

# Deep Sea Mining: the case for a moratorium

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Strategic Roundtable Discussion with Parliamentarians on the Protection  
of the Deep Seabed

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**deepsea**  
conservationcoalition



# Members include

deepsea  
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# UNCLOS Part XI: Seabed Mining

## Article 145

### *Protection of the marine environment*

- “Necessary measures shall be taken...to ensure effective protection for the marine environment from harmful effects”  
and “the prevention of damage to the flora and fauna of the marine environment”

Additional obligations Part XII: e.g. Art 194.5

# UNCLOS Part XI

The International Seabed Authority is obligated to act 'on behalf of', and 'for the benefit of', humankind as a whole

UNCLOS Articles 137, 140, 143 and paragraph 6 of the Preamble



# Biodiversity loss from deep-sea mining

Nature Geoscience June 2017

Biodiversity loss from deep-sea mining unavoidable, irreversible on human timescales and offsets in the deep-sea “scientifically meaningless”

## Biodiversity of the Clarion Clipperton Fracture Zone

One-half of species discovered to date depend on nodules & nodules and nodules-dependent animals may take millions of years to recover from the impacts of mining, and even the partial recovery of the animals living in the sediment may take hundreds to thousands of years.”

Kaiser, S., Smith, C.R. & Arbizu, P.M. Editorial: Biodiversity of the Clarion Clipperton Fracture Zone. *Mar Biodiv* 47, 259–264 (2017).

