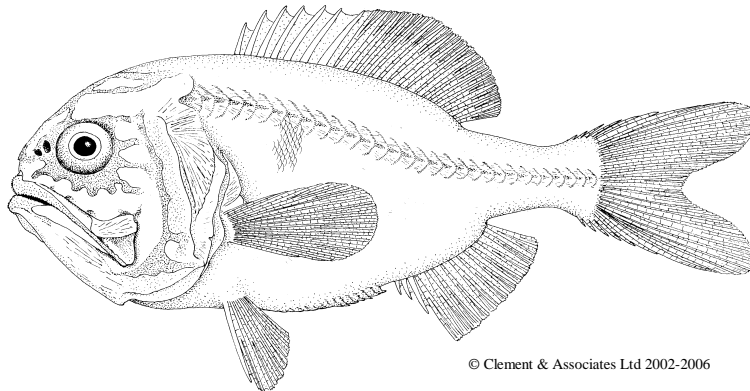


Brief Summary of Orange Roughy Fishery Management in the New Zealand EEZ



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Orange Roughy (*Hoplostethus atlanticus*)

Orange roughy (also known simply as 'roughy') are managed under the Quota Management System (QMS) in the New Zealand 200 nm Exclusive Economic Zone (EEZ). The management target is to maintain stocks at or above a level that will support the Maximum Sustainable Yield (B_{MSY}). The EEZ is divided into eight orange roughy Quota Management Areas (QMAs). Where more than one discrete orange roughy fishery occurs within a QMA, management sub-areas have been implemented and separate stock assessments are performed for each fishery stock. Shortly after the implementation of the QMS in 1986, the Total Allowable Commercial Catch (TACC) for each fishery stock was allocated to fishing companies on a proportional basis, in perpetuity. Ownership of fishing quota has resulted in the adoption of a custodial approach to the utilisation of fishery resources in New Zealand and to an active involvement by Industry in the management of these resources.

Stock management is based on the best available independent science. Stock assessment reviews are undertaken routinely, every two to three years by New Zealand scientists, often in collaboration with international scientists from USA, Canada and Australia. The stock assessment process is public, transparent and subject to peer review. The Ministry of Fisheries publishes the outcomes of stock assessments annually and summaries are available on their web site (<http://www.fish.govt.nz/en-nz/SOF/Species.htm?code=ORH&list=name>).

Orange roughy are managed on the assumption, based on the best available information, that these fish are slow growing and long-lived. On this basis, orange roughy in New Zealand are estimated to reach sexual maturity between 23 and 31 years of age, and become vulnerable to the fishery only after the onset of sexual maturity.

The deliberate management strategy in the early years of a fishery is to reduce the stock down to a level where it is deemed to be most productive and where the long-term annual yield is maximised (i.e. the 'Maximum Sustainable Yield'). For orange roughy this is estimated to be at 30% of the pre-exploitation biomass level, B_0 (i.e. $B_{MSY} = 30\%B_0$). So during the fish-down phase, catches are higher than would be implemented to sustain the population size. Once the fish-down is complete and the B_{MSY} level is reached, a lower annual catch is implemented in order to maintain the stock size in the long-term.

The oldest and largest orange roughy fishery in the world's oceans is in New Zealand waters on the Chatham Rise. This fishery commenced in the late 1970s, before

implementation of the QMS, and annual catch peaked at about 22,000 t by the early 1980s. As the fish-down phase is nearing completion, management initiatives have been introduced to reduce catches here down to the current annual catch of 8,650 t.

In earlier years the productivity (growth and regeneration rates) of orange roughy was over-estimated, leading to some New Zealand orange roughy fisheries being fished to levels below B_{MSY} . As a result, two fisheries were closed to fishing (in 1997 and 2000), to allow rebuilding at the maximum rate. Recent biomass surveys estimate these stocks have regenerated and may be close to B_{MSY} . A further three New Zealand orange roughy fisheries are deemed to be slightly below the B_{MSY} level and conservative catch rates have been implemented to promote their rebuilding in the medium-term while maintaining commercial fisheries.

In the New Zealand EEZ, fishing occurs all-year-round over flat ground and on underwater hills and in trenches. Virtually no roughy fishing is undertaken on seamounts (i.e. features with an elevation greater than 1,000 m). Most of the fished topographic features are small (i.e. less than 400 m in elevation). Roughy trawl nets are relatively small, with a vertical opening of about 6m and a horizontal opening of between 18 to 25 m. The trawl gear is rigged to ensure as little contact with the seabed as possible in order to reduce drag and optimise fuel consumption. With hill fishing the trawl gear is typically in contact with the seabed for around five to ten minutes only, equivalent to a distance over the ground of 500 to 1,000 m. While it is probable that bottom trawling has a direct effect on the seabed, most fishing now occurs along known tracks. Hill trawling is often restricted by the steepness and roughness of the terrain, and the proportion of a hill's surface area that is impacted by the gear is generally very small. There is also relatively little exploratory fishing over "new" landscape within the New Zealand EEZ. Where this does occur, only small areas of the seabed are affected because of the extensive knowledge that exists about the preferred environment in which orange roughy occur.

The sophisticated electronic gear used today also allows skippers to interpret the nature of the seabed in great detail and much smaller areas of seabed are impacted than ever before: 3-D charting software provides exceptional detail of seabed structure; modern echo-sounders allow skippers to clearly identify foul ground; gear-mounted sensors provide real-time information on trawl geometry, performance and position relative to the vessel; GPS allows pin-point location of features and trawl track lines. Orange roughy fishing in New Zealand waters has become more of a farming operation than a hunting one.

Within the NZ EEZ, only 10% of the deepwater habitat where orange roughy are found (i.e. between 750 and 1,500 m) has ever been trawled at any time. Currently, 19 defined hill and seamount areas are closed to trawling by regulation, including on the Chatham Rise, to protect benthic biodiversity.

In February 2006, Industry proposed the closure of large areas of seabed within the EEZ to bottom trawling to afford protection to benthic habitats (e.g. corals) and maintain benthic biodiversity. These areas are broadly representative of the entire range of marine benthic habitats, particularly in the deep water, and have been selected to encompass many pristine areas that have not yet been impacted by trawling. This Benthic Protection Area (BPA) initiative was adopted for implementation by the New Zealand Government in April 2007, and involves the closure to bottom trawling of 32% of the seabed within the EEZ. Work is ongoing to further refine knowledge of the effects of deep water trawling on seabed habitats.