangliae*	-	Hawaii	NA
Minke whale	*Balaenoptera acutorostrata*	-	CA/OR/WA, Hawaii	NA
North Pacific right whale	*Eubalaena japonica*	Endangered/Depleted	Eastern North Pacifici	74 FR 190000; 2008; Alaska Region
Killer whale	*Orcinus orca*	-	Eastern North Pacific Transient	NA
Killer whale	*Orcinus orca*	Endangered/Depleted	Eastern North Pacific Southern Resident	86 FR 14668, 2021
False killer whale	*Pseudorca crassidens*	-	American Samoa, Palmyra Atoll	NA
False killer whale	*Pseudorca crassidens*	Endangered/Depleted	Hawaiian Islands	83 FR 35062; 2018; Hawaii Islands
Pygmy killer whale	*Ferresa attenuata*	-	Hawaii	NA
Short-finned pilot whale	*Globicephala macrorhynchus*	-	CA/OR/WA, Hawaii	NA

Common Name	Scientific Name	ESA/MMPA Status	Stock Location	CH
Melon headed whale	*Peponocephala electra*	-	Hawaii	NA
Baird's beaked whale	*Berardius bairdii*	-	CA/OR/WA	NA
Balinville's beaked whale	*Mesoplodon densirostris*	-	Hawaii	NA
Cuvier's beaked whale	*Ziphius cavirostris*	-	CA/OR/WA, Hawaii	NA
Longman's beaked whale	*Indopacetus pacificus*	-	Hawaii	NA
Mesoplodont beaked whale	*Mesoplodon spp.*	-	CA/OR/WA	NA
Fraser's dolphin	*Lagenodolphis hosei*	-	Hawaii	NA
Risso's dolphin	*Grampus griseus*	-	CA/.OR/WA, Hawaii	NA
Northern right whale dolphin	*Lissodelphis borealis*	-	CA/OR/WA	NA
Pacific white-sided dolphin	*Lagenorhynchus obliquidens*	-	North Pacific, CA/OR/WA	NA
Rough-toothed dolphin	*Steno bredanensis*	-	American Samoa, Hawaii	NA
Spinner dolphin	*Stenella longirostris longirostris*	-	American Samoa, Hawaii	NA
Spotted dolphin, Pantropical	*Stenella attenuate attenuata*	-	Hawaii	NA
Striped dolphin	*Stenella coeruleoalba*	-	CA/OR/WA, Hawaii	NA
Bottlenose dolphin	*Tursiops truncatus*	-	CA/OR/WA, Hawaiian Islands	NA
Short-beaked common dolphin	*Delphinus delphis*	-	CA/OR/WA	NA
Long-beaked common dolphin	*Delphinus capensis*	-	CA	NA
Dall's porpoise	*Phocoenoides dalli*	-	CA/OR/WA	NA
Harbor porpoise	*Phocoena phocoena*	-	Central CA, Northern CA-Southern Oregon, Northern OR-WA coast	NA
Steller sea lion	*Eumetopias jubatus*	Delisted (but CH still in effect)/-	Eastern (west coast region)	50 FR 226.202,1985
Steller sea lion	*Eumetopias jubatus*	Endangered/Depleted	Western (Alaska region)	59 FR 30715, 1994

Common Name	Scientific Name	ESA/MMPA Status	Stock Location	CH
California sea lion	*Zalophus californianus*	-	U.S.	NA
Northern elephant seal	*Mirounga angustirostris*	-	CA	NA
Northern fur seal	*Callorhinus ursinus*	-	CA	NA
Northern fur seal	*Callorhinus ursinus*	-/Depleted	Eastern Pacific	NA
Harbor seal	*Phoca vitulina richardsi*	-	CA, OR/WA	NA
Guadalupe fur seal	*Arctocephalus townsendi*	Threatened/Depleted	Mexico	NA
Hawaiian monk seal	*Neomonachus schauinslandi*	Endangered/Depleted	Hawaii	50 CFR 226.201, 2015

NA: Not applicable. Species listed under ESA with no designated CH or species not listed under ESA without a designated CH.

*Humpback whale American Samoa stock is not listed under ESA, but IUCN classified this stock as endangered in 2008 (Childerhouse et al. 2008).

Table B-2. List of sea turtle species and their critical habitat (CH), Endangered Species Act (ESA) status, and their stock or distinct population segments (DPS)

Common Name	Species	Stock or DPS	ESA Status	CH
Green Turtle	*Chelonia mydas*	East Pacific DPS, Central North Pacific DPS, Southwest Pacific DPS	Threatened	Proposed 88 FR 46572, 2023
Green Turtle	*Chelonia mydas*	Central South Pacific DPS, Central West Pacific	Endangered	Proposed 88 FR 46572, 2023
Hawksbill Turtle	*Eretmochelys imbricata*	Throughout range	Endangered	NA (only outside the Pacific)
Leatherback Turtle	*Dermochelys coriacea*	Throughout range	Endangered	77 FR 4169, 2012
Loggerhead Turtle	*Caretta caretta*	North Pacific Ocean DPS, South Pacific DPS	Endangered	NA (only outside the Pacific)
Olive Ridley Turtle	*Lepidochelys olivacea*	Mexico’s Pacific coast breeding population	Endangered	NA
Olive Ridley Turtle	*Lepidochelys olivacea*	All other populations	Threatened	NA

NMFS and USFWS are proposing to designate CH for five DPS of green turtles (88 FR 46572, 7/19/2023), and one of the proposed CH areas for the Central South Pacific DPS is in American Samoa (**Figure B-1**). Although this CH has been proposed, it has not been finalized. Thus, no analysis will be conducted for this proposed CH. The reasons for proposing green turtle CH in the Pacific are the following:

- Reproductively active females nest in the following areas: Palmyra Atoll (Strawn, Copper and Aviation) and Rose Atoll (Swains, Ofu, Olosega, Ta’u, Aunu’u, and Motu o Manu);
- Migratory green turtles (East Pacific DPS) need 10 km of offshore, unobstructed water to allow for unrestricted transit of reproductive individuals between benthic foraging and resting and reproductive areas; and
- From the mean high water line to 20-m depth, underwater refugia and food resources (i.e., seagrasses, macroalgae, and/or invertebrates) of sufficient condition, distribution, diversity, abundance, and density are necessary to support survival, development, growth, and reproduction of benthic foraging and resting of the following green turtles: East Pacific, Central North Pacific, Central South Pacific, and Central West Pacific DPSs.

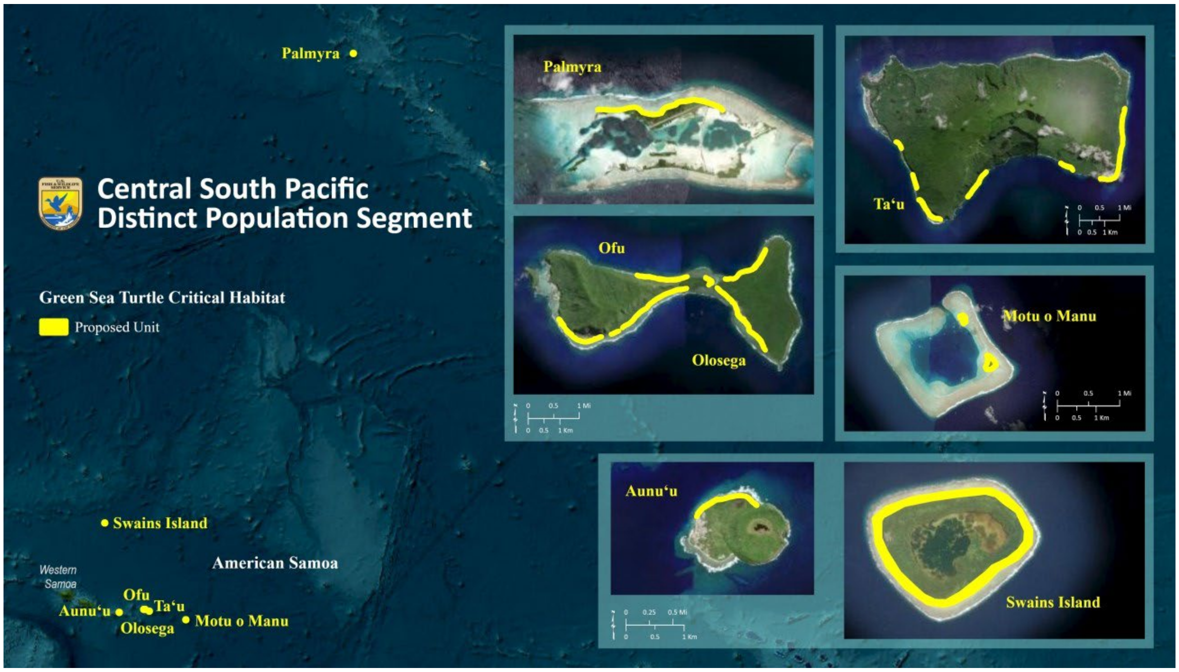

Figure B-1. Locations of the proposed critical habitat (CH) of green turtles in the Central South Pacific
Credit: USFWS. Source: https://www.fws.gov/media/map-america-samoa-proposed-green-sea-turtle-habitatjpg

Table B-3. Marine and coastal birds breeding near the Proposed Action Area

Common Name	Scientific Name	Samoan Name	Rose Atoll	American Samoa	Special Status
Brown Noddy	*Anous stolidus*	gogo	200 p	2,500 p	-
Black Noddy	*Anous minutus*	gogo	-	5–20	BCC
Blue-gray Noddy	*Anous ceruleus*	la’ia	-	29–76	BCC
Little White-Tern	*Gygis microrhyncha*	gogo sina	60 p	137–372	-
Sooty Tern	*Onychoprion fuscatus*	gogo uli	100,000 p	-	-
Gray-backed Tern	*Onychoprion lunatus*	gogo sina	30 p	Unknown	BCC
Bridled Tern	*Onychoprion anaethetus*	gogo sina	-	50	-
Black-naped Tern	*Sterna sumatrana*	gogo sina	Unknown	-	-

Common Name	Scientific Name	Samoan Name	Rose Atoll	American Samoa	Special Status
White-tailed Tropicbird	*Phaethon lepturus*	tava'e'ula	-	> 1,000 p	-
Red-tailed Tropicbird	*Phaethon rubricauda*	tava'e'ula	< 50 p	-	BCC
Tahiti Petrel	*Pseudobulweria rostrata*	ta'i'o	-	1,000s?	BCC
Tropical Shearwater	*Puffinus bailloni*	ta'i'o	-	500	-
Lesser Frigatebird	*Fregata ariel*	atafa	< 100 p	-	-
Great Frigatebird	*Fregata minor*	atafa	< 50 p	47–180	BCC
Masked Booby	*Sula dactylatra*	fua'o	25 p	Unknown	-
Brown Booby	*Sula leucogaster*	fua'o	375 p	64–114	-
Red-footed Booby	*Sula sula*	fua'o	700 p	127–316	-
Pacific Reef-Heron	*Egretta sacra*	matu'u	-	-	-

Notes: P = pairs; BCC = Bird of Conservation Concern

Table B-4. Pelagic marine birds that could occur within or near the Proposed Action Area

Common Name	Scientific Name	Samoan Name	Special Status
Pomarine Jaeger	*Stercorarius pomarinus*	-	-
Parasitic Jaeger	*Stercorarius parasiticus*	-	-
Great Crested Tern	*Thalasseus bergii*	gogo	-
Chatam Albatross	*Thalassarche eremita*	-	IUCN - V
Polynesian Storm-Petrel	*Nesofregetta fuliginosa*	ta'i'o	BCC
Cook's Petrel	*Pterodroma cookii*	-	BCC, IUCN - V
White-winged Petrel	*Pterodroma leucoptera*	-	IUCN - V
Collared Petrel	*Pterodroma brevipes*	-	-
Black-winged Petrel	*Pterodroma nigripennis*	-	-
White-necked Petrel	*Pterodroma cervicalis*	-	IUCN - V
Mottled Petrel	*Pterodroma inexpectata*	-	BCC
Murphy's Petrel	*Pterodroma ultima*	-	-
Phoenix Petrel	*Pterodroma alba*	-	-
Herald Petrel	*Pterodroma heraldica*	-	-
Wedge-tailed Shearwater	*Ardenna pacifica*	ta'i'o	-
Buller's Shearwater	*Ardenna bulleri*	ta'i'o	BCC, IUCN - V
Short-tailed Shearwater	*Ardenna tenuirostris*	ta'i'o	-
Sooty Shearwater	*Ardenna grisea*	ta'i'o	-

