

Re:

**Call on Canada to
show leadership
and support a
moratorium on deep
seabed mining**

Dear Minister Garneau, Minister Gould, Minister Wilkinson, Minister Jordan, Minister Champagne and Minister O'Regan,

We are writing as Canadian organizations committed to ocean conservation who support Canada's efforts to engage nationally and internationally on ocean leadership and biodiversity protection.¹ With this letter, we are requesting that Canada continue its environmental leadership role and support a moratorium on deep seabed mining, as raised by the UN Secretary General's Special Envoy for the Ocean.²

As Canada recovers from COVID-19, there are unique opportunities to ensure we do not return to the status quo and instead recognize human *induced* environmental degradation, biodiversity loss,³ and climate change as devastating global threats we must address. Building a truly circular economy that changes the trajectory of current economic activities is vital to meeting these challenges. Prime Minister Trudeau being awarded the Planetary Leadership Award, along with Canada's firm stance as a global environmental leader, provide Canada with the power and platform to effect lasting change in the name of our environment.⁴

In advance of the International Seabed Authority's (ISA) annual meeting schedule, we outline the case for Canada to advocate for a moratorium on deep seabed mining in international waters, joining others including: the European Parliament,⁵ the European Commission,⁶ the UK House of Commons Environment Audit Committee,⁷ the Long Distance Fleet Advisory Council of the European Union,⁸ and the Pelagic Advisory Council,⁹ as well as many civil society organizations,¹⁰ faith-based groups,¹¹ and deep sea scientific experts and academics.¹² We are encouraged that Canada is a member of the High Level Panel for a Sustainable Ocean Economy. This panel commissioned a Blue Paper on deep seabed mining published in 2020 that recommends a precautionary pause or moratorium on the issuance of new exploration contracts by the ISA and a moratorium on the development of rules, regulations, and procedures for deep-sea mining until at least 2030.¹³ We ask that Canada support these recommendations.

3rd February 2021



Also supported by:



**Clayoquot
Action**



**David
Suzuki
Foundation**



**Ecology
Action
Centre**



With domestic policies in Canada and abroad protecting territorial marine environments, a precedent is set for protecting the international seabed as well. Pacific Island Nations such as Fiji and Vanuatu,¹⁴ as well as the Northern Territory Government of Australia,¹⁵ Portugal¹⁶ and the U.K. overseas territory Tristan de Cunha¹⁷ are strongly in support of protecting their territorial marine environment from deep-sea mining. Canada's regulatory provisions under the *Fisheries Act* protect our fish habitat (section 35) and prohibit the release of "deleterious substances" into "waters frequented by fish" (section 36). The Metal and Diamond Mining Effluent Regulations,¹⁸ promulgated under section 36 of the *Fisheries Act*, restrict Total Suspended Solids (TSS) to 15mg/L on average per month. The return-effluent plumes projected in all deep-sea mining scenarios would greatly exceed this TSS limit, effectively prohibiting deep-sea mining in Canadian waters. We ask that Canada provide leadership in similarly protecting marine ecosystems in international waters.

Scientists agree there is a critical knowledge deficit on the subject of the deep-sea marine environment; this knowledge deficit hampers credible policy and regulatory development in regard to deep-sea mining.¹⁹ Many scientists maintain that more research is needed in order to accurately assess the impacts deep-sea mining would have on fauna and microorganisms, the wider marine environment, climate change, and global ecosystem sustainability more broadly.²⁰

Deep-sea mining is applied to the extraction of three types of metal ore deposits found in the deep sea, that include seafloor sulphides found in and near hydrothermal vents, ferromanganese (polymetallic) nodules and cobalt crusts. Each deposit type is formed in a different way, requiring three different mining processes and resulting in three different sets of associated environmental impacts. In regard specifically to deep-sea polymetallic nodules, found at 4-6.5 km depth, there is broad scientific consensus²¹ on the following:

- Mining of polymetallic nodules is predicted to lead to a significant loss of marine biodiversity,²² including many species which "are new to science and belong to entirely new species groups."²³ Even with plume management and impact-free refugia, negative impacts and biodiversity loss will be unavoidable."²⁴
- The deep-sea nodules that are the target of mining speculation take millions of years to form. If mined, the nodules and the habitat substrate they provide to deep-sea marine species will be effectively lost forever. The diverse microorganisms growing on, and fauna directly associated with, deep-sea nodules, such as sponges and incirrate octopods such as the Dumbo octopus, are revealing themselves through recent research.²⁵ For example, it is now



