Re-opening of a commercial fishery for orange roughy (*Hoplostethus atlanticus*) in Australia

For the first time in more than 10 years the Australian Fisheries Management Authority (AFMA) has set a commercial catch allocation for the eastern stock of orange roughy, re-opening the fishery off the eastern coast of Tasmania.

The history

Orange roughy is a deep water fish widely distributed in southern Australian waters from New South Wales around to Western Australia. They are mainly bottom-dwelling, generally occurring in water 700-1400 metres deep.

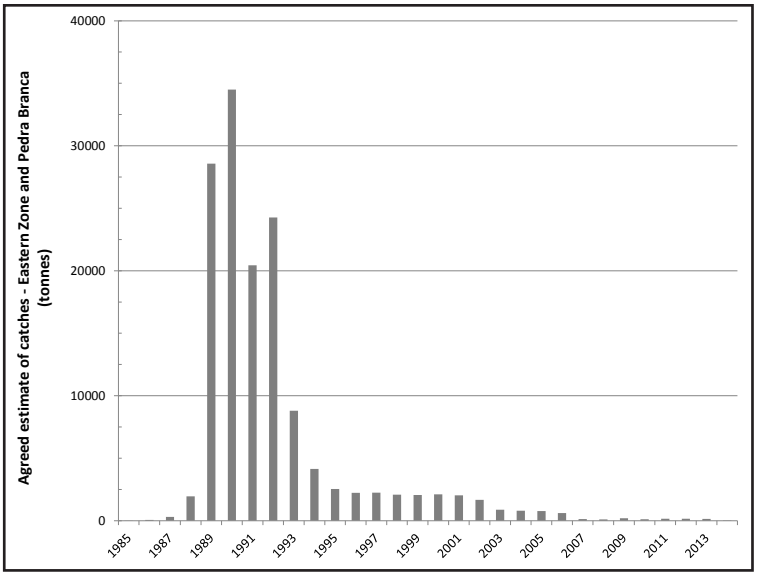
They form dense spawning and feeding aggregations over rugged sea floor features such as the edge of the continental shelf and seamounts but spend much of their lives dispersed across the seabed.

Orange roughy in the Eastern Zone of Australia's Commonwealth fisheries were heavily fished in the late 1980s and early 1990s with more than 85 000 tonnes being landed between 1988 and 1994.

Catches of this size ultimately led to the stock being overfished.

All targeted fishing for orange roughy in Australian waters ceased in 2006, with the exception of the Cascade Plateau where the stock was assessed as healthy.

The catch history of the fishery is shown in the diagram (right).



The eastern stock is rebuilt

Since 2006, four acoustic surveys have been conducted in the St Patrick's and St Helen's Hill areas off eastern Tasmania, most recently in 2013.

Acoustic surveys estimate the size of the spawning stock using the signal strength from an acoustic echo – very much like using the signal strength bouncing back from a boat's fish finder to estimate the size of a school of fish. The surveys are conducted on spawning aggregations as the fish are tightly packed and easy to locate.

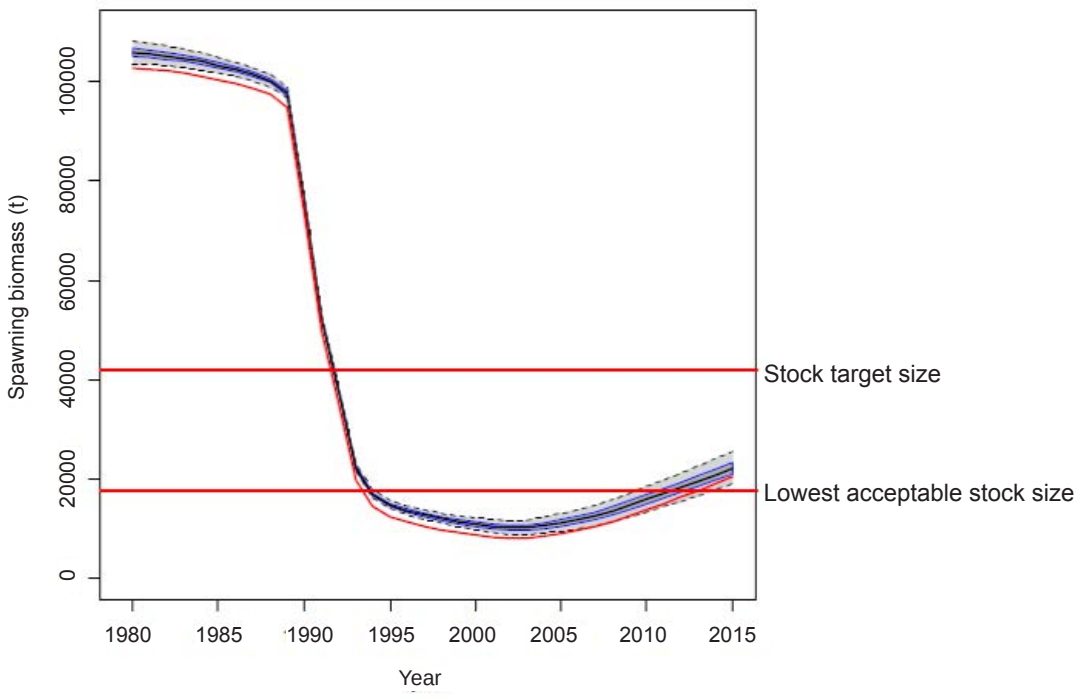
During the surveys a wide range of other biological information is collected from fish including age, length, weight and egg production. This information is used to assess the status of the fish stock.