Status: IUCN-V = Vulnerable; BCC = Bird of Conservation Concern

Table B-5. List of Endangered Species Act (ESA) listed fish and invertebrate species that could occur within the Proposed Action Area and the status of their critical habitat (CH)

Name	ESA status	Listing of ESA	Status of CH
Oceanic Whitetip Shark (*Carcharhinus longimanus*)	Threatened	January 30, 2018 (83 FR 4153)	Not prudent (85 FR 12898)
Giant Manta Ray (*Mobula birostris*)	Threatened	January 22, 2018 (83 FR 2916)	Not prudent (84 FR 66652)
Scalloped Hammerhead Shark (*Sphyrna lewini*)	Threatened	July 3, 2014 (79 FR 38213)	Not prudent (80 FR 71774)
Chambered Nautilus (*Nautilus pompilius*)	Threatened	September 28, 2018 (83 FR 48976)	Not prudent (85 FR 5197)
Coral (*Acropora globiceps, A. retusa, A. speciosa, Fimbriaphyllia paradivisa, Isopora crateriformis*)	Threatened	79 FR 53852	Listed: 90 FR 31800; 90 FR 39339
Clams (*Hippopus hippopus, Tridacna squamosa, T. derasa, T. Gigas, T. maxima*)	Proposed	NA	NA

Appendix C. Best Management Practices

The *Commercial Leasing for Minerals Offshore American Samoa Environmental Assessment* (EA) describes Proposed Actions that will occur if leases are issued within the American Samoa Outer Continental Shelf (OCS). The Proposed Actions evaluated in this EA are called preliminary activities in the Code of Federal Regulations (CFR) and the purpose of preliminary activities is to collect data and information for future federal decisions and reviews required for Delineation, Testing, and Mining Plans (30 CFR 582.21d). Once a lease is issued, results of environmental monitoring activities are required as part of Delineation, Testing, and/or Mining Plans, as well as other environmental data as the Director may require (30 CFR 582.28). Requirements may include appropriate environmental protection measures, mitigation measures, monitoring protocols, and/or adaptive management strategies pursuant to authorities under 43 U.S.C. § 1334.

The EA describes best management practices (BMPs), which are procedures or conditions related to a specific action. **Chapter 3** of the EA discusses the justification for the use of each BMP in reducing or removing a potential impact on a resource. BMPs described below are established standards of protection adapted from other industry and research actions, which utilize identical equipment, for application to the deeper remote waters offshore American Samoa.

The BMPs listed below are draft and will be part of a public review within the Proposed Leasing Notice and language is considered final when the Final Leasing Notice is published. BMPs listed in **Section C.2** is intended to be included as stipulations for the American Samoa Lease and are also currently part of concurrent consultations with the National Oceanographic and Atmospheric Agency (NOAA) National Marine Fisheries Service's (NMFS) Pacific Islands Regional Office.

C.1 Best Management Practices Associated with Lease Issuance

BMP-1: Lease Preliminary Activities and Survey Notices

For purposes of this lease, "Preliminary Activities" means activities performed by the Lessee that are consistent with the activities described in the Commercial Leasing for Minerals Offshore American Samoa Environmental Assessment (EA), provided to the Lessee with this lease. If the Lessee proposes any other activities not included in the EA prior to submitting a Delineation, Testing, and/or Mining Plan(s), they must notify the Lessor (through BOEM) at least 60 days prior to undertaking the activity. BOEM will notify the Lessee if any additional analysis or consultation to protect species listed under the Endangered Species Act (ESA) or Marine Mammal Protection Act (MMPA), or to protect historic or cultural properties, are required prior to the Lessee undertaking the activity.

The Lessee must give written notice to BOEM at least 30 days prior to initiating any Preliminary Activities on the lease. In the notice, the Lessee must describe in detail those activities that will be conducted and the time schedule for conducting those activities (30 CFR 582.21(d)) necessary to develop comprehensive Delineation, Testing, and/or Mining Plan(s). Each distinct activity (e.g., mobilization) must be identified in one or more written notices.

The Lessee must include in each written notice details of the proposed Preliminary Activities (e.g., bathymetric, geological, geophysical, mapping, or other surveys) to be conducted and timelines for the activities. The Lessee must demonstrate in its notice that these proposed Preliminary Activities conform to the requirements of the Outer Continental Shelf Lands Act (OCSLA; 43 U.S.C. §§ 1331 et seq.); are safe; do not unreasonably interfere with other uses of the Outer Continental Shelf (OCS), including those for national security and defense; conform to sound conservation practices for the Leased Minerals (as well as other OCS resources not subject to this lease) and protect the rights of the Lessor; and do not cause undue or serious harm or damage to the human, marine, or coastal environment. The notice must also demonstrate that it complies and is consistent with the analyses in the Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response issued by National Marine Fisheries Service (NMFS) related to this lease, and the Incidental Take Authorization issued by NMFS under the Marine Mammal Protection Act (if applicable) in place at the time of submission. The Lessor will review the notice and report to the Lessee if the notice is insufficient to demonstrate compliance with these provisions.

The Lessee must provide sufficient detail in each notice to reasonably enable the Lessor's review, including, but not limited to the following information:

- A description and illustration of the geographic areas involved in the activity;
- Details of the activities to be conducted and the time schedule of activities;
- The specifications of each vessel and each piece of equipment including towed, deployed, and/or autonomous with associated operating specifications such as source level, transmission frequency, directionality, beamwidth, and pulse repetition rate;
- A brief synopsis of proposed baseline environmental survey methods for surveys listed above, and sampling approaches, the spatial/temporal design, and data and metadata standards used for collection and reporting.

The Lessor may require meeting(s) with the Lessee regarding proposed Preliminary Activities prior to the commencement of such activities. The request will be made promptly after the Lessor receives the notice of Preliminary Activities, as provided by this lease, and the meeting(s) will be scheduled so as not to unreasonably delay the Preliminary Activities. The Lessee must ensure the presence at this meeting of all relevant personnel, crew members, and subject matter experts, as requested by the Lessor. Topics may include responsibilities, chains of command, communication procedures, monitoring procedures, operational procedures, and content of the notice. New personnel must be briefed as they join the work in progress.

BMP-2: Pre-Survey Meeting(s) with the Lessor

The Lessor may require meeting(s) with the Lessee regarding proposed Preliminary Activities prior to the commencement of such activities. The request will be made promptly after the Lessor receives the notice of Preliminary Activities, as provided by this lease, and the meeting(s) will be scheduled so as not to unreasonably delay the Preliminary Activities. The Lessee must ensure the presence at this meeting of all relevant personnel, crew members, and subject matter experts, as requested by the Lessor. Topics may include responsibilities, chains of command, communication procedures, monitoring procedures, operational procedures, and content of the notice. New personnel must be briefed as they join the work in progress.

BMP-3: Preliminary Activities Reporting

The Lessee must submit reports, synthesized data, and raw data of Preliminary Activities, and results of environmental monitoring activities within 90 days after the completion of preliminary survey activities. Preliminary activity completion dates must be provided in the associated Preliminary Activities notice described in Stipulation No. 1, “Lease Preliminary Activities and Survey Notices.” If there are delays or changes to the completion dates, the Lessee must notify the Lessor as soon as practical. The Lessee must publicly share all collected environmental data, and associated metadata, except as directed under Freedom of Information Act (FOIA) Exemption 4 or 30 CFR 582.5.

The report of Preliminary Activities conducted on the lease must include:

- A description of work performed;

- Charts, maps, or plats depicting the area and leases in which Preliminary Activities operations were conducted specifically identifying the lines of geophysical traverses and/or the locations where Preliminary Activities were conducted;
- The dates on which the operations were performed;
- A narrative summary of mineral occurrences; environmental hazards; and effects of the activities on the environment, aquatic life, archaeological resources, or other uses and users of the area in which the activities were conducted;
- Information on all interactions with fishing vessels or gear, as described in Stipulation No. 3, "Fisheries Communication Plan";
- Information on all samples collected on the lease, including location, conditions encountered, such as minerals, water, gas, or unusual conditions, and the sample analysis;
- A synopsis of baseline environmental survey methods conducted during Preliminary Activities and a reference to associated data/metadata documentation;
- Information on unrecovered equipment, such as oceanographic buoys; and
- Any other environmental mitigation and monitoring measures showing compliance evidence related to on-lease Preliminary Activities to satisfy conditions from relevant stipulations, other relevant leasing documents, the proposed action in the Commercial Leasing for Minerals Offshore American Samoa Environmental Assessment, and consultations resulting in the Endangered Species Act Section 7(a)(2) Letter of Concurrence (LOC) and Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) Response pursuant to section 305 (b) of the MSA (2026 ESA LOC and EFH Response) for the Bureau of Ocean Energy Management's Commercial Leasing for Minerals Offshore American Samoa issued by the National Marine Fisheries Service (NMFS) on February 17, 2026. The 2026 ESA LOC and EFH Response may be found at [INSERT BOEM PDF ADDRESS].

All maps must be appropriately marked with reference to official lease boundaries and elevations marked with reference to sea level. When applicable, vertical projections and cross sections will accompany plan views.

The Lessee must keep all original data and information available for inspection or duplication by the Lessor at the expense of the Lessee as long as the lease continues in force. Should the Lessee choose to dispose of original data and information once the lease has expired, said data and information must first be offered to the Lessor free of cost and will, if accepted, become the property of the Lessor. Navigation information showing the location(s) where samples were taken must be retained for as long as the lease continues in force.

BMP-4: Research Site Access

The Lessor, its designated representative, or any entity to which the Lessor provides access, retains the right to access, for research purposes, the site of any operation or activity conducted under this lease. The Lessor will make a good faith effort to provide prior notice of needs for access. This provision does not limit the Lessor's authority to access the lease for other purposes, including, but not limited to, inspections conducted pursuant to 30 CFR 285.822.

BMP-5: Protection of Birds

a. Lighting

Any lights used to aid marine navigation by the Lessee, operators, or contractors during any lease activities, except during times of emergency, must be described on the U.S. Coast Guard Private Aids to Navigation Application form. Lighting on project vessels must be directed inboard and downward, or shielded, to reduce upward illumination and illumination of adjacent waters, thereby reducing the potential for birds to be attracted to work areas. Light from cabin windows must be reduced with shades, blinds, or shields that block exiting light. A PSO or crew member must inspect lighted work areas daily for birds that may have been attracted to artificial lighting.

b. Injured Bird and Annual Bird Reporting

If an injured bird is discovered on a vessel, the bird will be transported on the next returning work vessel to an approved wildlife care facility. A log of all birds found onboard a vessel that may have been attracted by artificial light during a particular project will be maintained, with the status and health of birds on retrieval and release as applicable. The log will be provided to BOEM no more than 90 days following the completion of Preliminary Activities as part of the protected species reporting requirements described in paragraph (f) of Stipulation No. 2, “Endangered Species Act and Essential Fish Habitat Consultation Requirements.”

The protected species report provided to BOEM must document any dead birds found on vessels and structures during Preliminary Activities. The report must contain the following information: the name of species; date found; location; a picture to confirm species identity (if possible); and any other relevant information. Carcasses with federal or research bands must be reported to the U.S. Geological Survey’s Bird Band Laboratory.

BMP-6: Fisheries Communication Plan

The Lessee must develop and submit a Fisheries Communication Plan (FCP) for Preliminary Activities to the Lessor (through BOEM) at least 90 days prior to conducting any Preliminary Activities under this lease. The Lessee must consult with NMFS (Pacific Islands Regional Office), the Western Pacific Regional Fishery Management Council, and the American Samoa Department of Marine and Wildlife Resources during its development of the FCP. These consultations are for informational purposes only and do not create any substantive or procedural rights enforceable by private parties with regard to the FCP.

The Lessee must include the following components in its FCP: (1) identification of potentially affected fisheries; (2) procedures for early and ongoing communication and training among fishing communities, the Lessee(s), operators, and contractors; and (3) a conflict-avoidance strategy, including notification protocols and vessel routing measures to minimize interference with fishing operations. The Lessee must make the FCP publicly available, such as through their website.

