



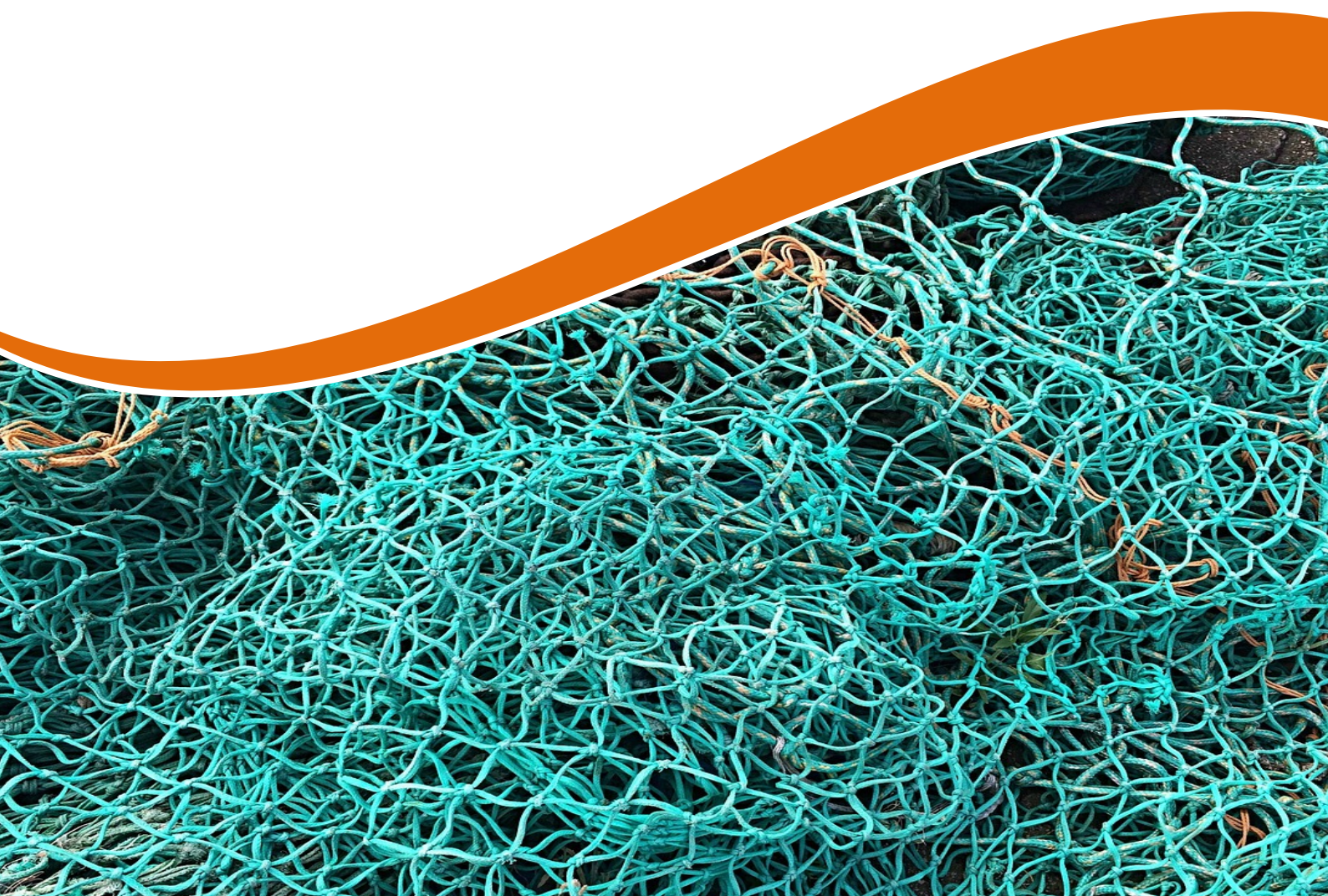
Australian Government

Australian Fisheries Management Authority

Orange Roughy Stock Rebuilding Strategy 2014

Five Year Review

December 2019



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Introduction

Orange roughy is a deepwater fish widely distributed in southern Australian waters from New South Wales, south around Tasmania and west to southern Western Australia. The species also occurs off New Zealand, southern Africa and in the Atlantic Ocean and Mediterranean Sea.

