



The Marine Environment of Nodules

Where are Nodules found?

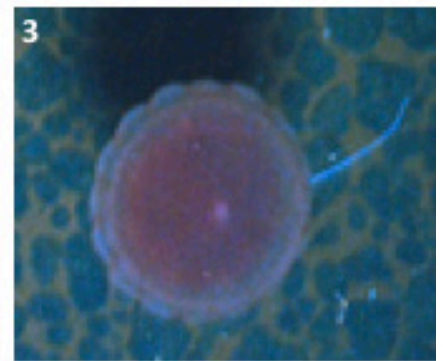
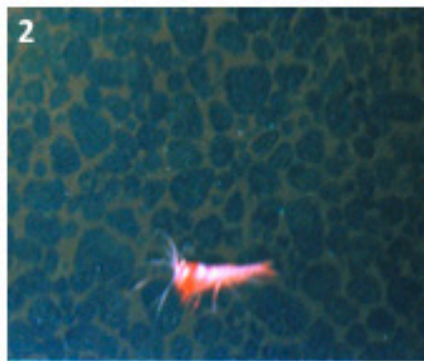
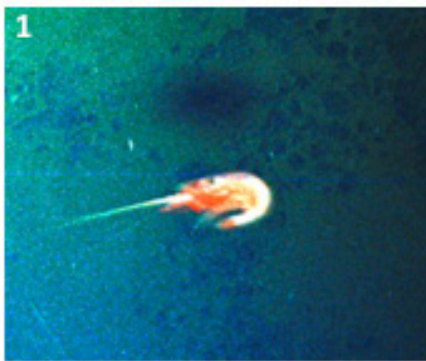
Nodules are found at the interface between the seabed and the overlying ocean. They may be partly or completely buried or fully exposed. Animals that inhabit this part of the seabed live on or around the nodules (burrowing, feeding, resting, swimming).

The Benthic Zone & the Benthos Community

The benthic zone is the environmental region located at the lowest level of a body of water. In the deep oceans, the benthic zone lies directly on the abyssal plains. The benthos is the community of organisms that lives in the ben-

thic zone. At the depths where we find nodules, there are only animals (fauna) due to the unavailability of sunlight. Deep sea marine fauna is classed by their size: Megafauna, macrofauna, meiofauna, and microfauna. Megafauna include, shrimp-like crustaceans, sea sponges, and crinoids, for examples. Macrofauna and Meiofauna include tiny worms (Nematoda, Polychaeta) and crustaceans (Copepoda, Tanaidacea). Microfauna include bacteria.

Certain fauna move freely, whilst others are fixed in place and may even rely on nodules as a place to live. Biomass is the measuring of the quantity of animals and plants.



SEABED MEGAFAUNA IN THE COOK ISLANDS 1. & 2. Shrimp-like Crustacean; 3. Sea Sponge; 4. Deep Sea Fish; 5. Sea Sponge; 6. Tail of a sea creature; 7. Deep Sea Fish; 8. Holothurian; 9. Crinoid (Source: Japan SOPAC Exploration, 1986)

The biomass of deep-seabed marine life is very low compared to biomass in shallow marine, and land-ecosystems. This is due to the lack of sunlight. The sea creatures at the seabed are ultimately dependent on surface nutrients sinking to the depths for food.

Environmental Management Programme

Protection of the marine environment is foremost for us all. Our 1.9 million square kilometre Marae Moana is our most cherished possession. Within this area lies approximately 700,000 square kilometres of nodule rich areas.

Exploration of just over one third of this nodule rich area should be under taken in the next 5 years, and this exploration will include extensive environmental studies. Key areas of focus will include baseline study of benthos, ecosystem function and biodiversity, as well as potential impact study of substrate removal, sediment changes, sediment plumes, and light and noise disruptions.

Concerns about assessment and protection of the marine environment need to be scientifically based, and thus more information needs to be collected, interpreted and in turn independently verified as part of the exploration phase as mentioned above. Appropriate project Environmental Impact Assessment's (EIA) are required for the developer to demonstrate to key stakeholders that the proposed activity will not lead to serious harm. The EIA will rely on comprehensive baseline studies and in turn will inform an Environmental Management Plan (EMP).

There are established regulations to control the process of collection and interpretation and verification of this information in line with world's best leading practice. The protection of the marine environment will rely on these comprehensive regulations and ongoing inspection and

enforcement. Key stakeholders will need to be consulted at each key step of the process

Environmental impacts from the exploration phase are expected to be quite minor and separate from other marine activities. (See below) Nonetheless, activities will constantly monitored to ensure this is the case

Benthos

The community that resides within the benthic zone at the seafloor.

Ecosystem function

How the seabed community works i.e. feeds, moves and reproduces. Disruption of the seabed will change the chemistry at that point and the consequence of this on function needs to be understood.

Preservation of biodiversity

Biodiversity includes the variety of animals at the seabed, especially how it varies between different places.

Plumes

Plumes are caused when deep-sea equipment disturbs the sea floor, sending sediment adrift. While this has been studied in other parts of the ocean we need to know more about how this might happen in the Cooks seabed.

Light and Noise Disruption

The light and noise disruption caused by the exploration vessel is thought to be similar to a fishing vessel, but this should be checked.

ENVIRONMENTAL IMPACT OF THE EXPLORATION PHASE