The Lessee must document interactions with fishing vessels and/or gear when conducting Preliminary Activities in the Lease Area, including summarizing written letters, meetings, and gear or boat damage, and provide a fishery interaction report in Stipulation No. 8, "Preliminary Activities Reporting." BOEM may share these reports with NMFS, as appropriate, under any relevant interagency agreements. The Lessee must include locations of the interactions and any avoidance or remedial actions. If the Lessor determines, based on documented interactions or stakeholder complaints, that substantial and repeated interference with fishing operations is occurring, the Lessor may require the Lessee to modify operations, implement additional measures, or participate in a fisheries liaison program consistent with applicable federal law.

BMP-7: Marine Archaeology Requirements for Preliminary Activities

A. In no case may the Lessee knowingly impact a potential archaeological resource without the Lessor's prior consent, following appropriate compliance with the National Historic Preservation Act.

B. The Lessee must ensure that its Qualified Marine Archaeologists (QMAs) meet the Secretary of the Interior's Professional Qualifications Standards listed in 48 Federal Register 44738–44739.

C. The Lessee must ensure a QMA visually examines retrieved box core and free fall grab samples for potential cultural material and artifacts and photo-documents cores and samples prior to sub-sampling. The Lessee, if technically feasible, will acquire bottom imagery from seabed disturbance or sampling activities. The Lessee will ensure the QMA reviews all imagery to identify if any potential archaeological resources are present in the sampled areas.

D. The QMA must monitor the video feed in real time if a remotely operated vehicle (ROV) survey is conducted near a potential or newly discovered archaeological resource.

E. Review and monitoring by the QMA may be conducted remotely only if images and video feed are of sufficient quality.

F. If during examination of the retrieved seabed samples and/or during visual imaging\ the Lessee determines that a potential marine cultural resource may have been located or affected, the Lessee will initiate the steps outlined in the Unanticipated Discovery requirements at Stipulation No. 6, "Unanticipated Discovery Requirements."

BMP-8: Unanticipated Discovery Requirements

While conducting activities, if the Lessee discovers an unanticipated potential archaeological resource, such as the presence of a shipwreck site (e.g., a sonar image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of historic objects, piles of ballast rock) or evidence of a pre-contact archaeological site (e.g. stone tools, pottery or other pre-contact artifacts) within the Lease Area, the Lessee must:

- Immediately halt seafloor-disturbing activities in the area of a distance of 1,000 feet (305 meters) from the discernible extent of the target;
- Submit to the Lessor a written report on details of the discovery within 72 hours of its discovery written by a Qualified Marine Archaeologist (QMA) that meets the Secretary of the Interior's Professional Qualifications Standards listed in 48 FR 44738–44739;
- Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the Lessor has made an evaluation based on analysis and recommendations from the QMA and instructs the Lessee on how to proceed; and
- If (1) the site was impacted by the Lessee's project activities; or (2) impacts to the site or to the area of potential effects cannot be avoided, the Lessee must conduct additional investigations overseen by a QMA, as directed by the Lessor, to determine if the resource is eligible for listing in the National Register of Historic Places (30 CFR 585.802[b]).

If the Lessee's investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will inform the Lessee how to protect the resource or how to mitigate adverse effects to the site. If the Lessor incurs costs in protecting the resource, then, under section 110(g) of the National Historic Preservation Act, the Lessor may charge the Lessee reasonable costs for carrying out preservation responsibilities under the Outer Continental Shelf Lands Act.

BMP-9: Confidential Information

BOEM will protect privileged or confidential information that the Lessee submits, as authorized by the Freedom of Information Act (FOIA), 30 CFR 582.5, or other applicable law and regulations. If the Lessee wishes to protect the confidentiality of any lease related information, the Lessee must clearly mark it "Contains Privileged or Confidential Information" and consider submitting such information as a separate attachment. BOEM will not disclose such information, except as required by FOIA, other applicable law, or court order. If your submission is requested under FOIA, your information will only be withheld if a determination is made that one of FOIA's exemptions to disclosure applies. Such a determination will be made in accordance with the Department's FOIA regulations and applicable law. BOEM will not treat as confidential aggregate summaries of nonconfidential information.

C.2 Protected Species and Habitats Best Management Practices Associated with Lease Issuance

The EA analyzed impacts from the Proposed Action and found the following BMPs necessary to ensure no harm or damage to protected species and habitats in the Proposed Action Areas. BOEM is currently in consultation with NMFS regarding the ESA Section 7 and EFH. The BMPs listed below were presented to NMFS in a draft Biological Assessment in early 2026 with the intent to be finalized as ESA Section 7(a)(2)

LOC and EFH Response pursuant to *Bureau of Ocean Energy Management's Commercial Leasing for Minerals Offshore American Samoa*.

After review by NMFS, the BMPs will be requirements for the Lessee, its operators, personnel, and contractors as related to protected species and habitats. These draft BMPs are consistent with BOEM and NMFS Pacific Island Regional Office policy as much as practicable and feasible. The Biological Assessment includes additional justifications and recommended methods and reporting protocols.

C.2.1 Communicating Protected Species Requirements

The Lessee, operators, personnel, and contractors must comply with the approved measures to safeguard ESA-listed species and designated critical habitat included in the proposed action for the ESA LOC and Magnuson-Stevens Fishery Conservation and Management Act (MSA) EFH Response pursuant to section 305 (b) of the MSA (2026 ESA LOC and EFH Response) for the Bureau of Ocean Energy Management's Commercial Leasing for Minerals Offshore American Samoa issued by the NMFS on February 17, 2026, and any Incidental Take Authorization (ITA) issued by NMFS under the MMPA (if applicable) in place at the time. The 2026 ESA LOC and the EFH letter may be found on the BOEM website.

The Lessee, operators, personnel, and contractors must ensure that applicable sections of the 2026 ESA LOC, EFH Response, and MMPA ITA (if applicable) are made available during operations on all project-related vessels. The Lessee, operators, and contractors must ensure that these documents are reviewed by all appropriate personnel aboard every project-related vessel. Preliminary activities must be within the scope of activities described in the above-referenced ESA LOC, EFH Response, and MMPA ITA (if issued) or the Lessee will be required to consult further with BOEM and NMFS, as appropriate.

The Lessee, operators, personnel, and contractors will be required to comply with the most current ESA consultation, EFH consultation, and MMPA ITAs (if any) in place at the time of the submission, review, and approval of any Delineation, Testing, and/or Mining Plan(s) or other authorization related to activities on the lease. The ESA, EFH, and MMPA requirements may be included as conditions of approval for these plans or other authorizations.

C.2.2 Vessel Speed

The Lessee must ensure that all vessels associated with Preliminary Activities (regardless of whether they are conducted by the Lessee, operators, or contractors) reduce speeds to 10 knots or less when mother-calf pairs, pods, or large assemblages (greater than three) of any Endangered Species Act (ESA) protected marine mammal species are observed or suspected (e.g., cannot be definitively identified as not an ESA-protected species) near a vessel. Operators must be particularly vigilant to watch for sea turtles at or near the surface in areas of known or suspected turtle activity, and if practicable, vessel speeds must be reduced to five (5) knots or less.

C.2.3 Protected Species Observers (PSOs)

A minimum of one qualified third-party PSO is required on each vessel while in the Lease Area for the purpose of Preliminary Activities. The number of required PSOs per vessel must be sufficient to provide complete viewing coverage of the surrounding marine environment. The Lessee must ensure that PSOs have adequate safety and monitoring equipment to conduct their activities (including night-vision equipment for nighttime survey operations). All third-party PSOs must have completed a NMFS-approved commercial PSO training course.

The Lessee must ensure that the PSOs have the authority to stop any transit or activity that could result in harm to an ESA-protected or marine mammal species, except when the stopping of the activity would put the safety of the vessel or crew at risk. If an ESA-listed species or marine mammal is struck by a vessel or survey equipment or becomes entangled in any cable or lines, the PSO must immediately notify NMFS so that appropriate response measures can be implemented. Similarly, the PSO must immediately notify NMFS if the vessel, Preliminary Activities, or crew causes any harassment or incidental take of an ESA-protected or marine mammal species.

C.2.4 Vessel Strike Avoidance Zone

All vessels associated with Preliminary Activities (regardless of whether they are conducted by the Lessee, an operator, or contractor), including during transit to the Lease Area, must have a Protected Species Observer (PSO) or trained observer monitoring the vessel strike avoidance zone for protected species at all times. While in the Lease Area, there must be a certified PSO present on the vessel. Regardless of vessel size, if sperm whales are detected at or within 100 meters, any baleen whale is detected within 500 meters, or any other ESA-protected species is detected or suspected within 50 meters, including sea turtles and large jellyfish aggregations, the vessel must slow down, stop, or alter course, as appropriate to avoid striking any protected species. The only exception is when the safety of the vessel or crew necessitates deviation from these requirements. If any such incidents occur, they must be reported as outlined below under the protected species reporting requirements in paragraph (f).

C.2.5 Moon Pools

During all times a vessel related to Preliminary Activities is equipped with a moon pool, there must be a hull door that can be kept closed, to the maximum extent practical, and monitored prior to and after closure to prevent ESA-protected and marine mammal species from entering during Preliminary Activities or related transit. If an ESA-protected or marine mammal species is detected in the moon pool, the Lessee, operators, and contractors must ensure that the animal(s) leave the moon pool prior to closing the doors. Any observed ESA-protected or marine mammal species observed in the moon pool must be reported as outlined below under the protected species reporting requirements in paragraph (f), including how long the animal was observed and whether it was able to leave the moon pool without assistance.

C.2.6 Equipment Deployment and Retrieval

The Lessee must have a deployment plan for autonomous underwater vehicle and/or remotely operated vehicles (AUV/ROV) and configure all Preliminary Activities to reduce the risk of potential entanglement of ESA-protected and marine mammal species. Within the Lease Area, PSOs meeting the requirements of paragraph (e) must observe a 500 m exclusion zone around the vessel for at least 30 minutes prior to and during deployment and retrieval of AUV/ROV, and buoys. If there are no sightings of ESA-protected and marine mammal species, the equipment deployment or retrieval can proceed. If there are sightings of

ESA-protected and marine mammal species, the Lessee, operators, and contractors must wait until the PSO determines that the animals have cleared the area for at least 30 minutes before retrieval or deployment can commence. In the unlikely event that entanglement does occur, the Lessee, operators, or contractors must undertake reasonable efforts to free the animal and ensure proper reporting of entanglement events according to the protected species reporting requirements specified below in paragraph (f).

C.2.7 Protected Species Reporting

The Lessee must immediately report to both NMFS and the Lessor (through BOEM) any incident of serious harm, injury, or death to an ESA-protected or marine mammal species observed during Preliminary Activities. In addition, should there be any incidental take of ESA-protected species (e.g., through harassment), the Lessee will immediately notify BOEM and NMFS to determine if additional ESA consultation is required. If an incident of serious harm, injury, or death occurs, the Lessee will ensure activities in the area are halted or modified as necessary to protect the animal and other species until such time as NMFS and BOEM determine the Preliminary Activities may proceed.

The Lessee must submit a final report summarizing the results of monitoring activities to BOEM and other appropriate agencies no more than 90 days following the completion of Preliminary Activities. Preliminary activity completion dates must be defined in the associated Preliminary Activities notice described in Stipulation No. 1, “Lease Preliminary Activities and Survey Notices.” If there are delays or changes to the completion dates, the Lessee must notify the Lessor as soon as practical. The final report must, at a minimum, include: (a) an evaluation of the effectiveness of monitoring protocols and (b) reporting of: (i) marine mammal, sea turtle, and other ESA-protected species sightings (species and numbers); (ii) any behavioral changes of the species in these sightings; and (iii) any interactions or conflict with ESA-protected and marine mammal species, including reporting of any project delays or cessation of operations due to the presence in the project area of marine wildlife species subject to ESA and Marine Mammal Protection Act (MMPA) protection. More details are found in the current ESA Letter of Concurrence (LOC), Essential Fish Habitat (EFH) Response, and any issued MMPA Incidental Take Authorization (ITA).

C.2.8 Marine Trash and Debris Prevention

The Lessee, operators, and contractors must comply with the marine trash and debris awareness and elimination terms and conditions within the 2026 ESA LOC and EFH Response from NMFS.

