CONFIDENTIALITY NOTICE
American Deep Sea Minerals Inc. – Exploration License Application
Submitted Pursuant to 15 CFR Part 970

Pursuant to 15 CFR § 970.200(f), American Deep Sea Minerals Inc. respectfully requests confidential treatment for specific portions of this Exploration License Application, as clearly identified within the text.

Period of Confidentiality
Confidential treatment is requested permanently unless American Deep Sea Minerals Inc. provides written notice to NOAA withdrawing or modifying this designation.

Scope of Request
Confidential treatment applies to all passages, figures, tables, and appendices explicitly marked "[Confidential Treatment Requested – # : ...]" within the application. All other materials may be treated as non-confidential.

Basis for Confidential Treatment
This application includes proprietary commercial, financial, technical, and personal information, the disclosure of which would cause substantial competitive and privacy harm to American Deep Sea Minerals Inc. It contains detailed budgets, financing structures, investor commitments, and operational cost models not publicly available. Public release would disadvantage American Deep Sea Minerals in negotiations with investors, contractors, and potential partners, and expose sensitive internal strategies. Certain materials also include personal contact information of company officers, the disclosure of which would constitute an unwarranted invasion of privacy. All confidential information is securely maintained and shared only with authorized personnel and contractors under confidentiality agreements.

Request to NOAA
American Deep Sea Minerals Inc. requests that NOAA maintain all such information in strict confidence and promptly notify the company of any request for public disclosure under the Freedom of Information Act or other applicable statute.

Exploration License Application – 15 CFR Part 970

Submitted to: National Oceanic and Atmospheric Administration (NOAA)

Program: Deep Seabed Mining Program – Office of Ocean Minerals and Energy

Date: November 2, 2025

Applicant: American Deep Sea Minerals Inc.

Verification and Authorization

Pursuant to 15 CFR § 970.200(b), I hereby certify that I am an authorized officer of American Deep Sea Minerals Inc. and that the information contained in this application for an exploration license is true, correct, and complete to the best of my knowledge and belief. I further certify that I am authorized to execute and submit this application on behalf of American Deep Sea Minerals Inc.

Sincerely,

[redacted]

Graham Goulet
President & Chief Executive Officer
American Deep Sea Minerals Inc.
Date: November 2, 2025

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Acronyms

AABW	Antarctic Bottom Water
ADCP	Acoustic Doppler Current Profiler
ADSM	American Deep Sea Minerals Inc.
AIS	Automatic Identification System
ALB	Albacore (tuna species code)
APEI / APEIs	Areas of Particular Environmental Interest
ASV / ASVs	Autonomous Surface Vehicle(s)
AUV / AUVs	Autonomous Underwater Vehicle(s)
BET	Bigeye (tuna species code)
BOEM	Bureau of Ocean Energy Management (U.S.)
BPA / BPAs	Biodiversity Preservation Area(s)
CCZ	Clarion–Clipperton Zone
CFR	Code of Federal Regulations
CIC	CIC Limited / CIC Ocean Research (company)
CIIC	Cook Islands Investment Corporation
CIICSR	Cook Islands Investment Corporation – Seabed Resources
CMM	Conservation and Management Measure (WCPFC legal instrument)
CTD	Conductivity–Temperature–Depth
DEME	Dredging, Environmental and Marine Engineering (company)
DGPS	Differential Global Positioning System
DOMES	Deep Ocean Mining Environmental Study
DP	Dynamic Positioning
DP2	Dynamic Positioning, Class 2
DSHMRA	Deep Seabed Hard Mineral Resources Act
EEZ	Exclusive Economic Zone

E-HSP / EHSP	Eastern High Seas Pocket
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EL / EL2 / EL3	Exploration License (Cook Islands designations)
ERIAS	ERIAS Group (company)
ESA	Endangered Species Act (U.S.)
ESIA	Environmental and Social Impact Assessment
FFA	Pacific Islands Forum Fisheries Agency
FS	Feasibility Study
GIS	Geographic Information System(s)
GNS	GNS Science (New Zealand)
GO-SHIP	Global Ocean Ship-based Hydrographic Investigations Program
GSR	Global Sea Mineral Resources NV
GSJ	Geological Survey of Japan
IACS	International Association of Classification Societies
ICPC	International Cable Protection Committee
IEC	International Electrotechnical Commission
ISA	International Seabed Authority
ISO	International Organization for Standardization
ISO/IEC 17025	Testing and calibration laboratory competence standard
JICA	Japan International Cooperation Agency
JOGMEC	Japan Oil, Gas and Metals National Corporation
JORC (Code)	Joint Ore Reserves Committee Code (Australasian standard)
JX Metals	Company name (formerly JX Nippon Mining & Metals)
KIOST	Korea Institute of Ocean Science and Technology
LISST	Laser In-Situ Scattering and Transmissometry

LS-Nikko Copper	LS Group affiliate + Nikko Copper
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multibeam Echosounder
MMAJ	Metal Mining Agency of Japan
MOB	Man Overboard
NAVAREA XIV	Navigational Area XIV (WWNWS region, South Pacific)
NHM	Natural History Museum (London)
NI 43-101	Canadian mineral resource disclosure standard
NIOT	National Institute of Ocean Technology (India)
NIWA	National Institute of Water & Atmospheric Research (New Zealand)
NOAA	National Oceanic and Atmospheric Administration
NORI	Nauru Ocean Resources Inc.
OCS	Outer Continental Shelf
OTC	Offshore Technology Conference
PAMCO	Pacific Metals Co., Ltd.
PB	Penrhyn Basin
PEA	Preliminary Economic Assessment
PEIS	Programmatic Environmental Impact Statement
PFS	Pre-Feasibility Study
PITIA	Pacific Islands Tuna Industry Association
PMN	Polymetallic Nodules
PNA	Parties to the Nauru Agreement
POC	Particulate Organic Carbon
QA/QC	Quality Assurance / Quality Control
R/V or RV	Research Vessel
ROV	Remotely Operated Vehicle

SAR	Search and Rescue
SBMA	Seabed Minerals Authority (Cook Islands)
SBP	Sub-Bottom Profiler
SKJ	Skipjack (tuna species code)
SMA	Special Management Area
SOLAS	International Convention for the Safety of Life at Sea
SOPAC	South Pacific Applied Geoscience Commission
SPC	Pacific Community (formerly Secretariat of the Pacific Community)
SSS	Side-Scan Sonar
TMC	The Metals Company
TSS	Total Suspended Solids
TVM	Te Vaka Moana (Pacific fisheries cooperation)
USBL	Ultra-Short Baseline (acoustic positioning)
VDS	Vessel Day Scheme
VIV	Vortex-Induced Vibrations
VMS	Vessel Monitoring System
WCPFC	Western and Central Pacific Fisheries Commission
YFT	Yellowfin (tuna species code)

Executive Summary

1. American Deep Sea Minerals Inc. ("ADSM") is pleased to submit the present application for the exploration of polymetallic nodules. The application is for approval of a plan of work for exploration under 15 CFR Part 970, as authorized by the Deep Seabed Hard Mineral Resources Act (DSHMRA).

2. ADSM is a Delaware Corporation. In alignment with Executive Order 13953, which addresses the nation's reliance on critical minerals and securing domestic supply chains, and Executive Order 14285, which directs federal agencies to expedite offshore critical mineral exploration and development, ADSM is committed to maintaining U.S. ownership and control over exploration operations. This commitment underscores our alignment with national priorities for secure access to critical mineral resources and responsible stewardship of the deep seabed.

3. The United States has a long and pioneering history in deep-sea exploration and the study of polymetallic nodules. In the 1960s and 1970s, American oceanographic institutions and companies led some of the first modern scientific and commercial expeditions to investigate deep seabed minerals, including through the Deep Ocean Mining Environmental Study (DOMES), funded by NOAA. These efforts built upon the legacy of U.S. naval and scientific exploration and contributed significantly to early understanding of deep ocean mineral resources. The United States was also instrumental in establishing early international dialogue on seabed governance and remains a leader in marine science and technology today.

4. ADSM seeks an exploration license pursuant to 30 U.S.C. § 1412 and NOAA's implementing regulations (15 CFR part 970). ADSM believes it satisfies the statutory and regulatory criteria and has the technical and financial capacity to contribute positively to U.S.-regulated exploration on the deep seabed, defined as seabed and subsoil lying beyond any nation's continental shelf or other recognized areas of national resource jurisdiction (15 CFR § 970.101(h)). In pursuing this program, ADSM aligns with U.S. policy to strengthen critical-mineral supply chains, as set forth in Executive Order 13953 and Executive Order 14285.

5. ADSM, founded by Graham Goulet, is led by a seasoned in-house team with deep expertise in marine geology, offshore operations, and environmental science. Our team has direct experience managing deep-sea exploration campaigns and overseeing complex offshore logistics. To complement these capabilities, ADSM has established working relationships with specialized partners in geophysical surveying, environmental studies, and subsea

operations. This combined expertise positions ADSM to deliver a technically robust and environmentally responsible exploration program.

6. ADSM will design and conduct exploration so that it cannot reasonably be expected to result in a significant adverse effect on the quality of the environment, consistent with § 970.506 and the considerations in § 970.701. Under NOAA's 1981 Programmatic Environmental Impact Statement and § 970.701(a), the listed exploration activities (e.g., mapping, coring, limited sampling) are identified as having no potential for significant environmental impact when carried out using established best practices. ADSM will therefore implement a rigorous environmental baseline, monitoring and mitigation program to keep all activities within this framework.

7. ADSM will adopt a precautionary, science-based approach that embeds mitigation measures throughout its exploration program to ensure protection of the marine environment. NOAA's Environmental Impact Statement process will proceed in two stages: (i) an EIS prior to the issuance of the initial exploration license; and (ii) a supplemental EIS in Year 4 if a collector trial is undertaken. Pursuant to 15 CFR § 970.204(a), ADSM will submit updated baseline data and trial information not less than one year before initiating the collector trial, enabling NOAA to prepare the required supplemental EIS.

8. ADSM recognizes the broader global value of deep-sea knowledge and is committed to advancing research, education, and transparent data sharing. Building on NOAA's Deep Ocean Mining Environmental Study (DOMES, 1975 to 1980), a program that established baseline and impact-assessment methods, ADSM will pursue collaborative scientific initiatives and will provide open access to environmental data where appropriate, subject to legal and confidentiality constraints.

9. ADSM will actively engage Pacific Island governments, regional bodies, and scientific institutions to ensure operations align with regional priorities, respect cultural values, and support equitable benefit-sharing. Activities will be planned to avoid interference with navigation, fisheries, and marine mammal migration, using seasonal timing, vessel tracking, and operational adjustments as needed. This approach integrates stakeholder input from the outset while safeguarding other legitimate ocean uses.

10. The proposed license area covers 101,064 km^2 in the South Penrhyn Basin of the South Pacific Ocean, also known as the Eastern High Seas Pocket 3 (E-HSP). Situated in international waters beyond national jurisdiction, it is bounded by the Exclusive Economic Zones (EEZs) of the Cook Islands, Kiribati, and French Polynesia.

11. The South Penrhyn Basin is recognized as one of the world's most prospective polymetallic nodule fields, distinguished by exceptionally high cobalt concentrations, elevated nodule abundances exceeding 30 kg/m^2 in adjacent areas, and a stable abyssal environment conducive to long-term nodule preservation. While the proposed license block itself has seen minimal direct modern exploration, its proximity to extensively studied zones within the Cook Islands EEZ provides a robust geological and environmental analogue. Decades of regional bathymetric mapping, geochemical sampling, and biological baseline work in these neighboring areas significantly de-risk ADSM's program by informing target selection, survey design, and environmental safeguards from the outset.

12. ADSM has developed a focused, four-year technical work program designed to progress systematically from early-stage resource and environmental characterization to full-scale technology validation and permit readiness. The plan builds logically from high-resolution seabed mapping and biological baseline studies, to detailed resource delineation, bulk sampling for metallurgical testwork, and ongoing environmental monitoring. It then advances to selection and testing of proven third-party mining systems, culminating in a collector trial in Year 4, and by Year 5, ADSM will have generated the complete set of technical, economic, and environmental inputs required to support a commercial recovery application.

13. ADSM's projected expenditures for its exploration program total approximately [**Confidential Treatment Requested – #1**: [redacted]].

14. ADSM plans to fund its four-year exploration program through [**Confidential Treatment Requested – #2:** [redacted]]. The company's financial position is supported by founder equity, early-stage investor commitments, and contingent funding documented in an enclosed comfort letter. Each successive raise is designed to increase in size as exploration results, resource modeling, and environmental assessments progressively de-risk the project and improve resource confidence.

1. Statement of Financial Resources (15 CFR § 970.201)

1.1. Current Financial Position

American Deep Sea Minerals Inc. ("ADSM") is a privately held Delaware corporation with no public credit or bond rating. The company does not currently have recent audited financial statements, as it is an early-stage venture formed in 2025 and has not yet completed a full fiscal year of operations. As of August 15, 2025, the Company holds $150,000 in cash, of which $100,000 is allocated for payment of the NOAA exploration license fee. The remaining $50,000 will be applied toward pre-mobilization, compliance, and administrative expenses.

ADSM does not consider a public credit or bond rating relevant to its financing capability for this program, as the Company does not intend to rely on a credit facility or bond issuance to generate revenue or fund exploration activities. Instead, all program financing will be sourced through founder equity and equity capital raises as outlined in Section 1.3.

The Company's financial position is supported by:

- **Founder equity:** Committed to support the exploration program and administrative expenses.
- **Early-stage investor commitment:** [**Confidential Treatment Requested – #3:** [redacted] (comfort letter enclosed in Appendix #1)].

ADSM plans to obtain audited financial statements upon completion of its first full fiscal year, which ends on December 31. ADSM affirms that it will provide NOAA with a copy of its audited financial statements as soon as they become available. In the meantime, and to demonstrate the Company's current financial health and capacity to fund the exploration program, ADSM provides the following in lieu of audited financials:

- **Summary of current financial position:** Includes cash on hand, equity commitments, and obligations (Figure 1 below).
- **Documentation of committed funding:** [**Confidential Treatment Requested – #4:** [redacted] (comfort letter, Appendix #1)].
- **Bank statements:** To be provided when available.

[**Confidential Treatment Requested – #5: Entire Figure 1**]

Category	Amount (USD)	Notes
Cash on Hand	$150,000	$100,000 allocated for NOAA exploration license fee; $50,000 for pre-mobilization, compliance, and administrative expenses
Committed Equity from Founder	[redacted]	[redacted]
Committed Funding	[redacted]	[redacted]
Obligations	[redacted]	[redacted]

Figure 1. ADSM Summary of Financial Position

1.2. ADSM Four-Year Exploration Cost Forecast and Financing Plan

Figure 2 outlines ADSM's projected exploration costs and corresponding financing plan for Years 1 to 4. Total program costs are estimated at [**Confidential Treatment Requested – #6:** [redacted]], with offshore exploration activities—including four sequential cruises—representing the majority of expenditures. Onshore work and general and administrative expenses are budgeted each year to support legal, insurance, staffing, and consulting requirements. The financing plan anticipates raising [**Confidential Treatment Requested – #7:** [redacted]].

[**Confidential Treatment Requested – #8: Entire Figure 2**]

[redacted]

Figure 2. ADSM Cost Forecast and Financing Plan

1.3. ADSM Funding Strategy and Strategic Investor Targets

ADSM's [**Confidential Treatment Requested – #9:** [redacted]]

[**Confidential Treatment Requested – #10: Entire Figure 3]**

[redacted]

Figure 3. ADSM Funding Strategy

1.3.1. Prospective Investor Groups and Financing Options

- **Offshore and Marine Strategic Partner Co-Investment:** Potential minority equity investments from offshore oil and gas companies such as Transocean, Valaris, and Saipem, and offshore engineering and marine infrastructure firms such as Allseas, DEME, Boskalis, and Royal IHC. These potential partners can offer both capital and proven offshore operating capabilities.
- **Mining and Metals Industry Strategic Co-Investment:** Potential minority equity investments from global mining companies with significant copper, cobalt, and nickel operations, such as Glencore, BHP, and Vale. These partners can provide capital, secure long-term offtake agreements, and contribute technical expertise in resource development, processing, and global commodity marketing to support the transition from exploration to commercial production.
- **Strategic Offtake Partnerships:** Engagement with global smelters and refiners, including Korea Zinc, PAMCO (Pacific Metals Co., Ltd.), Sumitomo Metal Mining Co., Ltd., and other leading Japanese and Korean industrial groups that have invested in deep-sea mineral ventures.
- **U.S. Military and Industrial Partnerships:** Engagement with U.S. defense, aerospace, and manufacturing companies such as Lockheed Martin, Anduril Industries, and Tesla to secure domestic critical mineral supplies. These partners can provide capital, offtake commitments, and political support aligned with national security objectives.
- **Convertible Debt and Bridge Financing:** Short-term capital to bridge between equity rounds, convertible to equity once milestones are met.

- **Government and Development Bank Support:** Potential access to U.S. Export-Import Bank facilities and critical minerals funding programs.
- **Joint Ventures:** Shared capital and operational costs on engineering test phases or environmental campaigns while retaining operational control.
- **Royalty Stream and Asset-Level Financing:** Monetizing a portion of future production revenue for upfront, non-dilutive capital, as seen in The Metals Company's 2023 royalty agreement with Low Carbon Royalties. This approach provides early funding, preserves equity, and aligns investor returns with project performance.

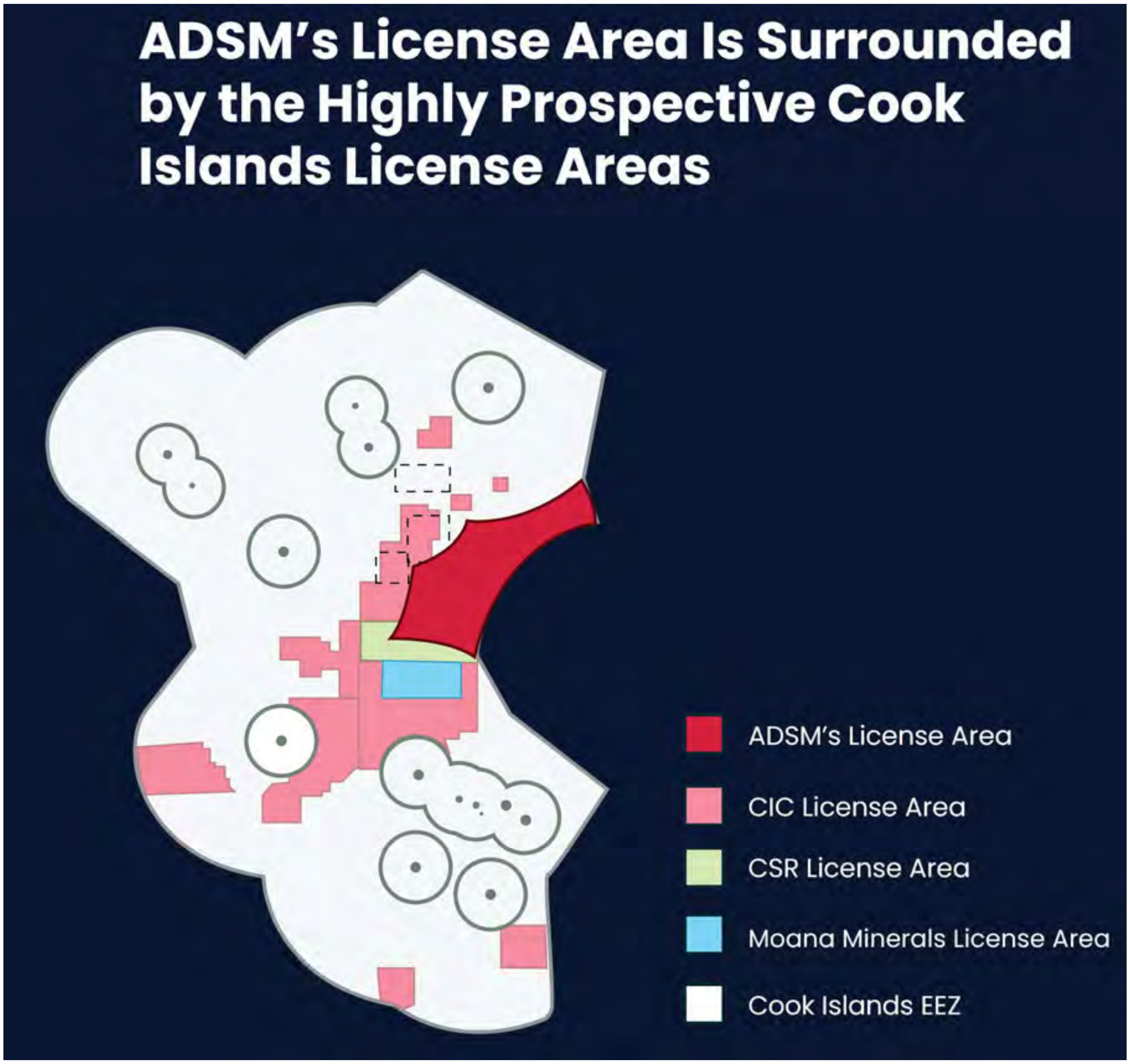
1.4. Resource Definition and Economic Value

According to the U.S. Geological Survey (USGS), J.R. Hein and K. Mizell, in their study "Penrhyn manganese nodules: A potential resource for rare earth element, titanium and cobalt", the Penrhyn Basin nodules contain "the highest mean Ti, Co and REY concentrations compared to nodules from all other nodule fields. When compared with the Clarion-Clipperton Zone (CCZ) manganese nodules, currently the area of greatest economic interest, the PB nodules show higher nodule abundances, and are more enriched in the green-technology, high-technology, and energy applications metals, Co, Ti, Te, Nb, REY, Pt and Zr, but have lower concentrations of Ni, Cu, and Li, with subequal amounts of Mo. The PB nodules show a significant resource potential for these critical metals because of their high prices and high demand in the global market, and also because of the high nodule abundance, which is important as it allows for a smaller mine-site footprint and therefore a smaller environmental impact".[1]

Exploration programs by neighboring license holders—including CSR, Moana Minerals, and CIC—have confirmed that adjacent nodule fields within the Cook Islands EEZ host significant polymetallic resources, providing a credible basis for comparative benchmarking and demonstrating strong economic potential. This track record has already attracted multi-million-dollar investments from strategic and institutional sources at early exploration stages, reinforcing the investment case for ADSM's program. If our forthcoming survey work identifies a viable resource area, these precedents will further support our ability to secure financing by referencing established metal content and recovery potential in nearby deposits.

[1] https://goldschmidtabstracts.info/2015/1221.pdf

In August 2025, the U.S. and the Cook Islands issued a joint statement to collaborate on seabed mineral resources. This underscores that Washington views the Penrhyn Basin nodule field as strategically vital.[2]



[3]

Figure 4. Cook Islands EEZ Nodule Resource Target Areas

1.4.1. CSR (CIISR) Resource Definition

CSR, which shares a border with ADSM's target area, has an inferred resource estimate for its 19,170 km^2 license block. Historical survey data indicates a mineable area of 50% with an average nodule abundance of 27 kg/m^2, translating into an estimated 147 million dry

[2] https://www.state.gov/releases/office-of-the-spokesperson/2025/08/joint-statement-on-u-s-cook-islands-cooperation-on-seabed-mineral-resources
[3] 2023 SEA MSA Report (https://www.sbma.gov.ck/technical-reports)

tonnes of polymetallic nodules containing high-value metals such as manganese, nickel, copper, cobalt, and rare earth elements.

Figure 5 summarizes historical resource estimates and metal content for an exploration area of 19,170 km^2, half of which (9,585 km^2) is considered mineable. Nodule abundance averages 27 kg/m^2, yielding an estimated 147 million dry tonnes of nodules.