Georgia Strait Alliance



PACIFIC PEOPLES' PARTNERSHIP



believed that the reason nodules that are millions of years old remain at the surface of the deep seabed is through the activity of star fish, octopods and molluscs that forage on and around the millions of nodules on the seafloor.²⁶ Lead author, Dutkiewicz, stated in an interview that “our conclusion is that deep-sea ecosystems and nodules are inextricably connected.”²⁷

- It is now better understood that the ecosystem provided by deep-sea nodules is connected vertically with marine species throughout the water column to the ocean surface.²⁸ These species include whales, turtles, tuna, and other fish that routinely make extended deep dives to 1,000 metres below the surface and deeper.²⁹ It is believed that Cuvier beaked whales may dive down to the depth of sea nodules.³⁰ Equally important is the vertical migration made by small pelagic (water column) fishes, shrimps, and squids from deep waters to the surface as these are important sources of food for many species, including tuna.³¹
- Impacts on marine ecosystems from mining of deep-sea nodules are also predicted horizontally from the mined area. These impacts occur both as a result of mining-related mobilization of seabed sediments and because of sediment plumes created by mine processing effluent returned from the ship to the marine environment, currently proposed to be returned to mid-water at around 1,300 metres depth via a riser (pipe). These effluents contain high levels of suspended solids. Sediments from these sources are expected to be mobilized horizontally over long distances through marine currents and to bury or smother species that cannot move to avoid the impact, as well as to “clog the respiratory surfaces of filter feeders and pollute the food supply for most benthic (seafloor) organisms”³² and harm species in the water column.
- While more scientific research needs to be done on the deep-sea organisms and fauna associated with polymetallic nodules, there is evidence that the impact of any nodule mining on the marine environment will be very long lasting, as exemplified by the more than 30-year-old DISCOL experiment,³³ which paints a stark picture of the glacial pace of recovery from mining impacts in the deep-sea environment.
- Scientists also found that remediation and/or offsetting of the harmful impacts of deep-sea mining are not realistic goals in this environment.³⁴

The deep ocean environment is inherently vulnerable to change; compared to most terrestrial environments, it is a very slowly evolving and stable ecosystem. Moreover, recent research indicates that the deep ocean already faces stress from impacts of climate change that are now understood to be greater in the deep seabed than at the surface, further putting vulnerable deep-sea ecosystems at risk.³⁵ The Intergovernmental Panel on Climate Change Special Report on the Ocean and Cryosphere in a Changing Climate noted numerous climatic hazards in the case of the destruction of the deep sea, including loss of biodiversity, as well as impacts on the water column and seafloor that are key for ecosystem services like carbon sequestration.³⁶

Canada made commitments to meet the Sustainable Development Goals (SDGs) and the provisions of the Paris Agreement on Climate Change. In order to meet these goals and to ensure global sustainability, there is an urgent need to transition away from economies based on extraction and towards economies based on renewable energy. Research indicates that extending mining-related environmental impacts and species loss from the terrestrial to the marine environment is not necessary to meet metal needs for the energy transition.³⁷ We are encouraged by the leadership Canada is showing through a focus on marine renewable energy by the Marine Energy Technology (MET)³⁸ team at Natural Resources Canada.

The field of energy transition technology is rapidly evolving. Leading energy transition companies are exploring ways to move technology towards a decreased need for new metals, such as through: recycling³⁹ (see also the 10 key principles of the Global Battery Alliance);⁴⁰ urban mining;⁴¹ and substitution. In particular, reduction or elimination of cobalt in batteries⁴² is already underway, as are efforts to create batteries that do not rely on mined metals.⁴³ All of this raises questions about DSM's economic feasibility and the financial risks faced by small Pacific Island Nations that partner with deep-sea mining companies, including those based in Canada such as DeepGreen.