C.2.9 Protection of Biological Resources

Lessee(s) must avoid unnecessary or substantial disturbance to sensitive seabed habitats and biodiversity hotspots, including areas of high biological productivity. If previously unidentified sensitive habitats or biological communities are discovered, the Lessee must notify the BOEM Pacific Regional Director within 48 hours. BOEM may require the Lessee to modify or suspend operations, implement additional mitigation measures, relocate activities, and/or require a buffer of up to 500 meters around designated sensitive features, unless otherwise justified by site-specific conditions or methodology. The Lessor may require additional documentation from the Lessee at any point based on the nature of the activity, the sensitivity of the environment, or the results of environmental monitoring reporting or incidents described in Stipulation No. 8, “Preliminary Activities Reporting.” Documentation requests could include additional protective measures, monitoring protocols, and/or adaptive management strategies as determined by BOEM, pursuant to its authority under 43 U.S.C. § 1334 and 30 CFR 582.1(a).

C.2.10 Fisheries and Wildlife Awareness Training

To reduce the potential conflicts with fishers and minimize adverse interactions with wildlife during lease activities, the Lessee must ensure that all personnel and contractors who will be present on vessels or platforms within the Lease Area complete a Fisheries and Wildlife Awareness Training prior to marine operations (e.g., transit, surveys, equipment deployments), consistent with vessel and worker safety. This training must address: (1) identification of common wildlife species; (2) best practices for avoiding vessel strikes and minimizing noise and light impacts; (3) protocols for reporting wildlife sightings and entanglements; and (4) cultural and economic importance of regional fisheries. Training must also include a briefing by the Lessee’s environmental compliance officer or designated representative on the importance of minimizing conflicts with local fishers and adhering to all applicable environmental protection measures. The Lessee must ensure that a copy of the environmental lease stipulations and related ESA, EFH, and MMPA (if applicable) conditions of approvals are made available and reviewed with all appropriate personnel aboard every project-related vessel.

Appendix D. Noise-Related Impact-Producing Factors for Marine and Coastal Birds

This section discusses the potential impacts of noise from routine events associated with the Proposed Action on marine and coastal birds. Potential sources of impacts for marine and coastal birds include (1) active acoustic sound sources, (2) vessel and equipment noise and vessel traffic, (3) underwater noise, (4) disturbance to nesting or roosting, (5) disturbance to feeding or modified prey abundance, and (6) aircraft traffic and noise. Since all site assessment activities are performed using vessels, all activities have the potential to impact coastal and marine birds.

Active Acoustic Sound Sources. The primary potential for impact to marine and coastal birds from active acoustic sound sources is to marine birds that dive below the water surface and are exposed to underwater noise (Turnpenny and Nedwell 1994) including terns, tropicbirds, albatrosses, gadfly petrels, shearwaters, and boobies. The species of albatrosses, gadfly petrels, and shearwaters that may occur in the area generally feed by snatching prey from the sea surface. Only those species that dive are at risk of exposure to active acoustic sound sources since pulses are directed downward and are highly attenuated near the surface. In addition, active acoustic sound sources, such as side-scan sonar and sub-bottom profilers, are highly directive (e.g., downward, towards the seafloor), with beam widths as narrow as a few degrees; this directivity and narrow beam width also diminishes the risk to bird species other than diving species. Because of these factors, other species of coastal and marine birds would not be affected by active acoustic sound sources and are not discussed further for this potential impact.

Birds have a relatively restricted hearing range for airborne noise, from a few hundred hertz to about 10 kHz (Dooling et al. 2000). Data regarding bird hearing range for underwater noise is limited; however, a study using psychophysics found that Great Cormorants (*Phalacrocorax carbo*) learned to detect the presence or absence of a tone while submerged (Hansen et al. 2017). The greatest sensitivity was found at 2 kHz, with an underwater hearing threshold of 71 dB re 1 μPa RMS. The hearing thresholds are comparable to seals and toothed whales in the frequency band 1–4 kHz, which suggests that cormorants and other aquatic birds make special adaptations for underwater hearing and make use of underwater acoustic cues (Hansen et al. 2017).

Active acoustic sound sources usually have one or two (and sometimes three) main operating frequencies. The frequency ranges for representative sources are 100 and 400 kHz for the side-scan sonar; 3.5, 12, and 200 kHz for the CHIRP sub-bottom profiler; and 240 kHz for the multibeam depth sounder. The low-frequency underwater noise generated by several types of survey equipment (e.g., sub-bottom profilers) falls within the airborne hearing range of birds, whereas noise generated by other types of survey equipment (e.g., side-scan sonar, depth sounders) is outside of their airborne hearing range, which may be more limited underwater, and should be inaudible to birds.

Some marine birds including terns, tropicbirds, and boobies either rest on the water surface or shallow-dive for only short durations. Most of these birds would be resting on the water surface in the area surrounding survey vessels or would be dispersed; therefore, they would not come into contact with the active acoustic sounds. However, birds that shallow-dive could come into contact with active acoustic sounds, with the majority of the sound energy directed towards the seafloor. Therefore, the energy level that these diving birds could be exposed to would be for such a short time and have a lower sound energy that it would result in a negligible impact.

Marine birds that dive for short durations—such as albatrosses, gadfly petrels, and shearwaters—could be susceptible to active acoustic sounds generated from survey equipment. However, seismic pulses are directed downward and highly attenuated near the surface; therefore, there is only limited potential for direct impact from the low-frequency noise associated with active acoustic sound sources to affect diving birds. In addition, active acoustic sound sources such as side-scan sonar and sub-bottom profilers are highly directive, with beam widths as narrow as a few degrees or narrower; the ramifications of this directionality include a lower risk of high-level exposure to diving birds that may forage close to (but lateral to) a survey vessel.

Investigations into the effects of acoustic sound sources on coastal and marine birds are extremely limited. However, studies performed by Stemp (1985) and Lacroix et al. (2003) did not observe any mortality to the several species of seabirds studied when exposed to seismic survey noise; further, they did not observe any differences in distribution or abundance of those same species as a result of seismic survey activity. Based on the directionality of the sound and the low-frequency equipment used for HRG surveys, it is expected that there would be no mortality or life-threatening injury and little disruption of behavioral patterns or other non-injurious effects of any diving marine birds from this direct impact, resulting in a negligible impact.

Vessel and Equipment Noise and Vessel Traffic. The primary potential impacts to marine and coastal birds from vessel traffic and noise are from underwater vessel and equipment noise, attraction to vessels and subsequent collision or entanglement, disturbance to nesting or roosting, and disturbance to feeding or modified prey abundance (Schwemmer et al. 2011). Since all survey activities are performed from vessels, with the exception of those conducted via aircraft, most survey activities have the potential to impact marine and coastal birds from vessel traffic and the associated vessel and equipment noise, and artificial lights.

Underwater Noise. The sound generated from individual vessels can contribute to overall ambient noise levels in the marine environment on variable spatial scales. As stated above, birds have a relatively restricted hearing range, from a few hundred hertz to about 10 kHz (Dooling et al. 2000) for airborne noise, with few data available regarding bird hearing range for underwater noise. The survey vessels would contribute to the overall noise environment by transmitting noise through both air and water. Underwater noise produced by vessels is a combination of narrow-band (tonal) and broadband sound. Tones typically dominate up to about 50 Hz, whereas broadband sounds may extend to 100 kHz. According to Southall (2004) and Richardson et al. (1995), vessel noise typically falls within the range of 100–200 Hz. Noise levels dissipate quickly with distance from the vessel. The underwater noise generated from the survey vessels would dissipate prior to reaching the coastline and the shore/beach habitats of shorebirds. Because of the dissipation of underwater noise from survey vessels prior to reaching the shore or beach habitat, it is expected that underwater noise would produce negligible impacts to shorebird species.

Some marine birds—including terns, tropicbirds, albatrosses, storm-petrels, gadfly petrels, shearwaters, frigatebirds, and boobies—either rest on the water surface, skim the water surface, or shallow-dive for only short durations. Because of these behaviors, members of these families would not come in contact with underwater vessel and equipment noise generated from HRG survey vessels, or the contact would be for such a short time that it would result in little disruption of behavioral patterns or other non-injurious effects. Therefore, impacts to these marine birds from vessel and equipment noise would be negligible.

Marine birds that dive for short durations—including terns, albatrosses, gadfly petrels, shearwaters, and boobies—could be susceptible to underwater noise generated from HRG survey vessels and equipment. Site assessment-related surveys typically use a single vessel. This level of vessel activity per survey event is not a notable increase in the existing vessel and equipment noise, the vessels are typically moving at slow speeds, and noise levels dissipate quickly with distance from the vessel. Machinery noise can be continuous or transient, and variable in intensity. Because of this noise dissipation, only a very small area would experience vessel and equipment noise and potential associated disruption. Therefore, impacts of underwater noise from survey vessels to diving marine birds are expected to be negligible.

Disturbance to Nesting or Roosting. There is the potential for impact to marine and coastal birds from the potential disturbance of breeding colonies by airborne noise from vessels and equipment (Turnpenny and Nedwell 1994). Most marine and coastal bird species nest and roost along the shore and on coastal islands. Survey vessels for the Proposed Action are expected to make regular trips to their shore base in Pago Pago.

Vessels could cause a disturbance to breeding birds, with the potential to adversely affect egg and nestling mortality, if a vessel approached too close to a breeding colony. Surveys would not occur close enough to land to affect marine and coastal bird breeding colonies during survey activities. However, survey vessels are anticipated to transit from a shore base to offshore on a frequent basis. The expectation is that this level of vessel transit would occur at one of the shore bases identified or at other established ports in Pago Pago, which have established transit routes for ingress and egress in the coastal areas and existing vessel traffic. Because of this existing vessel traffic, it is not anticipated that marine and coastal birds would roost in adjacent areas, or, if they did already roost nearby, the addition of survey vessels would not notably increase the existing vessel traffic. In addition, noise generated from the survey vessels and equipment typically would dissipate prior to reaching the coastline and the nesting habitats of coastal birds. Impacts of airborne vessel and equipment noise to nesting or roosting marine and coastal birds are expected to be negligible.

Disturbance to Feeding or Modified Prey Abundance. Marine and coastal birds require specialized habitat requirements for feeding (Kushlan et al. 2002). Survey vessel and equipment noise could cause pelagic bird species—including terns, tropicbirds, albatrosses, storm-petrels, gadfly petrels, shearwaters, frigatebirds, and boobies—to be disturbed by the survey vessel and equipment noise and to relocate to alternative areas, which could result in a localized, temporary displacement and disruption of feeding. These alternative areas may not provide food sources (prey) or habitat requirements similar to that of the original (preferred) habitat and could result in additional energetic requirements expended by the birds and diminished foraging opportunity. However, it is expected that the temporary relocation would be limited to a very small portion of a bird's foraging range, and it would be unlikely that this temporary relocation would affect foraging success. Impacts to pelagic birds from disturbance associated with vessel and equipment noise are expected to be negligible.

The Proposed Action Area likely provides foraging resources for transient and resident marine and coastal birds. Possible indirect impacts to marine and coastal birds from vessel and equipment noise may include relocation of some prey species, which is primarily linked to seasonality. During their annual migrations, a number of marine and coastal birds have very specific stopover locations for species-specific foraging to accumulate fat reserves. Because of the noise produced from survey vessels, there is the potential for an indirect impact of modified prey abundance and distribution that migrating birds rely on for the accumulation of fat reserves to fuel their migration, which could result in additional energetic requirements for the migrating birds. However, it is unlikely that bird prey species would be affected by survey vessels to a level that would affect foraging success. If prey species exhibit avoidance of the area in which a survey is performed, it is expected to be limited to a very small portion of a bird’s foraging range and for a limited duration. Therefore, there is the potential for temporary displacement of species from a portion of preferred feeding grounds during migration and short-term displacement of marine and coastal bird species from non-critical activities during non-migration seasons.

Aircraft Traffic and Noise. Potential impacts to marine and coastal birds from aircraft traffic include noise disturbance and collision. Noises that are generated by project-related survey aircraft and that are directly relevant to birds (for both individual birds on the sea surface and birds in flight above the sea surface) include airborne sounds from passing aircraft. Both helicopters and fixed-wing aircraft generate noise from their engines, airframe, and propellers. The dominant tones for both types of aircraft are generally below 500 Hz (Richardson et al. 1995) and are within the airborne auditory range of birds. Because of the expected airspeed (135 kn), noise generated by survey aircraft is expected to be brief in duration, and birds may return to relaxed behavior within 5 minutes of the overflight (Komenda-Zehnder et al. 2003); however, birds can be disturbed up to 1 km away from an aircraft (Efroymson et al. 2000).

