

Deep-sea Mining FAQ

What is the Center's deep-sea mining lawsuit?

The Center for Biological Diversity and its attorney Emily Jeffers have filed a lawsuit challenging the validity of exploratory permits that the United States has issued for deep-sea mining operations in the Clarion Clipper Zone of the Pacific Ocean.

What is deep-sea mining?

[Deep-sea mining](#) is the extraction of valuable metals and minerals by stripping away wide swaths of the deep ocean floor using robotic cutting machines. Currently 26 permits have been issued for deep-sea mining exploration, and one has been issued for the world's first active mining operation near Papua New Guinea, the Solwara I project, which is slated to be operational by 2018.

What will be mined?

Nickel, copper, cobalt, manganese, zinc, gold and other rare-earth metals and minerals, much of which are used in electronics. They are found on the seafloor, embedded in three types of mineral forms: cobalt-rich crust, polymetallic sulphides and polymetallic nodules, the latter type forming seafloor fields that can be thousands of miles long.

Why are there such valuable materials in the deep ocean?

Natural hydrothermal geysers on the deep ocean floor regularly vent rich concentrations of metals and minerals from the earth's core, forming valuable seams on the ocean floor that can yield up to 10 times the precious metals as in comparable land-based mining. The Clarion-Clipperton Fracture Zone in the Pacific Ocean is believed to be the most mineral-rich sea floor in the world.

What do we know about life on the deep-sea floor?

Not enough. The thermal vents on the ocean floor weren't even discovered by scientists until the late 1970s, and scientists are still learning about the ecosystems that surround these features. The vastness of the oceans also makes a comprehensive cataloguing of its biological diversity and resources almost impossible. As Cindy Van Dover, head of Duke University's Marine Lab (who was aboard the first manned deep-sea submersible in 1982), [told National Geographic in 2013](#), "We haven't yet studied the ecosystem services and functions of the deep-sea to understand what we'd lose. We don't yet know what we need to know." That makes it difficult to create effective environmental regulations for these projects.

How much are deep-sea metals worth?

Although there's no comprehensive tally of the value of all undersea materials, a World Economic Forum report in 2014 estimated the gold in international seabeds was worth at least \$150 trillion — or nine pounds of gold for every person on Earth. Nautilus Minerals, a Canadian company permitted by Papua New Guinea, estimates the value of gold, cobalt, zinc and copper it plans to mine to be in the hundreds of millions of dollars.

Why is deep-sea mining becoming a big issue now?

The high cost, difficulty and risks associated with conducting mining operations at depths of around a mile beneath the surface of the ocean have been barriers to pursuing deep-sea mining. But the combination of technological advances in mining equipment and the skyrocketing value of precious metals used in consumer electronics have created an intensifying competition to mine the seas, or what *National Geographic* called the new “underwater gold rush.”

What are the main environmental impacts?

There are many environmental problems created by deep ocean mines, which level the ocean floor to extract materials. The most direct impacts at mining sites are destruction of natural land forms and the wildlife they host, compaction of the sea floor, and creation of sediment plumes that disrupt aquatic life. Nearby impacts include noise, electromagnetic effects, disruption of the larval supply, contamination and fluid flow changes. Scientists also fear deep-water mining will alter the geochemical underpinnings of ocean life, cause the loss of important genetic resources, and disrupt the connectivity between deep oceans and surrounding oceans, potentially hindering the flow of nutrients. Any environmental effects would also be worsened by the cumulative impacts of multiple mining operations. The difficulty of deep-sea mining operations also make accidents, pollution and contamination likely.

Is deep-sea mining similar to strip-mining?

Yes, the methods are very similar, involving massive cutting machines that remove underwater mountains and other natural land forms and sift through tons of debris for valuable materials. Undersea mining companies claim their deep-sea operations are less destructive than comparable land-based mining and are a good alternative to expanding mountaintop removal on land, but there is sparse evidence to support the claim.

Isn't the deep ocean floor desolate and devoid of many life forms?

No. Lisa Levin, director of the Center for Marine Biodiversity and Conservation, said that used to be the dominant view, but scientists have discovered the deep ocean is actually teeming with life. “There is a wealth of ecosystem heterogeneity that provides a tremendous amount of biodiversity,” she told a recent online conference on the issue. The deep ocean contains fish that live more than 100 years, including the black oreo, orange roughy and sablefish, and a wide variety of snails, mussels, clams, tubeworms and other creatures that live amid coral and sponge reefs and other natural contours that would be wiped out by mining. Levin also said most indications are that this sensitive terrain will take many decades or even centuries to recover from the damage.