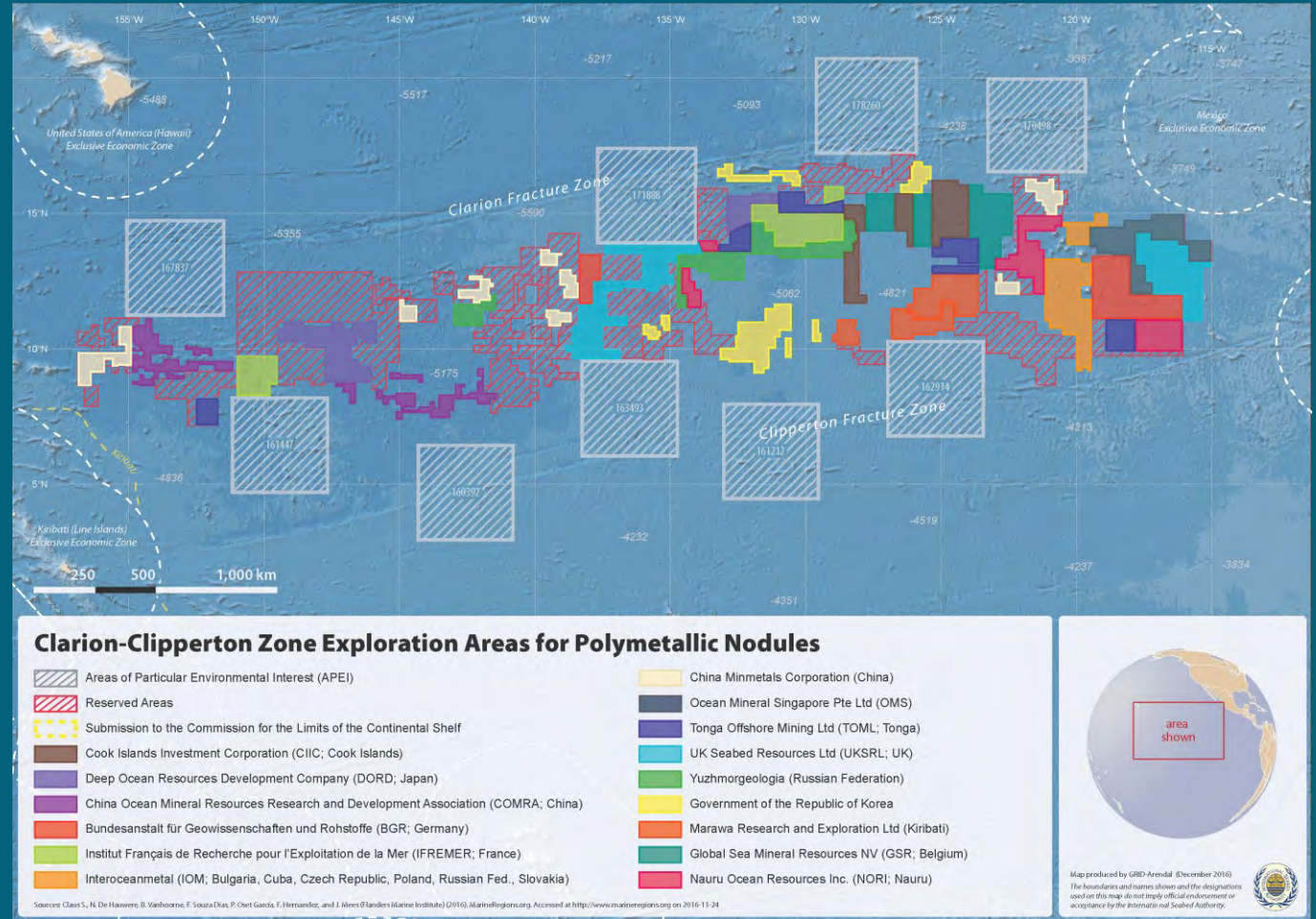
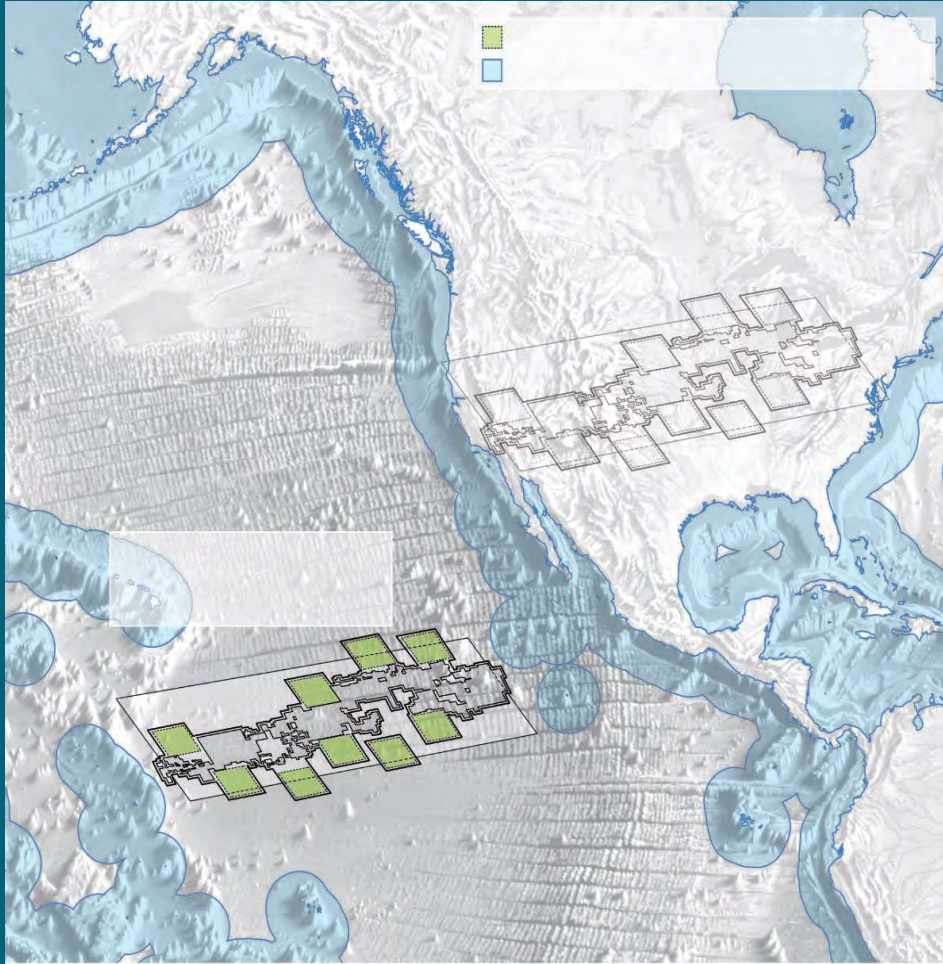


C. L. Van Dover, J. A. Ardron, E. Escobar, M. Gianni, K. M. Gjerde, A. Jaeckel, D. O. B. Jones, L. A. Levin, H. J. Niner, L. Pendleton, C. R. Smith, T. Thiele, P. J. Turner, L. Watling and P. P. E. Weaver