Within the SESSF, orange roughy are managed in nine zones:

1. Eastern Zone (Commonwealth South East Trawl Sector (SET) - quota)
2. Cascade Plateau (SET - quota)
3. Southern Zone (SET - quota)
4. Western Zone (SET - quota)
5. Southern Remote Zone (SET)
6. North-eastern Remote Zone (SET)
7. South Tasman Rise (SET)
8. East Coast Deepwater Trawl Zone (ECDWT)
9. Great Australian Bight (GABT - far west, west, central west, central east, east)

Orange roughy (*Hoplostethus atlanticus*) underwent a significant decline as a result of commercial fishing in the late 1980s and early 1990s; resulting in the species being overfished in a number of management zones. In 2006, the Orange Roughy Conservation Program (ORCP) was implemented when orange roughy was listed as 'Conservation Dependent' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to ensure the long term survival of orange roughy and recover the species to ecologically sustainable levels.

The ORCP was replaced by the *Orange Roughy Rebuilding Strategy in 2014* (the Strategy). The primary objective of the Strategy is to return all orange roughy stocks to above 20 per cent of their unfished spawning biomass; the biomass limit reference point that has been adopted for the stocks.

The South East Resource Assessment Group (SERAG) and the Great Australian Bight Resource Assessment Group (GABRAG) annually reviews the performance of the Strategy and recommends biologically appropriate catches for each stock based on the most recent stock assessment and fishery indicators.

All rebuilding strategies are subject to review every five years to ensure the objectives of the strategies are being met, and to adopt any recommended changes to management arrangements. This report constitutes the five year review of the Orange Roughy Rebuilding Strategy 2014.

Background

The Strategy outlines measures to rebuild stocks of orange roughy occurring in the Southern and Eastern Scalefish and Shark Fishery (SESSF). It replaces the ORCP; which was implemented in 2006 when orange roughy was listed as ‘Conservation Dependent’ under the EPBC Act. A listing in this category means that a fish species is *‘the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised.’*

Accordingly, in line with the EPBC Act, the objective of the ORCP was to conserve orange roughy to ensure its long term survival in nature and recover the species to ecologically sustainable levels. Recognising the progress made under the ORCP, the primary objective of this Strategy is to return all orange roughy stocks to levels where they can be harvested in an ecologically sustainable manner in line with the objectives of the *Commonwealth Fisheries Harvest Strategy Policy 2018* (HSP) and ultimately maximise the economic returns to the Australian community.

The Strategy focuses on methods to reduce the overall fishing mortality of orange roughy while monitoring and assessing the stock status (in all zones) to ensure recovery.

Progress against objectives

Objectives

The Strategy’s objectives are:

1. To rebuild orange roughy stocks (except Eastern Zone and Cascade Plateau that are assessed as having rebuilt) in the area of the SESSF to the limit reference biomass point (B_{Lim}) of 20 per cent of the unfished spawning biomass within a biologically reasonable timeframe; being one mean generation time (56 years) plus 10 years (66 years) from the start of the ORCP. That is, to reach B_{Lim} by no later than 2072.
2. Having reached B_{Lim} , rebuild these stocks to the maximum sustainable yield biomass level of 40 per cent of the unfished spawning biomass (B_{MSY}) using the harvest control rules outlined in the SESSF Harvest Strategy Framework. These harvest control rules provide for a restricted Total Allowable Catch (TAC) to allow limited fishing whilst rebuilding from B_{Lim} to B_{MSY} .
3. Once B_{MSY} is reached, pursue the default maximum economic yield biomass level of 48 per cent of unfished spawning biomass (B_{MEY}).

Once orange roughy stocks have recovered above B_{MSY} , management measures will remain in place to ensure the stocks remain stable above this level in accordance with the HSP.

To enable orange roughy stocks to recover, the overall fishing mortality of the species must be reduced in all zones to a level that allows recovery. The stock must be monitored in order to assess progress towards recovery. To achieve this, management arrangements have been developed to:

- ensure the incidental catch of orange roughy is reduced to an absolute minimum;
- significantly reduce the rate of fishing mortality on juvenile fish;
- protect the spawning aggregations of mature fish from fishing;
- ensure that removals from the stock by fishing are accurately recorded; and
- collect further data to inform the stock assessment.

