GLOBAL 03.09.2019 | Sharon E. Burke

Managing the next Gold Rush

The seafloor is rich in minerals, but barely understood. We need to be careful not to trigger an environmental catastrophe

The International Seabed Authority (ISA) sits perched above the concrete boardwalk of Jamaica's Kingston Harbor, across the bay from the spot where 'Calico Jack' Rackham was once gibbeted as a warning to other eighteenth-century pirates. Today, this small United Nations agency rules the high seas – or, more precisely, the seafloor some three miles below – and yet it is largely unknown to the general public. But if China decides to retaliate against US import tariffs by restricting its exports of rare-earth elements, that could change fast.

Some 71 per cent of the Earth's surface is actually underwater, and the seafloor (or seabed) is rich in rare-earth elements and other sought-after minerals – especially in deep international waters. The ISA manages the mineral rights of more than 50 per cent of the world's deep ocean floor, and its 168 member states have the right to vie for access to the resources there. But, given the risk of catastrophic environmental consequences, all countries could lose out if this contest proceeds without due care.

Undersea minerals tend to be clustered in potato-shaped chunks of rock nestled on abyssal plains, vented in boiling-hot water from fissures in the seafloor, and crusted along the flanks of extinct underwater volcanoes called seamounts. Generally, the concentrations of minerals in these formations are much higher than in ores on dry land.

Yet even with all that wealth, the only active seafloor mining project in the world right now is off the coast of Papua New Guinea, and it is currently stalled because of financial problems. That reflects how difficult and expensive it still is to operate in the dark, freezing, and high-pressure deep-sea environment, more than 80 per cent of which remains unmapped and unexplored.

The competition for deep sea minerals

Nonetheless, both commercial organizations and ocean scientists think new technologies will make deep-ocean mining all but inevitable within the next decade. A range of innovations, such as better satellite imaging of the ocean floor and robot submersibles, is improving seabed access. Moreover, digital-age technologies and the global clean-energy transition are driving a sharp increase in demand for materials that are abundant in the deep ocean. In addition to rare-earth elements, these include cobalt, manganese, and tellurium, which are used in a growing number of applications, including batteries, magnetic resonance equipment, solar panels, and guidance systems for munitions.

Competition for these increasingly useful materials was heating up even before the recent escalation of Sino-American trade tensions. China has a comparative advantage in critical minerals, owing to its significant domestic resources and extensive processing facilities. It also has longstanding investments in other major producing countries such as the Democratic Republic of Congo (DRC), which accounts for about 65 per cent of global cobalt production and half of total reserves.

The international community should aim to secure the best, least destructive supply of the minerals it needs, whether from the DRC or the deep ocean – or likely both.

The United States, by contrast, must import many high-tech minerals. Accordingly, the US government recently deemed 35 minerals critical to the country's economic and national security, and announced a new strategy calling for increased domestic mining, among other measures.

In terms of seabed resources, there is no contest between these two geopolitical rivals. China is expected to fare well next year when the ISA issues a new mining code and begins its first-ever permit process for mineral exploitation in international waters. But America will not even be at the table, because it is not a party to the UN Convention on the Law of the Sea (and thus is not officially represented at the ISA). A small clique of US senators has long blocked accession to the treaty for obscure ideological reasons, an idiosyncrasy that America may soon decide it can ill afford.

Understanding the largest biome on the planet

With or without US companies in the mix, economic progress is not a free ride, Recovering and refining the raw materials needed for digital

technologies and clean energy inevitably has environmental consequences. All mining – including the noxious process of extracting minerals from rocks – is destructive, and it is too soon to tell if deep-ocean mining is more or less destructive than mining on land.

What looks at first like a barren and forbidding wasteland is actually the largest biome on the planet, populated by fantastical creatures such as the anglerfish, vampire squid, and ancient corals that have been around since the Bronze Age. A recent University of Hawaii-led exploration of the Clarion-Clipperton Zone, a vast international underwater territory stretching from Hawaii to Mexico, documented a plethora of deep-seabed flora and fauna, more than half of which were entirely new to science.

Researchers have also recently discovered that microbial organisms in the deep ocean may play an important part in regulating Earth's climate. Some of these formations and organisms have taken millions of years to accrue; disturbing them, or even covering them in the sediment that mining would kick up, could permanently destroy them. Little is known about the role these species and deep-ocean microbes play in fisheries, the global climate, and other ecosystem processes that support both marine and terrestrial life.

The international community should aim to secure the best, least destructive supply of the minerals it needs, whether from the DRC or the deep ocean – or likely both. We should at least identify and understand the trade-offs before crucial decisions are made, so as to weigh the possible consequences before they become irrevocable. Clearly, China and the US (if it can be persuaded to step off the sidelines) must play a leading role in this effort.

When the Industrial Revolution began, no one could have known that climate change would be one of its end results. But in the digital age, the world must be much more environmentally aware when tapping the deep-ocean mineral riches.

(c) Project Syndicate



Sharon E. Burke
Washington D.C.

Sharon E. Burke, former US Assistant Secretary of Defense for Operational Energy, directs New America's Resource Security Program.