The physical presence of low-flying aircraft can disturb marine and coastal birds, including those on the sea surface as well as in flight. Behavioral responses to flying aircraft include flushing from the sea surface into flight or rapid changes in flight speed or direction. These behavioral responses can cause collision with the survey aircraft. However, Efroymson et al. (2000) reported that the potential for bird collision decreases for aircrafts flying at speed greater than 150 km/hr.

Marine and coastal birds are not expected to be significantly disrupted, given the relatively low number of aerial surveys and the short duration of potential exposure to aircraft-related noise, physical disturbance, and collision risk.

Appendix E. Supporting Documentation and Analysis

E.1 Descriptions and Justification for the Potential Survey Methods Used as Part of the Proposed Action

E.1.1 Survey Methodology Descriptions

Autonomous underwater vehicle (AUV) survey. AUV surveys consist of an autonomous (non-tethered) submersible with its own power supply and basic navigation logic. An AUV can run many geophysical sensors at the same time and typically would consist of a multibeam echosounder (MBES) and side-scan sonar system. AUVs also have forward-looking sonar for terrain avoidance, a doppler velocity logger for velocity information, an internal navigation system for positioning, an ultra-short baseline (USBL) pinger for positioning, and an acoustic modem for communication with a surface survey vessel. For single AUV operations, the surface survey vessel follows the AUV, keeping in communication via the acoustic modem. When several AUVs are deployed at the same time, navigation updates and modem communication are provided by a network of Underwater Transponder Positioning devices (UTPs). These transponders are deployed to the seabed in known locations. In both methods of operation, the survey vessel recovers, maintains, and launches the AUVs and UTPs. A survey vessel may deploy AUVs and UTPs through a moon pool, which is a large opening through the hull from the deck and to the bottom of a vessel for lowering tools and instruments into the sea.

Shallow multi-instrument towed surveys. A vessel tows side-scan sonar, or gradiometers with winches to provide altitude adjustments. Shallow survey vessel work using hull-mounted MBES and USBL systems is not relevant for seafloor survey at the depths of the area. However, water column and fish related surveys may use similar equipment.

Deep-tow survey. Deep-tow surveys use towed methodology in deep waters. The vessel uses a large winch with thousands of meters of cable to tow the survey instruments at seafloor depth. The survey instruments usually consist of a large weight (depressor), followed by a side-scan or potentially an MBES. The system is mounted in a survey vehicle. In deep waters, the survey vehicle might be 8–10 km behind the survey vessel, sometimes requiring the use of a chase vessel to provide USBL navigation for the survey vehicle. Vessels maintain speeds of 4.5 kn or slower when towing equipment.

Uncrewed surface vessel (USV) survey. USVs or autonomous surface vessels (ASVs) are remotely controlled vessels that are controlled by operators on shore or from another vessel. USVs can be simple (with a single instrument, designed for shallow waters, and controlled by an operator that maintains visual contact with the USV) or more complex (the size of a small survey vessel, able to tow instruments, and use radar and cameras to operate and monitor for protected species). USVs can be electrically powered with batteries, sail/solar powered, and/or use diesel motors and generators.

E.1.2 Standards of Research to Justify the Undetectable or Low Impacts Caused from These Survey Types

Table E-1. Comparison of the regulations from the International Seabed Authority (ISA) and relevant federal agencies

Entity	Topic Regarding Bottom Disturbance	Regulations
NOAA	Not significant actions include collecting box core samples	Appendix E of the NOAA Administrative Order 216-6A Companion Manual Categorical Exclusion E3: Activities to collect aquatic, terrestrial, and atmospheric data in a nondestructive manner
USGS	Nondestructive marine projects	CFR §46.210 (e): Nondestructive data collection, inventory including field, aerial, and satellite surveying and mapping, research, and monitoring activities Extraordinary Circumstances Review (43 CFR 46.215, Categorical Exclusions: Extraordinary circumstances)
ISA	Exploration regulations	Polymetallic nodules (ISBA/19/C/17) Polymetallic sulphides (ISBA/16/A/12/Rev.1) Cobalt-rich ferromanganese crusts (ISBA/18/A/11)
BOEM	Other than preliminary activities discussed above, regulations describe 10 activities for categorical exclusion related to prospecting activities, including sub-bottom acoustic profiling, box core or grab sampler	BOEM 30 CFR § 580.30 (Prospecting, subpart C)

E.1.3.1 Self-Determination

There is social science literature devoted to the value of self-determination as a cornerstone of the culture of Indigenous peoples living in the U.S. territories in the Pacific. Self-determination, as it applies to this Proposed Action, can be defined as the ability to influence how a territory's EEZ is managed. Grounded in political science, law, anthropology, sociology and human geography, this interdisciplinary literature notes Indigenous values potentially impacted by federal decision-making processes in Pacific Islands nations and territories (Kelly 2023; Singh and Jaeckel 2024; Villagomez and Johnson 2025).

There is increasing international momentum in the region for requiring free, prior, and informed consent (FPIC) from local populations for any and all mining actions taken in the oceans that have been navigated by Indigenous peoples for centuries (Lily 2012). Tilot et al. (2021) document how several Pacific island nations have already developed polices requiring FPIC before mineral mining is permitted. These include the nations of the Solomon Islands, Tonga, and Tuvalu.

As part of the Request for Information and Interest Comment process BOEM received 76,443 comments, 96% (73,586) of which were form letter campaigns expressing opposition to mineral leasing . The majority of comments in opposition to the leasing are based on the perception that deep-sea exploration will cause substantial and irreparable environmental harm. Governor Pula submitted a formal letter expressing the importance of collaboration with the American Samoan government (American Samoa Government 2025). Indigenous Pacific Islanders and public interest organizations, including the Defend Them All Foundation and the Native Samoan Corporation, expressed that proceeding with deep-sea mining without the consent of American Samoa would violate principles of Indigenous rights, self-determination, and cultural sovereignty. The commenters stated that the proposal disregards the voices of Pacific communities and opens the door to an industry that threatens their environment, culture, and livelihoods (BOEM 2025).

Some American Samoan government officials and industries are open to exploring the new opportunities mineral mining may afford the territory. One example is the Port Administration, which has previously highlighted the need for port repairs and upgrades, and could benefit from external investment and expansion (DOC Statistics and Analysis Division 2023).

Appendix F: Draft Section 106 Finding of No Historic Properties Affected for the Commercial Leasing for Minerals Offshore American Samoa Environmental Assessment

FINAL
Finding of No Historic Properties Affected for the Issuance of Minerals Leases on the Outer Continental Shelf Offshore American Samoa

Finding

The Bureau of Ocean Energy Management (BOEM) made a Finding of No Historic Properties Affected (Finding) for this undertaking, pursuant to Section 106 of the National Historic Preservation Act (NHPA) (54 U.S. Code [USC] 306108) and 36 Code of Federal Regulations (CFR) § 800.4(d)(l) of the Section 106 implementing regulations, "Protection of Historic Places." Should a mineral lease sale be held, BOEM expects the Finding will be met through inclusion of requirements in leasing documents. Such requirements will include avoiding any known or potential historic properties and ensuring a Qualified Marine Archaeologist is allowed to monitor or review live-stream video or recordings and/or samples during certain seafloor disturbing activities. The Lessee will follow unanticipated discovery protocols in the event of a discovery and/or inadvertent effect. Further, the Lessee will be required to follow specific marine archaeology survey methodology and reporting requirements during various later stages of leasing.

Documentation in Support of the Finding

I. Description of the Undertaking

Summary

This document describes BOEM's compliance with Section 106 of the NHPA and documents the agency's Finding for the undertaking of issuing up to two commercial leases for marine minerals in the American Samoa Outer Continental Shelf (OCS). BOEM has prepared this documentation in support of the Finding, following the standards outlined in 36 CFR § 800.11(d) (Documentation Standards). This Finding and supporting documentation has been provided to the consulting parties for the undertaking (see the Consultation with Consulting Parties and the Public Involvement section below). This Finding and supporting documentation were made available for public inspection by placement on BOEM's public website prior to the bureau approving the undertaking.

<u>Federal Involvement</u>

The Outer Continental Shelf Lands Act (OCSLA, 43 U.S.C. 1331 *et seq.*) mandates the preparation of the OCS mineral leasing program pursuant to 30 CFR Chapter V, Subchapter B. OCSLA and its implementing regulations pertaining to commercial mineral sales and development (30 CFR parts 580-582) encourage orderly, safe, and environmentally responsible development of mineral resources on the OCS. BOEM's authority in the Pacific U.S. Territories was granted by the Inflation Reduction Act of 2022 (P.L. 117-169), which amended OCSLA (codified at 43 U.S.C. 1331) by adding at the definition of "State" to include the Commonwealth of Puerto Rico, Guam, American Samoa, U.S. Virgin Islands, and the Commonwealth of the Northern Mariana Islands. BOEM is the only Federal agency with the authority to lease marine minerals from the OCS. BOEM's regulatory authority is limited to the OCS, and the bureau cannot approve activities in waters of a U.S. state or territory (from the coastline to the state submerged lands boundary, typically 3 miles offshore), or onshore areas.

On June 16, 2025, BOEM published a request for information and interest to hold a commercial lease sale for marine minerals within the eastern OCS of American Samoa (Federal Register Doc. 2025-10955). On October 15, 2025, BOEM's Acting Director signed the Area Identification Memorandum (Area ID) delineating an area covering approximately 33,136,060 acres (134,097 km^2) with water depths ranging from 4,600–20,000 feet (1,400–6,000 meters). The Area ID does not indicate a final decision on whether, where, or under what circumstances to hold a lease sale; the Area ID delineated potential lease areas for additional analyses as the proposed lease sale process continues. Additional information is provided below (Description of the Proposed Lease Areas) regarding the lease areas.

BOEM prepared an Environmental Assessment (EA) for up to two commercial leases for marine minerals in the American Samoa OCS, pursuant to 30 CFR 581.14. BOEM has determined that the issuance of these commercial leases and resulting preliminary activities in the lease areas constitute an undertaking subject to Section 106 of the NHPA (54 USC § 306101) (NHPA Section 106) and its implementing regulations (36 CFR 800). BOEM will serve as the lead federal agency for the NHPA Section 106 review.

<u>Description of the Proposed Lease Areas</u>

The proposed commercial lease areas are near the eastern limit of the American Samoa OCS bordering the limit of the Cook Islands Exclusive Economic Zone (Figure 1). The lease areas cover a total of 33,136,060 acres (134,097 km^2) with approximate water depths ranging from 4,600–20,000 feet (1,400–6,000 meters). These proposed lease areas are 150 miles from Tutuila and 104 miles from Manu'a Islands. These proposed lease areas partially border the Rose Atoll National Marine Sanctuary, which is 57 miles from Rose Atoll.

<u>The Undertaking</u>

The undertaking is the potential issuance of up to two leases for the purpose of commercial marine minerals mining within the eastern OCS of American Samoa. If granted, the commercial lease(s) will authorize the lease holder to conduct only preliminary activities. "Preliminary activities" have been defined as "bathymetric, geological, geophysical, mapping, and other surveys necessary to develop a comprehensive Delineation, Testing, or Mining Plan. Such activities are those which have no significant adverse impact on the natural resources of the OCS (30 CFR 582.21([d]).” The commercial lease(s) would not authorize any mining activities on the OCS but could result in preliminary activities.

The EA evaluated the following specific preliminary activities allowed with lease issuance and associated with this undertaking: use of dynamically positioned vessels, autonomous underwater vehicles (AUVs), and remotely operated vehicles (ROVs); high-resolution geophysical (HRG) surveys; high-resolution video or acoustic cameras; sampling sediments, water, and species from an ROV; anchors on the seafloor for buoys and physical or biological data collection; scientific physical and biological monitoring from a ship or moored anchor, including box core sampling and use of landers; expendable equipment such as weights; acoustic doppler current profilers (ADCPs); underwater transponder positioning units; and focused biological surveys from the air, ship, or in-water that can utilize aerial digital imaging, visual observation, radar, thermal or acoustic monitoring. Preliminary activities that could potentially impact the seafloor include geotechnical investigations (box coring and free fall grab samples) and deploying scientific equipment on the seabed. Lost equipment is another potential effect that could impact the seafloor as a result of these preliminary activities. A Lessee must submit the results of preliminary activities with their plans (Delineation, Testing, and/or Mining Plan) (e.g., 30 CFR 582.22, 30 CFR 582.23, and 30 CFR 582.24). The Lessee shall give written notice to BOEM at least 30 days prior to initiating preliminary activities on the lease. Each written notice must include details of preliminary activities (e.g., bathymetric, geological, geophysical, mapping, and other surveys) to be conducted and timelines of effort.
The following sections provide additional details regarding specific preliminary activities that may be carried out on a lease:

<u>High-Resolution Geophysical Surveys</u>
The purpose of HRG surveys is to acquire seafloor hazards data, characterize seafloor conditions, and conduct bathymetric charting. BOEM anticipates that the HRG surveys would be conducted using the following equipment: bathymetry sounder, multibeam echosounder (MBES), side scan sonar, magnetometer/gradiometer, and possibly sub-bottom profiler, and ultra high-resolution seismic imaging systems. This equipment usually does not contact the seafloor and is typically towed from a moving survey vessel that does not require anchoring. BOEM does not consider HRG surveys to be an activity that has the potential to affect historic properties and therefore is not considered further in this Finding.