We therefore call on Canada to advocate for a moratorium on deep seabed mining, on the issuing of new exploration licenses and on the adoption by the ISA of regulations for exploitation, until a clear set of environmental and social conditions is met.⁴⁴

Coinciding with the Decade of Ocean Science for Sustainable Development, 2021-2030, such a moratorium will provide time to enable greater understanding of the targeted ecosystems and the likely impacts. Such a call would also align Canada with its commitments under the UN 2030 Agenda on Sustainable Development Goals, including SDG 12, sustainable consumption and protection, SDG 15 on biodiversity, and the ocean SDG14: "Conserve and sustainably use the oceans, seas and marine resources for sustainable development."⁴⁵

The primary signatories to this letter, Mining Watch Canada and Oceans North, would like to meet with you and your officials to discuss the content and requests herein. We look forward to hearing from you in the near future, given the urgency of this issue in relation to upcoming international meetings.

Catherine Coumans, PhD., Co-manager, MiningWatch Canada

Susanna Fuller, PhD., VP Operations and Projects, Oceans North

Cc:

Ms. Christine Hogan, Deputy Minister of Environment & Climate Change

Mr. Simon Kennedy, Deputy Minister of Innovation, Science, and Economic Development

Mr. James Lauer, Senior Policy Manager for Natural Resources Canada.

Ms. Leslie MacLean, Deputy Minister of International Development

Ms. Marta Morgan, Deputy Minister of Foreign Affairs

Mr. Timothy Sargent, Deputy Minister of Fisheries and Oceans and the Canadian Coast Guard

Mr. Luke Sookocheff, Director General, Global Affairs Canada

Mr. Jean-Francois Tremblay, Deputy Minister of Natural Resources Canada

Mr. Kenneth Wong, Legal Counsel, Global Affairs Canada

This letter is supported by:

Campaign to Protect Offshore Nova Scotia, Marilyn Keddy
Canadian Parks and Wilderness Society, Alex Barron, National Director, Ocean Program
Conservation Council of New Brunswick, Matt Abbott, Marine Conservation Director
Clayoquot Action, Dan Lewis, Executive Director.
David Suzuki Foundation, Jay Ritchlin, Director General, Western Canada
Ecology Action Centre, Jordy Thomson, Senior Marine Coordinator (Ecosystems)
First Nations Women Advocating Responsible Mining, Loretta Williams
Georgia Straight Alliance, Christianne Wilhelmson, Executive Director
Greenpeace Canada, Shane Moffatt, Head of Nature and Food Campaign
Living Oceans Society, Karen G. Wristen, Executive Director
Nature Canada, Gauri Sreenivasan, Director of Policy and Campaigns
Northern Confluence Initiative, Nikki Skuce
Pacific Peoples' Partnership, April Ingham, Executive Director
The Union of B.C. Indian Chiefs
West Coast Environmental Law, Michael Bissonnette, Staff Lawyer
Wildlands League, Anna Baggio, Conservation Director
World Wildlife Fund Canada, Sigrid Keuhnemund, Vice President, Wildlife and Industry Team

References :

- ¹ With Prime Minister Justin Trudeau – June 2020. World Economic Forum. [Opening remarks](#). “*In so many ways, healthy Oceans, are an essential service.*”
- ² At the World Economic Forum in Davos in January 2019, Peter Thomson, Special Envoy of the UN Secretary General for the Ocean responded to a question on deep-sea mining by observing “There is a UN decade for Ocean science, which has been agreed to by 193 countries . . . Why wouldn't we give that decade its full run before we start even thinking about disturbing the seabed of the high seas? We are talking a moratorium of 10 years in that case.” See the [opening statement](#) of Algeria, on behalf of the African Group of Nations, to the 25th Session of the Council of the International Seabed Authority, 15 February 2019 (page 14).
- ³ World Economic Forum Global Risk Report http://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2021.pdf
- ⁴ <https://www.nationalgeographic.org/events/awards/planetary-leadership-award/>
- ⁵ On January 16, 2018, the European Parliament adopted a resolution calling for a moratorium “*until such time as the effects of deep-sea mining on the marine environment, biodiversity and human activities at sea have been studied and researched sufficiently and all possible risks are understood.*” http://www.europarl.europa.eu/doceo/document/TA-8-2018-0004_EN.html paragraphs 42, 19, 22 & 67.
- ⁶ In its 2020 [Biodiversity Strategy](#) the European Commission states that the EU's position in international negotiations should be that the “*international seabed area cannot be exploited before the effects of deep-sea mining on the marine environment, biodiversity and human activities have been sufficiently researched, the risks are understood and the technologies and operational practices are able to demonstrate no serious harm to the environment, in line with the precautionary principle.*”
- ⁷ On January 18, 2019 the UK House of Commons Environment Audit Committee issued a report on [Sustainable Seas](#) stating that: “*The case for deep sea mining has not yet been made*” and calling on the UK Government to “*commit not to*

