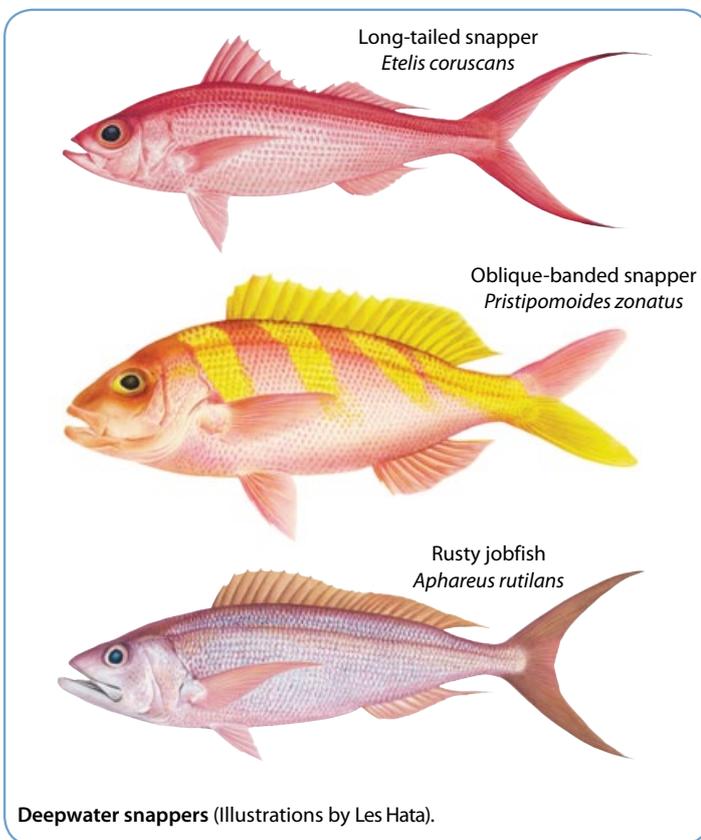


*Tuna are the best known fish in surface waters beyond the coral reefs of most Pacific Island countries. But, living at the bottom of the sea in deeper water, there is another valuable group of fish. This group includes the snappers and other species that are referred to as demersal or bottom-fish – that is, they live close to the sea floor.*

## What are deepwater snappers?

Snappers caught in deep water are related to, but different from, snappers caught on shallow-water reefs. But all belong to the snapper (or Lutjanid) family and most have common names that include 'snapper' or 'jobfish'. Some groupers (Serranid family) and emperors (Lethrinid family) are also caught in deep water.

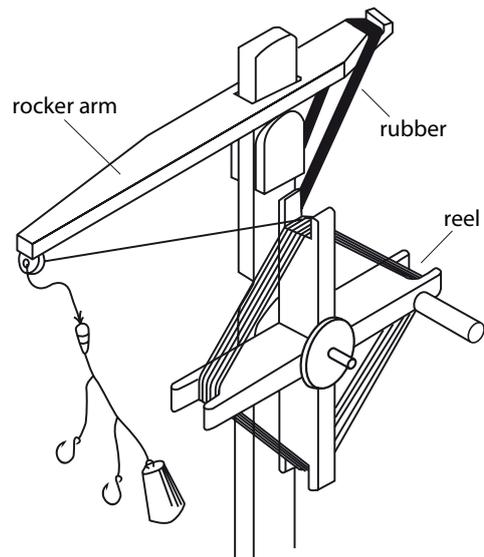


## Where are deepwater snappers found?

Deepwater snappers are found in depths between 100 m and 400 m around the outer reef slope of islands and seamounts.

## How are deepwater snappers caught?

Fishing for deepwater snappers has been carried out commercially in the Pacific Island region for many years. In the 1970s and 1980s, the Pacific Community (SPC) assisted in developing these fisheries in many countries by training fishers to use simple, low-cost, hand-reels such as the one shown in the accompanying illustration.



**A wooden hand-reel used to catch deepwater snappers.**

From: King M. 2007. Fisheries biology, assessment and management. UK: Wiley Blackwell. 400 p.