<https://t.co/2guyyvGfmC>



# Clarion Clipperton Zone



17 Exploration contracts: Belgium, China, Cook Islands, France, Germany, Jamaica, Japan, Kiribati, Korea, Nauru, Russia, Singapore, Tonga, UK & IOM - Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia = app 1.25 million km<sup>2</sup>



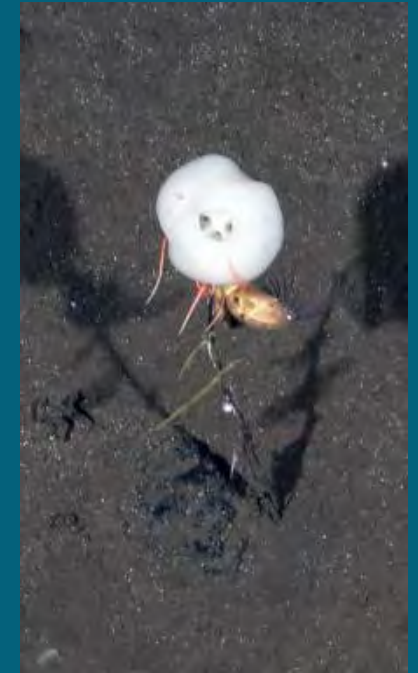
“Within all the nodule abundant ecosystems visited within the MiningImpact project, stalked biogenic structures have been abundant habitat components.”



Sponge smothered by sediment, in close vicinity to a disturbance track.



Stalked structures provide key habitat resources for some larger mobile megafauna for periods of their lifecycle. Here, an octopod was observed brooding eggs on a stalk in the DISCOL area.



Barnacle and ophiuroid utilising a sponge stalk in the DISCOL region

# Each ISA mining claim area in CCZ approximately 75,000 Km<sup>2</sup>

- Mining would occur in multiple areas within claim (black shapes) over 30 year period of contract – **each CCZ mine would strip mine est 10-12,000 km<sup>2</sup> of seabed** in 30-year license period (app 1/3 size of Belgium) to mine 3MT dry weight/year nodules (app 10K ton/day)
- Sediment plumes across seabed could “easily” cover another 10,000-30,000 km<sup>2</sup>; over all footprint estimated at 20-40,000 km<sup>2</sup> (Smith et al, 2020)
- Concentrations in the water column orders of magnitude higher than natural concentrations sediment/POC to which organisms are adopted (MIDAS; JPI Oceans;)





# Mid-water plumes

**Up to 1,400 km** - Wastewater, sediment & mining fines discharged from ships could travel up to 1,400 km through mid-water in multiple directions before fully settling on bottom

