

**Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Distinguished Professor of Earth and Planetary Sciences, UC Santa Cruz.**

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Mining the Deep Sea Floor**

As an undergraduate student at UC Santa Barbara in the early 1960s I read with enthusiasm and interest the popular magazine articles of the time about how many of the problems and limitations that humanity faced on land would all be solved in the ocean.

Food from the sea, fresh water from salty water, minerals and energy from the ocean floor, and we would soon be able to live under or floating on the surface of the sea in marine habitats or offshore cities. It all sounded pretty exciting.

As a geological sciences major, I looked for a while into what was believed to be the most potentially valuable seafloor mineral deposit, manganese nodules, as a possible research focus to pursue in graduate school. Large areas of the Pacific Ocean deep-sea floor are literally covered with potato size manganese nodules and they were being optimistically described as a target of the new mining frontier.

Manganese is a metal used in steel alloys to add strength and resist corrosion. It can also be combined with other metals to form magnetic alloys and is used in making rubber. But here it was, spread across thousands of square miles of seafloor – there for the taking. At depths of 10,000 to 15,000 feet, however, bringing up large volumes of these manganese and iron oxide nodules was no simple job.

About 1972, newspaper articles appeared about a special ship (the *Hughes Glomar Explorer*) that was owned and operated by the eccentric and reclusive billionaire businessman, Howard Hughes, which was being converted to a vessel that could recover manganese nodules from the deep-sea floor. The ship was described as having a mid-section that could be lowered to the ocean bottom and somehow scrape up large volumes of the manganese deposits.

My interest in deep-sea mining had subsided as I began applying to graduate school in 1964, however, when I realized that there were no oceanographic institutions working on deep-sea mining at that time. I did end up studying deep-sea sediments on the floor of the northeast Pacific off Oregon in graduate school at Oregon State University. Instead of sea floor minerals, however, I was researching deep-sea sediments in Cascadia Basin and the mysteries they contained on ancient climates and earthquakes.

By the time of the 1972 announcement of the deep-sea mining project, I had finished my graduate work and had already been teaching at UCSC for 4 years. I found the description of this plan to finally recover manganese nodules from the sea floor long overdue after the initial enthusiasm expressed for ocean mining in the 1960s. I also wondered how this made any economic sense.

There was a lot more going on behind the scenes than recovering manganese, however, that nobody but a few people in the CIA knew about.

In April 1968, Soviet Pacific Fleet surface ships and aircraft were noticed conducting a large deployment in the North Pacific about 1,700 miles northwest of the Hawaiian Islands. The U.S. Office of Naval Intelligence concluded that this

activity was a possible response to the loss of one of the Soviet submarines that were known to frequent this area, and which carried strategic ballistic missiles capable of reaching the U.S. West Coast.

The Naval Facility at Point Sur, which operated a hydrophone or underwater listening network, reviewed its recordings and detected an implosion event that had occurred a few weeks before on March 8, 1968. Using other similar listening arrays, the Navy was able to pinpoint the site of the acoustic event to 40.1° north latitude and 179.9° east longitude, which in time was determined to be the site of a lost Soviet submarine known as K-129.

Despite weeks of searching, the Soviets weren't able to locate the sunken submarine and fleet operations soon returned to normal. At this point the U.S. Navy initiated "Operation Sand Dollar" to find and photograph K-129. Using a new deep-water submersible and underwater photography the Navy collected over 20,000 photographs of the submarine resting on the seafloor beneath 16,000 feet of water.

In 1970, based on the successful photography, Secretary of Defense Melvin Laird and National Security Advisor Henry Kissinger proposed a secret plan to President Nixon to recover the wreck in order to study Soviet nuclear missile technology and possibly their code systems. The *Hughes Glomar Explorer* was the vessel selected for the job, and it was to be carried out under the guise of recovering manganese nodules from the seafloor. There is more to this story to come.