- Manganese: 15.00% (22.05 Mt)
- Nickel: 0.30% (0.44 Mt)
- Copper: 0.10% (0.15 Mt)
- Cobalt: 0.50% (0.74 Mt)
- Rare Earth Elements: 0.19% (0.28 Mt)

These figures provide a preliminary indication of the potential recoverable metals in the area based on historical data, supporting comparative resource benchmarking against adjacent license areas.

General specifications of the area under application (based on historical data)		Unit
Area	19,170	Km²
% Mineable	50%	
Mineable area	9,585	Km²
Abundance	27	kg/m²
Estimated quantity of PMN (wet)	204,000,000	Tonne (wet)
Water content	30%	
Estimated quantity of PMN (dry)	147,000,000	Tonne (dry)

Table II- 11: Quantity estimates of the minerals who could pretend to be extracted from the polymetallic nodules (in dry tons)

	%	Unit (Tonne - dry)
Manganese	15.00%	22,050,000
Nickel	0.30%	441,000
Copper	0.10%	147,000
Cobalt	0.50%	735,000
Rare Earth Elements	0.19%	279,300

[4]

Figure 5. CSR Estimated Resource Potential

1.4.2. Moana Minerals Resource Definition

The Moana Minerals EL3 license area, located within the Cook Islands' EEZ in the South Pacific Ocean, covers 23,615 km^2. It forms part of a broader polymetallic nodule province within the EEZ, with mineralization consistent across the project area and aligned with the wider geological framework. Resource estimates, reported under S-K 1300 definitions at a

[4] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/6317a3deba3fbb22dda22643/1662493819554/EL2_CIICSR.pdf

nodule abundance cut-off of 12.5 kg/m^2, are based on de-clustered samples collected by JICA and during multiple research cruises. The indicated resource averages 26.7 kg/m^2 (417 Mt wet nodules) with metal grades of 0.49% Co, 0.15% Cu, 18.9% Fe, 15.6% Mn, and 0.27% Ni, while the inferred resource averages 26 kg/m^2 (102 Mt wet nodules) with similar grades. The deposit is laterally extensive and well-defined, representing a significant source of critical minerals within the Cook Islands' EEZ.

Table 1-1: Mineral Resource statement at a nodule abundance cut-off of 12.5 kg/m^2.

Classification	Abundance (wet) kg/m^2	Nodules (wet) Mt	Metal Grade				
			Co (%)	Cu (%	Fe (%)	Mn (%)	Ni (%)
Indicated	26.7	417	0.49	0.15	18.9	15.6	0.27
Inferred	26	102	0.5	0.1	19	16	0.2

[5]

Figure 6. Moana Minerals Mineral Resource Statement

Benchmarking data from nearby Cook Islands license areas highlight the exceptional metal endowment of the region. CSR's 19,000 km^2 license area is estimated to contain roughly $53 billion in gross metal value, while Moana Minerals' 23,600 km^2 area indicates an estimated $98 billion in contained value. These estimates underscore the high cobalt and REE grades found throughout the basin and reinforce the comparative economic significance of ADSM's adjacent license area.

CSR License Area (Cook Islands)	
Area (km^2)	19,170
Abundance (kg/m^2)	27
Cobalt Grade %	0.50%
REE Grade %	0.19%
Gross Metal Value $	$53b

Moana Minerals (Cook Islands)	
Area (km^2)	23,615
Abundance (kg/m^2)	27
Cobalt Grade %	0.49%
Gross Metal Value $	$98b

**estimated gross metal value*

Figure 7. Cook Islands Licensees' Resource Summaries

[5] https://www.omlus.com/ocean-minerals-llc-news/

1.5. Fundraising History and Track Record

As noted in Section 1.1, ADSM [**Confidential Treatment Requested – #11:** [redacted]]

The Company's founder brings over a decade of experience in global capital markets, with a deep understanding of how to structure, position, and execute complex financing strategies across varied economic cycles. This background includes extensive engagement with institutional investors, strategic partners, and alternative capital providers, fostering a network and skill set directly applicable to securing the equity capital required for ADSM's multi-year exploration plan.

This combination of early committed capital, proven capital markets expertise, and a structured, milestone-aligned financing strategy ensures ADSM is well-positioned to raise the funds necessary to complete its exploration program on schedule.

2. Statement of Technological Experience and Capabilities (15 CFR § 970.202)

2.1. Overview

ADSM demonstrates full technological capability to implement the four-year exploration program outlined in its Plan. This includes access to a comprehensive suite of advanced deep-sea exploration and environmental monitoring equipment, a proven contractor network, and an experienced technical team. These resources—whether possessed directly or secured through binding agreements—satisfy the requirements of 15 CFR § 970.202 and provide information sufficient for the Administrator to determine, pursuant to § 970.402, that the applicant will possess, or have access to or a reasonable expectation of obtaining, the technological capability to conduct the proposed exploration.

2.2. Organizational and Technological Leadership

Graham Goulet – President

Graham Goulet serves as President and CEO of ADSM, where he leads overall strategy and manages relationships with technical partners, regulators, and stakeholders. He is also a partner at Valiant Capital, a global long short equities hedge fund. Graham has several years of direct experience in deep-sea mineral exploration, working closely with scientific and legal advisors.

Notably, he was previously involved in preparing an exploration application for submission through the International Seabed Authority (ISA), providing him with firsthand understanding of the regulatory, environmental, and operational frameworks governing international seabed exploration.

Dan McConnell – Principal Marine Geologist

Dan leads all geological work for ADSM's Pacific-focused exploration program. With 27 years of experience in marine site characterization, he combines technical depth with commercial insight. He specializes in deepwater seafloor mapping using multibeam echosounder and AUV data and has had key roles in various resource campaigns globally, in the Gulf of America, and in the Clarion-Clipperton Zone.

Over the past decade, he has focused on deep-sea mineral resources, survey support, and tendering for seafloor minerals programs as Global Product Manager for Marine Minerals for Fugro, the global survey and geotechnical data services provider. While at Fugro, he developed and was the lead geologist for the critical 2018 NORI D Campaign 3- AUV and resource survey for The Metals Company. Since then, he has served as a Qualified Person and lead geologist on multiple polymetallic nodule campaigns in the Clarion-Clipperton Zone.

He was the principal author subcontracted by Aptim Federal Services to write 'Resource Evaluation of Critical and Hard Offshore Mineral Programmatic Reference' – a reference for known and prospective marine minerals in the U.S. and Territorial OCS published by BOEM in 2023. This report and his 2024 Offshore Technology Conference paper, Prospects for Marine Minerals in the U.S. Pacific OCS and EEZ, highlight his expertise in Pacific marine mineral systems—directly relevant to ADSM's target area.

2.3. Technological Capability Statement

2.3.1. Exploration Phase

ADSM's technical team brings extensive, hands-on experience in deepwater survey operations, working with leading vessel owners and specialist equipment providers worldwide. We have identified and are in preliminary discussions with select owners and suppliers to align capabilities with upcoming exploration workstreams. While there are no agreements in place at this time, ADSM plans to formalize these partnerships prior to commencing exploration activities and will provide NOAA with copies of all executed agreements once available. Potential partners include:

- **Fugro:** Comprehensive global provider of geophysical vessels, AUVs, ASVs, ROVs, geotechnical data acquisition, metocean services, and geotechnical laboratory services.
- **Kiva Marine:** Offers the Anuanua Moana research vessel, with home port in Rarotonga, Cook Islands, for charter. The vessel is equipped specifically for seafloor mapping and polymetallic nodule resource surveys.
- **GNS-NIWA:** Offers the R/V Tangaroa, a New Zealand government research and geophysical vessel, with home port in Wellington, NZ, available for charter. Suitable for polymetallic nodule exploration, resource campaigns, and environmental campaigns.
- **Gravity Marine:** Designer and manufacturer of proven large box corers ideal for polymetallic nodule resource surveys. Provider of ancillary equipment, lighting, batteries, and subsea positioning equipment.
- **Ocean Floor Geophysics:** Specialist in high-resolution marine geophysics and seafloor mapping, offering AUV-mounted and towed sensor packages for MBES bathymetry, side-scan sonar, sub-bottom profiling, and magnetometer surveys.

Experienced in integrating geophysical, geological, and environmental datasets for polymetallic nodule exploration.

2.3.2. Vessels

ADSM has identified several capable research and survey vessels suitable for supporting the proposed exploration program. Each offers distinct technical capabilities, mobilization options, and operational histories relevant to deep-sea polymetallic nodule work in the South Pacific.

- **R/V Anuanua Moana:** ADSM believes that *Anuanua Moana* will be available for charter. The vessel has been specifically outfitted for polymetallic nodule exploration in the South Pacific in recent years and allows for mobilization from Rarotonga, Cook Islands — the closest port to the work area. ADSM's technical team visited Anuanua Moana in 2024. It is equipped with a 30 kHz multibeam system, as well as dedicated wet, clean, and geology laboratories. The vessel supports box coring, free-fall grab, and multicoring operations. Details on its design for PMN exploration are presented in Smit (2024).
- **R/V Tangaroa:** *R/V Tangaroa* is an excellent research vessel, also equipped with a 30 kHz MBES system. It is maintained by the New Zealand Crown company GNS–NIWA. The vessel's home port is Wellington, New Zealand. Although government-maintained, it is available for charter between scheduled scientific cruises. ADSM's technical team has used *Tangaroa* several times for commercial deepwater geochemical surveys and was consistently impressed by the safety standards, professionalism of the crew, and quality of results.
- **Fugro Supporter:** *Fugro Supporter* is primarily used as a cable-route survey vessel and is homeported in Perth, Australia. It is equipped with a 12 kHz MBES system and is well known to ADSM's technical team. The vessel can be configured for AUV and resource campaigns, and with possible winch upgrades, it can be equipped for deepwater box coring and environmental work. It features advanced DGPS positioning through Fugro StarFix, has some existing laboratory space, and can be fitted with additional laboratory facilities on the back deck.
- **Fugro Equator:** *Fugro Equator* is a multipurpose geophysical and light geotechnical vessel based in Singapore. It can be equipped for deepwater box coring and environmental work with possible winch upgrades for mobilization. The vessel is well known to ADSM's technical team. Equipped with a 30 kHz MBES, *Equator* can also deploy AUVs and features advanced DGPS positioning through Fugro StarFix. Additional laboratory facilities can be installed on the back deck.

Owner	Boat Name	Photo	Relevant Equipment	Location Based
Kiva Marine	RV Anuanua Moana		•DGPS Positioning •Acoustic Positioning •MBES EM 304 (30 kHz) •Subbottom profiler •6000m ROV •Box coring BX750 •MultiCorer •Freefall grab •AUV configuration option •Dedicated lab for environmental work	•Raratonga Cook Islands
GNA NIWA	RV Tangaroa		•DGPS Positioning •Acoustic Positioning •MBES EM 304 (30 kHz) •Subbottom profiler •box coring config option •Freefall grab config option •AUV configuration option •Dedicated lab for environmental work	•New Zealand
Fugro	M.V. Fugro Supporter		•DGPS Positioning •Acoustic Positioning •MBES EM 122 (12kHz) •Subbottom profiler •box coring config option •Freefall grab config option •AUV configuration option •Laboratories option	•Perth Australia
Fugro	M.V. Fugro Equator		•DGPS Positioning •Acoustic Positioning •MBES EM 302 (30 kHz) •Subbottom profiler •box coring config option •Freefall grab config option •AUV configuration option •Laboratories option	•Singapore

Figure 8. Evaluation of Vessels for E-HSP (Target Exploration Area)

2.3.3. Description of Exploration Equipment (§ 970.202(b)(1))

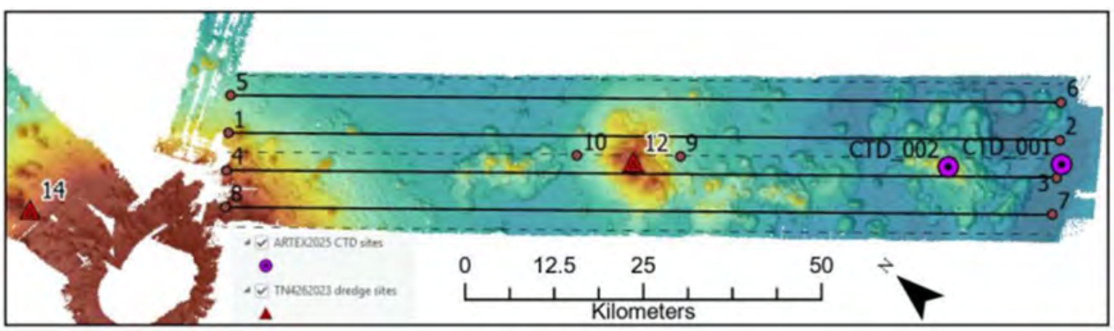
Effective deep-sea resource exploration demands a coordinated suite of geophysical, geological, environmental, and geotechnical systems capable of sustained operation in abyssal environments at depths of 4,000 to 6,000 m. ADSM's survey strategy combines wide-area seafloor mapping, high-resolution subseafloor imaging, precision sampling, and rigorous handling protocols to generate datasets suitable for both resource estimation and environmental baseline assessment. This section details the core systems, including a hull-mounted 30 kHz multibeam echosounder (MBES), autonomous underwater vehicles (AUVs), specialized coring and dredging equipment, positioning and imaging systems, and geotechnical tools. Together, these capabilities provide the resolution, accuracy, and data integrity required to meet NOAA's technical and environmental requirements for exploration license holders.

2.3.3.1. Multibeam Echosounder (MBES)

Resource exploration campaigns typically employ bathymetric and backscatter mapping using a hull-mounted multibeam echosounder (MBES). Polymetallic nodules sit exposed (“proud”) on old abyssal plains at depths of ~4,000–6,000 m. MBES systems emit sound pulses (“pings”) and measure both depth and seabed hardness/roughness through the pattern of specular and angled reflections. In deep water, hull-mounted MBES mapping achieves vertical uncertainty typically ≤0.2% of water depth (about 5 to 10 m at 5,000 m), a level of precision that is critical for efficient sampling because it enables accurate deployment, positioning over target, and controlled descent of coring systems.

For ADSM’s program, the primary system will be a 30 kHz MBES, considered optimal for polymetallic nodule exploration in deep water. At this frequency, the MBES provides a wide swath—typically 10–15 km at 5,000 m depth—while retaining resolution sufficient to resolve subtle seafloor features and variations in substrate. This balance of range and detail enables efficient coverage of ~1,500–2,500 km^2 per day at survey speeds of 8–10 knots. Calibrated backscatter returns are particularly valuable for identifying nodules on the sediment surface and for classifying substrate types to guide targeted sampling.

Hull-mounted MBES data will be integrated in near real time with positioning and navigation systems to support adaptive survey planning, optimize coring operations, and ensure accurate georeferencing of environmental and resource datasets.



[6]

Figure 9. RV Anuanua Moana Bathymetry (EM304 MK II)(ARTEX 2025)

2.3.3.2. Autonomous Underwater Vehicles (AUVs)

Autonomous Underwater Vehicles (AUVs) will be deployed from the vessel to conduct high-resolution, close-range mapping and sampling support. Each AUV will carry a geophysical payload that may include a high-frequency MBES (typically 200 kHz) for fine-scale bathymetry, side-scan sonar for seabed texture mapping, and sub-bottom profilers for

[6] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/688ab795e33a8610830c5c34/1753921429238/2503_PER_ARTEX2025_rev0.pdf

shallow sediment structure characterization. AUVs are also equipped with high-definition cameras and can be fitted with additional optical and chemical sensors to collect environmental data.

AUVs typically operate in 24-hour missions before returning to the vessel for data download and battery replacement. Operating at a low altitude above the seafloor, they acquire datasets that complement hull-mounted MBES surveys by providing microbathymetric detail, high-resolution imagery of nodule fields, and localized environmental measurements. These capabilities support precise target verification, aid in corer deployment planning, and contribute to both resource and environmental baseline datasets.

2.3.3.3. Coring and Dredging Systems

ADSM's primary method for resource and environmental bottom sampling will be a large box corer, with two units maintained for redundancy to ensure operational continuity. Each box corer will be equipped with ultra-short baseline (USBL) acoustic positioning for precise placement, along with integrated lighting and high-definition cameras to verify target location and document seafloor conditions prior to and during sampling. A high-capacity, fast-response winch system will be used to deploy and recover corers efficiently from abyssal depths.

For undisturbed sediment sampling, multicorers fitted with imaging systems will be utilized, enabling intact recovery of the sediment–water interface for geochemical and biological analyses. Additional sampling tools will include grab samplers with integrated cameras for rapid reconnaissance collections, and dredges for bulk recovery of nodules intended for bench-scale metallurgical testing and processing trials.

This combined coring and dredging capability provides the flexibility to collect representative samples across varying substrate conditions, supporting both quantitative resource assessment and environmental baseline characterization in compliance with NOAA exploration requirements.

2.3.3.4. Sampling and Environmental Handling Protocols

A critical component of successful deep-sea exploration is the establishment of robust sample handling protocols for both resource and environmental materials. Proper handling ensures the integrity, traceability, and scientific value of recovered nodules, sediments, and biological specimens, and is essential for producing datasets suitable for resource estimation and environmental baseline assessments.

ADSM's approach builds on the sampling protocol developed by current ADSM technical personnel during the 2018 polymetallic nodule survey conducted for The Metals Company. This protocol, described in detail in the company's NI 43-101 mineral resource disclosures prepared by AMC Consultants (2019), covers procedures for sample recovery, on-deck processing, preservation, labeling, and chain-of-custody documentation. Environmental handling procedures follow the same rigorous standards, ensuring that physical, chemical, and biological samples are collected and preserved in a manner that maintains their representativeness for later laboratory analysis.

These established protocols will be adapted as needed to reflect the operational conditions, equipment configurations, and environmental objectives of ADSM's planned survey campaigns, ensuring compliance with NOAA's technical and environmental requirements for exploration license holders.

2.3.3.5. Positioning, Imaging and Geotechnical Tools

Accurate subsurface positioning is essential for efficient and repeatable deepwater sampling. Resource surveys will employ ultra-short baseline (USBL) acoustic transponder systems, with transceivers installed on both the vessel and the coring equipment, to achieve precise location control during deployment and recovery.

Coring systems will be equipped with integrated lighting and high-definition cameras to provide visual confirmation of nodule distribution and surrounding seabed conditions at each sampling site. Adjustable-depth lighting controls will be used to illuminate only when required during the descent, optimizing battery life and reducing unnecessary power consumption.

In addition to resource and environmental sampling tools, geotechnical instruments will be deployed to characterize sediment properties. These will include in-core vane shear devices for measuring sediment strength and down-core density probes for bulk density profiling. Such measurements provide essential data for geotechnical de-risking, engineering design, and interpretation of coring results.

2.3.4. Description of Environmental Monitoring Equipment (§ 970.202(b)(1))

The purpose of environmental data collection and monitoring equipment is to establish a robust environmental baseline for the license area. Historically, knowledge of deep-sea ecology has been limited due to the logistical challenges and high cost of deepwater research. Over the past two decades, however, substantial advances in sampling technology and analytical methods have expanded this knowledge base, providing post-disturbance and resiliency data that inform modern baseline studies.

While some environmental data will be collected opportunistically during resource surveys, the scope and laboratory requirements for comprehensive sampling necessitate a dedicated cruise focused solely on environmental work. ADSM has scheduled such a campaign for Cruise 3, with the primary objective of documenting bacterial communities, meiofauna, and megafauna and their spatial distribution across the license area. Additional goals include sediment chemical analyses, taxonomic classification, and the preservation of meiofaunal and macrofaunal specimens, supported by photo documentation, microscopy, and sieving.

2.3.4.1. Water Column Monitoring Systems

Water column measurements are essential for establishing baseline oceanographic conditions and for detecting any changes associated with exploration or collector trials. These data provide critical context for interpreting benthic and faunal observations, as well as for modeling sediment plume dispersion and potential ecological effects.

ADSM will deploy a conductivity–temperature–depth (CTD) rosette on each environmental and resource cruise to obtain high-resolution vertical profiles of physical and chemical parameters, including dissolved oxygen (O_2), pH, turbidity, and redox potential. Auxiliary sensors integrated with the CTD will provide real-time data acquisition and logging, supporting both baseline characterization and plume modeling.

A full complement of Niskin bottles mounted on the CTD rosette will collect discrete water samples at targeted depths for laboratory analysis. These samples will be used for a range of environmental and oceanographic measurements, including nutrient concentrations, particulate matter, and chemical tracers. Together, the CTD profiles and Niskin samples will provide a comprehensive dataset on water column structure and chemistry across the license area.

2.3.4.2. Benthic and Biodiversity Survey Systems

Benthic and biodiversity surveys will combine visual observations, targeted specimen collection, and genetic sampling to document the composition, abundance, and distribution of marine life within the license area. These activities will support both baseline biodiversity assessments and the evaluation of potential impacts from exploration and collector trials.

A remotely operated vehicle (ROV) will be used for interactive sampling of macrofauna and benthic communities. The ROV will conduct photographic and video transects, collect targeted specimens, and capture high-resolution imagery for habitat mapping and taxonomic verification. For broader-scale faunal collections, an epibenthic sled rated to 6,000 m will be deployed to sample megafauna and macrofauna across varied substrates, complementing ROV observations with physical specimens.

To capture biodiversity information beyond what is visible or easily collected, DNA and environmental DNA (eDNA) sampling kits will be employed. These kits will allow shipboard processing of sediment and water samples, which will then be sent to ISO-accredited genomic laboratories for taxonomic identification and biodiversity analysis. Samples will be preserved in large cold saltwater tanks and stored in freezers or ultra-low temperature freezers to maintain integrity until onshore analysis. Power conditioning equipment, including battery backups and surge protection, will be used to ensure stable operation of laboratory systems in the variable offshore power environment. Integrating genetic data with visual and specimen-based surveys will provide a comprehensive view of benthic community composition and spatial variability across the license area.

2.3.4.3. Plume and Disturbance Monitoring Systems

Plume disturbance studies will not be authorized under the current exploration-phase EIS. NOAA will require a supplemental EIS before approving and overseeing such testing. Once approved, the focus will be on confirmation studies to verify plume behavior and benthic disturbance within the license area. These studies are critical for validating model predictions and providing the environmental data needed before applying for a commercial license. Planned monitoring systems include:

- **Seafloor Landers and ADCP Arrays (bottom mounted moorings):** Long-term deployments to measure bottom currents, suspended sediment load, and acoustic backscatter for plume dispersion analysis.
- **Collector-Mounted Sensors:** During Year 4 trials, LISST units, optical backscatter sensors, and ADCPs will monitor near-field plume dispersion, sediment resuspension rates, and particle size distribution.
- **Sediment Traps (long moorings):** Deployed at varying distances and heights to quantify particulate deposition from the plume.
- **AUV-Based Monitoring:** AUVs equipped with high-resolution navigation will map plume extents, heights, and post-collector seafloor disturbance.
- **AUV Environmental Sensor Suite:** Turbidity and chemical sensors integrated into a 6,000 m-rated AUV to collect co-registered habitat, geology, and plume impact data.

These systems will be deployed in coordination to provide both spatial and temporal resolution of plume dynamics, enabling robust comparison with pre-disturbance baseline conditions and ensuring compliance with NOAA environmental assessment requirements.

2.3.5. Relevant Experience and Access to Expertise (§ 970.202(b)(3))

ADSM's technical team includes personnel with extensive direct experience in deep-sea mineral exploration. Team members have led field programs in the Clarion–Clipperton Zone (CCZ) since 2016, generating datasets cited in the International Seabed Authority's DeepData repository and developing operational procedures documented in NI 43-101-compliant mineral resource disclosures. This experience spans geophysical survey design, deepwater sampling, environmental monitoring, and data integration for both resource estimation and baseline studies.

ADSM has access to a network of qualified consultants specializing in environmental science, sediment transport, and metocean conditions, many of whom have contributed to advancing global understanding of deep-sea ecosystems. These experts bring direct experience from prior deep-sea programs and are well-positioned to support ADSM's environmental and operational objectives.