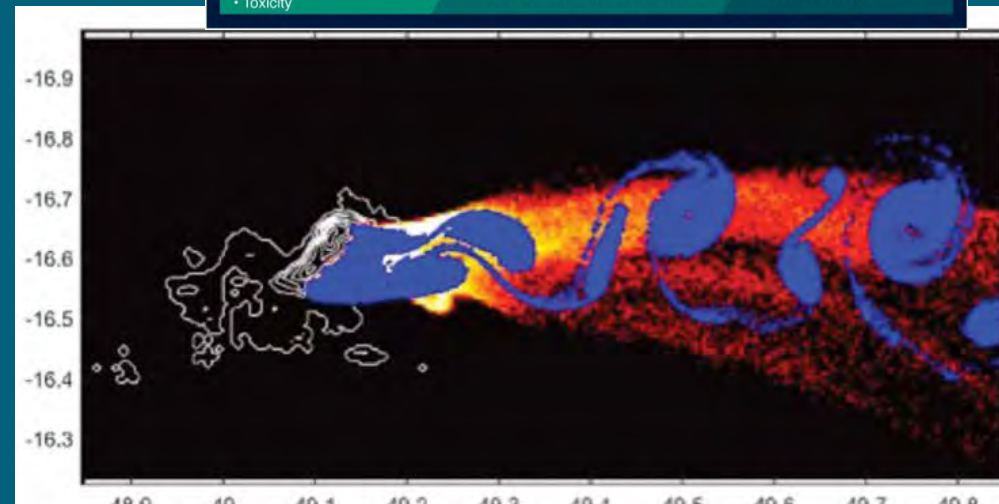
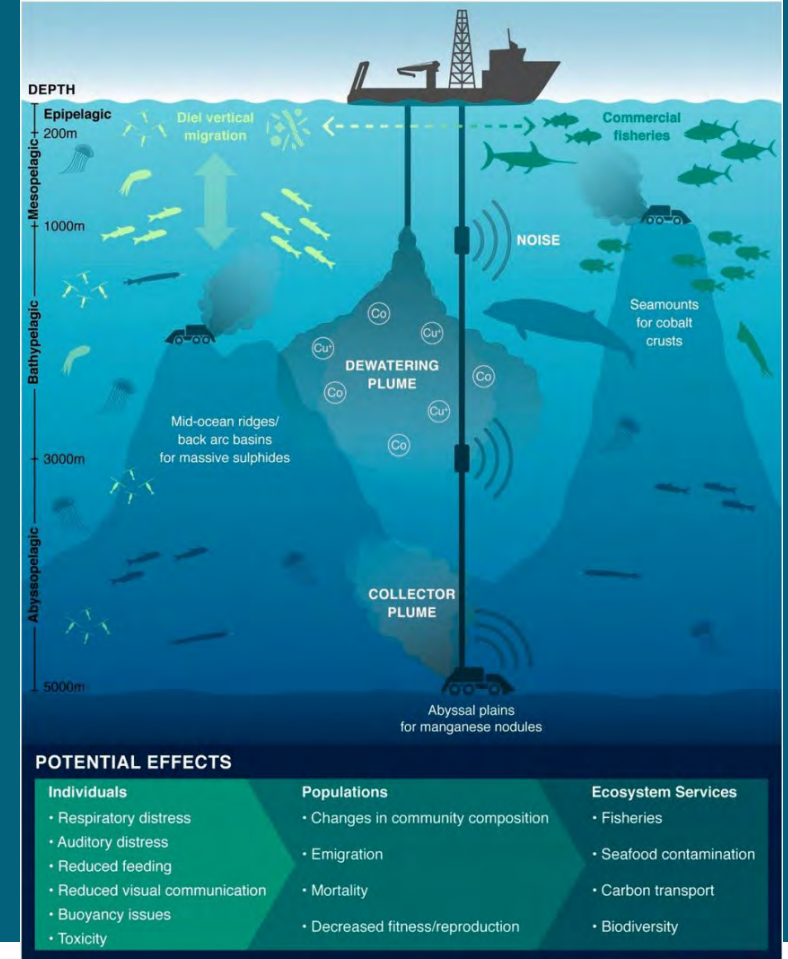
(Muñoz-Royo et al., (2021) "Extent of impact of deep-sea nodule mining midwater plumes is influenced by sediment loading, turbulence and thresholds.

COMMUNICATIONS EARTH & ENVIRONMENT | <https://doi.org/10.1038/s43247-021-00213-8>)

**Impacts of sediment, wastewater, noise & light** on fisheries (e.g. tuna fisheries in eastern & NW Pacific, western Indian Ocean, Mid Atlantic), migratory species (e.g. cetaceans, sea turtles, sharks, rays), & crucially – the biological carbon pump

(Drazen et al., (2020) "Opinion: Midwater ecosystems must be considered when evaluating environmental risks of deep-sea mining" Proceedings of the National Academy of Sciences.

<https://www.pnas.org/content/117/30/17455> )



# Impact/Recovery?

Up to half of the larger animals in CCZ believed to be nodule dependent species ('nodule obligate' species). And about half of species sampled to date in CCZ are 'singletons' – not known if a result of undersampling, rarity, endemism. Many species new to science and only a small number of species likely to inhabit CCZ have yet been sampled/discovered.

