

PACIFIC DEEP-SEA MINERAL ACTIVITIES



ECONOMIC OPPORTUNITY

KEY POINTS

- Across the Pacific, there is widespread and recognised need for new industries to overcome poverty and to support economic and social development. Deep-sea mining is seen to provide a potential source of [economic growth](#). Running counter to this is concern about potential environmental and social impacts and a lack of communal benefit from extractive projects.
- The deep-sea minerals (DSM) industry presents a complex governance challenge for Pacific island countries and territories, with their small government agencies and limited resources for [environmental assessment](#), monitoring, and enforcement.
- Pacific leaders recognise the potential benefits and risks of DSM activities and welcome further resources and assistance to better understand these.
- Deep-sea environments are rich in fauna, home to a variety of novel habitats, spatially variable on fine scales, and seasonally variable in some regions. The deep sea contains some of the most intact biological communities on Earth.^{1,11} Deep-sea species diversity equals or exceeds that of coastal ecosystems. Although our knowledge of the deep sea is growing, the ecosystems targeted for mining are generally poorly understood.²
- There remain many uncertainties regarding potential adverse impacts from DSM activities on deep sea ecosystems, globally significant [marine species](#), ocean-based ecosystem services and assets (e.g. [genetic resources](#)), and other industries (e.g. [fishing](#), [shipping](#)).
 - a. There are also uncertainties about impact mitigation strategies and whether mining proponents could secure a 'social licence to operate'.
 - b. These uncertainties give strong justification for applying the precautionary approach to DSM development.
 - c. DSM activities must also be subject to an effective environmental impact assessment (EIA) process that is objective and transparent; that provides clear protocols for government, proponents and stakeholders to follow; and the results of which are included in development approval decisions.

HOW ISSUE LINKS TO/IMPACTS SDGs BEYOND **SDG14 LIFE BELOW WATER**

- Unless managed carefully, DSM activities could have negative impacts on the achievement of a number of SDGs, e.g. SDG1, 3, 7, 8, 9, 10, 11, 12, 14, 15.
- If well managed, DSM activities can contribute to the achievement of SDG8.2 & 8.3 by promoting economic productivity and job creation, along with SDG9 and 10.

BACKGROUND

1. **Potential economic benefit, although not certain, drives interest in DSM.** For Pacific island countries and territories with large EEZs, but limited land-based resources and economic income sources, marine minerals may provide an alternative source of economic growth if suitable for commercial exploitation.³ Pacific governments have responded enthusiastically but cautiously to the prospective DSM industry, recognising the importance of identifying and evaluating potential costs and benefits for their countries. The economic viability varies by mineral type and location.⁴ Deep-sea resource extraction is infrastructure- and fuel-intensive. The DSM industry has an opportunity to create a socially responsible extractive industry, while minimising its environmental impact to the greatest extent possible.⁵
2. **Demand for deep-sea minerals is not yet critical.** Land-based sources of rare earths and other minerals are not yet exhausted, and there remain options for increased and more efficient recycling, or reduction of demand through innovation.^{6,7,8}
3. **Social and environmental concerns call for caution.** A growing number of studies suggest a negative relationship between mining and economic indicators of development, with local communities often bearing the brunt of negative social impacts and failing to gain measurable benefits while the profits flow elsewhere. Increasing community concerns about poor governance and impacts of, and inequitable returns from extractive industries run counter to the push for DSM development. Local and international movements express concerns about the perceived lack of information on the potential impacts of deep-sea mining and potential adverse impacts. Public engagement will be critical for Pacific countries intending to pursue DSM development, based on building public knowledge of deep-sea environments and DSM activities and ensuring the public can meaningfully contribute to the EIA process.