Interest in collaboration is strong among recognized research institutions, including the Natural History Museum (UK), the University of Southampton, and the UK's National Oceanography Centre, which co-manages the NHM DeepSea Lab DNA catalogue. Similar interest is growing within leading U.S. research organizations such as Woods Hole Oceanographic Institution and Scripps Institution of Oceanography, reflecting the scientific value of data to be generated during ADSM's exploration program.

Specialized assay laboratories in North America with proven capability in polymetallic nodule sample analysis are available to ADSM. In addition, mineral consultants with experience in preparing resource estimates and disclosures that meet the standards of the JORC Code, NI 43-101, and SEC Regulation S-K 1300 will be engaged to ensure all technical reporting meets both regulatory requirements and the expectations of the investment community.

2.3.6. Commercial Recovery Phase

Several capable contractors and national programs are advancing deep-sea nodule collection and transport systems. Allseas, working with The Metals Company, has already completed the first integrated collector trial in the Clarion-Clipperton Zone since the

1970s, successfully lifting over 3,000 tonnes of nodules through a 4.3 km riser system built by Oil States. DEME's Global Sea Mineral Resources has tested its Patania II tracked collector, while Allseas developed and deployed a tracked, pressure-head collector for its integrated collector trial. Royal IHC has developed the Apollo II system through EU-funded programs. National initiatives are also progressing: China Minmetals plans to test a full prototype collector at 5,000–5,500 meters in 2025; India's NIOT has tested its Varaha-1 miner at similar depths; and Korea's KIOST has advanced its MineRo robot.

These efforts show that multiple integrated systems are moving from prototype to real-world testing, creating a growing ecosystem of partners with relevant offshore capabilities. Commercial scale deployment of integrated collector systems will not be authorized under the current exploration phase EIS. NOAA will require a full commercial EIS before approving and overseeing such operations. ADSM intends to select its harvesting partner during the feasibility phase, focusing on operators with modern DP2 or higher support vessels, proven deep-sea equipment, and strong environmental safeguards. With this rapid progress, ADSM will benefit from a competitive field of capable partners, ensuring access to proven technologies and best-in-class environmental practices when moving toward commercial readiness.

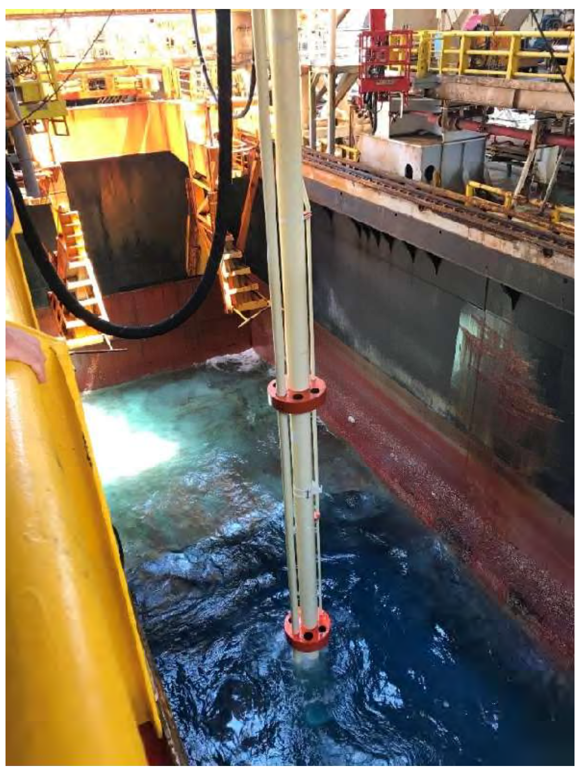


Figure 10. Oil States Marine Mineral Riser onboard Allseas' Hidden Gem prototype mining vessel. Photo: Dan McConnell.

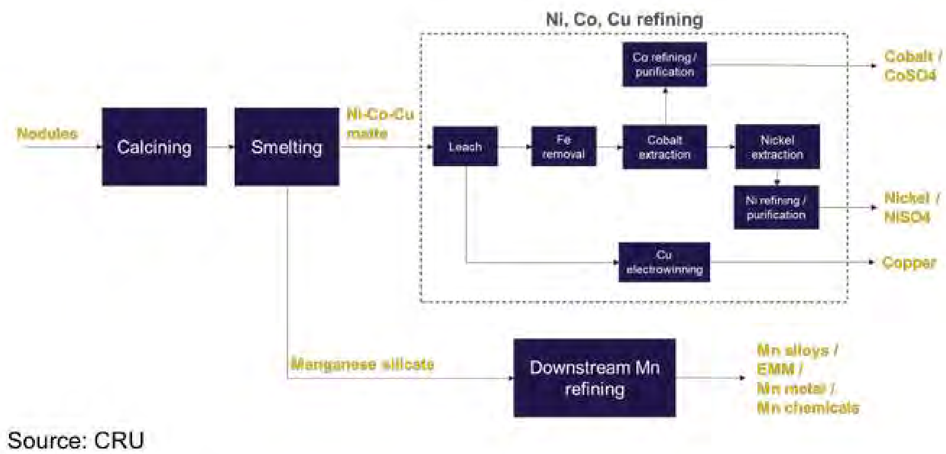
Figure 11. Royal IHC Collector System. Photo: Graham Goulet.

2.3.7. Processing and Refining Pathways

Processing typically scales from bench tests and flowsheet development to a bespoke processing facility. TMC has found existing metallurgical facilities that can be modified to take in polymetallic nodules until bespoke polymetallic nodule processing facilities are developed.

Once polymetallic-nodule processing facilities are built, they should be able to treat all major nodule types using a common flowsheet, because nodule deposits are relatively similar. This contrasts with terrestrial nickel deposits, which often require bespoke processing plants.

Although outside the scope of this exploration plan, ADSM is closely tracking technological and commercial advances in polymetallic nodule processing, smelting, refining, and recycling. Potential partners include U.S.-based critical minerals processors in Missouri, processors in Canada, Korean non-ferrous metal smelters, and Japanese metallurgical firms.



[7]

Figure 12. Polymetallic Nodules Flowsheet

A typical flowsheet for polymetallic nodules is shown in Figure 12. Processing of PMN requires a custom flowsheet and plant design. ADSM expects that U.S.-based processing facilities will develop to take in polymetallic nodules by U.S. based companies. Hazen Research in Golden, CO, is a world-class metallurgical design company and can develop bench tests and flowsheets for PMN processing.

There are cobalt and nickel refiners with headquarters and/or have operations in Canada that may have an interest in retooling to process cobalt, nickel, and copper from PMN, such as:

- Glencore Canada
- SGS Minerals
- Sherritt International
- Vale Canada Ltd
- Electra Battery Materials

Others that have started to address the processing of PMN supply outside of North America are:

- Korea – Korea Zinc, LS-Nikko Copper
- Japan – Sumitomo Metal Mining, JX Metals
- Australia – Cobalt Blue (cobalt extraction and refining technology)

These entities have demonstrated capabilities in cobalt, nickel, copper, and manganese processing.

[7] BOEM 2023

3. Exploration Plan (15 CFR § 970.203)

3.1. Overview

ADSM proposes a four-year exploration program focused on the delineation, sampling, and environmental assessment of polymetallic nodules within a 101,064 km^2 license block located in the South Penrhyn Basin of the South Pacific Ocean, sometimes referred to as the Eastern High Seas Pocket 3 (E-HSP). The area lies outside national jurisdiction and is bounded by the EEZs of the Cook Islands, Kiribati, and French Polynesia. The overarching objective of this plan is to evaluate the resource potential and environmental characteristics of the area to support the submission of a commercial recovery application within the 10-year license term.

3.2. Description of Area to be Explored

- **Location:** South Penrhyn Basin, South Pacific Ocean.
- **Name:** Eastern High Seas Pocket 3 (E-HSP) — a high-seas enclave bounded by the EEZs of French Polynesia, the Cook Islands, and Kiribati.
- **Size:** 101,064 km^2
- **Boundaries:** Surrounded by the EEZs of the Cook Islands, Kiribati, and French Polynesia
- **Coordinates:** See Appendix #4.
- **Boundary Buffer:** To avoid any potential overlap with adjacent license areas and to account for rounding or geospatial conversion tolerances, a buffer of 0.1 decimal minutes (≈6 arc-seconds, or ~175–185 meters in this region) will be applied to the original coordinates provided in Appendix #3. This ensures clear separation without altering the formally submitted coordinate set.
- **Seabed Topography and Mineral Deposit Locations:** A full discussion of seabed topography is provided in Section 4.3 (Description of the Proposed Exploration Area). Mineral deposit locations are discussed in Section 4.6.3 (Nodule Composition) and Section 4.6.4 (Nodule Abundance).

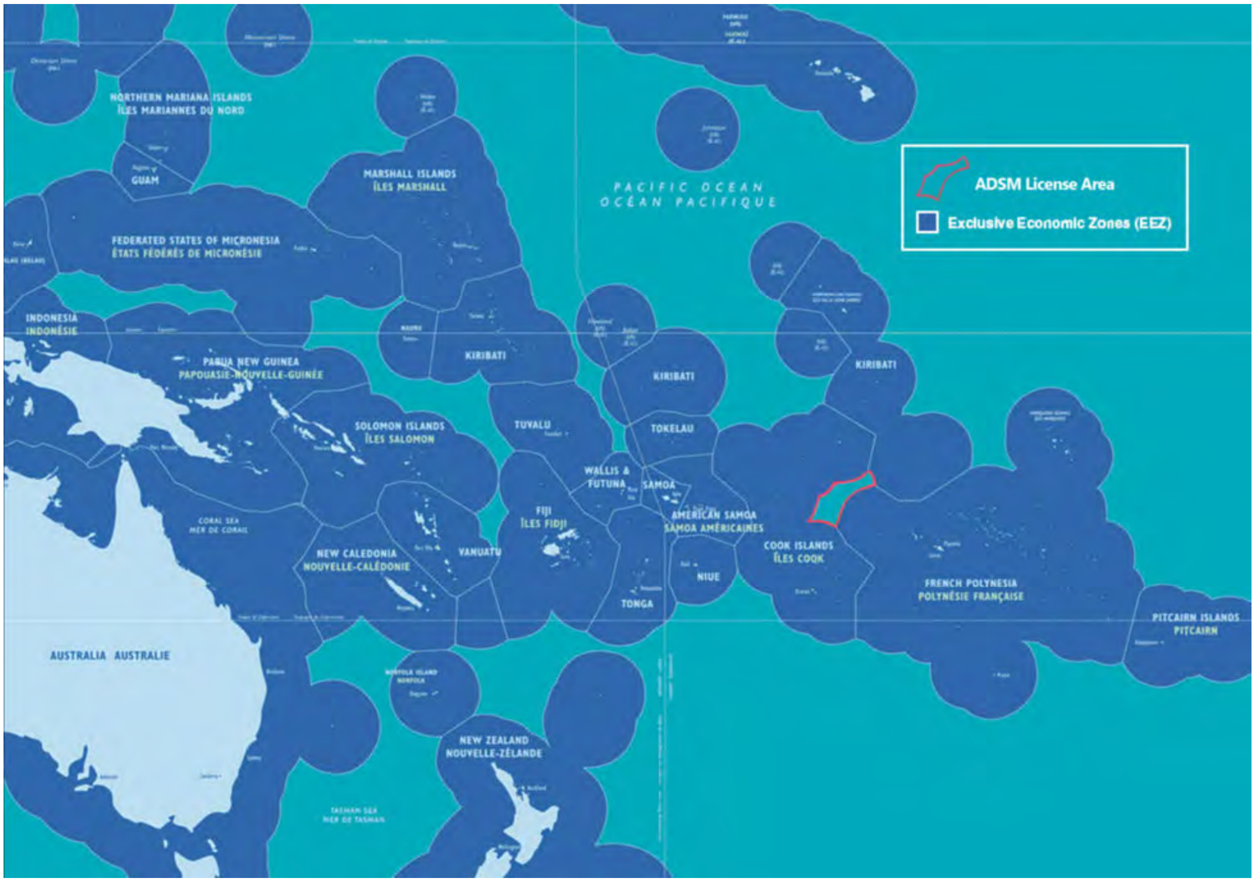


Figure 13. ADSM Target Exploration Area Sometimes Referred to as Eastern High Seas Pocket 3 (E-HSP)

3.3. Exploration Schedule

ADSM's four-year exploration strategy is designed to generate the geologic, environmental, and technical foundation necessary for a commercial recovery application by Year 5, with a full-scale collector trial in Year 4. In Years 1 and 2, the focus is on mapping, sampling, and environmental baseline development using multibeam sonar, box coring, and autonomous vehicles to delineate resource blocks and ecological sensitivities. Year 3 is dedicated to completing the environmental reference baseline, benthic community inventories, and hydrodynamic plume modeling through advanced sampling and time-series data recovery. These datasets, together with ADSM's initial Environmental Impact Assessment (EIA), will support NOAA's supplemental EIS required for the Year 4 collector trial. Year 4 features the collector trial with environmental monitoring to validate system performance and quantify plume and benthic impacts, generating key inputs for the commercial recovery application. In Year 5, the program culminates in the Feasibility Study (FS) and the submission of updated environmental and technical documentation to support NOAA's preparation of the commercial recovery EIS under 15 CFR 971.204. Together with the project's financing package, this will form the basis of the commercial recovery permit application, maintaining compliance with all regulatory diligence thresholds and ensuring continuous progress toward operational readiness.

AOCM Exploration Plan	2026	2027	2028	2029	2030	2031
Phase:	Exploration Phase				Commercial Recovery	
Cruise:	#1	#2	#3	#4		
Geology & Resource Program						
Survey Cruise	●	●	●	●		
Nodule Sampling & Assays	●	●	●	●		
Component Testing (engineering & environmental)	●	●	●	●		
Full-Scale Collector System Testing				●		
Processing & Recovery System Trials				●		
Evaluate Feasibility (political, legal, technical)	●	●	●	●	●	
Pre-Feasibility Study (PFS)				●		
Feasibility Study (FS)					●	
NOAA record of decision & 971 commercial recovery permit					●	
Commercial Recovery						●
Environmental Protection and Monitoring						
Exploration EIS (before exploration license is issued)	●					
Supplemental EIS (pilot test; data submitted 1 yr prior)				●		
Baseline Environmental Surveys	●	●	●			
Data Collection & Monitoring	●	●	●	●		
Impact Modeling & Mitigation Planning			●	●		
Evaluate Feasibility (environmental)	●	●	●	●	●	
Support NOAA Final Environmental Impact Statement (FEIS) (15 CFR 971.204)					●	
Establish Long-Term Monitoring Framework					●	
Commercial Recovery EIS (Part 971)					●	

Figure 14. ADSM Exploration Plan Phases

3.4. Phased Exploration and Development Program

3.4.1. Year 1 / Cruise 1

Year 1 launches ADSM's first offshore campaign to establish an integrated geophysical, geological, and environmental baseline across a frontier license area lacking modern bathymetric and nodule occurrence data. Survey priority will be given to the southern sector along the Cook Islands EEZ border, adjacent to high-abundance nodule fields. A hull-mounted 30 kHz multibeam echosounder (MBES), paired with CTD (conductivity, temperature, depth) casts, will map 1,500–2,500 km^2 of seabed per day, with real-time processing enabling adaptive survey strategies and rapid QA/QC.

Upon identifying priority acoustic targets, 25 camera-navigated box cores will recover nodules and sediments for acoustic calibration, early resource estimation, and environmental reconnaissance. Samples from these cores will assess benthic community composition, biodiversity, microbial activity, and geotechnical properties, including flocculation behavior via onboard vane shear testing. These data will inform collector design, plume modeling, and Cruise 2 resource delineation.

ADSM will employ class-compliant, commercially available systems and vessels wherever possible, issuing competitive tenders for MBES surveys, CTD profiling, box core sampling, and environmental baseline work. Suitable platforms already operating within the Cook Islands EEZ will be targeted to minimize mobilization costs and maximize time-on-task.

Program Scope	Year	Cruise #	Activity / Equipment	Objectives and Tasks	Critical Deliverables	Analysis
Year 1 / Cruise 1 Summary:						
Geology and Resource Program	1	1	• Hull MBES 30kHz • CTD data	• Deploy MBES for high-resolution bathymetry and backscatter mapping • Acquire CTD profiles to support acoustic calibration and environmental baseline • Generate georeferenced acoustic mosaics for seabed classification	• Bathymetric grids and backscatter maps (1,500 to 2,500 km^2/day) • CTD profiles of sound velocity, salinity, temperature • Preliminary facies classification of ridges, plains, and hardgrounds	• Identify geologic features correlated with nodule occurrence • Support box core site selection and nodule prospectivity modeling • Calibrate acoustic data against actual nodule density from box cores
Geology and Resource Program	1	1	• Limited box core and dredge sediment sampling	• Deploy 25 camera-navigated box cores (30 hours non transit time) to recover nodules and sediment • Collect samples for geotechnical, mineralogical, and flocculation testing. • Perform basic onboard nodule cataloging	• GPS-referenced imagery • Nodules: photo log, wet/dry weight, physical descriptions • Sediments: archived for geotechnical, flocculation, and eDNA processing	• Ground-truth MBES data against physical nodule presence and morphology • Feed assay data into preliminary resource model • Begin sediment behavior profiling to inform plume dynamics • Box core samples to validate abundance ranges
Environmental Protection and Monitoring	1	1	• Baseline Reconnaissance	• Collect opportunistic eDNA and sediment samples at every box core station • Log in-situ CTD + turbidity at each site • Deploy short-dwell landers (2h) with current meters and optical backscatter sensors • Begin geo-tagged photo transects	• First confirmed set of baseline data from the cruise, showing seafloor DNA, tiny animals in the sediment, and the temperature and chemistry of the water above. • 24h turbidity and particle flux variability records • Start of geo-referenced benchmark photo archive	• Establish "zero-impact" reference envelopes for turbidity and TSS • Identify key ecological indicator taxa and sensitive habitats • Prioritize areas for long-term monitoring and avoidance if needed
Geology and Resource Program	1	1	• Onshore work	• Conduct pre-cruise planning, station targeting, and GIS data review • Post-cruise integration of MBES, CTD, box core, and environmental data • Define Cruise 2 scope based on integrated analysis	• Updated survey maps and database • Preliminary block prioritization and Cruise 2 AUV plan • Sample processing protocols for lab delivery	• Assess feasibility and prospectivity of candidate areas • Refine targeting strategy for advanced resource definition • Improve environmental data coverage plans

Figure 15. ADSM Exploration Plan for Year 1

Current planning assumes the primary mobilization port will be Rarotonga, Cook Islands, which offers the most direct proximity to the target license area. This assumption underpins current voyage duration, fuel cost, and schedule estimates. However, mobilization from alternate ports—such as American Samoa, New Zealand, or Australia—may be required depending on vessel availability, equipment readiness, or regulatory/logistical constraints. Mobilization from these alternate ports could extend total transit time and increase associated costs. These contingencies will be incorporated into schedule and budget revisions as vessel sourcing is finalized.

Cruise #1 Planning Analysis		
Mobilization		
Rarotonga to exploration area (km)	623	
Speed (kts)	8	
Transit days to exploration area	**1.8**	days
Bathymetry		
Speed (kts)	7	
Reduction for weather & turns	20%	
Swath (km) (30khz)	15	
Reduction for swath overlap	20%	
Daily coverage (sq. km)	2,987	
Exploration target area	101,000	
Transit days for bathymetry	**33.8**	days
Box Cores		
Number of box Cores	25	
Hours per box core (not transiting)	3	
Total days box coring	**3.1**	days
Demobilization		
Exploration area to Rarotonga (km)	623	
Speed (kts)	8	
Transit days from exploration area	**1.8**	days
Total transit days	**40.4**	

Figure 16. ADSM Cruise #1 Operational Planning Analysis

3.4.2. Year 2 / Cruise 2

Year 2 builds on Cruise 1 results with high-resolution resource delineation and environmental characterization. A grid of camera-navigated box cores at 5–7 km spacing will provide the primary physical sampling for nodule abundance, morphology, and grade, supported by dredge bulk samples for metallurgical testing. An autonomous underwater vehicle (AUV) will collect detailed micro-topography (10 cm resolution), photographic transects, and geophysical data to integrate with box core results. Geological, geotechnical, and environmental datasets will refine Mineral Resource estimates, validate predictive models, and establish engineering baselines for future collector trials.

Long-duration metocean moorings will record seasonal currents, turbidity, and particle flux to inform hydrodynamic and plume dispersion models. Sampling will expand the environmental reference archive and feed into sediment plume modeling. Post-cruise analysis will integrate results into an internal Initial Assessment-level economic study, providing the basis for targeting and engineering work ahead of the Year 4 Pre-Feasibility Study (PFS).

Program Scope	Year	Cruise #	Activity / Equipment	Objectives and Tasks	Critical Deliverables	Analysis
Year 2 / Cruise 2 Summary:						
Geology and Resource Program	2	2	• AUV transects of possible production areas • CTD data	• Conduct AUV micro-topography surveys (1 cm resolution) • Run photographic transects over Cruise 1 box core and reserve areas • Collect CTD profiles for acoustic and environmental calibration	• High-resolution MBES, SBP, SSS datasets • Geo-referenced images of nodule zones and reserves • Photographic tie-lines across resource blocks	• Calibrate nodule abundance and morphology across box core grid • Support resource block modeling and collector test planning
Geology and Resource Program	2	2	• Navigated 200 Box Core with Camera, lights • Dredge for bulk samples	• Recover nodules at 5–7 km spacing for resource assay and abundance mapping • Collect bulk samples via dredge for metallurgical testing	• GPS-referenced nodules and dredge samples from test area • Material allocated to metallurgical contractors and assay labs	• Nodule abundance estimates from box cores • Laboratory assay results for mineral resource estimate
Geology and Resource Program	2	2	• Sediment sampling • Sediment geochemistry	• Collect representative sediment cores for composition and geochemistry profiling • Evaluate flocculation behavior and sediment dispersibility	• Sediment cores geo-tagged to Cruise 2 box core grid • Geochemical and particle-size data outputs	• Compare to plume modeling studies from other contractor test areas • Provide inputs to sediment transport and impact models
Geology and Resource Program	2	2	• Geotechnical data	• Assess seabed bearing strength and shear properties near candidate collector zones	• Laboratory and in-situ measurements (e.g. vane shear, cone penetrometer)	• Calibrate substrate strength to crawler collector specs • Support engineering design and plume generation thresholds
Environmental Protection and Monitoring	2	2	• Opportunistic Environmental Sampling	• Continue co-sampling for benthic DNA and sediment at box core locations • Expand spatial coverage of eDNA reference archive	• Preserve environmental samples for taxonomy, genetics, and community analysis. • In-situ data logs and sample metadata	• Community structure analysis (eDNA, meiofauna, megafauna, microbes) • Refine ecological baselines and habitat sensitivity zones
Metocean Program	2	2	• Deploy oceanographic moorings and environmental landers	• Record sea state, surface/mid/bottom currents, and seasonal variability •Deploy short and long-term moorings	• Multi-depth current profiles and velocity data for hydrodynamic models	• Refine models for station keeping, riser sway, and Vortex Induced Vibrations (VIV) • Define envelope for collector test cruise planning
Geology and Resource Program	2	2	• Post-cruise analysis and cruise planning	•Integrate Cruise 1 and 2 data to update Mineral Resource estimates • Define Cruise 3 priorities based on gaps and modeling	•Internal PEA-level economic model (not for public release) • Technical disclosure prepared in alignment with SEC S-K 1300 requirements • Integrated GIS for partners and licensing submissions	• Prioritize blocks for collector testing and exclusion • Generate investor and partner engagement materials incorporating preliminary S-K 1300 resource estimates and internal PEA-level economics

Figure 17. ADSM Exploration Plan for Year 2

3.4.3. Year 3 / Cruise 3

Year 3 will complete and validate the environmental baseline needed for NOAA's regulatory review and to support a supplemental EIS for the planned Year 4 collector trial. Sampling of benthic and sessile fauna will be conducted with ROVs, box cores, multicores, and epibenthic sleds, with specimens preserved for taxonomic and genetic analysis and results integrated into the geospatial database. Environmental moorings will be serviced to recover time-series data on currents, turbidity, and particle transport, informing hydrodynamic and plume models. Post-cruise analysis will integrate biological, geotechnical, and oceanographic datasets into NOAA-compliant baselines, setting monitoring targets and resilience thresholds that will guide the Year 4 collector trial and the supplemental EIS. ADSM will submit the full collector trial package—including test plan, site selection, monitoring protocols, and modeling inputs—to NOAA at least one year in advance to enable preparation of the supplemental EIS and completion of ESA/EFH consultations.