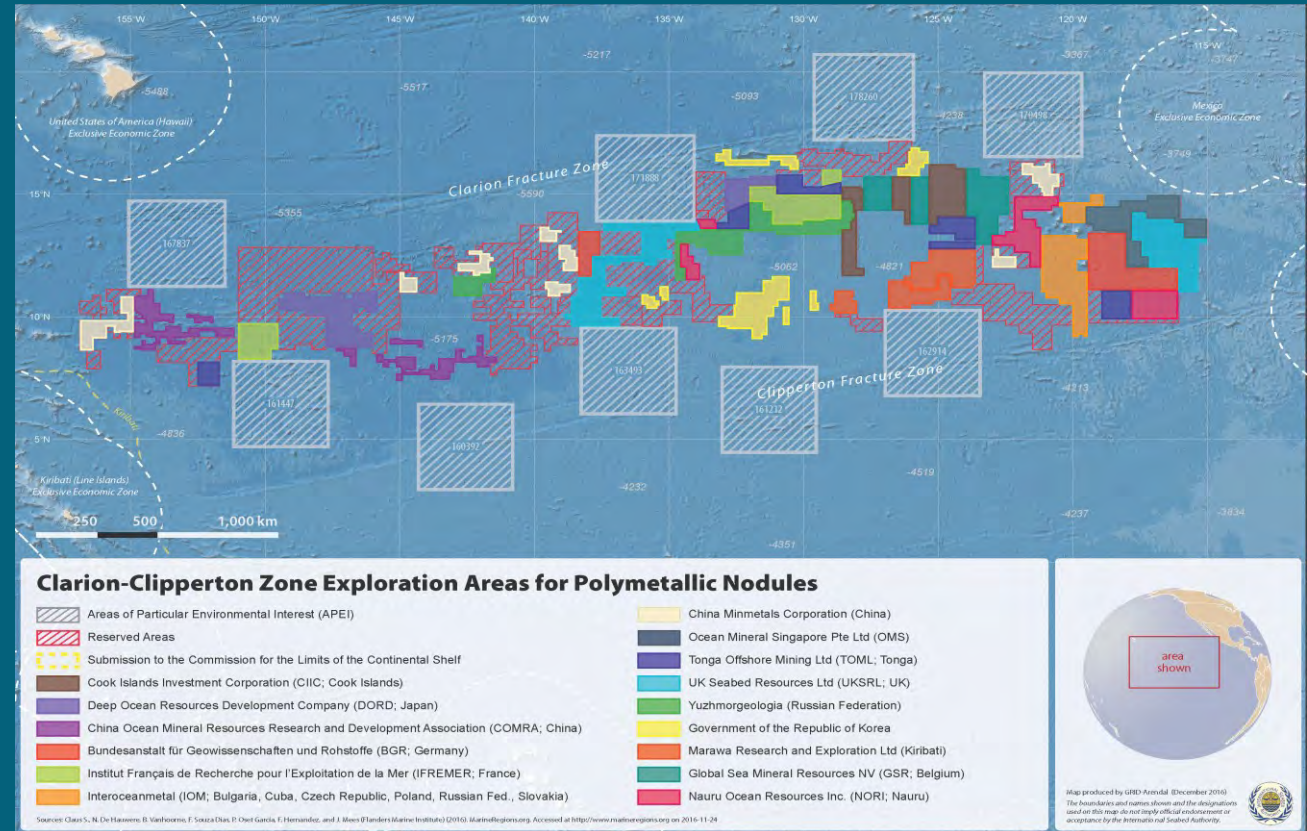
**“Nodules and nodule-dependent animals may take millions of years to recover from the impacts of mining, and even the partial recovery of the animals living in the sediment may take hundreds to thousands of years.”**

Kaiser, S., Smith, C.R. & Arbizu, P.M. Editorial: Biodiversity of the Clarion Clipperton Fracture Zone. *Mar Biodiv* 47, 259–264 (2017).



# Clarion Clipperton Zone REMP

- 9 APEIs covering app 1.44 million km<sup>2</sup> = app 32% of CCZ (4.5 million km<sup>2</sup>)
- BUT APEIs only designed to protect core area (200x200km) of each APEI = app 360,000 km<sup>2</sup> or app 8% of CCZ
- 4 new APEIs adopted in December 2021: total area app 44% of CCZ but only protecting app 11-12% from mining impacts



17 Exploration contracts: Belgium, China, Cook Islands, France, Germany, Jamaica, Japan, Kiribati, Korea, Nauru, Russia, Singapore, Tonga, UK & IOM - Bulgaria, Cuba, Czech Republic, Poland, Russian Federation and Slovakia = app 1.25 million km<sup>2</sup>