In 2014 a new stock assessment was prepared by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) that used data from the fishery and acoustic surveys up until the end of 2013.

Results from the assessment concluded that the eastern stock has rebuilt to sustainable levels and gave an estimated stock size of in excess of 20 000 tonnes.

The stock is at a level at which some commercial fishing can recommence and allow the stock to keep rebuilding.

The rebuilding is shown in the diagram (below).



Re-establishing a commercial fishery

For the first time in more than 10 years the Australian Fisheries Management Authority (AFMA) has set a commercial catch allocation for the eastern stock of orange roughy, re-opening the fishery off the eastern coast of Tasmania.

In short, the harvest control rules used mean there is:

- no targeted commercial fishing when stocks are below 20 per cent of unfished biomass as this would pose an unacceptable risk to the fish stock
- when stocks are above 20 per cent a small commercial catch is allocated. This amount will increase as the number of fish available (the biomass) increases.

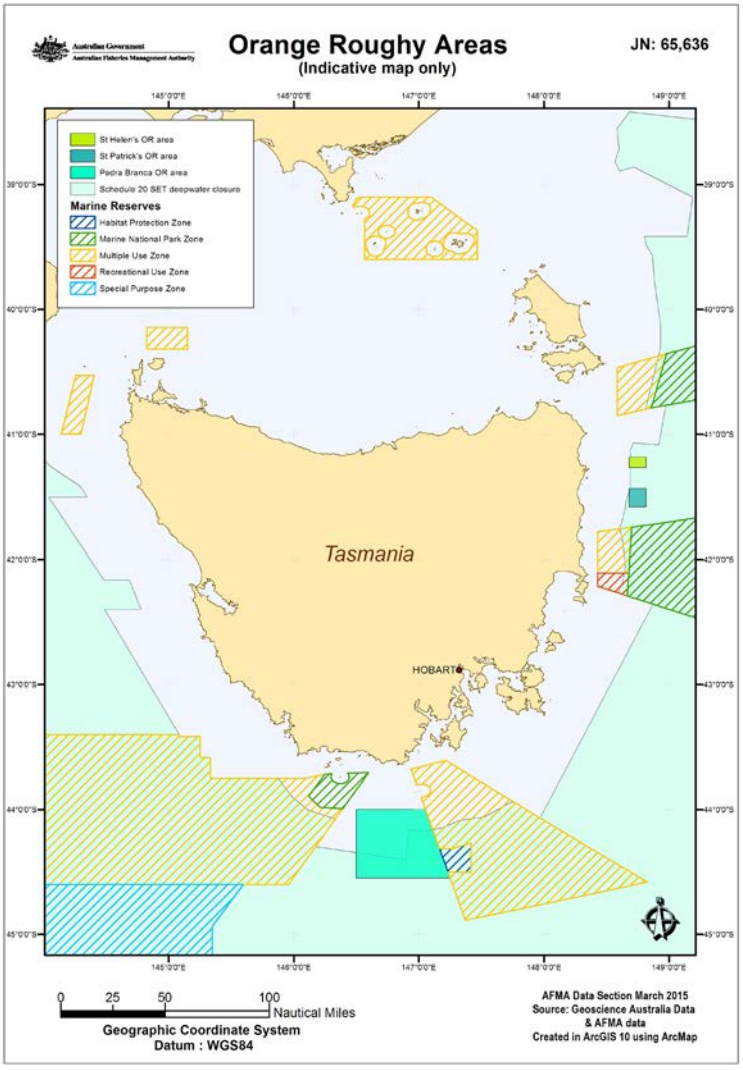
Harvest rules ensure that management decisions are consistent and protect fisheries from becoming overfished.