<u>Geotechnical Investigations</u>

Geotechnical investigations may include box coring and free-fall grab sampling to collect nodules, sediment, and biological samples from the seafloor for further analysis. A box core is lowered from a vessel at the surface to the seabed by winch and penetrates the seabed; when tension is applied, the box core jaws close, sealing the sample inside. A free-fall grab is similar except that it is released unconnected to the vessel, descends to the seafloor, samples the seabed and releases ballast weights, and comes back to the surface via a float. At the depths of this undertaking, preclearance is typically not possible for box cores or free-fall grab samplers.

Up to four box core or free-fall grab surveys are expected to be completed for the undertaking, collecting approximately up to 2,259 samples. Each sample will be expected to disturb 0.5 to 1.5 m^2 area of the seafloor. Together, these surveys could disturb 1952 m^2 of the seafloor for a two-lease scenario and represent less than 0.0000019 % of the total proposed lease areas. The total estimated area of disturbance to the seafloor caused by box core or free-fall grab surveys is presented in the EA Table 2-4.

To the extent historic properties may exist but have not yet been identified or discovered, BOEM is planning to ensure that a Qualified Marine Archaeologist visually examines retrieved box core and free fall grab samples for potential cultural material and artifacts and photo-documents cores and samples prior to sub-sampling. Bottom imagery (e.g., video or still systems with lights) may also be acquired as technically feasible for seabed disturbance or sampling activities. All imagery will be retained and provided for review by a Qualified Marine Archaeologist to determine if any potential archaeological resources were present in the sampled areas.

Underwater Transponder Positioning Units, Buoys, Moorings, and Landers

Ocean environmental characterization surveys involve placement of scientific equipment on the seafloor, utilizing associated anchors, clump weights or ballast weights. Weights and some equipment are considered expendable and released onto the seafloor, while the connected equipment is released and retrieved. The total estimated area of disturbance to the seafloor caused by placing underwater transponder positioning (UTP) units to support AUV navigation and deploying moorings and landers for physical and biological data collections is presented in the EA Table 2-5.

UTP units consist of equipment that is deployed on the seafloor to provide positioning for AUV surveys. As part of the undertaking, it is assumed that each HRG AUV-based survey would use multiple AUVs and require the use of UTP units placed on the seafloor. Each UTP could impact 1 m^2 of seafloor area, with up to 416 UTPs placed across the total area.

Buoys are rare in deeper waters, where a Lessee is more likely to set moorings for collecting oceanographic data without a surface buoy (AMC Consultants Pty Ltd et al. 2021). However, BOEM estimates two large surface ocean buoys would be placed per lease (the undertaking would have a maximum of 4 buoys). Metocean surface buoy anchors use a solid cast iron anchor weighing approximately 11,000 lbs. and have a footprint of approximately 2.3 m^2 (PNNL 2019). The chain at the bottom of the mooring line could sweep and disturb the seafloor. Moorings for collecting oceanographic data without a metocean surface buoy are more common internationally at depths of 4,500 – 5,200 m and use smaller moorings. BOEM estimates that mooring installation for surface and subsurface buoys could disturb approximately 28 m^2 of seafloor per mooring (Appendix A). Acoustic Doppler Current Profilers (ADCPs) assess the speed and direction of ocean currents. In addition to the moorings for the surface and subsurface buoys, BOEM estimates that approximately 16 moorings for ADCPs could be installed across both lease areas, with seafloor disturbance likely around 28 m^2 per mooring, ranging from 13 to 78 m^2. A lander is a stationary scientific monitoring device that ‘lands’ on the seafloor and ranges in size. BOEM assumes approximately 26 landers could be deployed across the total area but not at the same time. Most landers would displace about 2 m^2 of seafloor, though the footprint of a newer device rated to ocean depths of 6,000 m is approximately 4 m^2 (Guo et al. 2023).

To the extent historic properties may exist but have not yet been identified or discovered, bottom imagery (e.g., video or still systems with lights) may be acquired as technically feasible for seabed disturbance or sampling activities. The Lessee will ensure a Qualified Marine Archaeologist will review all imagery to identify if any potential archaeological resources are present in the sampled areas. The Lessee will follow unanticipated discovery protocols in the event of a discovery and/or inadvertent effect.

Remotely Operated Vehicles

The most precise method to collect seafloor sediments or species is by ROV, which can target samples to within a centimeter and provides real-time operational and visual control. BOEM plans to require as a lease stipulation that a Qualified Marine Archaeologist monitor the video feed in real time if a ROV survey is conducted near a potential or newly discovered archaeological resource.

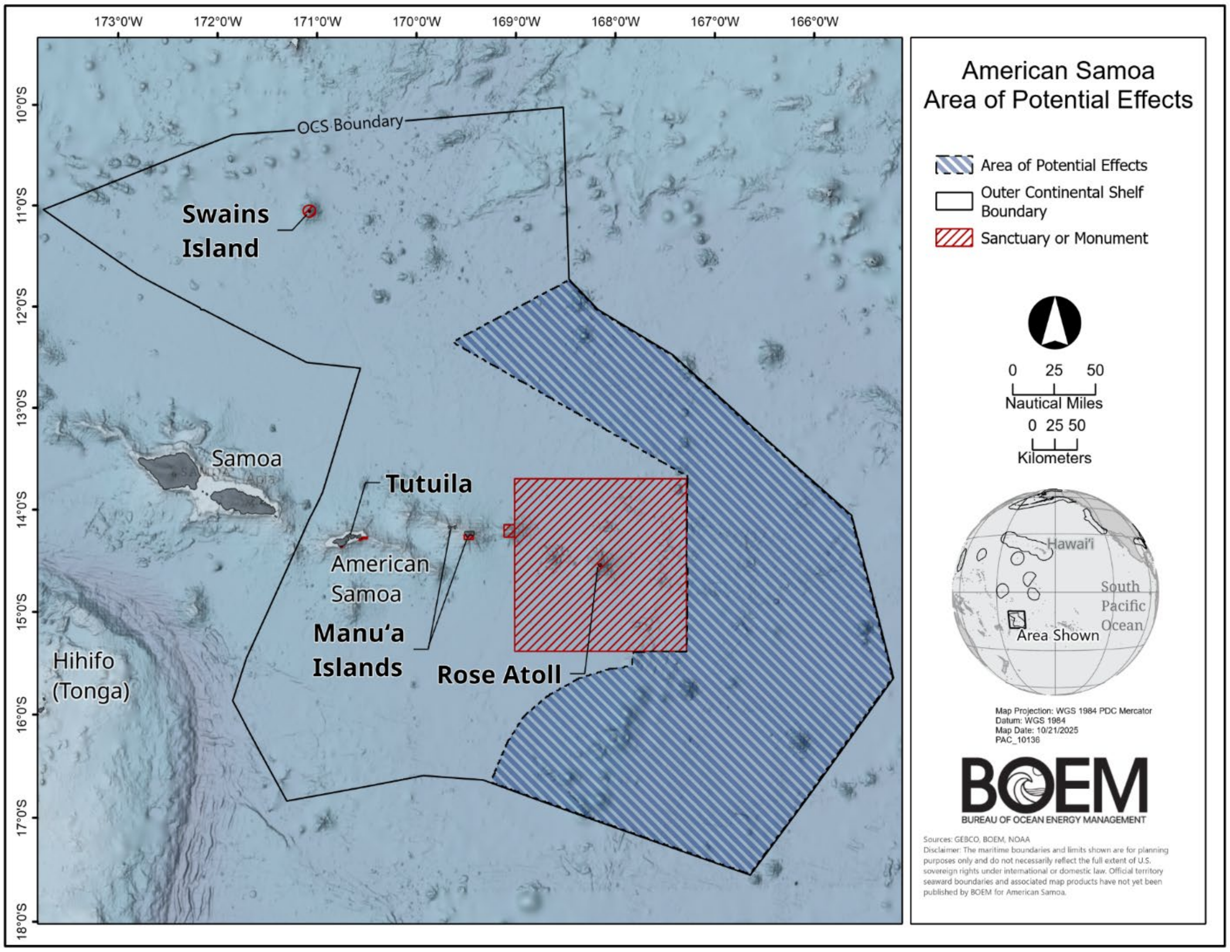

Figure 1. American Samoa Commercial Lease Section 106 NHPA Area of Potential Effects Map

Area of Potential Effects

As defined in the Section 106 regulations (36 CFR § 800.16[d]), the Area of Potential Effects (APE) is the geographic area, or areas, within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The dimensions of the APE are influenced by the scale and nature of an undertaking and may differ for various kinds of effects caused by the undertaking.
The APE for this undertaking is defined as the depth and breadth of the seabed that could be affected by seafloor-/bottom-disturbing activities associated with preliminary activities. The APE for preliminary activities includes the discrete horizontal and vertical areas of the seafloor that may directly affect historic properties on or below the seafloor, if present. The APE is equivalent to the entire Lease Areas.

Regarding visual potential effects, preliminary activities may include the temporary placement (i.e., deployment, maintenance, and decommissioning) of buoys within the commercial lease areas. The presence of buoys is expected to result in no impact on onshore historic properties because their distance from land is at least 57 miles from Rose

Atoll. The increased lighted vessel traffic is expected to result in no impact as it would be indistinguishable from current lighted vessel traffic. Potential increased vessel traffic associated with preliminary activities would be temporary in nature. These vessels would be indistinguishable from existing vessel traffic and only result in a nominal increase in existing vessel traffic over the life of the lease. Therefore, BOEM has not defined, as part of the APE, onshore areas from which the preliminary activities would be visible. In addition, there is no indication that the issuance of a commercial lease and subsequent preliminary activities will involve expansion of existing port infrastructure. Consequently, the APE for this specific undertaking does not include onshore areas.

Consultation with Consulting Parties and Public Involvement

On June 16, 2025, BOEM published a Request for Information and Interest for marine minerals commercial leasing within the eastern OCS of American Samoa in the Federal Register for a 60-calendar day public comment period. On October 15, 2025, BOEM's Acting Director signed the Area ID Memorandum (included in Environmental Assessment Appendix A) describing an area covering approximately 33,136,060 acres (134,097 km^2) with water depths ranging from 4,600–20,000 feet (1,400–6,000 meters).

BOEM developed a list of potential Section 106 consulting parties for the undertaking including American Samoa government agencies, the American Samoa Historic Preservation Office, American Samoa Community College, federal agencies, and other consulting parties recommended by the American Samoa Historic Preservation Officer (Attachment A, attached hereto). BOEM initiated Section 106 consultation for the undertaking by emailing an invitation letter on January 14, 2026, including an electronic copy of the letter, to the American Samoa Historic Preservation Officer and consulting parties. The Section 106 invitation letters solicited consulting parties' comments and input regarding the identification of historic properties as well as the potential effects on historic properties from leasing and preliminary activities for the purpose of obtaining input for the Section 106 review and determining their interest in participating as a consulting party. Prior to and after initiation the Section 106 consultation, BOEM meet in person and held several virtual meetings with the American Samoa Historic Preservation Officer.

BOEM shared this Finding in draft form with all the consulting parties listed in Attachment A for a 30-calendar day review period. Further, BOEM posted this draft Finding on BOEM's webpage to seek public comment. BOEM received comments from the Naval History and Heritage Command noting the importance of referencing the Sunken Military Craft Act in the EA and the Finding. BOEM incorporated these recommended edits. Further, the National Oceanic and Atmospheric Administration National Marine Sanctuary of American Samoa, U.S. Coast Guard Oceania District, and the Bureau of Safety and Environmental Enforcement responded noting their agencies did not have any comments. BOEM did not receive any comments from the American Samoa Historic Preservation Office.