## UN 1<sup>st</sup> World Ocean Assessment 2016

“This truly vast deep-sea realm constitutes the largest source of species and ecosystem diversity on Earth...evidence that the richness and diversity of organisms in the deep sea exceeds all other known biomes... and supports the diverse ecosystem processes and functions necessary for the Earth’s natural systems to function”

Deep sea already under stress:

- Climate change related impacts: deoxygenation, acidification, temperature, reduced food (POC flux) (Sweetman et al 2017; Levin et al 2016)
- Pollution: plastics, POPs in DS fish (Jamieson et al 2017)
- DW Fisheries impacts 200-2000m+ (1<sup>st</sup> UN WOA; ICES, others)



4,947 meters on canyon slope leading to Sirena Deep in Mariana trench /

NOAA

deepsea  
conservationcoalition



# Structural/political concerns re the ISA

- Use it or lose it incentives: mine or risk losing exploration claim/contract (15yr + multiple extensions?); ‘perverse’ incentive to mine
- All countries have equal opportunity to mine and/or become a Sponsoring State – noble idea in 1970s but can the ISA say no to any that apply today?
- Currently at least 25 of the 31 ISA exploration contracts in the hands of 7 countries - China, France, Germany, India, Japan, Korea, Russia - and 3 companies UKSR (UK), GSR (Belgium) Deep Green/The Metals Company (Canada) – Equity?

# Structural & political concerns regarding the ISA

- Lack of transparency (contracts, LTC meetings) – decision to grant mining contracts heavily influenced by LTC
- Voting structure - A MAJOR PROBLEM: If 16 individuals (or less) on LTC recommend a country/company get a mining license, as few as 2 members of the ISA Council (on Groups A, B or C) can guarantee the country/company gets a license even if the other 34 Council members oppose
- 131 Members of the ISA have no vote in deciding whether to issue mining licenses or not



# Benefit to humankind as a whole?

- Economics of CCZ mining (MIT): payout to ISA countries – a few hundred thousand dollars per country per year (if divided equally amongst 167 countries); less if discount rate/Net Present Value is taken into account.
- But potential very profitable for individual companies & Sponsoring States – corporate tax (but not all can/will share equally in benefits as sponsoring states unless all 167 apply for mining licenses)
- Economics likely to drive industry – if profitable, many countries & companies may want to join in the ‘gold rush’. The ISA not likely to be able to say no to (any?) applications to mine

# So why Mine? The Hype

- “The green transition is going to require hundreds of millions of tonnes of nickel, copper and cobalt...”

Gerard Barron, CEO The Metals Company (TMC) formerly  
DeepGreen Metals

TMC has 3 ISA exploration contracts in the CCZ sponsored by Nauru, Tonga, Kiribati  
<https://im-mining.com/2020/03/02/allseas-buys-deepwater-drill-ship-adapt-polymetallic-nodule-mining-partner-deepgreen-metals/>



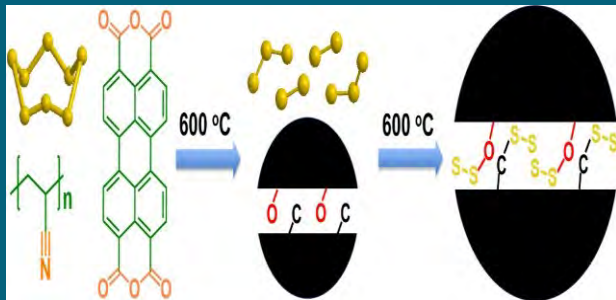
# Even to simply equal current annual terrestrial production of Ni, Co, Cu, Mn

Main metals found in polymetallic nodules in the CCZ	Estimated annual metal production in tons for each mining license in CCZ based on mining 3MT nodules (dry wt) per year	Land-based mined production in 2018 in tons (USGS)	Est Number of CCZ mines needed per year to equal 2018 terrestrial mining production	Est total CCZ seabed area that would be directly mined per year in km2	Cumulative impact over 30-year license period in km2
Nickel (Ni)	37,050	2,300,000	62	18,600	558,000
Cobalt (Co)	6,375	140,000	22	6,600	198,000
Copper (Cu)	32,400	21,000,000	648	194,000	5,832,000
Manganese (Mn)	760,000	18,000,000	24	7,200	216,000