4. **Management responsibility depends on location.** DSM deposits, or indications of deposits, have been identified within the exclusive economic zones (EEZs) of most Pacific countries, with three deposit types: seafloor massive sulphides, manganese nodules, and cobalt-rich crusts on seamounts. The jurisdictional issues regarding DSM activities within EEZs are at the national level. DSM activities in areas beyond national jurisdiction (ABNJ) or international waters are regulated by the International Seabed Authority (ISA), under the provisions of the United Nations Convention on the Law of the Sea (UNCLOS).
5. **The Pacific leads the world regarding DSM activities,** in many respects, and has the opportunity to lead in environmental management. In 2011, PNG became the first country in the world to issue a mining licence within its EEZ. Over 300 exploration licenses have been granted within the EEZs of Pacific island countries; specific laws have been passed for DSM in the Cook Islands, Fiji, Nauru, Tonga and Tuvalu; public consultation on DSM policies and/or draft legislation has been conducted in Kiribati, Vanuatu and the Marshall Islands; and Cook Islands and Tonga identified DSM as a development priority in the 2014 Palau Declaration. In ABNJ, Cook Islands, Kiribati, Nauru and Tonga have entered into 15 year contracts with the ISA for DSM exploration in the Clarion-Clipperton Fracture Zone.
6. **Regional projects support informed action.** The Pacific Community – European Union Deep Sea Minerals Project (SPC-EU DSM Project), from 2011–2016, significantly advanced regional knowledge of DSM resources; supported the development of national regulatory, environmental and financial management frameworks for DSM activities; and increased public awareness of and participation in DSM discussions.
7. **The potential environmental impacts of DSM activities need to be further investigated,** including the likelihood of deep-sea ecosystems recovering following mining. Prospecting, exploration and mining can create significant marine noise, affecting [cetaceans](#) and possibly other marine species. Mining may have additional effects, including smothering, chemical pollution, and sediment plumes.⁶ A unique fauna is associated with Mn nodule fields, which would be threatened by large-scale mining. Massive sulphide mining is likely to affect the unique fauna around hydrothermal vents, either by directly killing organisms by mining machinery or by altering the fluid flows on which these organisms depend.⁹ Very little is known about the community structure of deep-sea organisms or their resilience to significant disturbance. Individuals surviving this disturbance would be subject to a radical change in habitat conditions. Because of the high degree of uniqueness and high endemism in these environments, impacts of mining on [biodiversity](#) are likely to be significant and difficult to reverse.
8. **Deep-sea ecosystems are valued by people.** Studies indicate a strong willingness to pay for deep biodiversity conservation, e.g. visitors and residents in the Azores and Scotland were willing to pay over USD 100 per person to promote maximum deep-sea conservation and develop new medicinal products from deep-sea species.¹⁰ The Pacific DSM industry can lead in environmental management, in line with Pacific values.
9. **EIA is an important instrument for the management of DSM activities in the Pacific.** Effective EIA application requires adequate human resources; EIA report quality control; compliance monitoring and enforcement; and public engagement and participation.¹¹ Countries must enforce rigorous EIA to maximise positive outcomes of DSM development and to minimise adverse effects on other marine users and values.
10. **Ideally, strategic environmental assessment should be used to inform national DSM policy development,** prior to countries assessing individual DSM projects. SEA can consider all values, uses and users of the marine environment; national development and conservation goals; environmental governance and management obligations under national legislation and multilateral environmental agreements; and environmental and financial management options.

1 Rex & Etter 2010. Deep-sea biodiversity. Harvard University Press.
 2 UNEP 2007. Deep-Sea biodiversity and ecosystems: a scoping report on their socio-economy, management and governance. 85 p
 3 Roche & Feenan. Drivers for the development of deep sea minerals in the Pacific. Mineral Policy Institute, IHC Mining. 40 p
 4 Cardno 2016. An assessment of the costs and benefits of mining deepsea minerals in the Pacific island region. Pacific Community (SPC). 229 p.
 5 Swaddling 2016. Pacific ACP states Regional Environmental Management Framework for deep sea minerals exploration and exploitation. SPC. 100 p
 6 Kesler SE. 2007. Mineral supply and demand into the 21st century. USGS [NB: Fig. 7]
 7 Meinert et al. 2016. Mineral resources: reserves, peak production and the future. Resources 5:14
 8 Lusty & Gunn. 2015. Challenges to global mineral resource security and options for future supply. Geol Soc Lond 393:265–276
 9 Nakajima et al. 2015. Post-drilling changes in seabed landscape and megabenthos in a deep-sea hydrothermal system, the Iheya North Field, Okinawa Trough. PLOS ONE 10:e0123095
 10 Barbier et al. 2014. Ecology: protect the deep sea. Nature 505:475–477
 11 Bradley & Swaddling (2016) Addressing environmental impact assessment challenges in Pacific island countries for effective management of deep sea minerals activities. Marine Policy (in press)

REGIONAL RESOURCES, CREATED IN THE SPC-EU DSM PROJECT:

- Regional Legislative and Regulatory Framework for Deep Sea Minerals Exploration and Exploitation
- Regional Environmental Management Framework for Deep Sea Minerals Exploration and Exploitation
- Regional Financial Framework for Deep Sea Minerals Exploration and Exploitation
- Regional Scientific Research Guidelines for Deep Sea Minerals

KEY REGIONAL BODIES:

- SPC led the SPC-EU DSM Project and has the GeoScience Division
- SPREP has the regional mandate for EIA support and training and the conservation of threatened and migratory species, such as whales
- PIDF leads regional action on sustainable development for green (or blue) economy
- PIFS represents a political grouping of 16 independent and self-governing Pacific states