Outcome

Catch limits

- In 2006, with the implementation of the ORCP, the SESSF was closed to targeted orange roughy fishing except on the Cascade Plateau where the stock remained above the target biomass (at the time) of 60 per cent of unfished levels.
- Targeted fishing has been permitted in the Eastern ORMA (St Patricks and St Helen's Hill) and Southern ORMA (Pedra Branca, eastern side of the Southern Zone) following extensive surveys and a number of assessments which demonstrated they had rebuilt to be above the limit reference point.
- Bycatch TACs in the remainder of the Southern, Western and Albany & Esperance orange roughy zones are set at levels which cover the minimum incidental catch while targeting other species. Catches in these zones have remained below the incidental TACs; primarily because many areas where orange roughy are targeted are closed to fishing. Catches against TACs are detailed at Appendix A.
- For areas outside of the Albany and Esperance zones in the GABT, an incidental catch trigger of 10 tonnes per deepwater management zone: far west, west, central west, central east and east, applies. If catches of orange roughy in any zone exceed the bycatch TAC or trigger limit, management measures to cease all catches of orange roughy will be implemented.
- A 212 t research catch allocation was introduced in the GAB 2006 under the GABT Orange Roughy Research Plan (the Research Plan). This allowed operators to apply for a scientific permit to fish in GABT orange roughy closures to collect data to support a stock assessment and demonstrate rebuilding. The research allowance was carried over at 200 t under the GABT Orange Roughy Research Plan 2016-2020. Further information on the Research Plan is provided below, and it is also scheduled to be updated in 2020.
- A Western Orange Roughy Research Plan, similar to that in the GABT, is being considered for the 2020 SESSF season.

Closures

- Spatial closures have been implemented in deep water areas within the SESSF except where targeted orange roughy fishing is allowed (Eastern and Southern ORMA) or specific management arrangements are in place to target other deepwater species (Western Deepwater Shark Closure amendment).
- In 2000 Australia established a Memorandum of Understanding (MOU) with New Zealand to manage the South Tasman Rise (STR) cooperatively. This MOU expired in 2007 and the

STR is current closed to fishing both within the Australian Fishing Zone and on the high seas.

- Within the GABT Fishery, there are nine spatial closures that have been implemented over areas that represent 90 per cent of historical catches in the GABT: Albany, Bremmer, Humdinger West, Humdinger/Magic, Lomvar Gully, United Nations, The Knob, Racetrack/Hamburger and Kangaroo Island Hill.
 - Access to these closures is permitted under the Research Plan, via scientific permits, to fish for orange roughy within the orange roughy closures (also called Orange Roughy Research Zones) for the purpose of obtaining robust scientific information to assess the status of these stocks.
 - Access to the Racetrack/Hamburger and Kangaroo Island Hill closures is currently being reconsidered as part of a review of the Upper-Slope Dogfish Management Strategy (the Dogfish Strategy), as these closures also count towards the protection of Southern Dogfish under the Dogfish Strategy.
 - Catches to date under the Research Plan are detailed at Appendix A.
 - The Plan is being reviewed for the 2020 SESSF season, and any changes will be reflected in the updated Strategy.
- The STR zone has been closed since 2007 and the High Seas component is managed through South Pacific Regional Fisheries Management Organisation (SPRFMO).

Limited entry

- Access to the SESSF is limited to the number of concessions that currently exist under the SESSF Management Plan 2003. New operators can access the fishery only by purchasing an existing concession. Although this rule limits effort in the fishery, it was not specifically designed for this Strategy.

Reporting and monitoring

- Catch and effort are reported by operators and monitored by AFMA in accordance with the logbook and catch disposal record provisions of the fishery. There have been no major issues identified with regards to reporting catches of orange roughy.
- Catch composition, discard and biological data are collected through AFMA's observer program and Acoustic Optical Surveys. Biological data has been collected successfully in the Eastern ORMA as part of the ISMP and acoustic surveys since targeted fishing began. Collections in other zones remains sporadic due to low effort.