Sources: MIT; USGS, GSR: Financial Model Presentation: Techno-Economic Assessment & Financial Payment Regime. Presentation by Kris Van Nijen, Global Sea Mineral Resources NV, to the Deep Seabed Mining Payment Regime Workshop #3: Exploring a Financial Model and Related Topics. Singapore, 19-21 April 2017. GBR: Analysis of the Economic Benefits of Developing Commercial Deep Sea Mining Operations in Regions where Germany has Exploration Licences of the International Seabed Authority, as well as Compilation and Evaluation of Implementation Options with a Focus on the Performance of a Pilot Mining Test. Study on Behalf of the Federal Ministry for Economic Affairs and Energy Division I C 4. Project No. 59/15. 30 September 2016

# Changing technologies: Batteries without CCZ metals planned/already in production – no nickel, no cobalt

Sulfur provides promising 'next-gen' battery alternative  
Phys.org 16 June 2020



“Lithium-sulfur batteries... high energy density, low cost, abundance, nontoxicity and sustainability.”

“Cobalt, nickel free electric car batteries are a runaway success”  
Mining.com 11 March 2021



Lithium-ion and lithium-iron phosphate (or LFP) dominate the current EV battery landscape.

EV Battery Technology:  
The Road To A Breakthrough  
April 2022



<https://www.investors.com/news/ev-battery-technology-hunting-for-the-next-big-thing/>

These and other alternatives to LMNC/LNCA batteries exist:

LFP: Tesla (50%), BYD (100%), Ford, Volkswagen, others

# Deep-sea mining not needed to transition to renewable energy economies



RENEWABLE ENERGY AND DEEP-SEA MINING:  
SUPPLY, DEMAND AND SCENARIOS

Sven Teske  
Nick Florin  
Elsa Dominish  
Damien Giurco



2016

- Metal demands for renewable energy - Transition to 100% renewable energy economy by 2050 can be done without sourcing metals from deep-sea
- (alternative technologies, substitute materials, recycling, better product design etc.)

- **Copper**
- **Nickel**
- Silver
- Specialty metals (Tellurium)
- Rare Earths (Neodymium, Dysprosium)
- **Cobalt**
- Lithium

Teske, S., Florin, N., Dominish, E. & Giurco, D. 2016, Renewable Energy and Deep Sea Mining: Supply, Demand and Scenarios. University of Technology Sydney  
<https://opus.lib.uts.edu.au/handle/10453/67336>



# Intergovernmental Conference (BBNJ): UNCLOS Implementing Agreement conservation and sustainable use of marine biodiversity in ABNJ



© UN Photo

# A Tale of Two Instruments under negotiation

- On the one hand, the BBNJ Agreement – an UNCLOS ‘implementing agreement’ for the conservation and sustainable use of marine biological diversity in ABNJ
- On the other hand, the ISA Mining Code/exploitation regulations – an instrument under UNCLOS likely to lead to large-scale biodiversity loss in deep-sea/open ocean ecosystems systems already under stress (climate change, pollution, plastics)

# DSM: incompatible with 2030 Sustainable Development Goals

SDG 14, Target 14.2: “By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans”

CCZ mining: likely to cause significant adverse impacts on marine ecosystems; weaken their resilience (e.g. to climate change impacts); & cause damage from which they may never recover. Also lead to unsustainable patterns of production and consumption under SDG 12



# Growing support for a moratorium

European Parliament: “...moratorium, including at the International Seabed Authority, on deep-seabed mining 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 deep seabed mining can be managed to ensure no marine biodiversity loss nor degradation of marine ecosystems” (June 2021)

Chilean Senate, Guam Senate, legislatures of Canary Islands, Galicia, others

Over 600 marine science & policy experts from 44 countries

<https://www.seabedminingsciencestatement.org/>

BMW Group, Volvo Group, Samsung SDI, Philips, Google, Volkswagen Group, Renault Group, Scania, Patagonia. Northvolt, Ford and Microsoft stated they will avoid DSM metals in supply chains. Banks: BBVA, Lloyd's, NatWest ABN AMRO - More companies likely... EU's Long Distance (fishing) Fleet Advisory Council and other EU Councils