Program Scope	Year	Cruise #	Activity / Equipment	Objectives and Tasks	Critical Deliverables	Analysis
Year 3 / Cruise 3 Summary:						
Environmental Protection and Monitoring	3	3	• CTD Water column sampling	• Conduct CTD and Niskin bottle sampling for chemical and physical oceanographic characterization	• Profiles of temperature, salinity, oxygen, nutrients, turbidity, and backscatter	• Support oceanographic model calibration and baseline plume behavior assumptions
Environmental Protection and Monitoring	3	3	• Navigated Box Core with Camera, lights	• Recover sediment and biological samples from targeted benthic zones • Capture visual data for morphologic analysis	• DNA-preserved benthic fauna • High-quality seabed imagery	• Identify indicator species • Establish benthic community structure and spatial variability
Environmental Protection and Monitoring	3	3	• Navigated multicore	• Extract sediment for meiofauna, bacterial communities, and porewater chemistry	• Replicate cores preserved for eDNA, microbial, and geochemical analysis	• Quantify diversity, community gradients, and environmental drivers
Environmental Protection and Monitoring	3	3	• ROV	• Conduct visual megafauna transects and collect biological voucher specimens	• ROV footage and biological samples of mobile and sessile fauna	• Document faunal density, composition, and behavioral observations
Environmental Protection and Monitoring	3	3	• Epibenthic sled	• Sample mobile and low-relief megafauna across broader spatial swaths	• Megafauna collected from transects across environmental zones	• Complement ROV data and expand geographic coverage
Metocean Program	3	3	• Service and download data	• Service Metocean Program moorings and environmental landers • Download time-series data	• Multi-depth current velocity and direction • Turbidity and particle flux records	• Site-specific hydrodynamic modeling for collector and plume design
Environmental Protection and Monitoring	3	3	• Post-cruise analysis	• Compile and vet taxonomic and eDNA datasets with academic partners • Integrate results into the environmental baseline to support preparation of a supplemental EIS submission at least one year prior to any collector trial. • Compile environmental time-series and sediment analysis	• Third-party certified eDNA and fauna inventory • Refined environmental GIS layers	• Establish monitoring targets and resilience thresholds for EIA • Provide foundational environmental datasets required for supplemental EIS readiness for the collector trial and associated regulatory review timelines.

Figure 18. ADSM Exploration Plan for Year 3

3.4.4. Year 4 / Cruise 4

Year 4 shifts from data acquisition to commercial readiness, prioritizing integration of proven, third-party, class-compliant systems over proprietary hardware development. Competitive tenders will be issued to established nodule-mining consortia, with parallel negotiations to secure offtake agreements with shore-based metallurgical plants. The focus is on validating and selecting mining, riser/transfer, and processing solutions that can scale reliably. This work culminates in a Pre-Feasibility Study in alignment with SEC S-K 1300, underpinned by technical due diligence, independent engineer reviews, and preliminary CAPEX and OPEX modeling to define Measured and Indicated Mineral Resources and map the critical path to first ore.

Subject to NOAA's issuance of the supplemental EIS and decision and authorization, Cruise 4 will serve as the primary collector trial. A track-mounted seafloor collector will operate within a 1 km^2 test area under class-society oversight, with real-time monitoring of recovery rates, energy use, and equipment condition. Targeted environmental observations— including moorings, ROV transects, and optical plume imaging—will assess sediment plume behavior and seafloor disturbance. Findings will guide engineering refinements, environmental management measures, stakeholder reporting, and investor due diligence, providing key technical and environmental inputs for the Year 5 FS and commercial EIS.

Program Scope	Year	Cruise #	Activity / Equipment	Objectives and Tasks	Critical Deliverables	Analysis
Year 4 / Cruise 4 Summary:						
Service and partner selection and contracting	4	4	• Collector test planning	• Define environmental envelope for collector testing •Initiate Pre-Feasibility Study (PFS) in alignment with S-K 1300 requirements, incorporating Cruise 1–3 results and environmental baseline data	• Signed term sheets (mining, transfer, processing, offtake) • Integrated execution schedule and critical path network • PFS-level technical report per S-K 1300 definitions	• Update economic model to PFS standard under S-K 1300 • Identify key technical, permitting, and commercial risk drivers for transition to FS
Collector Test	4	4	• Full-scale collector trial (30 days)	• Demonstrate >90 % nodule pick-up efficiency and <10 % breakage • Log energy, throughput, and mechanical reliability KPIs • Record plume generation with in-situ turbidity and optical sensors • Validate real-time environmental monitoring telemetry	• Collector performance dashboard (uptime, velocity, intake rates) • Plume source-term dataset (turbidity, particle size spectra) • Class society trial certificate / statement of fact	• Compare KPIs to economic model assumptions • Update engineering design envelope and maintenance regime
Environmental Protection and Monitoring	4	4	• Integrated Environmental Monitoring	• Deploy before/after ROV and lander surveys of impact and reference sites • Capture water-column eDNA, sediment traps, benthic chambers	• High-freq water and sediment plume data • Benthic impact maps and resilience indicators	• Calibrate far-field plume model • Quantify acute vs. chronic benthic effects

Figure 19. ADSM Exploration Plan for Year 4

3.4.5. Year 5

Year 5 finalizes the Feasibility Study in alignment with SEC S-K 1300 and submits the complete 15 CFR 971 commercial recovery application. NOAA's commercial EIS process incorporates multi-year environmental baselines, collector trial results, and updated technical and operational plans for commercial-scale operations. All regulatory, stakeholder, and class-society requirements are consolidated into the application package. In parallel, the FS provides the Proven and Probable Mineral Reserve statement and definitive CAPEX and OPEX estimates to support project-finance commitments, insurance placement, and offtake agreements.

3.5. Estimated Schedule of Expenditures

[**Confidential Treatment Requested – #12: Entire Figure 20]**

[redacted]

Figure 20. ADSM Cost Forecast

3.6. Prior Activity

While very little direct exploration has occurred in the target license area to date, ADSM has drawn on prior industry experience and research targeting adjacent nodule fields within the Cook Islands to inform block selection and program design.

3.7. Recovery and Processing Technology

In the commercial recovery phase, ADSM anticipates deploying a tracked seafloor nodule collector with a hydraulic suction head designed to recover nodules while minimizing seafloor disturbance. Nodules will be transferred as slurry via a vertical riser, using a positive displacement pump (with air-lift retained as a contingency), classed for deepwater operations. Onboard, a primary separator will dewater the slurry, with nodules either stockpiled or prepared for offload to a shore-based processing plant. Return water will be discharged at a depth optimized to minimize plume impacts, based on EIS findings, and monitored in real time. ADSM intends to partner with an established developer to deploy proven, class-compliant systems with integrated environmental monitoring. Testing and integration, including telemetry and mechanical diagnostics, will occur during the full-scale collector trial in Year 4.

3.8. Metallurgical Testwork

ADSM does not plan to construct its own metallurgical facility and will instead partner with ISO/IEC 17025–accredited laboratories and industrial research centers—such as SGS

Minerals Services (Canada/UK). Bench- and pilot-scale testing on bulk nodule samples from Cruise 1, Cruise 2, and the Year 4 collector trial will evaluate crushing and sizing, reductive acid leaching and ammoniacal leaching, solid–liquid separation, and residue and effluent characterization. Results will inform recovery assumptions, reagent consumption, and residue strategies in the feasibility study, with simulated flowsheets validated against test data to support downstream system design and permitting.

4. Environmental and Use Conflict Analysis (15 CFR § 970.204)

4.1. Overview

Consistent with 15 CFR § 970.204(a) and 30 U.S.C. § 1419(d) of DSHMRA, this section provides the physical, chemical, and biological information needed for NOAA to prepare its EIS on the proposed exploration license. It summarizes relevant historical environmental information, outlines planned activities, including integrated system tests, and identifies the location, boundaries, and baseline data or plans for the area. Any additional baseline or system-test data will be submitted at least one year before testing to allow NOAA time to prepare an EIS supplement, and no tests will proceed without NOAA concurrence. This section also describes known or potential use conflicts and other ocean uses in the area to support NOAA's determinations under §§ 970.503, 970.505, and 970.520, and notes NOAA's role in coordinating review of any related onshore impacts.

Although little direct exploration has occurred within the target license area, the Cook Islands nodule field, including the Penrhyn Basin, has been systematically explored since the 1970s. Successive national and international campaigns have mapped seabed morphology, measured nodule abundance and grade, profiled the water column, and documented benthic and pelagic biodiversity. These efforts, undertaken by scientific institutions, government agencies, and commercial partners, have been documented in public research reports referenced herein. This application draws upon those reports, including historical bathymetry, sediment composition, nodule abundance and geochemistry, and baseline environmental observations from adjacent areas, to provide a regional context for the proposed work and to inform the design of forthcoming in-situ baseline surveys in Years 1 and 2.

4.2. Location and Boundaries of the Proposed License Site

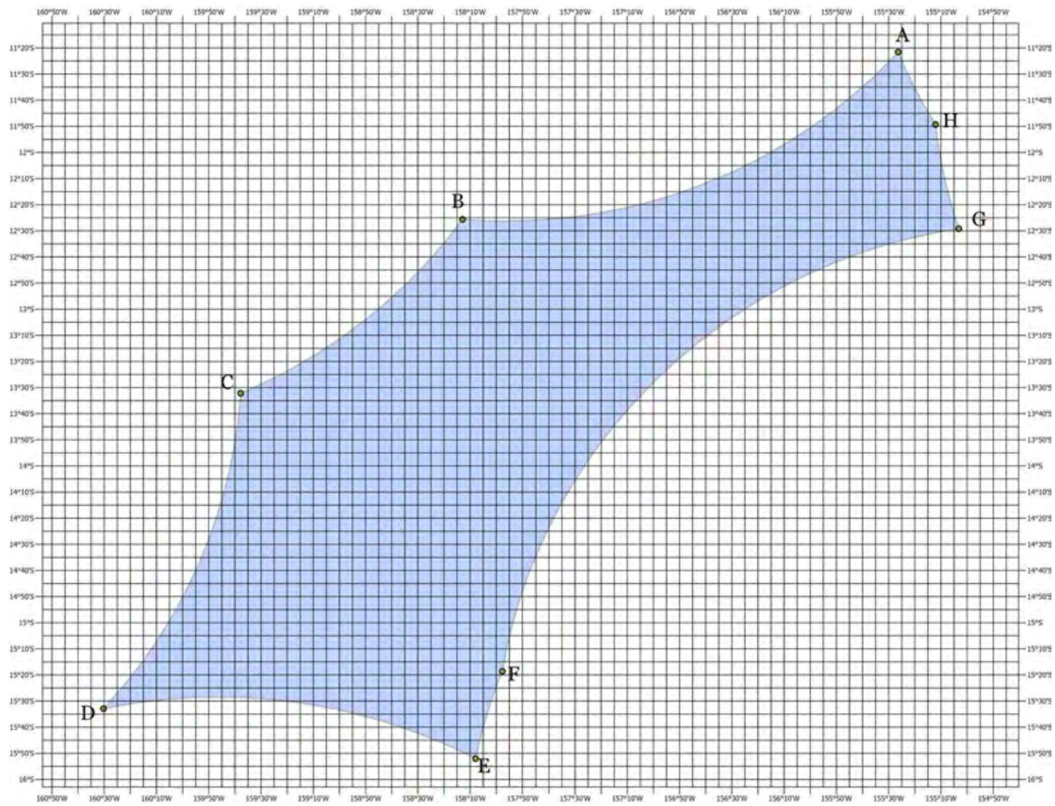


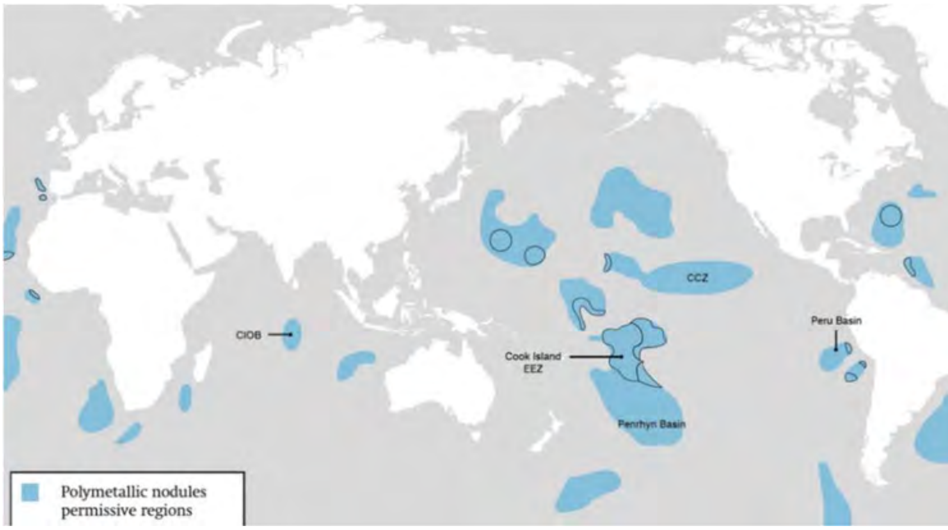
Figure 21. Boundary Map of Proposed Exploration Area

Point	Latitude	Longitude
A	-11.359732	-155.439710
B	-12.425847	-158.214769
C	-13.535054	-159.629418
D	-15.548132	-160.504109
E	-15.869287	-158.127885
F	-15.311007	-157.958777
G	-12.488122	-155.052647
H	-11.822559	-155.201140

Figure 22. Latitude and Longitude of Exploration Area Boundary Points

4.3. Description of the Proposed Exploration Area

The proposed exploration license area lies in the South Penrhyn Basin within the South Pacific Ocean and is bounded by the Exclusive Economic Zones (EEZs) of the Cook Islands, Kiribati, and French Polynesia. It lies within the broader region sometimes referred to as the Eastern High Seas Pocket (E-HSP), an expanse of international waters between these EEZs noted for its high-grade polymetallic nodule potential. Adjacent to the target exploration zone lies one of the world's best-known polymetallic nodule fields, located in the Cook Islands. This area has been extensively sampled and resource-modeled, making it one of the most thoroughly studied nodule zones globally and providing a strong scientific foundation for understanding its mineral potential.



[8]

Figure 23. Map of polymetallic nodule regions around the world

The area encompasses a large portion of the South Penrhyn Basin and the northern tip of the Aitutaki Passage, a deep abyssal region characterized by broad sedimented plains and interspersed volcanic and tectonic features, including troughs, knolls, and seamounts. Water depths are approximately 5,200 meters (5,000 – 5,900 m range) below sea level, making the terrain suitable for polymetallic nodule formation and preservation.

[8] https://metals.co/how-much-seafloor-will-the-nodule-collection-industry-impact/

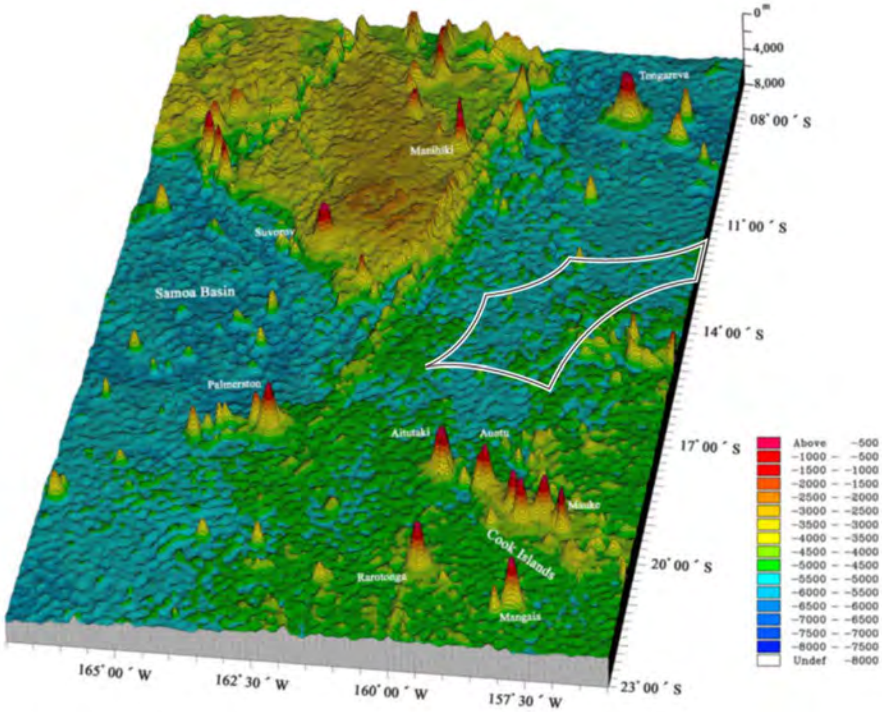


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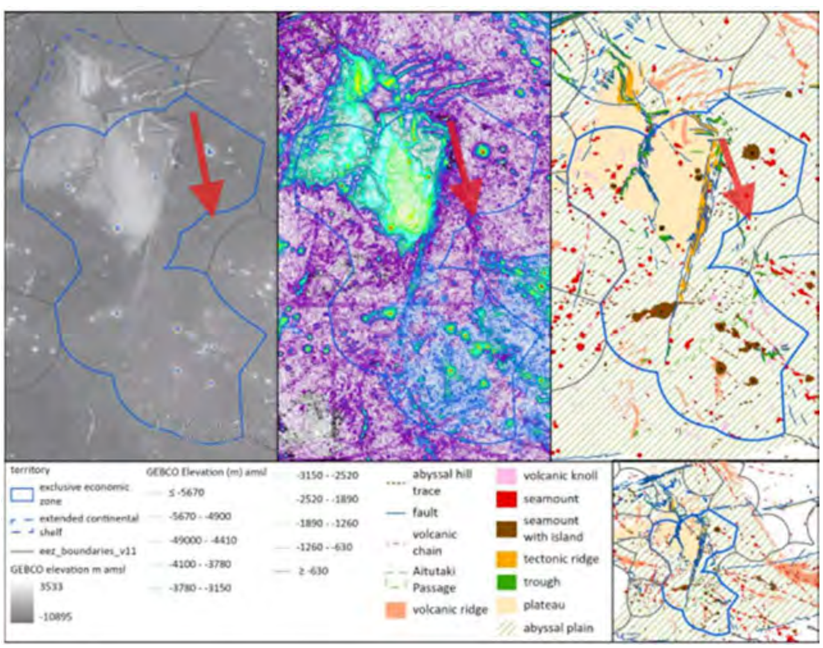
Figure 24. Depth chart of the Penrhyn Basin and Target Exploration Area



10

Figure 25. Geomorphology Interpretation of Penrhyn Basin and the Target Area

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9 https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdf

10 2023 SEA MSA Report (https://www.sbma.gov.ck/technical-reports)

4.4. Summary of Historical Exploration in the Penrhyn Basin

Systematic investigation of polymetallic nodules in the Penrhyn Basin began in the 1970s, following earlier regional geophysical and sediment surveys in the surrounding southwest Pacific. Early scientific cruises confirmed widespread nodule occurrence and provided initial bathymetric and sediment characterizations.

Between 1985 and 2000, the Japan International Cooperation Agency (JICA), the Metal Mining Agency of Japan (MMAJ), and the Geological Survey of Japan (GSJ) undertook detailed surveys within the Cook Islands Exclusive Economic Zone (EEZ), including parts of the Penrhyn Basin. Work aboard the RV Hakurei Maru No. 2 included multibeam and single-beam bathymetry, sub-bottom profiling, photographic transects, and physical sampling using grabs, box corers, and dredges. These campaigns produced some of the first mapped estimates of nodule abundance and grade in the basin.

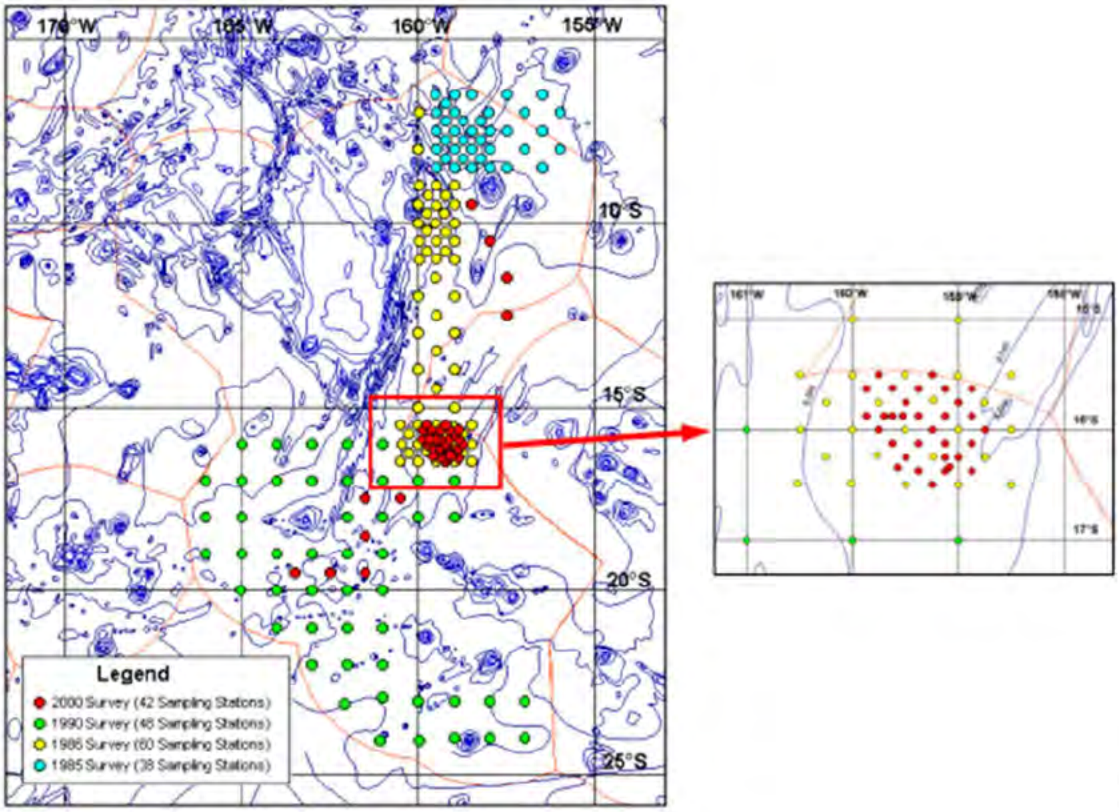
After a period of limited offshore activity in the early 2000s, new research momentum developed under the Cook Islands Seabed Minerals Act (2009) and subsequent partnerships. From 2012 onward, national and international research cruises in the Cook Islands EEZ—conducted by agencies such as GNS Science (New Zealand) and BGR (Germany)—collected high-resolution bathymetry, CTD profiles, sediment and nodule samples, and environmental baseline data, contributing to modern geological and environmental datasets for the basin. Summary of Historical Research & Data Compilations in the Cook Islands EEZ & the Proposed Exploration Area.

