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# Seamount fisheries in New Zealand

## Effects on high-value target fish species and non-target invertebrates

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**Principles:** 1) Life history of target species is crucial to sustainable management, 2) trawling can have large effects on non-target biodiversity

**Experience:** Technologically advanced trawl-fisheries for slow-growing, long-lived species can severely reduce standing stock and non-target invertebrate species on seamounts.

**Most important lessons learned:** 1) Allowable catch must reflect life history and appropriate management units, 2) non-target species are little-known.

**Best practices:** 1) Closure of individual seamounts, 2) catch-limits on individual seamounts, 3) increased investment in research.

### Seamount fisheries

The deepwater trawl fishery for orange roughy and oreos in New Zealand illustrates the effects of a high-technology fishery on both target and non-target species.

Seamounts are steep-sided, undersea mountains that are widely distributed in the world's oceans. This unique and vulnerable habitat is often characterized by slow-growing, long-lived, high value fish species that aggregate near the mount summits to spawn and are vulnerable to over-exploitation at this time. The wide distribution of seamounts outside of EEZs increases the risk of over-exploitation through unregulated fishing in high seas.

Seamounts are fished by trawling, which poses a major threat to non-target biodiversity and the sustainability of bottom-living species. Seamounts are the focus of very deep (600-1200m) trawl fisheries for orange roughy, black oreo, and smooth oreo. The fish are slow-growing, reaching maturity at 20-30 years of age, and may live for more than 100 years.

### Management

An Individual Transferable Quota (ITQ) management system was introduced in 1986 for coastal and deepwater New Zealand fisheries. ITQs provide individuals with a transferable or tradable right to harvest a specific proportion of the total allocated surplus production of a stock.

The New Zealand Ministry of Fisheries sets an annual Total Allowable Commercial Catch (TACC) based on stock assessments produced by fishery working groups made up of representatives from the seafood industry, government agencies, and non-government organizations.

### Reductions in catch on seamounts

Stock assessment results from the late 1980s had indicated that previous catch levels were not sustainable. During the 1990s more than 50% of the orange roughy catch in the New Zealand EEZ has come from seamount complexes and all have shown a significant decline in catch rate. The TAC on the Chatham Rise was reduced from 21,300 t to 12,700 t in 1995-96 and further reduced to 7,200 t in 2000-01. The TAC for the Challenger Plateau fishery, which has been fished to only 3% of virgin biomass, has been reduced from 1425 to 1 t, effectively closing the fishery. Additional orange roughy fisheries have been developed outside the EEZ. In all fisheries, catches have declined rapidly within a few years of exploitation.

### Effects of seamount fisheries on non-target biodiversity

While there are few data on the impacts of trawling in deepwater environments, the indications are that impacts will be more severe and longer-term than in coastal waters. Once depleted, seamount habitat and individual species may take decades, or even centuries, to regenerate. Concerns about loss of biodiversity are amplified when there is limited information on the taxonomy and biology of the seamount invertebrates.

There is anecdotal evidence for reduction in invertebrate by-catch in orange roughy trawls in the New Zealand fisheries. On Tasmanian seamounts, major impacts were recorded on biodiversity within a few years of the development of the orange roughy fishery. On heavily fished seamounts, reef aggregate had been removed or reduced to rubble, the invertebrate biomass was 83% lower, and the number of species was 59% lower than on lightly fished seamounts.

### Responses to concerns about seamount fisheries

In 1999, the New Zealand Ministry of Fisheries developed a draft strategy to manage the adverse effects of commercial fishing on seamounts. Key seamounts are identified and become eligible for a limited range of measure to reduce the impact of bottom trawling, including sub-area and/or depth restrictions on specific seamounts, restricting fishing within 50 m of the seabed, closure to trawling and closure to all fishing methods. Nineteen seamounts around New Zealand were closed to bottom trawling in September 2000.

The closed seamounts represent a small proportion of the known seamounts (19 out of 800 in or near the EEZ) and far less than the proportion of land protected in National Parks or coastal reserves. . They may represent too little, too late; key seamounts have been heavily exploited, and these productive seamounts, with high fish densities, could maintain the

highest densities of invertebrates. The fishing industry is actively surveying unfished seamounts for potential new fish stocks. Nevertheless, the closures represent a first step in protecting biodiversity on seamounts and comply with the precautionary principle of taking action on the basis of limited data

The draft New Zealand fishery strategy is designed to evolve, as new data become available. In this respect, the Ministry of Fisheries allocated just over NZ\$14 million over five years from June 2000 for research and management of marine biodiversity. Projects include database development, analysis and research on threats to biodiversity, and research on three key seamount communities.