Habitats

The areas proposed for targeted orange roughy fishing are areas that have previously been fished. Habitat protection is afforded through other fishery closures and the Commonwealth Marine Reserves Network.

The map on the right shows the extensive existing closures and the areas that will be opened to allow targeted orange roughy fishing:

- St Helen's Hill
- St Patrick's Head
- Pedra Branca.



History of orange roughy fishing and management in Australia

1972	Orange roughy first recorded in trawl surveys off New South Wales.
1982	First small catches from the Southern and Eastern Scalefish and Shark Fishery (SESSF).
1986	The first large aggregation was discovered off Sandy Cape, western Tasmania and catches increased rapidly.
1986 - 1988	Several other non-spawning aggregations were discovered in southern Australian waters and fished. Landings increased to between 4600 and 6000 tonnes.
1989	The discovery of large spawning aggregations on St Helen's Hill (a seamount off eastern Tasmania) and other aggregations in the Pedra Branca and Maatsyker area off southern Tasmania lead to significant growth of the fishery. Catches in the eastern zone and Pedra Branca area of the southern zone increased from about 2000 tonnes in 1988 to peak at greater than 35 000 tonnes in 1990.
1991	The introduction of management zones and catch quotas prevented further increase in catch and a managed decline in catches began. Acoustic surveys commenced in the eastern zone and continued in 1992, 1993, 1996 and 1999.
1992	Catches from the eastern zone and Pedra Branca during the four years 1989 to 1992 totalled in excess of 85 000 tonnes. The landed value of the fishery at this time was about $60 million a year; at the time it was the most valuable fishery in Australia.
1993 - 2005	A gradual reduction in eastern zone quotas from 2000 tonnes in 1993 to 720 tonnes in 2005 resulted in lower landings. Quotas in the other zones were also reduced over this period.
2000	The last formal stock assessment of southern zone orange roughy estimated the stock to be at seven percent of unfished biomass.
2002	The last formal stock assessment of western zone orange roughy estimated the stock to be at less than thirty percent of unfished biomass.

2006	A stock assessment of eastern zone orange roughy estimated the biomass to be at 10 percent of unfished levels. Orange roughy are declared to be overfished, leading to the species being in Australian waters as 'Conservation Dependent' under the *Environment Protection and Biodiversity Conservation Act 1999*. AFMA introduced the Orange Roughy Conservation Programme 2006. Under the programme targeted fishing for orange roughy is not permitted (with the exception of the Cascade Plateau where stocks are assessed as being healthy) and large areas of the deep water fishing grounds are closed.
2010	First acoustic optical survey to estimate eastern zone biomass undertaken.
2012	Second survey to estimate eastern zone biomass undertaken.
2013	Third survey to estimate eastern zone biomass undertaken.
2014	A scientific workshop is run in Hobart to discuss improvements to the existing stock assessments and provide guidance to an updated model that can fit both the age data and acoustic survey abundance estimates. Key scientists from Australia and New Zealand discuss improvements. A new quantitative stock assessment is prepared by CSIRO that incorporates data from the fishery and acoustic surveys up until the end of 2013. The assessment indicates that the eastern stock has rebuilt and provides an estimated stock status of 26 per cent of unfished biomass at the start of 2015.
2015	Following public consultation, the Orange Roughy Rebuilding Strategy 2015 was updated to amend the existing Conservation Program. The updated strategy allows targeted fishing for orange roughy in an ecologically sustainable manner consistent with the *Commonwealth Fisheries Harvest Strategy Policy and Guidelines 2007*. Following fixed catch scenario modelling by CSIRO in late February the AFMA Commission set a total allowable catch of 500 tonnes (split across the eastern and southern quota zones where the stock exists) for the 2015-16 fishing season. This level of catch is consistent with the Harvest Strategy Policy and allows sustainable harvesting while the stock continues to rebuild.