Year	Vessel (Expedition)	Location and Work Programme
1962	*RV Vema (Vema 18)*	Manihiki Plateau; seismic survey, seabed sediments
1963	*RV Vitiaz Cruise 37*	Penrhyn Basin and southern-western Cook Islands; polymetallic nodules
1967/68	*RV Vitiaz Cruise 43*	Southern Cook Islands; polymetallic nodules
1970	*RV Vitiaz Cruise 48*	Penrhyn Basin and southern Cook Islands; polymetallic nodules
1971	*RV Chain (Chain 100)*	Manihiki Plateau; seismic survey
1972	*RV Thomas Washington (SOUTHTOW 10,11,12)*	Manihiki Plateau; seismic survey and dredging
1972	*RV Melville (CATO 3)*	Manihiki Plateau; seismic survey, seabed sampling
1973	*Glomar Challenger DSDP 33*	Manihiki Plateau; seabed drilling
1974	*RV Tangaroa*	South and southwest of Rarotonga; polymetallic nodules
1973	*RV Vitiaz*	Cook Islands; polymetallic nodules
1975	*RV Dmitry Mendeleyev Cruise 14*	Southern Cook Islands; polymetallic nodules
1976	*MV Ravakai*	Between Rarotonga and Penrhyn; polymetallic nodules, metalliferous sediment and phosphate
1977	*RV Acheron*	Southern Group; precious coral, polymetallic nodules
1977	*RV Machias*	Northeast of Rarotonga, polymetallic nodules
1978	*RV Machias*	Penrhyn and Samoa Basins; polymetallic nodules and precious coral
1978	*RV Sonne (SO6)*	Aitutaki Passage; polymetallic nodules
1980a	*RV Machias*	Northern Cook Islands; polymetallic nodules and precious coral
1980b	*RV Machias*	East of Penrhyn Island, Penrhyn Basin, Penrhyn, Manihiki, Nassau Islands; polymetallic nodules, precious coral and phosphate
1980	*RV Hakurei-Maru*	South Penrhyn Basin; polymetallic nodules
1983	*MV Ravakai*	Slopes of Rakahaga and Manihiki Atoll; precious coral
1983	*RV Hakurei Maru*	South Penrhyn Basin; polymetallic nodules
1984	*RV Sonne (SO35-1)*	Manihiki Plateau; seabed sampling
1985	*RV Hakurei-Maru No. 2*	Western Penrhyn Basin, eastern margin of the Manihiki Plateau and the north of Penrhyn Island; polymetallic nodules
1986	*HMNZS Tui*	Manihiki Plateau and adjacent southwest sea areas; Co-rich crust, polymetallic nodules
1986	*RV Hakurei-Maru No. 2*	Western edge of the southern Penrhyn Basin (to the east of the Manihiki Plateau; polymetallic nodules (some data used in this MRE)
1987	*RV Moana Wave*	Cook Islands: Suwarrow Trough, eastern Manihiki Plateau, Rakahaga-Manihiki island area; Co-rich crust and metalliferous sediments
1987	*RV Thomas Washington*	Northern Cook Islands and adjacent High Seas; polymetallic nodules, Co-rich crust, deep sea sediments and the Calcite Compensation Depth
1990	*RV Sonne (SO67)*	Northeast edge of Manihiki Plateau; complex of volcanic cones and mineral resources
1990	*RV Hakurei-Maru No. 2*	Southern Cook Islands; polymetallic nodules
2000	*RV Hakurei-Maru No. 2*	Southern Penrhyn Basin; polymetallic nodules
2007	*RV Sonne (SO193)*	Manihiki Plateau and Samoa Basin; Fe-Mn crusts and nodules
2019	*MV Grinna*	Southern Penrhyn Basin CIICSR reserve area; polymetallic nodules (data used to verify grades and nodule abundance)
2019/2020	*MV Grinna*	Southern Penrhyn Basin OML reserve area - polymetallic nodules (data used to verify grades)

[11]

Figure 26. Summary of research expeditions to the Cook Islands EEZ and the Penrhyn Basin

[11] 2023 Cook Islands Report (https://www.sbma.gov.ck/technical-reports)



[12]

Figure 27. Survey Sample Stations Conducted on Past Cruises in South Penrhyn Basin

4.5. Historical Research and Data Compilations

Decades of survey work have been synthesized in a series of notable studies and assessments of the Penrhyn Basin and the Cook Islands EEZ.

Year / Period	Source / Author(s)	Primary Focus	Reference
1980s	New Zealand Geological Survey and academic studies led by Exon (1980s)	Evaluated the geological setting and economic potential of the North and South Penrhyn Basins in the Cook Islands EEZ, highlighting depth range and prospective zones.	
1988 / 2013	Cronan (1988) with update in Cronan (2013)	Produced Cook Islands EEZ-wide maps integrating grade, abundance, and geological context for polymetallic nodules.	https://www.sciencedirect.com/science/article/abs/pii/002532279190114J
1993	Usui, Nishimura & Mita (1993), Geological Survey of Japan	Detailed mineralogical differences between older Co-poor and younger Co-rich nodules in the Penrhyn Basin, linking formation to low sedimentation and AABW influence.	https://www.sciencedirect.com/science/article/abs/pii/002532279390044V
1995	Metal Mining Agency of Japan (MMAJ, 1995)	Compiled and contoured datasets from southwest Pacific surveys, including Cook Islands EEZ coverage, creating regional abundance and grade maps for SOPAC distribution.	https://evols.library.manoa.hawaii.edu/items/4a4b2bdc-ac78-4399-8b94-1bb6de1fd420

[12] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdf

1995	East-West Center (EWC, 1995)	Prepared a broad economic and resource assessment of Cook Islands nodules, integrating available grade, abundance, and cost data.	https://library.sprep.org/content/economic-and-development-potential-manganese-nodules-within-cook-islands-exclusive-economic
2001 / 2003	South Pacific Applied Geoscience Commission (SOPAC, 2001; 2003)	Defined a high-potential 'Promising Site' in the southern Penrhyn Basin, synthesizing multi-expedition data to guide exploration priorities.	https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdf
2003	International Seabed Authority (2003) — Geological Model of Polymetallic Nodule Deposits in the Clarion–Clipperton Fracture Zone	Chapter 19 examines the polymetallic nodule potential within the Cook Islands Exclusive Economic Zone.	https://www.isa.org.jm/wp-content/uploads/2022/11/2003-geomodel.pdf
2011	Paul E. Lynch (2011) — Towards the Development of a National Regulatory Framework for Deep Sea Mining in the Cook Islands	Outlines the Cook Islands' path to developing a national deep-sea mining regulatory and institutional framework—including the Seabed Minerals Act 2009 and balancing national interests with stakeholder engagement within the EEZ.	https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9d26d06b5efb7a40509779/1570580394494/16-11-11-Research+paper+Paul+Lynch.pdf
2014	Kenex Ltd. (2014) — Prospectivity analysis for the Cook Islands Seabed Minerals Authority	Applied GIS-based prospectivity modeling to identify and prioritize zones within the Cook Islands EEZ with the greatest commercial and geological potential.	https://kenex.com.au/wp-content/uploads/2022/04/Assessing-polymetallicnodule-deposits-in-the-Cook-Islands-Exclusive-Economic-Zone.pdf
2015	Joint Agencies Study (2015) — USGS, JOGMEC, SBMA, SOPAC	Re-analyzed historical JICA–MMAJ datasets from the Cook Islands EEZ to delineate six areas of economic interest and characterize their metal enrichment patterns.	https://www.sciencedirect.com/science/article/abs/pii/S0169136814003679
2016	Cardno (2016) — Cook Islands Seabed Minerals Authority Scoping Study	Assessed multiple extraction and processing scenarios for Cook Islands nodules, identifying the most financially viable development pathway.	https://pacificdata.org/data/dataset/oai-www-spc-int-0121e994-75ae-4824-b6a3-b18752a6a9fe
2016	McCormack (2016) — Geological and environmental assessment report	Provided a detailed geological and environmental baseline for the South Penrhyn Basin and recommended biodiversity protection and management measures.	https://cinature.org/wp-content/uploads/2021/04/Nodules_Booklet_CookIslands-Precautionary-Approach_2016_GeraldMcCormack_corrected.pdf
2021-2023	Fathom Pacific & ERIAS Group (2021; updated 2022, 2023) — ESIA Scoping Study for Moana Minerals Ltd.	Created ESIA framework for Cook Islands nodule exploration, covering baseline data, stakeholder engagement, and adaptive management.	https://www.moanaminerals.com/hubfs/618_10_ESIA%20Scoping%20Study_Public_v3_compile-1.pdf?hsLang=en
2022	Cook Islands Investment Corporation – Seabed Resources (CIICSR) 2022 – EL2 Tenement Report	Outlines CIICSR's exploration interests under EL2, including jurisdictional scope, development objectives, and associated legal and institutional frameworks for seabed resource management.	https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/6317a3deba3fbb22dda22643/1662493819554/EL2_CIICSR.pdf
2022	SBMA (2022) — Geomorphology of the Cook Islands, Tropical South Pacific Ocean	Characterized seafloor geomorphology across the Cook Islands EEZ to support marine spatial planning and resource assessment.	https://www.sbma.gov.ck/technical-reports
2022	SBMA (2022) — Equal Area Projection for the Entire Cook Islands EEZ	Developed equal-area mapping projection to enable consistent spatial analyses across the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports

2023	SBMA (2023) — SEA - Marine Spatial Assessment V1.1	Produced spatial analysis for marine planning, identifying environmental and operational constraints within the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports
2023	SBMA (2023) — Cook Islands Mineral Resource Estimate (JORC)	Published JORC-compliant mineral resource estimates for polymetallic nodules in the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports
2023	SBMA (2023) — Scale of Harvesting Against Natural Topography	Assessed potential seabed disturbance scale from harvesting in relation to natural geomorphological features in the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports
2024	SBMA (2024) — SEA - Effects Assessment	Assessed specific environmental effects of proposed nodule exploration and potential recovery activities in the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports
2024	SBMA (2024) — Ecosystem-Based Management Framework	Outlined a framework for managing Cook Islands deep-sea resources using ecosystem-based principles and integrated governance.	https://www.sbma.gov.ck/technical-reports
2025	SBMA (2025) — SEA - Cumulative Impact Assessment	Evaluated the cumulative environmental and socio-economic impacts of potential polymetallic nodule harvesting within the Cook Islands EEZ.	https://www.sbma.gov.ck/technical-reports

Figure 28. Summary of Historical Research and Data Compilations for the Cook Islands EEZ and the Penrhyn Basin

4.6. Environmental Characteristics (Baseline Information)

While little exploration work and box core sampling have been conducted in the target exploration area, the neighboring Cook Islands EEZ has been extensively studied. This section summarizes publicly available and previously commissioned datasets related to bathymetry, sediment composition, water column properties, and biological communities. Although not site-specific, these data provide valuable contextual insight into the environmental characteristics of the area and inform the design of forthcoming baseline surveys.

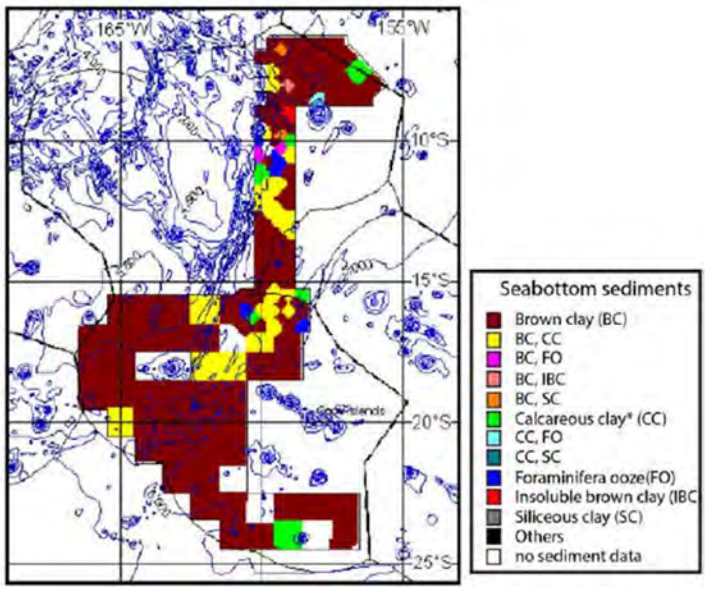
4.6.1. Bathymetry and Seafloor Morphology

The Penrhyn Basin is hydrologically linked to neighboring basins via the Aitutaki Passage, which carries Antarctic Bottom Water northwards. The basin is commonly divided into northern and southern Penrhyn Basin, demarcated by Penrhyn Island. Exploration targets focus primarily on flat, sediment-covered abyssal plains and smooth seafloor regions between tectonic features, where high-value nodules are most concentrated and accessible. The geology consists mainly of east-northeast–trending abyssal hills, 100–200 m high and spaced 5–20 km apart, with volcanic edifices in the northeast and scattered volcanic knolls.[13]

[13] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/6317a3deba3fbb22dda22643/1662493819554/EL2_CIICSR.pdf

4.6.2. Sediment Composition & Geochemistry

The Southern Penrhyn Basin seafloor is covered mainly by red-brown pelagic clays with very low sedimentation rates, creating ideal conditions for the slow growth of hydrogenetic nodules. These clays are composed primarily of clay minerals, siliceous microfossil remains—mostly radiolaria, sponge spicules, and silicoflagellates—and calcareous remains such as foraminifera and coccoliths. They also contain small amounts of amorphous material, volcaniclastics, zeolites, barite, and ichthyoliths. Micro-nodules of ferromanganese oxides occur in almost all samples, usually making up less than 1% of the sediment by content but occasionally reaching several percent.[14]



[15]

Figure 29. Seabed Sediments in the Cook Islands EEZ & Penrhyn Basin

4.6.3. Nodule Composition

According to the U.S. Geological Survey (USGS), J.R. Hein and K. Mizell, in their study "Penrhyn manganese nodules: A potential resource for rare earth element, titanium and cobalt", the Penrhyn Basin nodules contain "the highest mean Ti, Co and REY concentrations compared to nodules from all other nodule fields. When compared with the Clarion-Clipperton Zone manganese nodules, currently the area of greatest economic interest, the PB nodules show higher nodule abundances, and are more enriched in the green-technology, high-technology, and energy applications metals, Co, Ti, Te, Nb, REY, Pt and Zr, but have lower concentrations of Ni, Cu, and Li, with subequal amounts of Mo. The PB nodules show a significant resource potential for these critical metals because of their

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[14] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf
[15] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

high prices and high demand in the global market, and also because of the high nodule abundance, which is important as it allows for a smaller mine-site footprint and therefore a smaller environmental impact”.[16]

Table 4
Value (in USD) of contained metals in one dry ton of Cook Islands EEZ, nodules compared to CCZ nodules for select metals[1].

	Price of metal ($/ton)[2]	Mean content CIs nodules (g/ton)	Value in 1 ton CIs nodules ($)	Value in 1 ton CCZ nodules ($)
Manganese	2889	160,898	465	820
ΣREY[3]	14,426,804	1665	263	176
Cobalt	29,604	4113	122	62
Titanium	8720	11,999	105	28
Nickel	17,140	3805	65	223
Scandium	5,000,000	12	61	53
Copper	7657	2262	17	82
Niobium	140,000	90	13	3
Platinum	54,294,362	0.21	11	7
Molybdenum	*26,990*	*295*	*8*	*16*
Vanadium[4]	*13,176*	*508*	*7*	*6*
Tungsten	*62,120*	*64*	*4*	*4*
Tellurium	*115,000*	*24*	*3*	*<1*
Zirconium[4]	*3307*	*524*	*2*	*1*
Total	–	–	1111	1447

[17]

Figure 30. Estimated Value (USD) of Contained Metals in Cook Islands EEZ Nodules vs. CCZ Nodules

Area	Nodules (Mt)	Grade (%Co)	Grade (%Mn)	Grade (%Ni)	Grade (%Cu)	Grade (%Ti)
North Penrhyn Basin	616	0.27	20	0.55	0.31	1.1
South Penrhyn Basin/Aitutaki Passage	2,832	0.48	15	0.28	0.16	1.1
Manihiki Plateau	692	0.33	17	0.39	0.21	1.1
Southern Cook Islands	6,127	0.42	20	0.36	0.16	1.9
Total EEZ	10,266	0.42	18	0.35	0.17	1.6

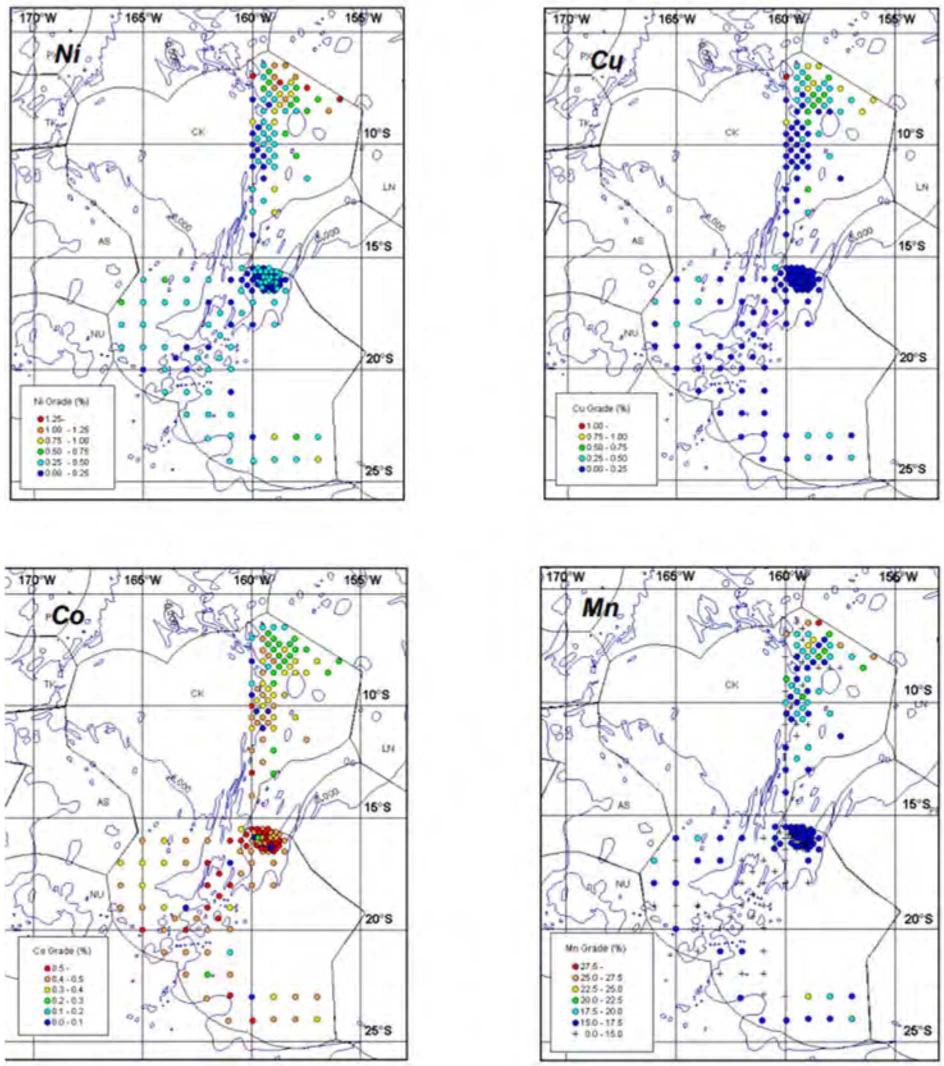
[18]

Figure 31. Nodule Metal Content in the Cook Islands EEZ and Penrhyn Basin

The Southern Penrhyn Basin nodules, located along the EEZ border to the south of the target exploration area, are characterized by elevated cobalt concentrations (>0.50% Co), exceeding those of most other known nodule deposits. These higher grades likely result from hydrogenetic growth, which concentrates cobalt in the oxic vernadite crystal structure (Fe >13%), combined with more highly oxygenated bottom waters. Their distribution—especially near the Aitutaki Passage into the South Penrhyn Basin and along abyssal plains

[16] https://goldschmidtabstracts.info/2015/1221.pdf
[17] https://www.sciencedirect.com/science/article/abs/pii/S0169136814003679?via%3Dihub
[18] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

east of the Manihiki Plateau—points to influence from Antarctic Bottom Water circulation (AABW).



[19]

Figure 32. Nodule Metal Content in the Cook Islands EEZ and Penrhyn Basin

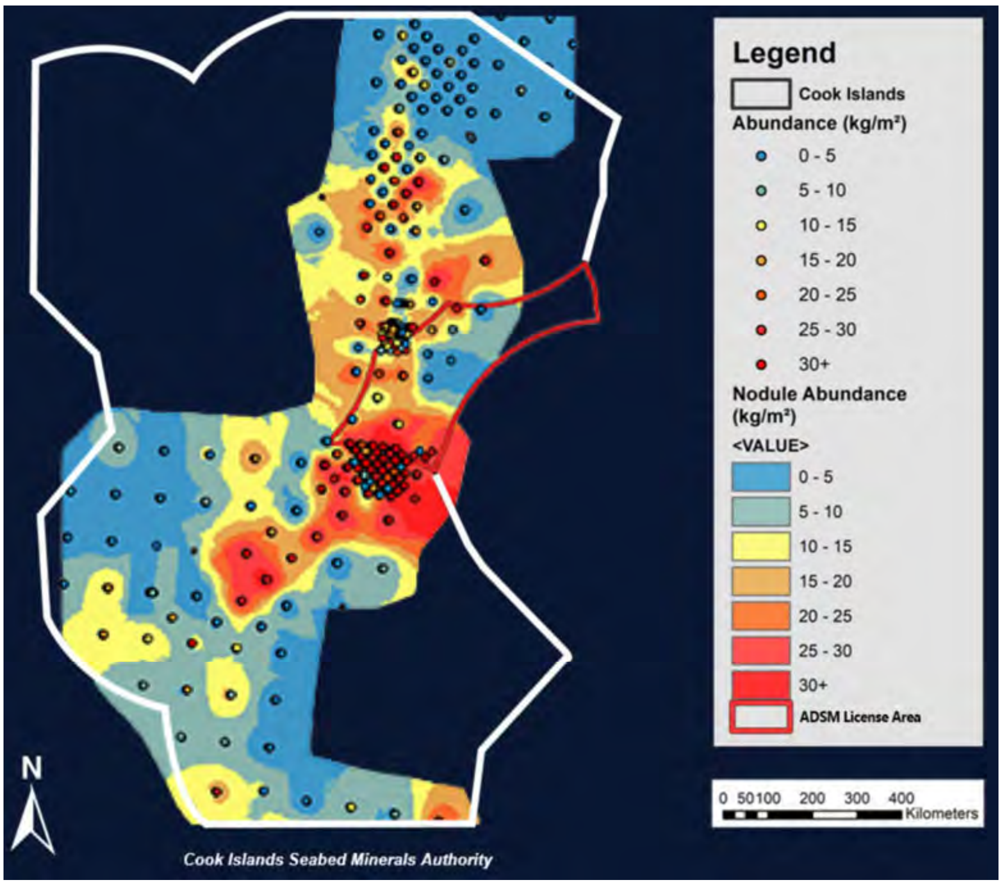
4.6.4. Nodule Abundance

According to the U.S. Geological Survey (USGS), J.R. Hein and K. Mizell, in their study "Penrhyn manganese nodules: A potential resource for rare earth element, titanium and cobalt", note that "the Penrhyn Basin encompasses more than 2,000,000 km² of the central South Pacific where manganese nodules (south of 10° South) show the highest

[19] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdf

concentrations per square meter of seabed over the largest area of any nodule field in the global ocean, with more than 124,000 km^2 showing >25 kg/m^2".[20]

Japanese expeditions in the 1980s provides ADSM with early baseline data on its license area. The southern part of ADSM's license area hosts the world's largest and highest-abundance nodule field ever discovered according to USGS. Data suggests this high-abundance nodule field extends continuously through ADSM's license area – from CSR in the south to CIC in the north.



[21]

Figure 33. Nodule Abundance in the ADSM License Area and Cook Islands EEZ

[20] https://goldschmidtabstracts.info/2015/1221.pdf

[21] Based on published data (Cook Islands Seabed Minerals Authority) and ADSM internal estimates; not verified or certified resource figures.