BOEM posted the final Finding on BOEM's webpage.

II. Description of the Steps Taken to Identify Historic Properties

BOEM has determined that separate Section 106 consultations, including the identification and evaluation of historic properties, assessment of effects, and, if necessary, the resolution of adverse effects will be conducted at different stages of this leasing. This Section 106 consultation addresses potential effects associated with the issuance of leases including implementation of allowable preliminary activities after lease issuance. Should one or more leases be issued and activities be proposed beyond preliminary activities, BOEM will conduct separate Section 106 consultations, as appropriate, prior to approval/approval with conditions or disapproval of Delineation, Testing, and/or Mining Plans.

Based on the nature and scale of this undertaking (issuing commercial leases and subsequent preliminary activities) with no or minimal potential to affect historic properties, BOEM determined that the agency meets the reasonable and good faith effort requirements for the identification and evaluation of historic properties through the evaluation of existing databases, reports, and regional studies identifying potential or nonpotential historic properties and consultation with the American Samoa Historic Preservation Officer and consulting parties. BOEM reviewed existing and available information regarding historic properties that may be present within the APE, including data concerning possible historic properties not yet identified.

BOEM conducted a review of reported shipwrecks in BOEM's Pacific OCS Shipwreck Database. BOEM's Pacific OCS Shipwreck Database does not represent a complete listing of all potential shipwrecks on the Pacific OCS but, rather, serves as a baseline source of existing and available information for the purposes of corroborating and supporting identification efforts. Analysis of this BOEM database and other shipwreck databases reviewed is discussed later in this report, specifically the Post-Contact Period Cultural Resources subsection below. BOEM reviewed the publicly available National Register of Historic Places (NRHP) database. Thirty-one historic properties in American Samoa are listed in the NRHP, none of these sites are within the APE for this undertaking.

BOEM determined available multibeam data collected in the lease areas have been acquired using hull-mounted multibeam sources. However, object detection at the seafloor remains a technical challenge given the extreme water depth and precision/accuracy inherent in using surface acoustic data. Even though there is multibeam data of certain sections of the proposed lease areas, the horizontal and vertical resolution of the available multibeam data is not suitable for the purpose of historic property-specific identification.

To date, the APE has not been subject to a complete and comprehensive archaeological identification survey. Contributions from regional and area cultural studies are included in this report (BOEM 2017 and 2024; NOAA 2012; Van Tilburg et al 2007 and 2013). The following sections outline the history of human habitation in American Samoa through several time periods and discuss the potential cultural resources that may be discovered.

Pre-Contact Period (approximately 2000 Before Common Era [BCE] to 1722 Common Era [CE])

Based on the present understanding of the archaeological record, human populations in American Samoa during the Pre-Contact Period developed distinct cultures and lifeways, corresponding with three sub-periods: the Early, Middle, and Late (Periera 2017). Samoa was settled by Polynesians approximately 3,000 years ago during the Early Pre-Contact Period (ca. 2000 BCE to 500 CE), forming the eastern boundary of the Lapita culture (Craig 2009; Linnekin et al. 2006; Bedford et al. 2019). In addition to other materials, Lapita archaeological sites are characterized by distinctive pottery (Clark and Michlovic 1996). Pigs, dogs, and chickens were among the early domesticated animals in American Samoa (Spriggs 2006). Although some Lapita sites have been discovered in mountainous areas, most are characterized by predominantly coastal habitations (Clark and Michlovic 1996; Spriggs 2006). This fact, combined with rising sea levels and island subsidence provides the potential for formerly terrestrial submerged archaeological sites, but only in waters far shallower than the APE (Eckert and Welch 2009; Pereira 2017). During the Middle Pre-contact period (500 to 1200 CE) pottery ceases to be present (Clark and Michlovic 1996; Linnekin et al. 2006). Sites from this period are challenging to identify because of this absence of pottery; some have classified this period as the Samoan Dark Ages (Davidson 1979). From the Late Pre-Contact Period (1200 CE to 1722 CE) into the early historic period "large mound and settlement complexes" characterize archaeological finds (Linnekin et al 2006). Especially prominent are star mounds, built to conduct high rank activities, such as pigeon catching (Sand et al. 2018; Herdrich 1991). This period is also characterized by fortified sites during times of war, and coastal villages in peacetime (Periera 2017; Moyle 1984). From approximately 1200 to 1400 CE, Samoa was mostly under Tongan control (Linnekin *et al.* 2006).

Pre-Contact Period Cultural Resources

The APE has no potential for the presence of inundated precontact terrestrial sites because the water depths (4,600–20,000 feet [1,400–6,000 meters]) are well below the lowest sea levels during human habitation of American Samoa. Polynesian watercraft and/or associated artifacts from the Pre-Contact Period or later could, however improbably, exist within the APE. Polynesian shipwrecks are extremely unlikely to be encountered mostly because of their inherent buoyancy. Pacific voyaging canoes used a double-hull design to achieve stability, instead of the use of ballast (Haddon and Hornell 1936). As a result, "Submerged wreck sites (unintentional or accidental losses while in-use) for voyaging canoes may therefore be very rare, if they exist at all, in the Pacific" (BOEM 2017). So far, the only in-situ voyaging canoes have been discovered at nearshore terrestrial wet sites, instead of oceanic contexts (Sinoto 1983; Johns et al 2014; BOEM 2017; BOEM 2024). The likelihood of discovering or encountering artifacts from lost Polynesian watercraft is likewise remote.

Post-Contact Period (1722 CE to Present)

The Post-Contact Period begins when Europeans arrived on voyages of exploration. The first documented European contact with American Samoa is the Dutch explorer Jacob Roggeveen in 1722 CE, and later with the French and Louis-Antoine de Bougainville in 1768 (Linnekin *et al.* 2006; Couper 2009). They were followed by European explorers, whalers, and Christian missionaries (Davidson 1969). By 1830, outside contact had resulted in a rapid decline in the indigenous population from foreign diseases, with a population shift from inland to the coast (NOAA 2012). In the latter nineteenth century, a crisis between German and American interests nearly flared into war, and conflict was only avoided by the arrival of a hurricane. An 1899 agreement, which was brokered by Britain and effective in 1900, divided Samoa between Germany and the United States (NOAA 2012). World War II stressed the importance of American Samoa as a strategic base for the US military. Although the territory saw little direct action, Japan sent a submarine to shell the US Naval station at Tutuila (Gray 1960). American Samoa was involved in fueling, supplies, and aviation throughout the conflict, and served as headquarters for the American Samoa Defense Group, “the largest area of command in the South Pacific” (Burke 1945). It is important to note that military vessels and aircraft are protected under the Sunken Military Craft Act (SMCA 2004), and may also be submerged grave sites. American Samoa was under the jurisdiction of the US Navy until the 1950s and is currently an unincorporated United States territory, with an elected governor and a non-voting member of the U.S. House of Representatives (NOAA 2012; Enright et al. 1997).

Post-Contact Period Cultural Resources

The maritime heritage resources in American Samoa have been divided into five aspects: historic shipwrecks; lost World War II naval aircraft; World War II fortifications; ancient terrestrial archaeological sites; and “marine/coastal natural resources associated with the legends and folklore of American Samoa” (Van Tilburg 2007). BOEM understands the Pacific Islanders place a deep cultural significance to the ocean itself and through consultation may determine if these lease areas or certain portions are or are not culturally significant to specific communities. Based on the information available at this stage of early leasing, BOEM has determined that shipwrecks and downed aircraft may be encountered in the APE, given its water depth and distance from land.

Maritime traffic, whether shipping, fishing, military, or recreational, at various geographic scales, from local to international, has been a hallmark of the Pacific for centuries. Consequently, shipwrecks could be found within the APE and could reflect a variety of vessel types. Of the 35 known historic shipwrecks in American Samoa, none were reported lost within the APE. Of these, the precise location of only two are known (Office of National Marine Sanctuaries 2022).

No submerged archaeological sites are currently known to be in the APE. In consultation with other federal partners, BOEM marine archaeologists searched multiple databases and contacted other federal agencies (Automated Wreck and Obstruction Information System, BOEM, United States Naval History and Heritage Command, and Defense POW/MIA Accounting Agency) and found no record within these sources of reported missing vessels, aircraft, or other potential archeological sites in the APE.

Although there are no identified historic properties in the APE at this time, BOEM considered details particular to deepwater environments that could affect the preservation of potential archaeological sites. These conditions are described in the following information, excerpted from BOEM 2017 and BOEM 2024: “In extreme water depths, burial, survival, and preservation of a wreck warrants close consideration. Burial is extremely unlikely at the water depths in the APE owing to very low sedimentation rates and quiescent bottom conditions typically found in open ocean, deepwater settings. Despite low sedimentation, conditions may also be anoxic or feature low oxygen levels that could enable preservation of wooden shipwrecks. In comparison, if there are sufficient oxygen levels (or dark oxygen), organisms that depend on organic material may destroy wooden hulls. Preservation of non-wooden shipwrecks would similarly depend on conditions at the site. However, if a wreck is found with sufficient diagnostic artifacts in concentration, the older wooden shipwreck site may possibly be eligible for NRHP inclusion as an archaeological site (artifact concentration) rather than relatively intact wreck or discrete object (NHPA 1966).”

Of the 45 aviation losses known to have occurred around American Samoa, most are military aircraft protected by the Sunken Military Craft Act of 2004 (Van Tilburg 2007). Other than one potential nearshore site, none have been located. All of the naval aviation losses occurred during training or patrol between 1942 and 1944, many of which were in the vicinity of Tutuila, far from the APE (Burke 1945; Van Tilburg 2007).

Due to the lack of survey information in this area of the Pacific Ocean, the potential for the presence of submerged historic sites, consisting of shipwrecks, downed aircraft, or other cultural resources remains unknown. Leasing stipulations and best management practices will require the Lessee to avoid any known historic properties if present, to ensure a Qualified Marine Archaeologist is involved in specific surveys and inspections of samples, to conduct visual examination with video recording of box core and free-fall grab samples collected during preliminary activities, to implement specific high-resolution geophysical survey methodology and reporting of survey results, and to conduct unanticipated discovery protocols in the event of a discovery or unanticipated effect.

III. Leasing Requirements

Where practicable, BOEM expects to require avoidance of potential historic properties through lease stipulations, resulting in BOEM recording a Finding of No Historic Properties Affected, consistent with 36 CFR § 800.4(d)(1). Inclusion of the elements outlined below in the lease would help ensure the identification and avoidance of historic properties; their inclusion is a requirement of this Finding.

The following elements, designed to avoid impacts to offshore historic properties from bottom-disturbing activities associated with preliminary activities, are proposed to be included in the commercial leases associated with the OCS offshore American Samoa:

- No Impact without Approval:
  In no case may the Lessee knowingly impact a potential archaeological resource without the Lessor's prior consent, following appropriate compliance with the National Historic Preservation Act.

- Qualified Marine Archaeologist:
  The Lessee must ensure the Qualified Marine Archaeologist meets the Secretary of the Interior Professional Qualifications Standards (48 Federal Register 44738–44739).

- Preliminary Activities – Archaeology Requirements:
  For preliminary activities, the Lessee must ensure a Qualified Marine Archaeologist visually examines retrieved box core and free fall grab samples for potential cultural material and artifacts and photo-documents cores and samples prior to sub-sampling. Bottom imagery (e.g., video or still systems with lights) may also be acquired as technically feasible for seabed disturbance or sampling activities. The Lessee will ensure a Qualified Marine Archaeologist will review all imagery to identify if any potential archaeological resources are present in the sampled areas. If a ROV survey is conducted near a known, potential, or newly discovered archaeological resource, the Lessee must ensure a Qualified Marine Archaeologist is available to monitor the video feed in real time during that part of the survey. All review and monitoring by the Qualified Marine Archaeologist may be conducted remotely if images and video feed are of sufficient quality for the purposes discussed above.

  If during examination of the retrieved seabed samples (and or post-activity reviews of bottom imagery) and/or visual imaging, the Lessee or BOEM determines that a potential marine cultural resource may have been located or adversely affected, then Lessee, with BOEM's assistance, will initiate the steps outlined in the Unanticipated Discovery protocols. The Lessee will perform any descriptions, documentation, or additional investigations directed by BOEM to determine if the resource is potentially eligible for listing in the National Register of Historic Places. The Lessee will keep the location confidential of any potential marine cultural resource identified through the Unanticipated Discovery protocols.