pursue licences for polymetallic sulfides/ seafloor massive sulfides found at active hydrothermal vents within its own jurisdiction and internationally. The UK should utilise its substantial experience in regulating marine industries and its influence with the International Seabed Authority (ISA) to impose a moratorium on exploitation licences in these areas as ISA develops its exploitation guidelines.”

- ⁸ In May 2019 the [Long Distance Fleet Advisory Council of the European Union](#) called for: “A moratorium on mining of the deep-sea needs to be in place in international waters without exemptions until the risks are fully assessed and understood.”
- ⁹ [Pelagic AC Opinion on Deep-sea mining activities](#), 2020. June. “A moratorium on mining of the deep-sea needs to be in place in international waters without exemptions until the risks are fully assessed and understood.”
- ¹⁰ Civil Society Organizations calling for a ban or moratorium include: [Conservation International](#); [Fauna and Flora International](#); [WWF](#); [Greenpeace International](#); [Seas at Risk](#); [The Sierra Club](#); [MiningWatch Canada](#); the more than 80 members of the [Deep Sea Conservation Coalition](#); [Civil Society Forum of Tonga](#); The Papua New Guinea Council of Churches, Voice of Milne Bay, Alliance of Solwara Warriors, Bismarck Ramu Group, and the Center for Environmental Law and Community Rights, who published an [open letter](#) to the Prime Minister of Papua New Guinea in 2019; India-based [The Future We Need](#); civil society leaders to the [Pacific Island Forum](#) in 2019; [German Federation for Environment and Nature Conservation \(BUND\)](#), [PowerShift](#), [Fair Oceans](#), [Brot für die Welt](#), [MISEREOR](#), [Stiftung Asienhaus](#), [Forum Umwelt and Entwicklung](#); 50 global organizations that signed onto a [letter to the ISA in 2018](#), over 100 environmental organizations led by Seas At Risk, BirdLife Europe, ClientEarth, Oceana, Surfrider Foundation Europe, Conservation International and WWF in their [2020 Blue Manifesto](#); 26 organizations in the 2020 [RISE UP Blue Call to Action](#); the undersigned organizations in Canada.
- ¹¹ In 2019 the [Pacific Conference of Churches](#) reiterated its call of 2013 “for a regional moratorium on Deep Sea /Seabed Mining in the Pacific.”
- ¹² See, for example, “[Our Common Heritage: International seas threatened by mining](#)” a statement signed on to by many Canadian academics. See also August 2020 sign-on letter to the Chilean Ministry of Foreign Affairs from scientists and academics calling on the Government to support a moratorium on DSM. Amongst the signatories are Chile’s former ambassador to the ISA, Eduardo Bonilla, and Sandor Muslow, a former employee of the Secretariat of the ISA. An article on the open letter can be found here: <https://www.guiaminera.cl/piden-a-cancilleria-que-chile-se-sume-a-solicitud-de-moratoria-para-la-mineria-en-aguas-profundas/>