Additional Management Arrangements

A range of management arrangements have been implemented since targeted fishing recommenced in the Eastern and Southern ORMAs:

Observer Requirements

Observer requirements have been in place since targeted fishing recommenced in the eastern and southern ORMA's to collect biological samples and catch composition information. Initially, the requirement was to carry an observer on 100 per cent of trips during the period 1 June to 31 August. AFMA has reduced the level of coverage required each year as operators have demonstrated their ability to fish the aggregations without any discarding issues.

For the 2019-20 season, operators were required to carry an observer for the first three trips in the ORMA and every second trip thereafter. Where a skipper has had three consecutive trips with observer coverage in the previous season, without records of discards exceeding 500 kg in any shot, observer coverage was only required on the first trip and every second trip thereafter.

As skippers become more experienced fishing the aggregations, the level of observer coverage will be reviewed, however AFMA expects an ongoing level of observer coverage to ensure biological samples are collected each year.

Minimum quota holdings

In order to fish in either of the ORMA's between 1 June and 31 August each year, minimum quota holdings were introduced to ensure operators held enough quota to account for their catch and avoid discarding.

To fish in the Eastern ORMA an operator must hold 30 tonnes of uncaught quota to enter the area and begin fishing, and 2.5 tonnes to remain in the area and complete further shots. To fish in the Southern ORMA an operator must hold 10 tonnes of uncaught quota to enter the area and begin fishing, and 0.5 tonnes to remain in the area and complete further shots.

Stop fishing triggers

Stop fishing triggers were set at 80 per cent of the TAC in each of the ORMA's to prevent overcatching the TAC. The triggers were introduced at a time where the targeting practices and likelihood of incidental catch after the orange roughy spawning season were unknown. It was introduced along with the minimum quota entry/exit requirements to ensure that enough quota remained at the end of the spawning season to avoid incidental catches of orange roughy being discarded, and at the time, equated to about 93 t in the east.

The triggers were removed in 2019 after consultation with the South East Management Advisory Committee (SEMAC). SEMAC considered that quota holding requirements and overcatch provisions were sufficient to cover the small amount of incidental catch that is known to occur outside the spawning period.

Stock Status

The HSP and the SESSF Harvest Strategy Framework are designed to pursue an exploitation rate that keeps fish stocks at a level equal to maximum economic yield (B_{MEY}) and to ensure stocks remain above a biomass limit level at least 90% of the time. The HSP allows for proxy settings for reference points when reference points are not available for the species. Consistent with the HSP, proxy settings for B_{LIM} of 20% of unfished biomass (20% B_0), B_{MSY} of 40% of unfished biomass (40% B_0) and B_{MEY} of 48% of unfished biomass (48% B_0) are used for orange roughy.

Eastern zone

The most recent assessment (2017) indicated that the stock biomass had continued to increase and estimated the female spawning biomass had rebuilt to be 33 per cent of unfished biomass (33% B_0) at the beginning of 2018.

Six acoustic surveys have been undertaken in the eastern ORMA since 2006, the most recent in 2019. The acoustic survey abundance estimates support the model predicted increase in spawning biomass.

In the Management Strategy Evaluation (MSE) completed in 2009, recovery of the Eastern Zone stock to the limit reference point was predicted to occur before 2030, while recovery to the target level took almost 70 years. The MSE suggested recovery would slow for a period after 2030. This was attributed to the reduction in spawning biomass due heavy fishing and subsequently lowered recruitment up to 1990, and the MSE assumption of the age at which 50 per cent of fish mature of 38 years. This ‘slowing’ of the recovery is demonstrated in the predicted female spawning biomass in Figure 1 (Haddon, 2017).