<http://www.savethehighseas.org/momentum-for-a-moratorium/>

# Moratorium/concern

- 44 government ministries/agencies from 37 countries, 530+ NGOs and indigenous peoples groups voted to support DSM moratorium resolution 069 at IUCN World Conservation Congress September 2021  
<https://www.iucncongress2020.org/motion/069>
- Pacific Blue Line “ban” on DSM in the Pacific  
<https://www.pacificblueline.org/>
- UK House of Commons Environment Audit Committee: DSM - “catastrophic impacts on the seafloor”; ISA benefiting from revenues from mining “a clear conflict of interest” and “the case for [deep-sea] mining has not yet been made”(January 2019)
- High Level Panel for a Sustainable Ocean Economy: Ocean Solutions report (2020); UNEP Finance Initiative: Harmful Marine Extractives: Deep Sea Mining report (2022) – Deep Sea Mining is unsustainable, should not be financed nor considered a goal of any ‘sustainable’ blue economy

# Moratorium on deep-sea mining

- Yes – possible, legally defensible, required under the precautionary approach, consistent with contemporary commitments to protecting biodiversity and implementing UN SDGs
- Future role for the ISA? Critical to maintain ISA as a multilateral, global regulatory body with Authority over activities in the Area / CHM (but need reform/transformed)
- Reform & transform ISA - instead of mining, ISA c/should promote, coordinate, and/or conduct marine science research on the deep-sea and open ocean and role in carbon sequestration and regulation of planetary climate processes (UN 1<sup>st</sup> World Ocean Assessment) – knowledge that would provide an incalculable benefit to humankind as a whole



# The Anthropocene?

“Clearly we are in the midst of one of the great extinction spasms of geological history”

E.O. Wilson, *The Diversity of Life* (1992)

A million species at risk of extinction, many over the next few decades from direct exploitation/mortality, habitat loss, climate change...

IPBES report (May 2019)/UNEP February 2021

# The ISA is now negotiating regulations to mine deep sea nodules in the central Pacific/CCZ

“It’s one of the most biodiverse areas that we’ve ever sampled on the abyssal plains” ... “We’re about to make one of the biggest transformations that humans have ever made to the surface of the planet. We’re going to strip-mine a massive habitat, and once it’s gone, it isn’t coming back.” Jeff Drazen, University of Hawaii

<https://www.theatlantic.com/magazine/archive/2020/01/20000-feet-under-the-sea/603040/>

“Once we destroy vast areas of deep seabed habitat, there will be no going back. These ecosystems will take millions of years to recover.” Craig Smith, University of Hawaii

<https://www.thedailybeast.com/deep-sea-mining-may-uplift-clean-energy-and-curse-our-oceans>

A moratorium by/at the ISA is required

# DSCC fact sheets on DSM & the ISA

<http://www.savethehighseas.org/resources/publications/deep-sea-mining-factsheets/>

- [Deep-sea Mining an Introduction](#)
  - Also available in: [Spanish](#) & [French](#)
- [Deep-sea mining: the science and potential impacts](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: growing support for a moratorium](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: where are they seeking to mine first?](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: international commitments](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: who stands to benefit?](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: is the International Seabed Authority fit for purpose?](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining and the transition economy](#)
  - Also available in: [Spanish](#)
- [Deep-sea mining: what are the alternatives?](#)
  - Also available in: [Spanish](#)



# Thank-you!

## DSM in the news

<http://geographical.co.uk/nature/oceans/item/4280-should-we-mine-the-deep-sea-floor-before-we-discover-its-true-treasures>

<https://chinadialogueocean.net/19878-deep-sea-mining-code-missing-from-the-agenda-at-first-isa-meeting-in-two-years/>

<https://www.theguardian.com/environment/2021/sep/27/race-to-the-bottom-the-disastrous-blindfolded-rush-to-mine-the-deep-sea>

<https://www.theguardian.com/environment/2021/sep/28/false-choice-is-deep-sea-mining-required-for-an-electric-vehicle-revolution>

<https://www.bloombergquint.com/business/a-mining-startup-s-rush-for-underwater-metals-comes-with-deep-risks>

<https://www.theatlantic.com/magazine/archive/2020/01/20000-feet-under-the-sea/603040/>

<https://www.newyorker.com/magazine/2022/01/03/mining-the-bottom-of-the-sea>