- ¹³ Haugan, P.M., L.A. Levin, D. Amon, M. Hemer, H. Lily and F.G. Nielsen. 2019. What Role for Ocean-Based Renewable Energy and Deep Seabed Minerals in a Sustainable Future? Washington, DC: World Resources Institute. www.oceanpanel.org/blue-papers/ocean-energy-and-mineral-sources. p. 45
- ¹⁴ The Government of [Fiji](#) announced it would impose a moratorium on seabed mining in its national waters during the Pacific Islands Forum Leaders Meeting in Tuvalu in August 2019. The Governments of [Papua New Guinea](#) and Vanuatu indicated their support for this call. See also [here](#) p. 48.
- ¹⁵ The Northern Territorial Government of Australia declared a moratorium on deep seabed mining in 2012 and has renewed it repeatedly since then.
- ¹⁶ The Portuguese Minister of the Sea is reported to have [stated](#) that “said deep-sea mining would compromise the archipelago’s biodiversity.”
- ¹⁷ https://www.theguardian.com/environment/2020/nov/13/tiny-atlantic-island-takes-giant-leap-towards-protecting-worlds-oceans?CMP=Share_AndroidApp_Other
- ¹⁸ <https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2002-222/index.html>
- ¹⁹ Haugan, P.M., L.A. Levin, D. Amon, M. Hemer, H. Lily and F.G. Nielsen. 2019. What Role for Ocean-Based Renewable Energy and Deep Seabed Minerals in a Sustainable Future? Washington, DC: World Resources Institute. P.45. www.oceanpanel.org/blue-papers/ocean-energy-and-mineral-sources.
- ²⁰ *Ibid.* p. 45-46. See also a recently published scientific review of more than 250 scientific articles, reports and industry sources: Chin, A and Hari, K (2020), [Predicting the impacts of mining of deep sea polymetallic nodules in the Pacific Ocean: A review of Scientific literature](#), Published by Deep Sea Mining Campaign and MiningWatch Canada, 52 pages
- ²¹ Chin, A and Hari, K, 2020. [Predicting the impacts of mining of deep sea polymetallic nodules in the Pacific Ocean: A review of Scientific literature](#), Published by Deep Sea Mining Campaign and MiningWatch Canada, 52 pages.
- ²² Van Dover, C.L., Ardron, J.A., Escobar, E., Gianni, M., Gjerde, K.M., Jaeckel, A., Jones, D.O.B., Levin, L.A., Niner, H.J., Pendleton, L. and Smith, C.R., 2017. Biodiversity loss from deep-sea mining. [Nature Geoscience](#), 10(7), pp.464-465.
- ²³ Chin, A and Hari, K, 2020. [Predicting the impacts of mining of deep sea polymetallic nodules in the Pacific Ocean: A review of Scientific literature](#), Published by Deep Sea Mining Campaign and MiningWatch Canada. p. 14
- ²⁴ Niner, H.J., Ardron, J.A., Escobar, E.G., Gianni, M., Jaeckel, A., Jones, D.O., Levin, L.A., Smith, C.R., Thiele, T., Turner, P.J. and Van Dover, C.L., 2018. Deep-sea mining with no net loss of biodiversity—an impossible aim. [Frontiers in Marine Science](#), 5, p.53.
- ²⁵ [Fauna & Flora International 2020](#)