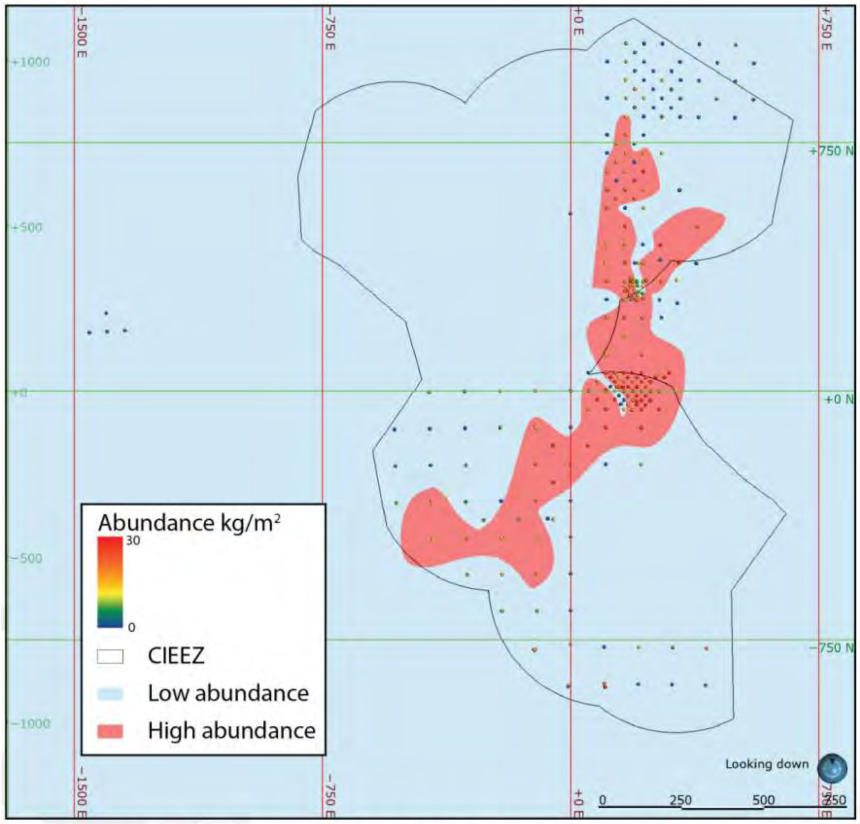
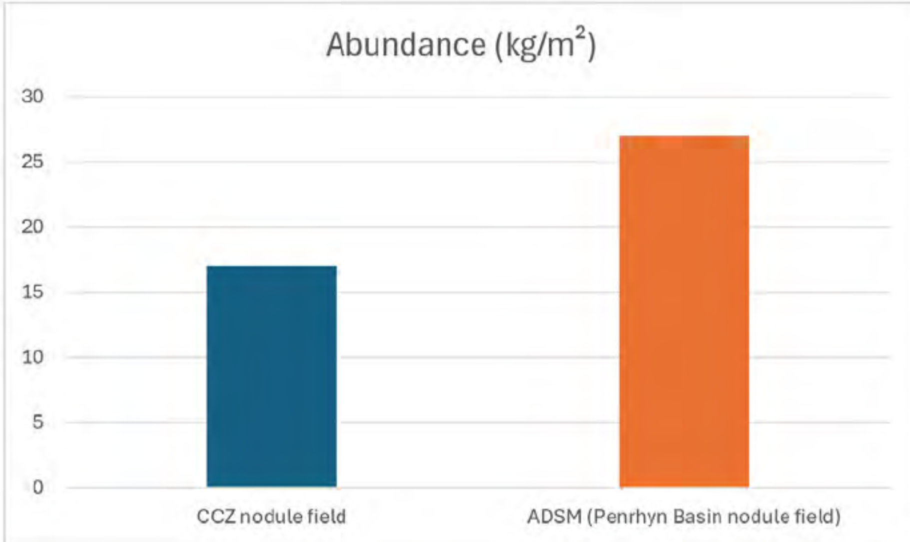


Figure 7-3: Plan view of the high- and low-abundance estimation domains. [22]

Figure 34. Nodule Abundance in the ADSM License Area and Cook Islands EEZ

Average nodule abundance in the Penrhyn Basin exceeds that of the CCZ by a wide margin. This highlights the favorable geological conditions and strong resource potential.

[22] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf



[23]

Figure 35. Comparison of Nodule Abundance: CCZ vs. ADSM (Penrhyn Basin)

Eight hours of ROV footage captured just south of ADSM's southern border reveal the remarkable scale, continuity, and abundance of this nodule field.

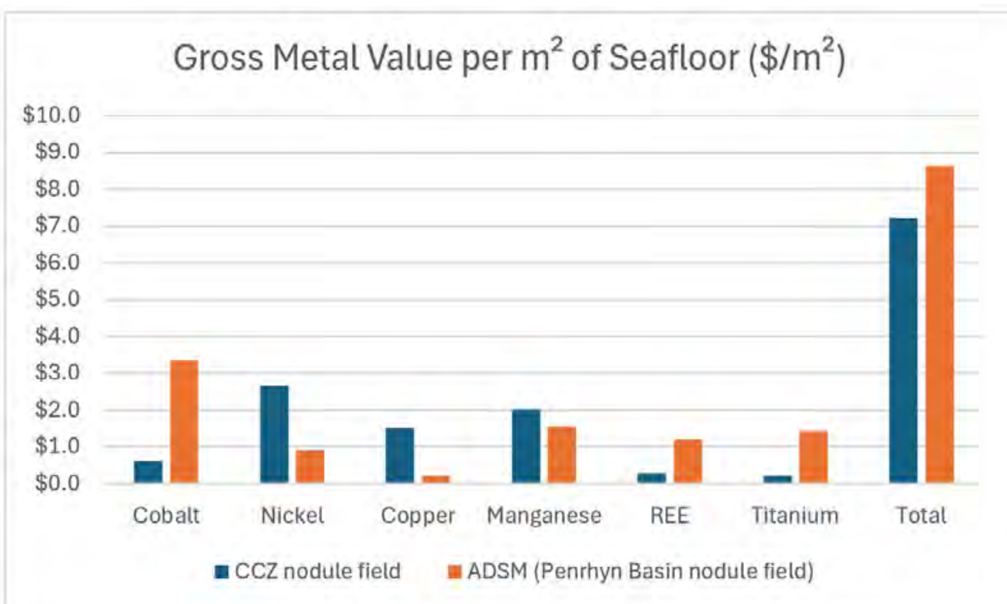
[24]

Figure 36. 8 Hours of ROV Footage Capturing Nodule Abundance South of ADSM's Southern Border

[23]For illustrative comparison only. Based on published data (Cook Islands Seabed Minerals Authority; TMC PFS August 2025) and ADSM internal estimates; not verified or certified resource figures. Represents ADSM's southern high-abundance zone within its NOAA license area.
[24] https://www.youtube.com/watch?v=FSp3I8sUUrl

4.6.5. Comparative Gross Metal Value per Square Meter

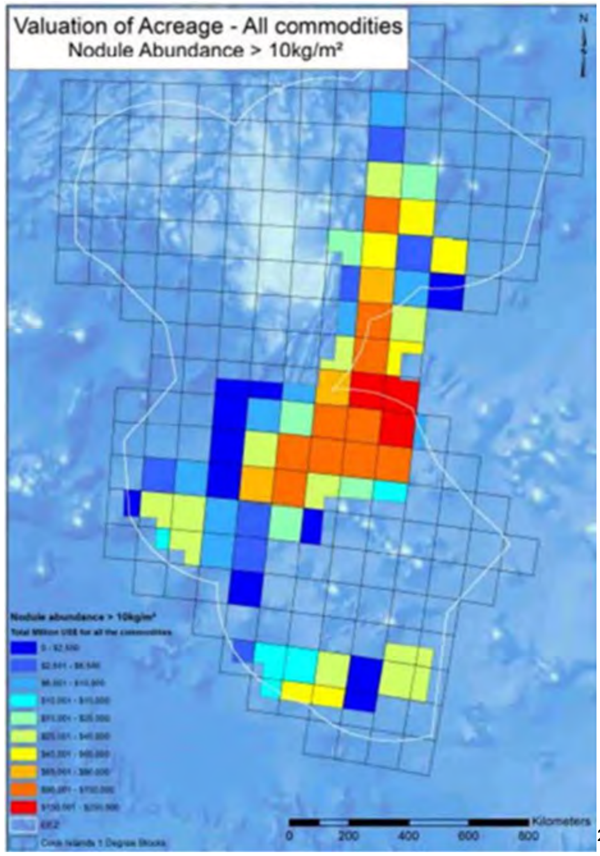
Figure 37 compares the gross metal value per square meter of seafloor between the Clarion-Clipperton Zone and ADSM's Penrhyn Basin license area. The Penrhyn Basin nodules show a higher overall value per m^2, driven by both higher nodule abundance and richer grades of high-value metals such as cobalt, titanium, and rare earth elements. While the CCZ nodules contain greater value from base metals like nickel, copper, and manganese, the Penrhyn Basin's composition favors strategic and higher-margin critical minerals, resulting in a stronger total gross metal value. As noted by Hein et al. (USGS), the data indicate that the Penrhyn Basin is a potential world-class metal resource, characterized by exceptionally high nodule abundance and elevated concentrations of critical minerals. Given these attributes, the Penrhyn Basin may be the most valuable and strategically significant nodule field in the world.



[25]

Figure 37. Comparison of Gross Metal Value per m^2 of Seafloor

[25] For illustrative comparison only. Based on published data (Hein & Mizell, USGS 2014; Cook Islands Seabed Minerals Authority; CSR Technical Report 2022; TMC PFS August 2025) and ADSM internal estimates; not verified or certified resource figures. Represents ADSM's southern high-abundance zone within its NOAA license area.



[26]

Figure 38. Estimated Nodule Valuation in the Cook Islands EEZ and surrounding area

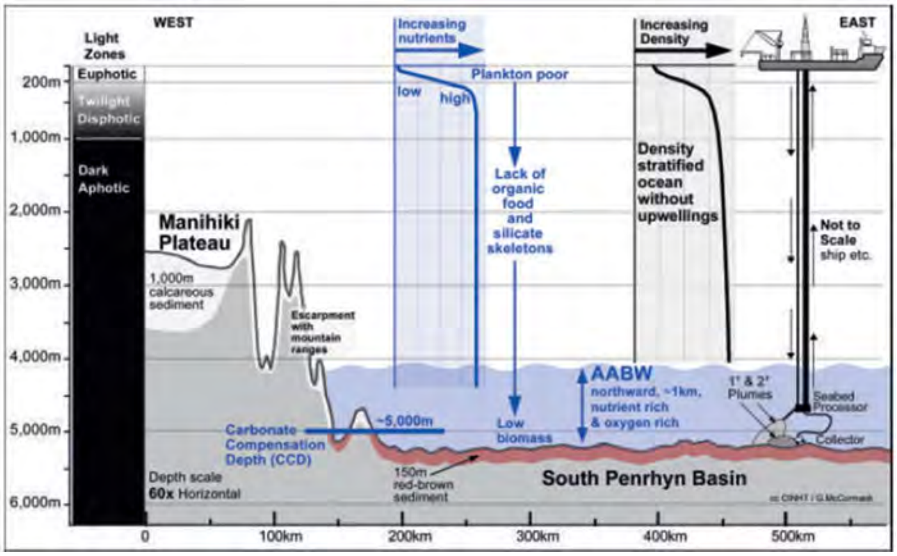
4.6.6. Nutrients

The South Pacific's low productivity (very little plant growth and marine life production) is driven by a shortage of nutrients in the surface waters. This nutrient scarcity creates an oligotrophic "biological desert" — waters are clear blue with very little plant plankton. Consequently, little organic matter sinks to the abyssal plain, starving benthic communities and resulting in very low biomass. It also alters the composition of sediments and associated life: almost no silicate-based plankton sink to the seafloor, leaving abyssal sediments with less than 1% siliceous material[27] and very few animals that require silicate skeletons. The basin's abyssal plain lies below the Carbonate Compensation Depth (~5,000 m), so calcareous sediments dissolve before reaching the seafloor, and organisms that rely on calcium carbonate skeletons are absent.

South Penrhyn Basin cross-section showing light, nutrient, and density profiles. Surface waters are nutrient-poor, limiting productivity, while deep waters are nutrient-rich but isolated by lack of upwelling. The abyssal plain lies below the Carbonate Compensation

[26] https://star.gsd.spc.int/meeting_docs/presentations/Session1-1_Seabed%20Minerals%20Cook%20Islands_WichmanM.pdf
[27] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

Depth, lacking calcareous and siliceous sediments. Strong density stratification helps keep mining plumes from reaching surface waters.

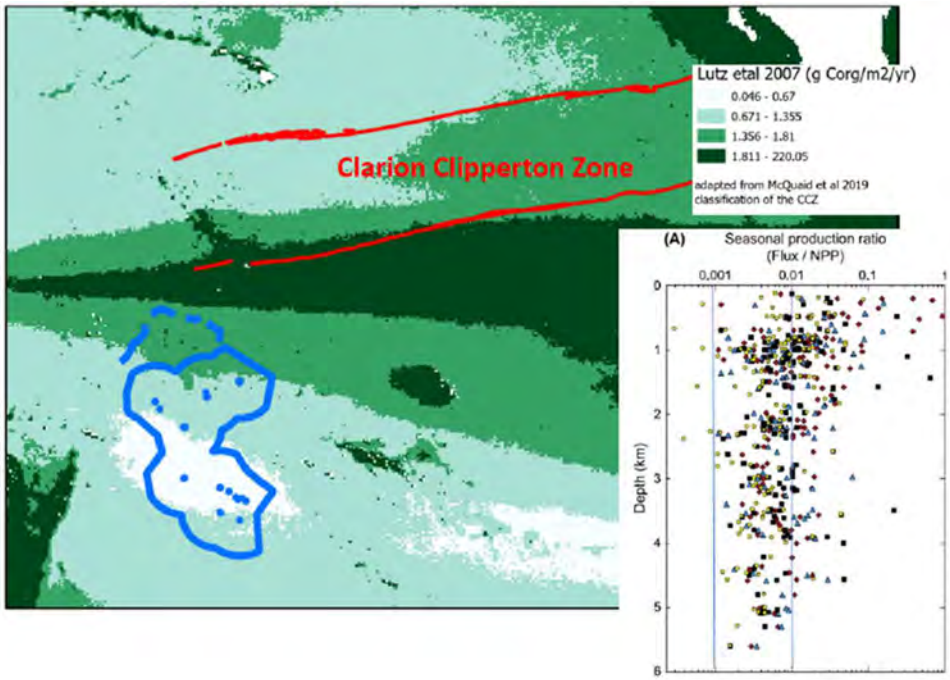


[28]

Figure 39. Environmental Features of the South Penrhyn Basin

The South Penrhyn Basin lies within one of the most nutrient-poor regions in the Pacific, indicating persistently low phytoplankton growth. In contrast, the Clarion–Clipperton Zone has higher productivity due to greater nutrient availability from upwelling.

[28] https://cinature.org/wp-content/uploads/2021/04/Nodules_Booklet_CookIslands-Precautionary-Approach_2016_GeraldMcCormack_corrected.pdf



[29]

Figure 40. Net Organic Export in the Cook Islands and Penrhyn Basin

4.6.7. Water Column Salinity, Temperature & Density:

The vertical structure of the water column within the Penrhyn Basin exhibits characteristics typical of the tropical South Pacific and plays a critical role in shaping benthic environments, sediment dynamics, and polymetallic nodule formation. Understanding the temperature, salinity, and density profiles is essential for modeling plume dispersion, assessing environmental impacts, and designing monitoring strategies for exploration activities.

The overall thermohaline structure is spatially consistent across transects surveyed within the Penrhyn Basin and adjacent regions, with only minor latitudinal variations. Surface temperatures are marginally higher in the northern EEZ, while salinity minima occur in central zones due to convergence of rainfall-dominated currents.

Density increases steadily with depth, driven by both salinity and temperature gradients. Below the pycnocline, the water column becomes more homogeneous, with stable stratification extending to the seabed. This structure limits vertical mixing and confines any disturbances or discharges to the deep ocean layer.

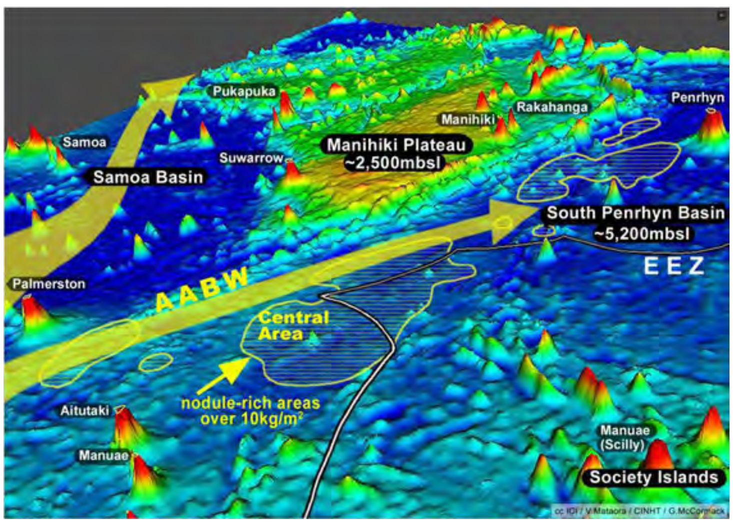
[29] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

4.6.8. Currents

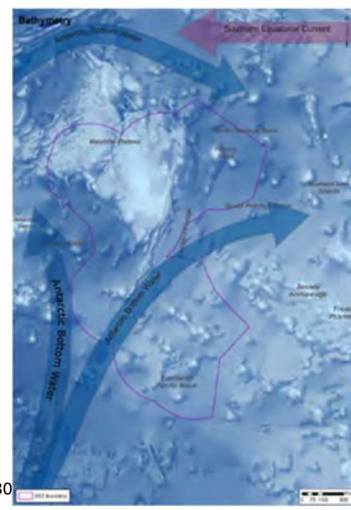
The Penrhyn Basin is influenced by Antarctic Bottom Water, a cold, dense current that flows northward through the Aitutaki Passage. This deep current maintains oxygen-rich seafloor conditions and suppresses fine sediment accumulation, both critical for the formation and long-term exposure of polymetallic nodules.

The region's weak bottom currents and low sedimentation rates create stable seafloor environments ideal for nodule growth. At the surface, the absence of upwelling results in oligotrophic conditions and low biological productivity, limiting Particulate Organic Carbon (POC) flux to the seabed. This in turn contributes to the low benthic biomass observed in the basin.

The near-freezing Antarctic Bottom Water is about 1 km thick and flows north along the seabed, splitting around the Manihiki Plateau.



[30]



[31]

Figure 41. and Figure 42. Antarctic Bottom Water Flow Map

4.6.9. Benthic Environment and Faunal Communities:

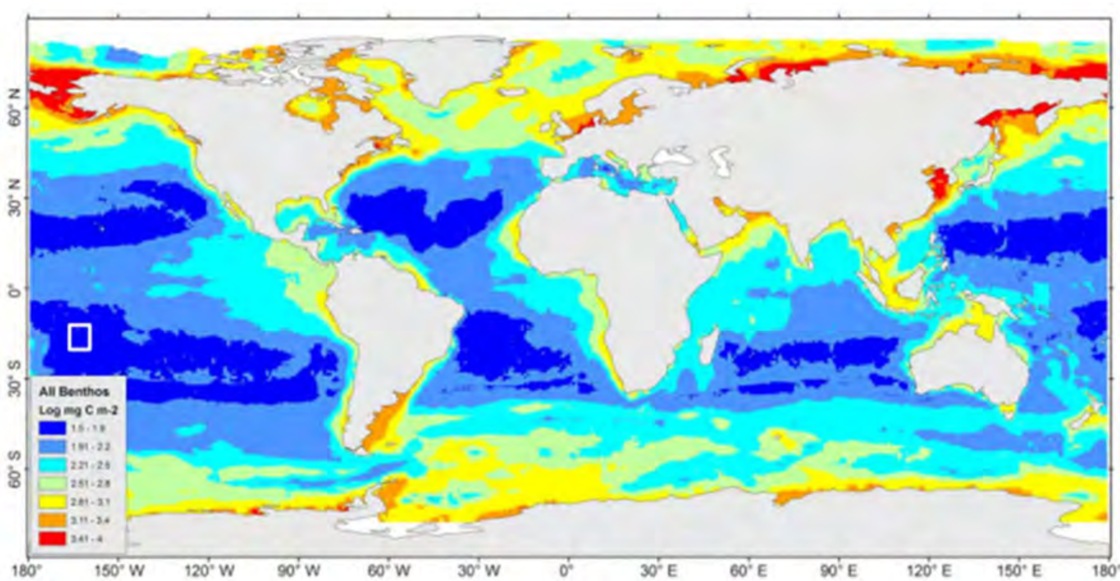
No site-specific benthic biology surveys have yet been carried out in the project area. However, based on the consistent and stable environmental conditions typical of abyssal polymetallic nodule fields, it is reasonable to expect that local benthic communities will resemble those documented elsewhere in the Pacific, such as in the Clarion-Clipperton Zone. This expectation will be evaluated and refined through dedicated studies during the project's exploration phase. One impact of the relatively low rate of surface production in

[30] https://cinature.org/wp-content/uploads/2021/04/Nodules_Booklet_CookIslands-Precautionary-Approach_2016_GeraldMcCormack_corrected.pdf
[31] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

the South Penrhyn Basin is that limited nutrient sources sink to the seafloor, which may result in fewer benthic organisms.

In general, there is a decline in abundance and body size with depth, and as such, benthic communities on abyssal plains are dominated by bacteria (microfauna) and meiofauna communities. This does not imply diminished biodiversity. Species richness can be high in the meiofauna and macrofauna size range, and given the low abundance, repeated sampling often continues to identify low numbers or singletons of additional species, resulting in species accumulation curves that are rarely asymptotic, even after multiple surveys.

It should also be noted that while the overall functional structure of benthic communities in the South Penrhyn Basin may be broadly comparable to those in the CCZ, differences in particulate organic carbon (POC) flux between the two regions are expected to influence species composition, biomass, and trophic dynamics. The lower POC flux in the South Penrhyn Basin relative to the CCZ may further limit total biomass and abundance, even as overall species diversity remains high.



[32]

Figure 43. Seafloor Biological Communities

4.6.9.1. Microfauna

Microfauna in the South Penrhyn Basin, including bacteria, archaea, and microscopic eukaryotes under 32 µm, are vital to deep-sea sediment ecology. Although no microbiological survey has been done for the South Penrhyn Basin, these organisms are

[32] https://www.moanaminerals.com/hubfs/618_10_ESIA%20Scoping%20Study_Public_v3_compile-1.pdf?hsLang=en

likely more diverse and abundant than other size groups. They help drive carbon cycling, transfer energy from detritus to larger organisms, and support processes like nutrient recycling and bioturbation. Advances in genetic tools, including eDNA, now allow detailed biodiversity assessments, and microfauna may also be an important source of marine genetic resources.