In addition, BOEM is expected to require that the Lessee observe the "unanticipated finds" requirements in the Section 106 NHPA regulations (36 CFR 800.13[a]). The following elements are being proposed for inclusion in the commercial leases that may be issued within the OCS offshore American Samoa:

- Unanticipated Discovery Clauses: If the Lessee, while conducting geotechnical exploration or any other bottom-disturbing activities, discovers an unanticipated potential archaeological resource, such as the presence of a shipwreck (e.g., a side scan sonar or multibeam echosounder image or visual confirmation of an iron, steel, or wooden hull, wooden timbers, anchors, concentrations of historic objects, piles of ballast rock) or evidence of a pre-contact archaeological site (e.g. stone tools, pottery or other pre-contact artifacts) within the project area, the Lessee must:

    - Immediately halt seafloor-disturbing activities in the area of discovery and place an avoidance buffer around the location of the potential site to a distance of 1000 feet (305 m) from the discernible extent of the target,
    - Notify the Lessor within 24 hours of discovery,
    - Notify the Lessor in writing by report within 72 hours of its discovery,
    - Keep the location of the discovery confidential and take no action that may adversely affect the archaeological resource until the Lessor has made an evaluation and instructs the Lessee on how to proceed. If (1) the site has been impacted by the Lessee's project activities; or (2) impacts to the site or to the area of potential effects cannot be avoided, the Lessee must conduct additional investigations, as directed by the Lessor, to determine if the resource is eligible for listing in the National Register of Historic Places (30 CFR 585.802[b]). If investigations indicate that the resource is potentially eligible for listing in the National Register of Historic Places, the Lessor will inform the Lessee how to protect the resource or how to mitigate adverse effects to the site. If the Lessor incurs costs in protecting the resource, then, under Section 110(g) of the National Historic Preservation Act, the Lessor may charge the Lessee reasonable costs for carrying out preservation responsibilities under the OCS Lands Act.

Marine Archaeological Survey Protocols and Details

These leasing requirements are best management practices noted as Information for the Lessee in Appendix C of the EA. These leasing requirements also will need to incorporate the lease stipulations listed above.

- Archaeological Survey Required for Delineation, Testing and Mining Phases: The Lessee must conduct and provide the results of an archaeological survey with submission of any of its plans (Delineation, Testing, and/or Mining Plan). The archaeological survey report must include a description of the methods used to conduct the archaeological surveys in support of the submitted plan or plans (i.e., Delineation, Testing, and/or Mining Plan). The Lessee must follow these marine archaeology survey requirements prior to, during, and after submittal of the archaeological survey results to BOEM.
  - The Lessee will have to complete a marine archaeology survey plan and conduct a pre-survey meeting. The Lessee will coordinate with BOEM before conducting survey activities through both the preparation and submission of a survey plan and participation in a pre-survey meeting with BOEM. The Lessee should include appropriate historic preservation staff and marine archaeologist(s) both in the preparation of the survey plan and as participants in the pre-survey meeting.
  - The Lessee will provide a detailed description of the activities proposed in their plans (Delineation, Testing, and/or Mining Plan) including a description of the potential Area of Potential Effects (APE). The geographic area, or areas, in which these proposed activities take place is the APE. The scope of these geographic areas should include the depth and breadth of the seabed potentially impacted by any bottom-disturbing activities.
  - The Lessee will conduct the archaeological survey of the lease area(s) by employing high-resolution geophysical (HRG) survey techniques prior to conducting seafloor disturbing activities not assessed in BOEM's Finding of No Historic Properties Affected for the Issuance of Minerals Leases on the Outer Continental Shelf Offshore American Samoa.
  - High-resolution Geophysical Survey Techniques: The areas surveyed for archaeological identification purposes must be large enough to cover all portions of the project area affected by the activities proposed, including all seafloor-disturbing activities, whether temporary or permanent. The survey will include 100% seafloor coverage using side scan sonar (SSS), and/or multibeam echo sounder (MBES), prior to bottom disturbing activities in the Testing and Mining phases. The SSS instrument range must be set to provide at least 100 percent overlapping coverage (i.e., 200% seafloor coverage). This coverage must ensure 0.5 m resolution or better of the seafloor.
  - The Lessee will be required to submit the results of the archaeological survey(s) in a final report. The report will be a stand-alone document submitted with the Lessee's Delineation, Testing, and/or Mining Plan. The report must provide an evaluation and synthesis of the data (including desktop research and HRG survey) for the purpose of identifying potential archaeological resources in the lease areas. The report and analyses presented therein must be prepared by a Qualified Marine Archaeologist. The report will describe the activities proposed in the plan, the area(s) that may be affected by the proposed activities, the methods of identifying

archaeological resources within those areas, and the results of those identification efforts.

- The Lessee will be required to submit digital data including the following:
    - Navigation Data: The navigation post-plot of the surveyed area(s) including survey lines, line numbers or other designations, navigational shot points or event markers, and other relevant attributes should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp).
    - Proposed Project: The location of the proposed project elements, including relevant attributes, should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp).
    - Side scan sonar: The information used to create the table of side scan sonar contacts and charting of sonar contacts should be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp). The following attributes should be included: Side scan sonar contact ID; Lease block; Survey line number; Target length (m); Target width (m); Target height (m); Target shadow (m); Target description; Associated magnetic anomalies (if any); coordinates of the target in decimal degrees to 5 decimal places; Original source file name; and recommended avoidance distance, if applicable. Applicants must provide both raw and renavigated (if available) files for the survey in the side scan manufacturer's native format, at the side scan's native sample rate (not resampled). Side scan sonar mosaics of the survey area must be prepared as a geo-referenced Tagged Image Format (.tif) and output as 0.5 m resolution or better.
    - Multibeam Echosounder (MBES): The information used to create the table of MBES contacts and charting of sonar contacts may be submitted in an ArcGIS readable format (e.g., Microsoft Excel (.xls), Comma separated value (.csv), Text file (.txt), Database (.dbf) or Shapefile (.shp). The following attributes must be included: MBES contact ID; Lease block; Survey line number; Target length (m); Target width (m); Target height (m); Target description; Associated magnetic anomalies (if any); coordinates of the target in decimal degrees to 5 decimal places; Original source file name; and recommended avoidance distance, if applicable. Applicants must provide both raw and renavigated (if available) files for the survey in the MBES manufacturer's native format. MBES bathymetry and backscatter grids of the survey area must be prepared as a geo-referenced Tagged Image Format (.tif) and output as 0.5 m resolution or better.
    - Bathymetry Data: The Lessee may provide bathymetric data in one of the following formats with appropriate metadata detailing processing

parameters, illumination angles and coordinate systems: XYZ data; ARC ASCII Grid and layer files; Contours (ESRI compatible); and Geo-referenced image files.

- Pre-Survey Meeting: The Lessee must coordinate a pre-survey meeting associated with archaeological surveys conducted to support plan (Delineation, Testing, and/or Mining Plan) submittal by sending an email and following up with email or phone calls as necessary, to the following parties: BOEM, American Samoa Historic Preservation Officer, and Underwater Archaeology Branch - Naval History and Heritage Command.

    - The purpose of this meeting will be for the Lessee, the Lessee's Qualified Marine Archaeologist, and other pertinent personnel to discuss the Lessee's Survey Plan and consider requests by the party attendees to monitor portions of the archaeological survey and the geotechnical exploration activities, including the visual logging and analysis of geotechnical samples (e.g., cores). Notification of the pre-survey meeting must be sent at least 15 calendar days prior to the date of the proposed pre-survey meeting. The meeting must be scheduled for a date at least 30 calendar days prior to commencement of survey activities performed in support of plan submittal and at a time that affords the participants a reasonable opportunity to participate. The anticipated date for the meeting must be identified in the timeline of activities described in the applicable marine archaeology survey plan. The Lessee must provide the Lessor with documentation of compliance with this stipulation prior to commencement of surveys.

- Geotechnical Exploration: The Lessee must adhere to the preliminary activities archaeology requirements. With the exception of box core and free fall grab samplers, the Lessee may only conduct geotechnical exploration activities performed in support of its plan(s) submittal (i.e., Delineation, Testing, and/or Mining Plan) in locations where an analysis of the results of geophysical surveys has been completed. This analysis must include a determination by a Qualified Marine Archaeologist as to whether any potential archaeological resources are present in the area. The geotechnical exploration activities must avoid potential archaeological resources by a minimum of 1000 feet (305 meters), and the avoidance distance must be calculated from the maximum discernible extent of the archaeological resource. A Qualified Marine Archaeologist must certify, in the Lessee's archaeological survey report, that geotechnical exploration activities did not impact potential historic properties identified as a result of the HRG surveys performed in support of plan submittal. In the event that the geotechnical exploration activities are found to have impacted potential historic properties, the Lessee must follow the Unanticipated Discovery lease stipulation.

Monitoring and Avoidance: The Lessee must ensure a Qualified Marine Archaeologist is present (this can be conducted virtually if the information is conveyed in sufficient quality and in real time to give their professional guidance) during bottom-disturbing activities performed during preliminary activities and in support of plan submittal (i.e., Delineation, Testing, and/or Mining Plan) that occur in areas near a potential archaeological resource or occurring in areas that have not been sufficiently surveyed with high-resolution surveys to ensure avoidance of potential archaeological resources.

IV. The Basis for the Determination of No Historic Properties Affected

This Finding is based on a review of existing and available information conducted by BOEM, consultation with interested and affected parties, stipulations outlined in the required elements of a lease, and conclusions drawn from this information. The proposed undertaking includes the issuance of one or two commercial leases within the OCS offshore American Samoa and takes into account the execution of associated preliminary activities. The proposed bottom-disturbing activities located in the APE are in extremely deep water (>4,600 feet, 1,400 m water depth) in a remote location where BOEM has not found any information to suggest that historic properties exist. Additionally, the preliminary activities allowed with lease issuance (i.e., the collection of box core and free fall grab samples and the deployment of UTPs, moorings, landers, and scientific equipment) have minimal potential to adversely affect a historic property if present. To the extent historic properties exist but have not yet been identified or discovered, then the unanticipated discovery protocols will be followed. Therefore, no historic properties will be affected for the undertaking of issuing one or two commercial lease(s) within the OCS offshore American Samoa, consistent with 36 CFR 800.4(d)(1).

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Attachment A: Section 106 NHPA Consulting Parties List

Agency/Organization	**Consulting Party***
Federal Government	
***Bureau of Safety and Environmental Enforcement**	**Doug Jones** **Barry Bleichner**
***National Oceanic and Atmospheric Administration (NOAA)** **National Marine Sanctuary**	**Atuatasi Lelei Peau** **Valerie Brown** **Isabel Gaoteote Halatuituia**
***NOAA Maritime Heritage Program**	**William Hoffman**
Office of the Assistant Secretary Insular and International Affairs	Melissa Braybrooks
U.S. Coast Guard U.S. Coast Guard Oceania District	Sean P. Regan
U.S. Fish and Wildlife Service Acting Refuge Manager Rose Atoll	Laura Beauregard
U.S. National Park Service National Park of American Samoa	Pua Tuaua Jessica Epperson
***Underwater Archaeology Branch –** **Naval History and Heritage Command**	**Bradley Krueger** **Alexis Catsambis**
***U.S. Army Corps of Engineers** **Honolulu District**	**Vera Koskelo** **Jennifer Martin**
American Samoan Government Agencies	
Department of Local Government (coordination with American Samoan Villages)	
Secretary of Samoan Affairs Deputy Director	High Chief Faiivae Godinet
Deputy Director of Samoan Affairs	Mr. Sala Samuelu
***American Samoa Historic Preservation Office**	**Tumau Lokeni** **Letitia Peau-Folau**
Members of the American Samoa Legislature (FONO)	Senators and Representatives
Other Potentially Interested Parties	
American Samoa Community College	Dr. Rosevonne Makaiwi-Pato

* Accepting parties are indicated in bold with an asterisk

U.S. Department of the Interior (DOI)

DOI protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities.

Bureau of Ocean Energy Management (BOEM)

BOEM's mission is to manage development of U.S. Outer Continental Shelf energy, mineral, and geological resources in an environmentally and economically responsible way.