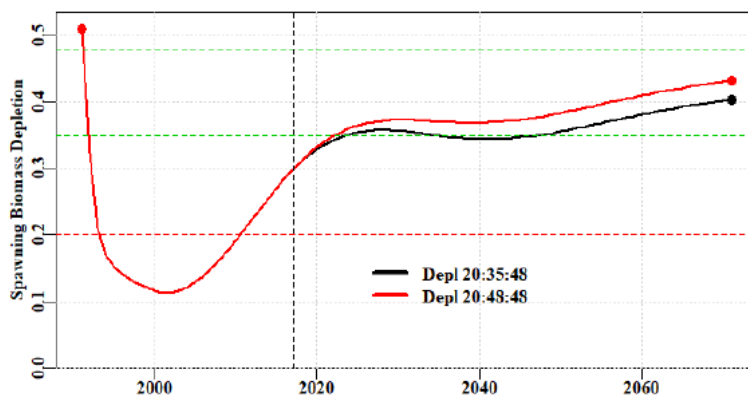


Figure 1. From Haddon (2017). The female spawning biomass depletion levels from 1991-2071. The vertical black dashed line is the current state, the red line is the limit reference point, the solid green line is the target reference point, and the green dashed line at 35% depletion is the point in the Tier 1 20:35:48 harvest control rule where fishing mortality, and its associated catches, switches to $F_{48\%}$.

Eastern orange roughy is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and not overfished with regards to biomass.

Cascade Plateau

Cascade Plateau is managed as a separate zone. It was previously suggested that there may be some mixing between the Cascade and south-east populations during larval and juvenile stages¹ and that the Cascade Plateau may have played a role in recovery of depleted populations². For this reason, a target reference point of 60 per cent of unfished biomass was adopted for this stock under the ORCP.

¹ ORCP page 7.

² ORCP page 2.

The last formal stock assessment for orange roughy on the Cascade Plateau was in 2009 using revised data to 2005. Based on this assessment the biomass of orange roughy in 2011 was estimated to be at 63 per cent of unfished levels. SlopeRAG advised that, due to low effort and limited data, it is unlikely that a new stock assessment can be undertaken until effort increases. Due to low fishing effort it is unlikely that the stock has declined to below 60 per cent of unfished biomass.

Effort on the Cascade Plateau is generally low due to remoteness. During the 2019-20 SESSF season, 23.6 t were caught on the Cascade Plateau with the most recent catch prior to this being 2 t in 2015-16.

Cascade Plateau orange roughy is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and not overfished with regards to biomass.

Southern zone

The component of the southern zone stock that resides in the Pedra Branca seamounts area is assessed as a part of the eastern zone stock assessment due to the stock structure assumptions.

The stock status in the southern zone is unresolved but is likely to be less than the limit reference point. The most recent accepted assessment (2000) estimated the biomass to around seven per cent of 1989 levels. The 2004 and 2006 updates of abundance indices and observations of possible spawning aggregations (from acoustic surveys) indicated that rebuilding may be occurring.

Southern zone orange roughy is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and overfished with regards to biomass.

Western zone

The last updated stock assessment for the Western Zone was in 2002. This assessment estimated the biomass had a 50 per cent chance of being less than 30 per cent of the biomass that existed in 1985.

Current stock status is unresolved in the Western Zone, however, considering that there has been little fishing in the western zone, and that the eastern stock has rebuilt to be above the limit reference point, it is not inconsistent to think that similar rebuilding may have occurred in the western zone.

Accordingly, a Western Orange Roughy Research Plan is being developed for 2020 to collect appropriate data to enable future stock assessments to be completed, including fishing effort, catch composition and biologicals.

Western zone orange roughy is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and overfished with regards to biomass.

Southern remote zone

There are no known spawning aggregations in the Southern Remote Zone. Catches have been low and there is no stock assessment for orange roughy in this area.

The Southern Remote Zone stock is not classified in the *ABARES Fishery Status Reports 2019*.

North East Remote Zone

There are no known spawning aggregations in the North East Remote Zone. Catches are very low with the highest recorded catch since 1998 being 78 tonnes in 2003.

There is no stock assessment for orange roughy in the Southern Remote Zone and the stock is not classified in the *ABARES Fishery Status Reports 2019*.

South Tasman Rise

The STR is an undersea ridge that extends south of Tasmania and into the Southern Ocean, straddling the Australian Fishing Zone (AFZ) and the high seas. An assessment in 2003 of the STR fishery indicated the original stock was not large and had been reduced dramatically since 1997, although no biomass estimates are available.

There have been no updates to the assessment since the fishery was closed in 2007 and the current biomass and population trends are unknown.

South Tasman Rise orange roughy is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and uncertain with regards to biomass.

East Coast Deepwater Trawl Sector

Limited fishing has occurred in this fishery, with 150 kg being reported in the 2003-04 SESSF season and no catch since then. There is no stock assessment for orange roughy in this area and the stock is not classified in the *ABARES Fishery Status Reports 2019*.