4.6.9.2. Meiofauna

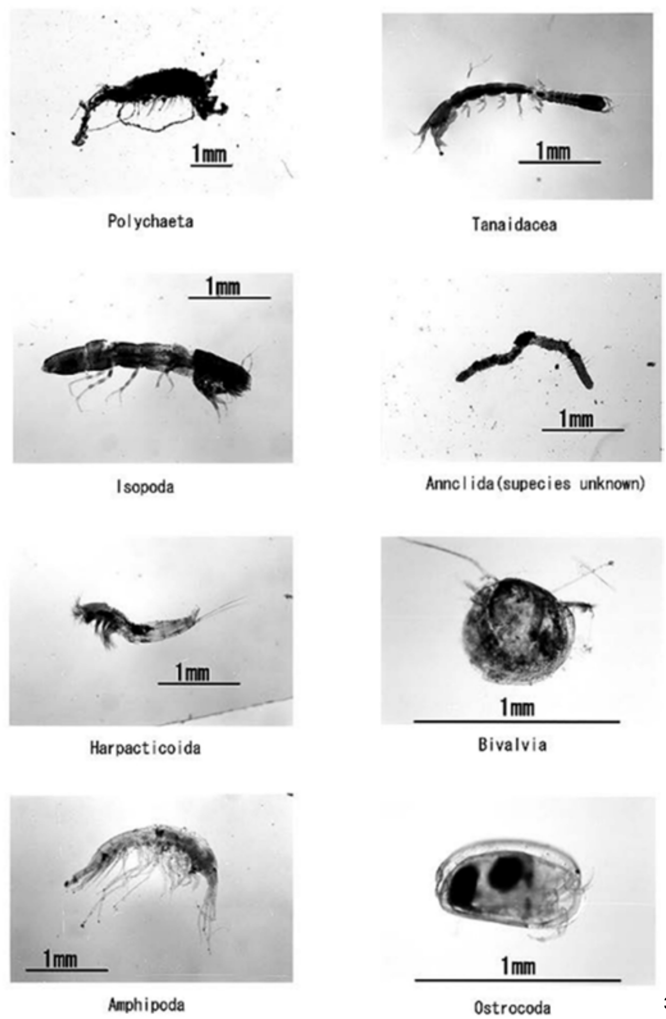
Meiofauna in the South Penrhyn Basin, typically 32–300 μm in size, include nematodes, copepods, and other small invertebrates that live within the sediment. Meiofauna, notably nematodes and copepods, are likely the most abundant and biomass-dominant group, although detailed taxonomic surveys remain limited. While site-specific data for the South Penrhyn Basin are limited, meiofauna generally play an important role in deep-sea ecosystems by grazing on microfauna, consuming detritus, and serving as prey for larger organisms. They also contribute to sediment mixing and nutrient cycling, helping maintain overall benthic ecosystem function.

4.6.9.3. Macrofauna

Macrofauna in the South Penrhyn Basin, generally 0.5–20 mm in size, are challenging to sample effectively, and data remain limited. The most comprehensive work to date in the Cook Islands, conducted by JICA-MMAJ (2001), found community composition consistent with long-term Clarion–Clipperton Zone (CCZ) studies, where macrofauna are dominated by four main classes: Polychaeta (segmented worms), Crustacea (including isopods, amphipods, and tanaids), Bivalvia, and Gastropoda. These groups typically account for up to 90% of macrofaunal diversity in the CCZ and other deep-sea basins.

At the species level, research in the Pacific abyssal basins has shown that many polychaete and isopod species have wide geographic distributions, often spanning thousands of kilometers, although this pattern may be influenced by under-sampling. Deep-sea macrofauna communities tend to have high diversity but also a high proportion of rare species, with many taxa represented by single specimens. Genetic studies in the CCZ suggest that while diversity is high, overlap between sites decreases with distance, highlighting both widespread and locally restricted species.

Macrofaunal abundance in abyssal plains typically ranges from the high tens to high hundreds of individuals per square meter, with diversity and abundance linked to organic material reaching the seafloor. In low-productivity regions like the South Penrhyn Basin, reduced Particulate Organic Carbon (POC) flux is likely to limit both abundance and diversity compared to more productive regions such as the CCZ. Understanding macrofaunal communities in the basin will require more extensive sampling, ideally using both morphological and genetic methods to capture the full scope of diversity.



[33]

Figure 44. South Penrhyn Basin Macrofauna

4.6.9.4. Pelagic & Surface Zone Macrofauna

The South Penrhyn Basin's pelagic environment is part of the Western South Pacific water mass, within the nutrient-poor South Pacific Subtropical Gyre, which stretches from Easter Island to Samoa. These waters are stable, with midwater layers dominated by Antarctic Intermediate Water (~1,000–3,500 m) and Antarctic Bottom Water below ~3,500 m.

[33] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdfhttps://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/5d9e86a3aae2d05ebebbc16a/1570670286708/2003_Okamoto_SummaryReportofMnVodulesInTheCookIslands_JICA_SOPAC.pdf

Seasonal and climatic events such as cyclones and El Niño–Southern Oscillation can influence conditions, but variability at abyssal depths is generally low.

An important ecological process in the pelagic zone is diel vertical migration, where micronekton move from deep waters to the surface at night and descend during the day. This movement brings deep-dwelling prey within range of predators such as tunas, billfishes, and dolphinfish, which are key to local fisheries, and supports the transfer of carbon and energy from surface waters to the deep sea.

4.6.9.5. Megafauna and Migratory Species

The Penrhyn Basin also supports migratory marine megafauna, including whales, dolphins, and sea turtles, which traverse the region as part of South Pacific migration routes. Humpback whales pass through seasonally and may use coastal areas for breeding or resting, while green and hawksbill turtles inhabit the region and may nest onshore. These species are not typically associated with deep-sea habitats targeted for polymetallic nodule exploration, but their presence in surface and midwater zones warrants consideration in the EIA.

Large predators, including sharks and cetaceans, are present, and the region supports important seabird populations. The northern Cook Islands host significant colonies of sooty terns, lesser frigatebirds, red-footed boobies, and red-tailed tropicbirds, while the southern islands support large numbers of great frigatebirds, red-footed boobies, and brown boobies. There are 62 seabird species in the Penrhyn Basin.[34] These species form part of a wider interconnected pelagic ecosystem that depends on the movement of energy from the surface to depth.

[34] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/6317a3deba3fbb22dda22643/1662493819554/EL2_CIICSR.pdf

Common Name	Scientific name	IUCN Category
Dwarf Minke-Whale	*Balaenoptera bonaerensis*	NT
Blue Whale	***Balaenoptera musculus***	**EN**
Humpback Whale	*Megaptera novaeangliae*	LC
Common Dolphin	*Delphinus delphis*	LC
Short-finned pilot Whale	*Globicephala macrorhynchus*	LC
Fraser's Dolphin	*Lagenodiphis hosei*	LC
Ocra	*Orcinus orca*	DD
Melon-Headed Whale	*Peponocephala electra*	LC
Pantropical spotted Dolphin	*Stenella attenuata*	LC
Spinner Dolphin	*Stenella longirostris*	LC
Sperm Whale	***Physeter macrocephalus***	**VU**
Blainville's beaked Whale	*Mesoplodon densirostris*	DD
Cuvier's beaked Whale	***Ziphius cavirostris***	**VU**
Bryde's Whale	*Balaenoptera edeni*	LC
Sei Whale	***Balaenoptera borealis***	**EN**
Risso's Dolphin	*Grampus griseus*	LC
Peale's Dolphin	*Lagenorhynchus australis*	LC
False Killer Whale	*Pseudorca crassidens*	NT
Striped Dolphin	*Stenella coeruleoalba*	LC
Bottlenose Dolphin	*Tursiops truncatus*	LC [35]

Figure 45. Known Marine Mammals in the Penrhyn Basin

4.7. Planned Exploration Activities, Environmental Impacts and Mitigation Measures:

4.7.1. Delineation of Seafloor Features and Survey Activities

ADSM's exploration program is a multi-year, phased survey effort designed to map and characterize the South Penrhyn Basin license area, integrate geological and environmental datasets, and delineate high-value polymetallic nodule zones while minimizing environmental impact. All proposed activities fall within those identified in NOAA's 1981 Programmatic Environmental Impact Statement (PEIS) as having no significant adverse environmental impact when conducted under established best practices.

The program will use the following classes of survey and sampling systems:

- **Mapping & Imaging Systems:** Hull-mounted multibeam echosounder (MBES, 30 kHz) for bathymetry and backscatter; Autonomous Underwater Vehicles (AUVs) for high-resolution micro-topography; Remotely Operated Vehicles (ROVs) and towed camera systems for visual habitat documentation.

[35] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/6317a3deba3fbb22dda22643/1662493819554/EL2_CIICSR.pdf

- **Seafloor Sampling Gear:** Large box corers, multicorers, and boomerang samplers for nodules and shallow sediments; dredges for bulk metallurgical samples in designated test zones; epibenthic sleds for benthic community characterization.
- **Water Column & Oceanographic Instruments:** CTD rosettes and Niskin bottles for physical and chemical profiling; Acoustic Doppler Current Profilers (ADCP) and sediment traps on long moorings for current, particle flux, and seasonal monitoring.
- **System Trials:** A track-mounted collector vehicle for a small-scale operational test during Cruise 4, which will require a supplemental EIS.

Each system has been selected for proven effectiveness in deep-ocean research while limiting disturbance to the seafloor and overlying water column. Equipment deployment and timing are linked to cruise phases, with the most intensive mapping in Years 1–2, environmental baselining in Year 3, and a collector trial in Year 4.

4.7.2. Planned Exploration Activities, Environmental Impacts, and Mitigation Measures

ADSM's exploration program will use low-impact mapping systems, sampling tools, and environmental monitoring instruments over four cruises. The goal is to collect geological, geotechnical, and environmental baseline data while keeping seafloor disturbance to a minimum. Cruise plans will be guided by habitat mapping to avoid sensitive areas, and sampling will be limited so that impacts do not add up over time. These practices follow NOAA's 1981 Programmatic Environmental Impact Statement, which found that exploration done under best practices does not cause significant harm. If monitoring shows that impacts are greater than expected, operations will be adjusted or paused and extra safeguards put in place.

Figure 46 below shows, for each major piece of equipment, how it will be used, the potential risks, the initial risk assessment, the specific safeguards, and which cruises it will be deployed on. This format links each activity directly to its environmental footprint and the measures in place to prevent, track, and manage any impacts.

Equipment	Program	Environmental Risks	Initial environmental risk assessment	Environment Mitigation	Cruise 1	Cruise 2	Cruise 3	Cruise 4
Exploration Phase								
Vessel	•Geology •Environmental	• Noise from engines/acoustics • Light emissions • Fuel/oil discharge • Air emissions	**• No significant impact** • Short duration • Modern vessel • Controls in place	• Short-term campaigns • Shielded lighting • Low-power acoustics with ramp-up • Preventive maintenance • Spill kits onboard • MARPOL-compliant waste handling	●	●	●	●
Hull Mounted Multibeam Echosounder (MBES) 30kHz	•Geology •Environmental	• Underwater noise • Short-term disturbance to marine fauna	**• No significant impact** • Short duration • Targeted use	• Operate at lowest effective power • Avoid sensitive areas if marine mammals present	●	●		
Autonomous Underwater Vehicles (AUVs)	•Geology •Environmental	• Noise from thrusters/sonars • Light emissions • Physical contact with seafloor	**• No significant impact** • Localized effects • Short missions	• Low-power acoustics • Shielded lights • Maintain safe altitudes above seafloor • Abort protocols if malfunction occurs	●	●	●	●
Large Box Corer (x2)	•Geology •Environmental	• Localized sediment disturbance • Removal of benthic organisms	**• No significant impact** • Limited footprint • Infrequent deployment	• Limit deployments to required sampling • Target representative areas only • Adjustable depth lighting controls • USBL acoustic positioning	●	●	●	
Multicorers	•Geology •Environmental	• Localized sediment disturbance • Removal of benthic organisms	**• No significant impact** • Small sample area • Controlled use	• Minimize number of samples • Use precision positioning • Document sites before and after sampling		●	●	
Dredges	•Geology	• Larger localized disturbance • Removal of nodules and associated fauna	**• No significant impact** • Infrequent use • Controlled deployment zones	• Deploy only in designated test areas • Limit dredge width and duration • Avoid sensitive habitats	●	●		
CTD Rosette	•Environmental	• Brief underwater noise from winch and sensors • Potential minor disturbance to water column fauna	**• No significant impact** • Short deployment duration • No seafloor contact	• Limit casts to required sampling • Avoid deployment in presence of sensitive species • Maintain proper winch handling to avoid entanglement	●	●	●	
Niskin Bottles	•Environmental	• Minimal disturbance to water column during closure	**• No significant impact** • Small footprint • No seafloor contact	• Deploy only as needed for environmental sampling • Operate at pre-determined depths to avoid unnecessary disturbance	●	●	●	
Remotely Operated Vehicle (ROV)	•Environmental	• Noise and light emissions • Possible sediment disturbance from thrusters • Potential contact with benthic organisms	**• No significant impact** • Controlled operations • Localized footprint	• Shielded lighting • Maintain safe altitude above seafloor • Minimize thruster wash • Avoid sensitive habitats			●	
Epibenthic Sled	•Environmental	• Sediment disturbance • Capture of benthic organisms	**• No significant impact** • Limited tow area • Infrequent deployment	• Restrict use to designated sampling sites • Limit tow length • Document pre- and post-sampling			●	
ADCP Arrays (bottom mounted moorings)	•Environmental	• Seafloor contact • Potential entanglement risk to marine fauna • Minimal acoustic emissions	**• No significant impact** • Small footprint • Long-term passive monitoring	• Use minimal mooring footprint • Avoid known sensitive habitats • Ensure mooring lines are taut and marked		●	●	●
Sediment Traps (long moorings)	•Environmental	• Potential entanglement risk • Minimal disturbance from deployment/retrieval	**• No significant impact** • Small footprint • Long-term passive monitoring	• Deploy in low-traffic areas • Use streamlined mooring design • Retrieve promptly at end of deployment period		●	●	
Collector Vehicle Test (will require supplemental EIS in year 4)	•Geology •Environmental	• Significant sediment disturbance and plume generation • Removal of nodules and associated benthic organisms • Underwater noise and vibration • Potential hydraulic fluid or oil leaks	**• Potential impact** • Small trial area • Limited operational hours	• Restrict use to designated test zones • Limit operational duration and area of disturbance • Monitor and characterize plume during operations • Conduct pre- and post-disturbance environmental surveys • Maintain equipment to prevent leaks; spill response plan in place • Operate at lowest effective speeds to reduce noise and plume height				●

Figure 46. Exploration Risk Assessment and Mitigation for Exploration Equipment

4.7.2.1. Sediment Disturbance and Plume Behavior

Exploration activities will include deployment of seabed sampling equipment such as box corers, multi-corers, push cores, and free-fall grabs. Based on prior regional operations and standard volumes, each sampling event is expected to disturb between 0.1 and 1.0 m^3 of surface sediment. Sampling will be spatially distributed across the license area to support habitat classification and baseline geochemical analysis. Sediment disturbance during Years 1 to 3 under the initial EIS is expected to be minimal.

Independent MIT and Scripps field trials showed that immediately behind a prototype collector, 92–98% of mobilized sediment remained within 2 m of the seabed. At instrumented moorings positioned 50–100 m from the track, plume signals passed after ~2–3.5 hours, and analysis indicated that just 1–8% of the original discharge persisted aloft, demonstrating that the vast majority of material redeposited quickly and effects were localized and short-lived.[36]

Although exploration-scale sampling is far smaller in scope, ADSM will apply similar dynamic plume modeling frameworks to guide impact assessment, operational planning, and real-time monitoring. Any future collector trials, such as the planned Cruise 4 trial, will require a supplemental EIS.

4.7.2.2. Benthic Ecosystem Considerations

The abyssal benthic ecosystem in the South Penrhyn Basin is considered highly vulnerable to disturbance, with many species being sedentary, slow-growing, and poorly adapted to environmental disruption. Potential impacts from nodule removal include habitat alteration, loss of substrate, and sediment plume exposure. Given the limited number of surveys to date and potential for undocumented or endemic species, ADSM will implement precautionary measures, including the designation of Biodiversity Preservation Areas (BPAs), to conserve representative habitats and mitigate localized impacts.

All sampling will be designed to minimize its footprint and avoid ecologically sensitive features. Monitoring of benthic communities before, during, and after activities will enable early detection of changes, supporting adaptive management consistent with NOAA's finding that exploration-scale activities cause no significant impact.

4.7.2.3. Pelagic Fauna Considerations

Direct interaction with pelagic fauna during abyssal exploration is unlikely; however, indirect effects—such as underwater noise, vessel traffic, and potential ship strikes—pose

[36] https://www.science.org/doi/epdf/10.1126/sciadv.abn1219

low but non-negligible risks. Seasonal awareness of migration periods for whales, dolphins, and turtles will inform cruise scheduling. Vessel activity will be monitored, and operational adjustments will be made to minimize disturbance during peak migratory windows.

Due to sparse regional data on pelagic species distribution and behavior, ADSM will integrate marine megafauna observations into baseline surveys and share results with relevant conservation authorities to strengthen cumulative impact assessments.

4.7.2.4. System Test Planning

No collector trials are planned during Years 1 through 3, when the program will focus exclusively on geoscientific surveys and environmental baseline characterization. NOAA's initial EIS, prepared prior to issuance of the exploration license, addresses these activities. If ADSM proposes a Year 4 collector trial to simulate commercial recovery at limited scale, we will submit updated baseline data, detailed equipment descriptions, and trial plans (including environmental modeling) to NOAA at least one year in advance, and will not proceed without NOAA's concurrence, per 15 CFR § 970.204.

This sequencing allows NOAA to prepare a supplemental EIS specific to the collector trial, ensuring regulatory coverage beyond the scope of the initial license EIS and minimizing both environmental risk and the potential for regulatory delays.

4.7.3. Environmental Monitoring Plan

ADSM's environmental monitoring plan, developed in accordance with 15 CFR § 970.702, ensures activities remain within the approved exploration scope, provide NOAA with data to verify its environmental findings, and maintain full compliance with license terms. All activities will be conducted strictly as described in the approved plan, with any changes requiring prior NOAA approval. Collected data—physical, chemical, and biological—will be quality-controlled, archived, and made available for NOAA review. Exploration during the first three years will consist of low-impact mapping, sampling, and measurements classified as "no significant impact" under § 970.701(a), used to build a comprehensive environmental baseline. Since the activities under the initial EIS (Year 1 through Year 3) are not expected to result in any significant environmental impact, a stand-alone monitoring plan specific to those years is unnecessary. For a detailed activity-by-activity risk assessment and corresponding mitigation measures of the activities expected under the initial EIS, see Figure 46 in Section 4.7.2. The proposed collector trial in Year 4 will be subject to a supplemental EIS and monitored specifically for the three unresolved concerns identified in § 970.701(b): (i) benthic disturbance within and adjacent to the collector track, (ii) sediment blanketing and food dilution, and (iii) plume effects on fish larvae.

Unresolved Concern	Relevant Monitoring Parameters	Methods / Equipment	Purpose
(i) Quantifying the extent of benthic disturbance within and adjacent to the collector track	• Benthic disturbance (track) • Benthic biodiversity & sediments • Benthic habitats • Geological properties • Faunal succession (time-lapse cameras)	• Before-and-after ROV & lander surveys • Multicorer, epibenthic sleds, sediment sampling • ROV photo transects and habitat mapping • Sediment granulometry, porewater chemistry, redox profiles • Time-lapse camera deployments	• Measure physical track disturbance, benthic organism loss, substrate alteration, and post-disturbance community recovery
(ii) Evaluating the degree of sediment blanketing and potential dilution of benthic food supply	• Particle dispersion & settling • Food dilution / blanketing • Ecosystem functioning • Chemical oceanography	• Particle-size sensors; sediment traps at 10m, 500m, 2000m • Sediment traps & benthic landers at impact vs. reference sites • Benthic chambers for oxygen flux, nutrient cycling, bioturbation • Water-column nutrient & particulate organic matter sampling	• Quantify sediment deposition thickness, organic matter dilution, and impacts on benthic metabolic processes and food availability
(iii) Determining whether plume dispersion has any measurable effect on fish larvae in the water column	• Near-bottom turbidity & plume density • Plume modeling • Water-column biology & fish larvae • Chemical oceanography	• In situ turbidity & optical backscatter sensors • ADCP moorings, hydrodynamic models • eDNA sampling, plankton nets for larvae/zooplankton • Nutrients, pH, carbonate chemistry, trace metals in water column	• Assess vertical and horizontal plume extent, overlap with larval habitat, and potential biological exposure or displacement

Figure 47. Environmental Monitoring Plan for Key Environmental Concerns

4.8. Use Conflict Analysis

The E-HSP is a high-seas enclave bounded by the Exclusive Economic Zones (EEZs) of French Polynesia, the Cook Islands, and Kiribati, formally designated by the Western and Central Pacific Fisheries Commission (WCPFC) as a Special Management Area (SMA) to monitor and regulate fishing activity. ADSM's proposed exploration area within the E-HSP lies in abyssal waters at depths of approximately 5,000–5,400 m—well beyond the reach of nearshore ecosystems, traditional use zones, or coastal economic activity. The combination of great depth, remote offshore location, and clear physical separation from biologically and economically active shallower zones greatly reduces the potential for overlap or conflict with other marine uses.

This section provides the "use conflict" information NOAA requests in 15 CFR 970.204(b) and affirms that operations will not unreasonably interfere with navigation, fishing, scientific research, or other high-seas freedoms, consistent with Subpart E (e.g., §§ 970.503, 970.520). Where potential conflicts are identified, ADSM will coordinate and, if necessary, adjust timing or locations in consultation with relevant authorities and ocean users.

ADSM's program is designed to align with existing marine uses while applying a precautionary, inclusive approach to conflict avoidance and resolution. Anticipated risks are low to moderate, with mitigation measures in place to address both direct impacts and stakeholder interests. These include integrated plume modeling within the EIA, seasonal timing safeguards, and adherence to zoning constraints. ADSM will also maintain full compliance with NOAA regulations.

The applicant affirms that, to the extent presently known, all potential conflicts with other lawful uses of the license area have been identified and disclosed in this application. No additional conflicts are known to the applicant at this time.

4.8.1. Fisheries

Fishing in the E-HSP is exclusively pelagic, targeting migratory tuna species such as albacore, bigeye, and yellowfin using longline gear set in the upper water column. No bottom-contact or demersal fishing occurs on or near the 5,000–5,400 m seabed where ADSM will operate. The area lies within the Eastern High Seas Special Management Area (EHSP-SMA) designated by the Western and Central Pacific Fisheries Commission (WCPFC) under CMM 2016-02, which requires continuous vessel monitoring, advance entry and exit notices, and prohibits transshipment within the SMA. Because fishing occurs far above the seabed, potential interaction with deep-sea exploration is minimal. Any residual risk will be managed through advance Notices to Mariners, vessel tracking, and proactive coordination with the relevant fisheries authorities listed above

Fisheries oversight and coordination in and around the zone are provided by:

- **WCPFC:** Regional treaty body establishing binding conservation and management measures for tuna fisheries and the EHSP-SMA.
- **Pacific Islands Forum Fisheries Agency (FFA):** Regional organization coordinating surveillance, monitoring, and joint enforcement for its 17 member states.
- **Te Vaka Moana (TVM):** Cooperative fisheries framework among six Pacific states, including the Cook Islands, focused on sustainable tuna management.
- **Parties to the Nauru Agreement (PNA):** Coalition of Pacific Island countries that drove high-seas pocket closures and manage purse-seine tuna effort through the Vessel Day Scheme.
- **Secretariat of the Pacific Community (SPC):** Provides fisheries science, stock assessments, and technical advice to Pacific Island countries and regional bodies.

- **Pacific Islands Tuna Industry Association (PITIA):** Industry body representing regional tuna fleets and processors.
- **Cook Islands Fisheries Field Office:** National authority managing adjacent EEZ fisheries, compliance, and coordination with regional bodies.