Where is deep ocean mining being proposed?

There are permitted deep-sea mining explorations now underway in the Pacific, Atlantic and Indian oceans, but the most interest and activity so far has been around the mineral-rich Clarion-Clipperton Zone in the Equatorial North Pacific, roughly halfway between Hawaii and

Mexico. Papua New Guinea has permitted a company to conduct mining operations 19 miles from its shores, in the Bismarck Sea near that zone.

Why is the Clarion-Clipperton Zone important for wildlife?

Among the wildlife in the Clarion-Clipperton Zone that could be affected by the project are sharks (gray reef, tiger, great hammerhead, and whitetip reef), tuna (frigate, mackerel, dog-tooth, yellowfin, albacore and bigeye), cetaceans (pygmy killer whale, sperm whale, spinner dolphin and Cuvier's beaked whale), marine birds (Beck's petrel and [Heinroth's shearwater](#)) and turtles ([loggerhead](#), green, [leatherback](#), hawksbill, olive ridley and flatback). The seafloor at the mining sites will be wiped clean of life and natural contours, directly affecting clams, mussels, [corals](#), tubeworms, snails and microorganisms.

Who regulates most deep-sea mining projects?

Most of the 26 permits that have been issued come from the International Seabed Authority, which was created by the United Nations Convention on the Law of the Sea and its 167 member nations. The convention divided the deep oceans up into zones controlled by individual countries, an area that covers 54 percent of the world's oceans, but individual countries can also permit mining in their territorial waters, known as their "Exclusive Economic Zones."

Who benefits from deep-sea mining?

The Law of the Sea specifies that resources in international waters "are the common heritage of mankind" and must be managed in the public interest, technically precluding strictly commercial mining operations and requiring state sponsorship for all permits. Countries are free to permit strictly commercial mining operations in their Exclusive Economic Zones, as many developing Pacific island nations have started to do.

What companies are leading the charge?

The series of small Pacific island nations that are pursuing deep-water mining deals — including Papua New Guinea, Tonga, Cook Islands, Micronesia, Marshall Islands, Solomon Islands, Kiribati, Tuvalu, Fiji and Vanuatu — have contracted with three deep-water mining companies: Neptune Minerals from the U.S., Nautilus Minerals from Canada, and Kiost, a South Korean company. In international waters, Lockheed Martin is exploring deep-water mining through permits issued by the United States and Great Britain.

What other countries have issued deep-sea mining permits?

Countries that have licensed mining exploration in the Clarion-Clipperton Zone in the Equatorial North Pacific are Japan, China, Korea, France, Russia, Germany, Great Britain and the Interoceanmetal Joint Organization, a consortium comprised of Bulgaria, Cuba, Czech Republic, Poland, Russia and Slovakia.

Why are countries permitting these operations?

Countries that permit deep-sea mining operations get a cut of the revenues from these operations. When British Prime Minister David Cameron announced an undersea-mining deal with a Lockheed Martin subsidiary in 2013, he said it could funnel \$60 billion into the British

economy over the next 30 years. Some Pacific island nations now permitting mining, including Papua New Guinea and Tonga, are being threatened by rising sea levels and are desperate for resources to shore up their infrastructure. Papua New Guinea reportedly has a 30 percent equity share in the Solwara I project.

Is the United States a party to the Law of the Sea?

No. Although U.S. diplomats participated in its development from 1973 to 1982 and officially regard it as a codification of customary international law, it has yet to be ratified by Congress, largely because of concerns by political conservatives that it might infringe on U.S. national sovereignty and independence.

How does the United States permit deep-sea mining?

Congress passed the Deep-seabed Hard Mineral Resource Act in 1980, giving the National Oceanic and Atmospheric Administration the authority to issue permits for deep-sea mining. Those permits are recognized only through bilateral agreements with some countries.

Who holds U.S. permits to do deep-sea mining?

In 1980 a company called OMCO Seabed Exploration LLC, a subsidiary of defense contractor Lockheed Martin, was issued permits to explore two zones the United States created in the Clarion-Clipperton Zone: USA-1 and USA-4. The permits expired in 2004, but the company sought and was granted an extension in 2012; it says it wants to begin exploration and prospecting work.

Why is the Center challenging those permits?

Scientists and environmentalists have long raised concerns about how deep-sea mining operations will affect underwater ecosystems and vulnerable wildlife. The Center formally raised those concerns with NOAA when Seabed Exploration LLC sought an extension of its permits in 2012, but the agency ignored those concerns and issued the extension, without completing an environmental impact study.