The wooden reels used to catch deepwater fish are often made locally. Each reel consists of i) wooden bars set at right angles with notched ends to hold the fishing line, ii) a rocker arm with ends that are allowed to move up and down, and iii) a strong rubber band attached to one end of the rocker arm. Several baited hooks and a heavy lead weight are attached to the end of the line. When a snapper takes the bait and fights to free itself, the rubber allows the rocker arm to flex and move – a rigidly fixed rocker arm could allow a large, strong fish to break the line.

Fisheries for deepwater species are based in many islands including (in alphabetical order) American Samoa, Cook Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Northern Marianas, Palau, Papua New Guinea, Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Wallis and Futuna.

## Benefits of deepwater snapper fisheries

- Deepwater snappers have firm white flesh and can attract a much higher price per kilogram than most other reef fish.
- Unlike many shallow-water reef fish, deepwater snappers are free of ciguatera, a form of fish poisoning that can make people sick (see Teachers' Resource Sheet 20: Fish poisoning and ciguatera).
- Fishing beyond the reefs for deepwater species can result in a reduction in fishing pressure on inshore reefs and lagoons where catches may be decreasing due to overfishing.

## Problems with deepwater snapper fisheries

Deepwater snapper stocks are considered to be vulnerable to fishing pressure. This is because the fish live for a long time, grow slowly, and reproduce late in their lifespan. Therefore, fishing rapidly reduces the numbers of fish in the stock; this is particularly noticeable if fishing is concentrated in a small area such as around a small seamount.

Many deepwater snapper fisheries have started off with fishers making very large catches. But catch rates (say the weight of fish caught per hour fishing) declined quite quickly over time. One of the largest deepwater snapper fisheries is in Tonga, where catch rates were quite high in the 1980s with up to 40 vessels targeting deepwater snappers. But within 10 years catch rates had declined dramatically, and by the mid-1990s catches were too low to be profitable. The Tongan government moved to restrict the number of boats to allow the fish stocks to recover and, now, only 10–15 boats are licensed to fish.

## Assessment of deepwater snapper fisheries

Local fisheries authorities have the task of assessing deepwater snapper fisheries in order to ensure their sustainability. But deepwater snapper fisheries are difficult to assess and SPC has been involved in assisting countries to assess the sustainability of deepwater snapper fisheries since the early 1990s.

One method has been to estimate the weight of the unfished stock (referred to by scientists as the virgin biomass) and suggest that fisheries managers restrict fishing to catch about one-third of the virgin biomass each year. This is done so that there are sufficient number of fish remaining to produce young fish and maintain the stock.

Accurate data on catch rates are needed by scientists but these are not available for most Pacific Island countries. SPC is advocating the use of measurements of the size or age of fish in the catch to suggest the level of fishing. If average fish sizes in catches are decreasing it may indicate that too many large adult fish are being taken from the stock (see Teachers' Resource Sheet 3: Fisheries assessment).

## Management of deepwater snapper fisheries

Although many Pacific Island countries do not have a management plan for deepwater snappers, a plan and regulations are needed to restrict fishing to levels that are sustainable. In other words to ensure that a fish stock is not overexploited\* and continues to provide benefits to people in the future (see Teachers' Resource Sheet 1: Fisheries management).

Some countries have regulations that include limiting the number and size of fishing boats, the number of hooks allowed on each fishing line, and the areas in which fishing is allowed.



### Minimum size regulations for deepwater snappers?

*A minimum size limit, in which small fish must be released back into the sea, is a common fisheries management regulation. But why would a minimum size limit be a useless conservation measure for fish caught in deep water?*

*Pressure on a fish at the surface of the sea is due to the weight of the column of air above it (one atmosphere of pressure). As water is about 800 times heavier than air, pressure increases rapidly with increasing depth – at about 10 m below the surface, the water exerts twice the pressure on the fish as air does at the surface. Some deepwater snapper are caught at 200 m where the pressure is 20 times that at the surface.*

*Consider what would happen to the swim bladder of a fish caught at 200 m as it is hauled to the surface (See Teachers' Resource Sheet 6: Fish anatomy). The swim bladder will expand rapidly as it is hauled in and burst or choke the fish.*