Albany and Esperance/ Great Australian Bight Trawl Sector

There is no formal stock assessment for orange roughy in the GAB because catches are low and data collection has been sporadic and spatially scattered. No large aggregations have been reported since 1990 and the species is believed to have declined in the GAB as it had in other parts of the SESSF.

Orange roughy in the GAB is classified in the *ABARES Fisheries Status Reports 2019* as not subject to overfishing and uncertain with regards to biomass.

Discussion and future recommendations

The broad objective of the revised Strategy will continue to be to return stocks to levels where they can be harvested in an ecologically sustainable manner consistent with the objectives of the HSP and ultimately maximise the economic returns to the Australian community from this resource.

The Strategy was reviewed by GABRAG and SERAG at their November and December 2019 meetings respectively. Both RAGs agreed that the current management arrangements remain effective and arrangements in the revised Strategy should follow on from the 2014 Strategy. The following advice was provided:

- GABRAG
 - Industry maintain that the decision to close the GAB to orange roughy fishing was not based on scientific evidence; it was based on the response to the depletion of orange roughy stocks in the east.
 - The eastern stock has rebuilt and the RAG identified the need to consider the implications for other stocks managed under the rebuilding strategy.
- SERAG
 - Eastern orange roughy should be removed from the Strategy (stock assessed as being above limit reference point); noting the need to determine the process for exiting the rebuilding strategy.
 - Orange roughy in all other zones remain under the Strategy until stock assessments demonstrate that they have rebuilt.
 - The Strategy continues to be monitored and evaluated against its objectives.

Table 1 Catches against TAC for each orange roughy zone

Fishing season	TAC (t)	Catch (t)		Fishing season	TAC (t)	Catch (t)
Cascade Plateau				Eastern Zone		
2006-07	700	615		2006-07	720	502
2007-08	483	190		2007-08	27	12
2008-09	700	125		2008-09	25	4
2009-10	500	465		2009-10	25	9
2010-11	500	151		2010-11	25	2
2011-12	500	7		2011-12	25	25
2012-13	500	6		2012-13	25	0.5
2013-14	500	0		2013-14	25	3
2014-15	500	0.2		2014-15	25	14
2015-16	500	2		2015-16	465	6
2016-17	500	0		2016-17	465	436
2017-18	500	0		2017-18	465	297
2018-19	500	0		2018-19	698	856
2019-20	500	23.6		2019-20	900	595
Southern Zone				Western Zone		
2006-07	100	24		2006-07	250	89
2007-08	40	0.5		2007-08	61	11
2008-09	25	0.1		2008-09	50	6
2009-10	35	17		2009-10	60	25
2010-11	35	16		2010-11	60	28
2011-12	35	17		2011-12	60	34
2012-13	35	18		2012-13	60	27
2013-14	35	22		2013-14	60	40
2014-15	35	17		2014-15	60	29
2015-16	66	57		2015-16	60	22

Fishing season	TAC (t)	Catch (t)		Fishing season	TAC (t)	Catch (t)
2016-17	66	58		2016-17	60	22
2017-18	66	53		2017-18	60	23
2018-19	84	79		2018-19	60	19
2019-20	94	25		2019-20	60	15
Great Australian Bight (research TAC)				Great Australian Bight (Albany and Esperance)		
2006-07	212	203		2006-07	212	114
2007-08	200	44		2007-08	52	0.2
2008-09	200	39		2008-09	25	0
2009-10	200	104		2009-10	50	0
2010-11	200	107		2010-11	50	0
2011-12	200	29		2011-12	50	0
2012-13	200	0.1		2012-13	50	0
2013-14	200	0		2013-14	50	0
2014-15	200	11		2014-15	50	0
2015-16	200	0		2015-16	50	0.1
2016-17	200	0		2016-17	50	0
2017-18	200	19		2017-18	50	0
2018-19	200	0		2018-19	50	0
2019-20	200	0		2019-20	50	0

References

Haddon, M. (2017) *Orange Roughy (Hoplostethus atlanticus) stock assessment using data to 2016 Report to November 2017 SE RAG meeting*. CSIRO, Oceans and Atmosphere, Australia. 46p.

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