Multibeam Echosounder Mapping to Identify Seafloor Habitats

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SUMMARY

Undersea New Zealand, NIWA's national mapping product, provides a unique insight into the shape of the seafloor within one of the world's most extensive deepwater jurisdictions. It uses some 1.5 million square kilometres of multibeam coverage, supplemented by more than 5 million line kilometres of single-beam ship tracks, to illuminate the full richness of New Zealand seascapes: flat, deep (>4000m) abyssal plains; fracture zones in the Southwest Pacific and South Fiji Basins; and the structure of the >10,000 metre-deep Kermadec Trench. Vast submarine canyons incise the continental margin, and terrigenous material flows down sinuous channels into the deep ocean, both west and east of New Zealand. Many smaller structures as also mapped, showing the abundance of seamounts, volcanoes and flat-topped guyots.

NIWA also conducts baseline surveys that require multibeam bathymetry of the nearshore coastal region. Recently, three mapping initiatives (D'Urville, Kapiti, Kaikoura) using NIWA's Kongsberg EM2040 high-resolution multibeam echo-sounder (MBES) have been undertaken to map the seafloor bathymetry and identify the diversity of physical habitats. The density of soundings has been used to create bathymetric grids at 0.5 m resolution. Bathymetry data reveal the shape and depth of the seafloor, and the strength of the return signal (backscatter imagery) provides valuable information on the bottom substrate types and physical benthic habitats. In addition, data recorded through the water column (from echo-sounder to seafloor) can be used to help characterise water masses, identify bubbles and turbulence, and detect fish schools and other features not normally imaged in the bathymetry data. Interpreted together, these data form the basis of an ecosystem or habitat classification map that outline distinct environmental conditions for subsequent targeted photographic and sampling programmes. New nearshore survey data can be combined with existing multibeam data from deep ocean RV Tangaroa surveys to produce regional high quality MBES baseline coverage, gridded at 10 m resolution, over wider extents. NIWA has produced a range of

digital and charting products that can be used to aid habitat demarcation and future sampling programmes.