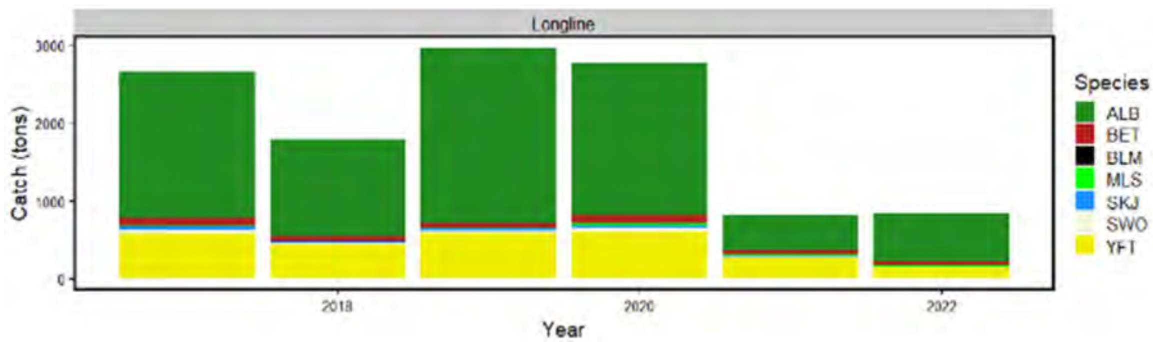
Fishing activity within the Eastern High Seas Pocket Special Management Area (EHSP-SMA) is limited in scale, highly regulated under WCPFC CMM 2016-02, and dominated by longline operations. Vessel Monitoring System (VMS) data for 2023 show that activity was concentrated between March and August, with monthly totals peaking at 46–47 vessels in May and June before declining to fewer than 10 vessels by December. The primary fleet presence is from Chinese Taipei, which regularly accounted for two to three dozen vessels during peak months. China represented the second-largest presence, with up to 19 vessels active in May.

Flag CCM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2023												
Cook Islands	0	0	0	0	0	0	0	0	0	0	0	1
China	1	2	8	7	8	19	9	8	11	2	2	2
EU-Spain	0	0	0	1	0	0	0	0	0	0	0	0
Korea (Republic of)	0	0	0	0	0	1	0	0	0	0	0	1
Panama	0	0	0	0	0	0	1	0	0	0	0	0
Chinese Taipei	1	1	23	22	38	26	32	28	11	12	3	3
United States of America	0	1	0	0	0	0	0	0	0	1	2	1
Vanuatu	0	0	0	0	0	1	0	1	0	0	0	0
Total	2	4	31	30	46	47	42	37	22	15	7	8 [37]

Figure 48. Monthly number of Fishing Vessels Operating in the EHSP-SMA by Flag State

Catch from the area is overwhelmingly longline tuna. The principal species taken are albacore (ALB), followed by yellowfin (YFT) and bigeye (BET), with minor contributions of skipjack (SKJ) and billfish. Longline catch volumes peaked in 2017–2020 at approximately 2,000–3,000 tons per year, before declining to under 1,000 tons annually in 2021–2023.

[37] https://meetings.wcpfc.int/node/23704



[38]

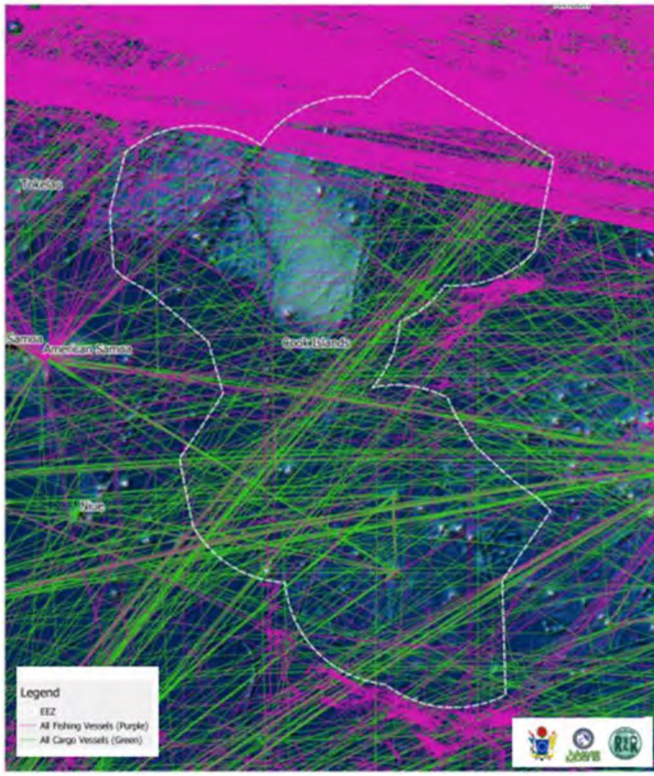
Figure 49. Catch in the EHSP-SMA by Species and Year (Longline), 2017–2022

Relative to basin-wide catches in the Western and Central Pacific Ocean, the EHSP-SMA contributes a negligible proportion: roughly 1% of albacore, 0.03% of bigeye, 0.05% of yellowfin, and less than 0.01% of skipjack in recent years. All fishing activity is continuously monitored through the WCPFC VMS "live list," and transshipment has been prohibited since 1 January 2019, with no reported violations. No infringements or compliance concerns have been reported in the area under high-seas boarding, aerial surveillance, or other monitoring measures.

4.8.2. Commercial Shipping

The E-HSP lies outside major trans-Pacific shipping lanes, with overall vessel density remaining low. AIS records and mapping indicate that most vessel traffic in the area is associated with fishing activity, with minimal cargo or commercial shipping presence. Although the area is far from major shipping routes, ADSM will follow standard maritime practice by issuing NAVAREA XIV navigational warnings prior to operations, maintaining continuous AIS broadcasting, and coordinating with any transiting vessels to ensure safe separation and avoid navigational interference.

[38] https://meetings.wcpfc.int/node/23704



[39]

Figure 50. South Penrhyn Basin Commercial Shipping Traffic

4.8.3. Tourism

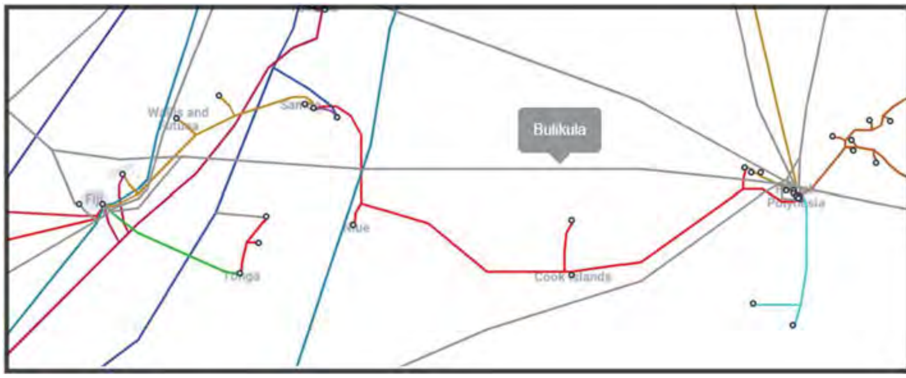
The E-HSP is remote and has no tourism activity or infrastructure. Exploration vessels transiting near coastal areas en route will avoid known whale-watching corridors during the austral winter to minimize any disturbance.

4.8.4. Submarine Cables

No subsea trunk lines are charted within the E-HSP. However, the Bulikula submarine cable, a new Google-led system connecting Guam and Fiji with branches to Tuvalu and French Polynesia, is under construction with service expected by 2026. Recent landings in Suva and Natadola confirm the route's progress. In addition, the Manatua cable, linking Samoa, Niue, the Cook Islands, and French Polynesia, passes to the south of the application area. ADSM will monitor final alignments through ICPC charts and TeleGeography datasets and, prior to each cruise, overlay survey lines against updated cable routes. All operations will follow ICPC good practices, including chart checks, owner notifications, avoidance buffers, and no anchoring near cables. ADSM has also contacted the International Cable Protection Committee (ICPC) to obtain updated route coordinates

[39] https://static1.squarespace.com/static/5cca30fab2cf793ec6d94096/t/644183fa3af99719cc3b5813/1682015326243/CIMinRscRevt_final_b.pdf

for Bulikula to ensure appropriate avoidance measures are incorporated into voyage planning.



[40]

Figure 51. Submarine cable systems near the Eastern High Seas Pocket

4.8.5. Oil and Gas

No offshore oil or gas activity exists in the region.

4.8.6. Marine Protected Areas and Zoning

Humpback whales migrate through parts of the South Pacific each year between June and October, with occasional sightings in waters between French Polynesia, the Cook Islands, and Kiribati. Deep-diving species such as sperm and beaked whales may also transit the area, though most activity occurs well above the seabed. While encounters with exploration equipment are unlikely, underwater noise can affect communication and behavior.

ADSM will minimize these risks through seasonal awareness in transit planning, limiting high-noise activities during peak migration, reducing noise in sensitive frequency ranges, and training crews in marine mammal encounter protocols.

4.8.7. Indigenous Resource and Use Consultation

ADSM recognizes that Pacific marine spaces hold deep cultural, historical, and economic importance for the peoples of the region. The company is committed to building relationships founded on trust and mutual respect, and will actively engage with Pacific Island governments, regional organizations, and community representatives throughout the project lifecycle. These engagements will ensure that operations are conducted with transparency, cultural sensitivity, and in alignment with regional development priorities, while supporting fair and equitable benefit-sharing for Pacific communities.

[40] https://www.submarinecablemap.com/submarine-cable/bulikula

4.8.8. Marine Scientific Research

The E-HSP does not appear to host any dedicated long-term scientific observatories, though it falls within the range of global ocean observing systems. Argo profiling floats periodically transit the area, collecting temperature and salinity profiles, and the eastern boundary lies adjacent to the GO-SHIP P16 hydrographic line at 150°W, occupied in past decadal surveys with future repeats possible. No additional marine scientific research activities have been identified, but ADSM will conduct further outreach to confirm whether any planned surveys may overlap with the E-HSP. ADSM will also review Argo float deployment records to track instruments transiting the license area. To avoid interference, ADSM will coordinate with relevant operators, remain clear of scheduled surveys, and maintain communication with international observing programs. No conflicts are anticipated, but verification and coordination will be undertaken to ensure none arise.

4.8.9. International Seabed Authority (ISA)

The proposed license area is not subject to any International Seabed Authority (ISA) exploration or exploitation contracts. No ISA contract blocks, reserved areas, or Areas of Particular Environmental Interest (APEIs) overlap or are adjacent to the proposed license area. Accordingly, no conflicts with ISA-sponsored activities or designated protection zones are anticipated.

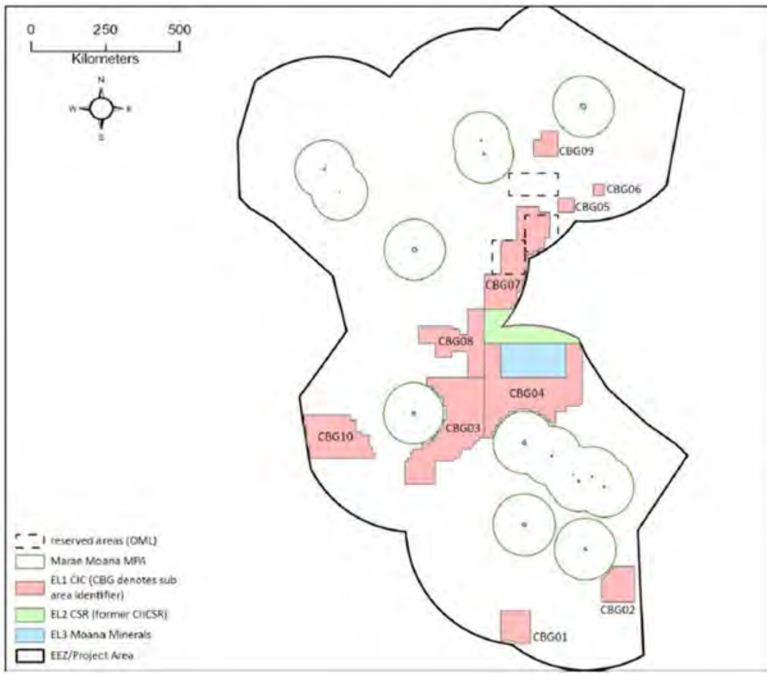
4.8.10. Neighboring Licensed Seabed Mineral Contractors

The proposed license area shares maritime boundaries with two Cook Islands licensed seabed mineral contractors for polymetallic nodules: Cobalt Seabed Resources Ltd. (CSR) and CIC Limited (also known as CIC Ocean Research).

- **Cobalt Seabed Resources Ltd. (CSR):** A joint venture between the Cook Islands Investment Corporation (CIIC) and Global Sea Mineral Resources (GSR, Belgium). As the only state-backed contractor in the Cook Islands, CSR leverages GSR's extensive experience as an ISA exploration contractor.
- **CIC Limited (CIC Ocean Research):** A private Cook Islands company supported by a consortium of partners including Odyssey Marine Exploration and Royal Boskalis Westminster. CIC holds the largest license area awarded by the Cook Islands Seabed Minerals Authority, with exploration and sampling campaigns already underway.

Both CSR and CIC operate under the Cook Islands Seabed Minerals Act and are regulated by the Cook Islands Seabed Minerals Authority. To minimize the potential for operational overlap, the proposed license area incorporates a buffer of 0.1 decimal minutes (~175 to

185 meters in this region) along shared boundaries. Prior to each cruise, we will proactively communicate with both CSR and CIC to share operational timelines and survey coordinates, ensuring transparency and avoiding any interference. No direct conflicts are anticipated.



[41]

Figure 52. Cook Islands EEZ License Holders

[41] 2023 SEA MSA Report (https://www.sbma.gov.ck/technical-reports)

5. Vessel Safety (15 CFR § 970.205)

ADSM anticipates utilizing a foreign-flagged oceanographic research vessel exceeding 300 gross tons for offshore exploration activities during Cruise 1. As the vessel will fall outside the small-vessel exception in § 970.205(a), ADSM will comply with the applicable safety provisions for foreign-flagged vessels as follows:

- SOLAS Compliance – Prior to mobilization, ADSM will submit to NOAA valid safety certificates issued under the International Convention for the Safety of Life at Sea (SOLAS 74, as amended), as issued or endorsed by the vessel's flag state.
- Classification Society Verification – Where applicable, ADSM will provide proof of classification by a recognized member of the International Association of Classification Societies (IACS).
- Timely Submission – All certifications and supporting documentation will be submitted to NOAA at least 30 days prior to the scheduled sailing date for Cruise 1, consistent with § 970.205(c).

The selected vessel will be a purpose-built survey platform with integrated navigation, communication, and safety systems, including:

- Rescue and Survival Equipment – Davit-launched MOB boat, SAR finder, 25-person life rafts, 100 lifejackets, Helly Hansen survival suits.
- Fire Safety – Siemens fire detection and alarm system throughout accommodation and machinery spaces.
- Compliance-Ready Design – Built to classification society standards for offshore survey operations, equipped with redundant navigation systems, and capable of safe operation in remote ocean environments.

ADSM will update NOAA with the final vessel details and all supporting documentation prior to mobilization to ensure full compliance with § 970.205.

6. Statement of Ownership (15 CFR § 970.206)

The applicant, American Deep Sea Minerals Inc. is a corporation formed under the laws of the State of Delaware and qualifies as a United States citizen pursuant to 30 U.S.C. § 1403 and 15 CFR § 970.101(t).

(a) The individual responsible for exploration operations and to whom all notices and orders should be delivered is:

Graham Goulet
[**Confidential Treatment Requested – #13:** [redacted]**]**

(b) Description of the applicant:

Name of entity: American Deep Sea Minerals Inc.
Form of entity: Corporation
State of incorporation: Delaware, United States
Registered agent: Northwest Registered Agent Service Inc, located at 8 The Green, Suite B, Dover, DE 19901
[**Confidential Treatment Requested – #14:** [redacted]**]**

Certification: The essential and nonproprietary provisions of the certificate of incorporation and bylaws are included in Appendix #2. These documents certify that American Deep Sea Minerals Inc. is duly incorporated under Delaware law.

Ownership and control: The corporation is controlled by its sole founder and principal shareholder, Graham Goulet. No other individuals or entities hold equity or management rights in the corporation as of the application date.

7. Antitrust Information (15 CFR § 970.207)

(a) General

This section is submitted in accordance with Section 103(d) of the Deep Seabed Hard Mineral Resources Act, which provides for antitrust review of license applications by the Attorney General of the United States and the Federal Trade Commission.

(b) Contents

Joint Venture Agreements

American Deep Sea Minerals Inc. is not presently a party to any joint venture agreement related to deep seabed hard mineral resource exploration or mining. Accordingly, there are no joint venture agreements to submit under this section.

Affiliates

American Deep Sea Minerals Inc. is a privately held company, wholly owned and controlled by its founder, Graham Goulet. The company has no affiliates, subsidiaries, or parent companies as defined in § 970.101. No other persons or entities have an ownership or controlling interest in ADSM at the time of this application.

Production or Trade in Covered Minerals

Neither American Deep Sea Minerals Inc. nor any affiliate, parent, or subsidiary of an affiliate, is currently engaged in the production, purchase, or sale—within or into the United States—of copper, nickel, cobalt, manganese, or any metals refined from these minerals. Consequently:

(i) There are no annual production, purchase, or sales data to report for the two preceding years;

(ii) No annual reports, balance sheets, or income statements are available or required to be submitted for these purposes; and

(iii) American Deep Sea Minerals Inc. is not a public reporting company and has not submitted any filings to the U.S. Securities and Exchange Commission.

8. Fee (15 CFR § 970.208)

American Deep Sea Minerals Inc. acknowledges that a non-refundable administrative fee of $100,000 is required for the submission and processing of this exploration license application, in accordance with Section 104 of the Deep Seabed Hard Mineral Resources Act and § 970.208 of NOAA's regulations.

Proof of payment, including payment method, date of remittance, and transaction confirmation, will be provided in Appendix 3.

Appendix #1 – Investor Comfort Letter [**Confidential Treatment Requested – #15: Entire Appendix #1]**

[redacted]

[Confidential Treatment Requested – #15: Entire Appendix #1]

[redacted]

Appendix #2 – Certificate of Incorporation & Certificate of Amendment to Change of Corporate Name

State of Delaware
Secretary of State
Division of Corporations
Delivered 11:03 AM 08/11/2025
FILED 11:03 AM 08/11/2025
SR 20253628181 - File Number 10290619

STATE *of* DELAWARE
CERTIFICATE *of* INCORPORATION
***A* STOCK CORPORATION**

FIRST - Name

The name of the Corporation is:
Kraken Metals Inc.

SECOND – Registered Agent

Its registered office in the State of Delaware is to be located at 8 The Green, Suite B, in the City of Dover County of Kent Zip Code 19901. The registered agent in charge thereof is Northwest Registered Agent Service, Inc.

THIRD - Purpose

The purpose of the corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of Delaware.

FOURTH - Stock

The amount of the total stock of this corporation is authorized to issue is 10,000,000 shares (number of authorized shares) with a par value of 0.0001 per share.

FIFTH – Incorporator

The name and mailing address of the incorporator are as follows:

Northwest Registered Agent Service, Inc.
8 The Green, Suite B, Dover, DE 19901

I, The Undersigned, for the purpose of forming a corporation under the laws of the State of Delaware, do make, file and record this Certificate, and do certify that the facts herein stated are true, and I have accordingly hereunto set my hand this 11th day of August, A.D. 2025.

Name: Northwest Registered Agent Service, Inc., Incorporator

BY: Nat Smith
Nat Smith, Assistant Secretary

State of Delaware
Secretary of State
Division of Corporations
Delivered 09:54 AM 10/20/2025
FILED 09:54 AM 10/20/2025
SR [illegible] - File Number [illegible]

STATE OF DELAWARE
CERTIFICATE OF AMENDMENT
OF CERTIFICATE OF INCORPORATION

The corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware does hereby certify:

FIRST: That at a meeting of the Board of Directors of Kraken Metals Inc. resolutions were duly adopted setting forth a proposed amendment of the Certificate of Incorporation of said corporation, declaring said amendment to be advisable and calling a meeting of the stockholders of said corporation for consideration thereof. The resolution setting forth the proposed amendment is as follows:

RESOLVED, that the Certificate of Incorporation of this corporation be amended by changing the Article thereof numbered First so that, as amended, said Article shall be and read as follows:

The name of the Corporation is: American Offshore Critical Minerals Corp

SECOND: That thereafter, pursuant to resolution of its Board of Directors, a special meeting of the stockholders of said corporation was duly called and held upon notice in accordance with Section 222 of the General Corporation Law of the State of Delaware at which meeting the necessary number of shares as required by statute were voted in favor of the amendment.

THIRD: That said amendment was duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, said corporation has caused this certificate to be signed this 20TH day of October, 2025.

By: /s/ Graham Goulet
Authorized Officer
Title: President
Name: Graham Goulet

STATE OF DELAWARE
CERTIFICATE OF AMENDMENT
OF CERTIFICATE OF INCORPORATION

The corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware does hereby certify:

FIRST: That at a meeting of the Board of Directors of AMERICAN OFFSHORE CRITICAL MINERALS CORP resolutions were duly adopted setting forth a proposed amendment of the Certificate of Incorporation of said corporation, declaring said amendment to be advisable and calling a meeting of the stockholders of said corporation for consideration thereof. The resolution setting forth the proposed amendment is as follows:

RESOLVED, that the Certificate of Incorporation of this corporation be amended by changing the Article thereof numbered First so that, as amended, said Article shall be and read as follows:

The name of the Corporation is: American Deep Sea Minerals, Inc.

SECOND: That thereafter, pursuant to resolution of its Board of Directors, a special meeting of the stockholders of said corporation was duly called and held upon notice in accordance with Section 222 of the General Corporation Law of the State of Delaware at which meeting the necessary number of shares as required by statute were voted in favor of the amendment.

THIRD: That said amendment was duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, said corporation has caused this certificate to be signed this 31st day of October, 2025.

By: /s/ Graham Goulet
Authorized Officer
Title: President
Name: Graham Goulet
Print or Type

State of Delaware
Secretary of State
Division of Corporations
Delivered 12:57 PM 10/31/2025
FILED 12:57 PM 10/31/2025
SR [illegible] - File Number [illegible]

Appendix #3 – Proof of Payment of Application Fee (15 CFR § 970.208) [**Confidential Treatment Requested – #16: Entire Appendix #3]**

Tracking Information

Pay.gov Tracking ID: [redacted]

Agency Tracking ID: [redacted]

Form Name: NOAA MISC PAYMENT

Application Name: NOAA Payment

Payment Information

Payment Type: [redacted]

Payment Amount: $100,000.00

Transaction Date: 08/18/2025 12:00:40 PM EDT

Payment Date: 08/19/2025

Name: Graham Goulet

Street Address, City, State, Zip: [redacted]

Email, Phone: [redacted]

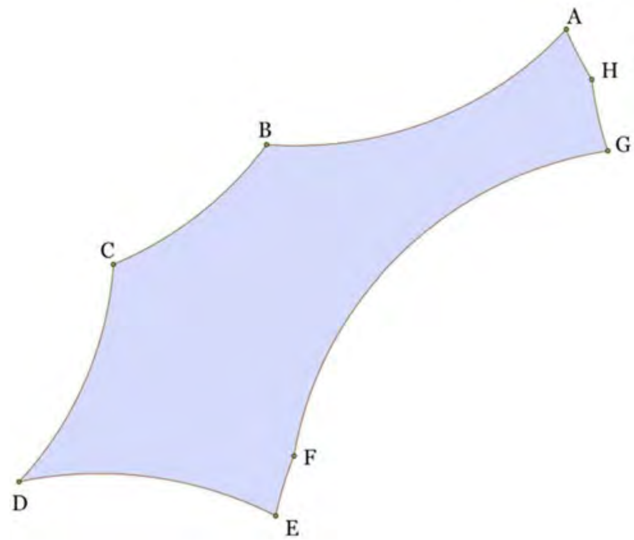
Reason for Payment: Exploration License Application Admin Fee

Additional Notes: Kraken Metals Inc. non-refundable administrative fee of $100,000 for the submission and processing of this exploration license application, in accordance with Section 104 of the Deep Seabed Hard Mineral Resources Act and 970.208 of NOAAs regulations.

Account Information

Account Holder Name: Graham Goulet

Appendix #4 – Target Exploration Area Coordinates (1km spacing)



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	4	-11.375858	-155.454821
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	13	-11.434628	-155.511678
	14	-11.441079	-155.518080
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	16	-11.453916	-155.530951
	17	-11.460307	-155.537414
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