-
- ²⁶ Adriana Dutkiewicz, Alexander Judge and R. Dietmar Müller. 2020. Environmental predictors of deep-sea polymetallic nodule occurrence in the global ocean. *Geology*. 2020. 48 (3): 293–297.
- ²⁷ “Polymetallic nodules stay out of the mud with a little help from benthic burrowers.” *DSM Observer*. At <http://dsmobserver.com/2020/01/polymetallic-nodules-stay-out-of-the-mud-with-a-little-help-from-benthic-burrowers/>
- ²⁸ Marsh, L., Huvenne, V.A. and Jones, D.O., 2018. Geomorphological evidence of large vertebrates interacting with the seafloor at abyssal depths in a region designated for deep-sea mining. *Royal Society open science*, 5(8), p.180286; Chin, A and Hari, K, 2020. *Predicting the impacts of mining of deep sea polymetallic nodules in the Pacific Ocean: A review of Scientific literature*. Published by Deep Sea Mining Campaign and MiningWatch Canada. p. 2.
- ²⁹ Leigh Marsh, Veerle A. I. Huvenne and Daniel O.B. Jones. Geomorphological evidence of large vertebrates interacting with the seafloor at abyssal depths in a region designated for deep-sea mining. *R. Soc. open sci.*5180286.
- ³⁰ *Ibid.* p. 7.
- ³¹ Drazen, J.C., Smith, C.R., Gjerde, K.M., Haddock, S.H., Carter, G.S., Choy, C.A., Clark, M.R., Dutrieux, P., Goetze, E., Hauton, C. and Hatta, M., 2020. Opinion: Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining. *Proceedings of the National Academy of Sciences*, 117(30), pp.17455-17460.; Chin, A and Hari, K, 2020. *Predicting the impacts of mining of deep sea polymetallic nodules in the Pacific Ocean: A review of Scientific literature*. Published by Deep Sea Mining Campaign and MiningWatch Canada. p. 3.
- ³² See Gillard, B., Chatzievangelou, D., Thomsen, L., & Ullrich, M. S. 2019. Heavy-metal-resistant microorganisms in deep-sea sediments disturbed by mining activity: An application toward the development of experimental in vitro systems. *Frontiers in Marine Science*. <http://dsmobserver.com/2020/05/a-3-decade-long-disturbance-study-on-the-deep-abyssal-plain/>
- ³³ <http://dsmobserver.com/2020/05/a-3-decade-long-disturbance-study-on-the-deep-abyssal-plain/>
- ³⁴ See Ininer, H.J., Ardron, J.A., Escobar, E.G., Gianni, M., Jaeckel, A., Jones, D.O., Levin, L.A., Smith, C.R., Thiele, T., Turner, P.J. and Van Dover, C.L., 2018. Deep-sea mining with no net loss of biodiversity—an impossible aim. *Frontiers in Marine Science*, 5, p.53.; Van Dover, C.L., Aronson, J., Pendleton, L., Smith, S., Arnaud-Haond, S., Moreno-Mateos, D., Barbier, E., Billett, D., Bowers, K., Danovaro, R., Edwards, A., Kellert, S., Morato, T., Pollard, E., Rogers, A., Warner, R. 2014. Ecological restoration in the deep sea: Desiderata. *Marine Policy* February. Pages 98-106.
- ³⁵ Brito-Morales, I., Schoeman, D.S., Molinos, J.G., Burrows, M.T., Klein, C.J., Arafeh-Dalmau, N., Kaschner, K., Garilao, C., Kesner-Reyes, K. and Richardson, A.J., 2020. Climate velocity reveals increasing exposure of deep-ocean biodiversity to future warming. *Nature Climate Change*, pp.1-6.
- ³⁶ Bindoff, N.L., W.W.L. Cheung, J.G. Kairo, J. Aristegui, V.A. Guinder, R. Hallberg, N. Hilmi, N. Jiao, M.S. Karim, L. Levin, S. O’Donoghue, S.R. Purca Cuicapusa, B. Rinkevich, T. Suga, A. Tagliabue, and P. Williamson, 2019: Changing Ocean, Marine Ecosystems, and Dependent Communities. In: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegría, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In press. pp.452-453.
- ³⁷ Teske, S., Florin, N., Dominish, E., & Giurco, D. 2016. Renewable energy and deep sea mining: Supply, demand and scenarios. *The Institute for Sustainable Futures*. <https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/renewable-energy/marine-energy/7307>
- ³⁸ <https://www.nrcan.gc.ca/our-natural-resources/energy-sources-distribution/renewable-energy/marine-energy/7307>
- ³⁹ <https://www.ft.com/content/4bf84bbd-c4e2-48bb-920a-172805b9e594>
- ⁴⁰ <https://www.weforum.org/global-battery-alliance/home>
- ⁴¹ <https://sustainabilitycommunity.springernature.com/users/183121-saleem-ali/posts/urban-mining-has-potential-for-meeting-china-s-circular-economy-goals>
- ⁴² <https://www.reuters.com/article/us-tesla-china-electric-exclusive/exclusive-tesla-in-talks-to-use-catls-cobalt-free-batteries-in-china-made-cars-sources-idUSKBN20C0RP>
- ⁴³ IBM’s Research’s Battery Lab is reported to be developing a battery using materials “extracted from seawater, which means they are non-toxic and do not involve mining” <https://www.greenmatters.com/p/ibm-new-battery-no-heavy-metals>
- ⁴⁴ For environmental and social considerations and conditions around deep sea mining see: Deep Sea Conservation Coalition. 2019. *Position Statement on Deep Seabed Mining*.
- ⁴⁵ The High Level Panel for Sustainable Ocean Economy came out with its final commissioned report in December 2020, “Ocean Solutions That Benefit People, Nature and the Economy” which concludes that “[u]ntil the need for, and potential consequences of, deep-sea mining are better understood, the concept is conceptually difficult to align with the definition of a sustainable ocean economy and raises various environmental, legal and governance challenges, as well as possible conflicts with the UN Sustainable Development Goals.” (p. 60). <https://www.oceanpanel.org/ocean-action/files/full-report-ocean-solutions-eng.pdf>