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Australia Orange Roughy—Eastern Zone Trawl Fishery

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2 Glossary of Abbreviations

AAT	Administrative Appeals Tribunal	HSF	Harvest Strategy Framework
ACAP	Agreement on Conservation of Albatross and Petrels	HSP	Commonwealth Fisheries Harvest Strategy Policy
ACCOBAMS	Agreement on the Conservation of Small Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area	ISMP	Integrated Scientific Monitoring Program
AEWA	African-Eurasian Migratory Waterbird Agreement	IUCN	International Union for Conservation of Nature
AFMA	Australia Fisheries Management Authority	LRP	Limit Reference Point
AFZ	Australian Fishing Zone	M	Natural Mortality
B	Biomass	MACs	Management Advisory Committees
BLIM	Limit Biomass Level	MEY	Maximum Economic Yield
CDRs	Catch Disposal Records	MSC	Marine Stewardship Council
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	MSE	Management Strategy Evaluation
CMS	Convention on the Conservation of Migratory Species of Wild Animals	MSY	Maximum Sustainable Yield
CFIN	Commonwealth Fisheries Infringement Notice	OCN	Observer Compliance Notice
CPUE	Catch Per Unit Effort	OCS	Offshore Constitutional Settlement
CSIRO	Conservation, Scientific and Industrial Research Organisation	OMC	Operations Manager Compliance
CTS	Commonwealth Trawl	ORMA	Orange Roughy Management Area
SectorDAWE	Department of Agriculture and the Environment	PBR	Potential Biological Removal
DEPS	Daily Egg Production Survey	PI	Performance Indicator
EEZ	Exclusive Economic Zone	PRI	Point of Recruitment Impairment
EM	Electronic Monitoring	RAG	Research Assessment Group
ESD	Ecological Sustainable Development	RBC	Recommended Biological Catch
ERM	Ecological Risk Management	SED	Seal Excluder Device
EPBC	Environment Protection and Biodiversity Conservation Act 1999	SEMAC	South East Management Advisory Committee
EREA	Ecological Risk of the Effects of Fishing	SESSF	Southern and Eastern Scalefish and Shark Fishery
ETP	Endangered, Threatened, and Protected species	SET	South East Trawl Sector
F	Fishing Mortality	SETFIA	South East Trawl Fishing Industry Association
FIS	Fishery Independent Surveys	SFR	Statutory Fishing Right
FMA	Fisheries Management Act 1991	SI	Scoring Indicator
GABTS	Great Australian Bight Trawl Sector	SIOFA	Southern Indian Ocean Fisheries Agreement (SIOFA)
HCR	Harvest Control Rule	SMP	Seabird Management Plan
		SPRFMO	South Pacific Regional Fishery Management Organization
		SS	Stock Synthesis
		SFR	Statutory Fishing Rights
		SFRARP	Statutory Fishing Rights Allocation Review Panel
		STAG	Seine and Trawl Advisory Group
		TAC	Total Allowable Catch
		UoA	Unit of Assessment
		UoC	Unit of Certification
		VME	Vulnerable Marine Ecosystem
		VMS	Vessel Monitoring System

3 Executive summary

This is the Client and Peer Review Draft Report (C/PRDR) for a full MSC assessment of the Australia Orange Roughy-Eastern Zone Trawl fishery being undertaken by MRAG Americas. The site visit for this assessment took place in Hobart, Tasmania from 3-5 December, 2019. This C/PRDR contains the findings of this assessment, suggesting the fishery is a good candidate for MSC certification. The following Principle-level scores have been achieved:

Principle-level scores	Eastern ORMA UOA	Pedra Branca UOA
Principle 1 - Target species	90.8	90.8
Principle 2 - Ecosystem	88.7	88.0
Principle 3 - Management	99.4	99.4

For Principle 1, the conservation plan, rebuilding strategy and harvest control rules in place for this stock since 2007 has been successful in rebuilding stock biomass to the point of recovery and ability to maintain a commercial fishery. However, because of the long life history of this species (individuals are at least 25 years old before they are recruited to the fishable stock), it is likely that high catches during the 1980s and 1990s has just started to affect recruitment and impact is likely to occur in the next decade. However, there is some evidence to show that the fecundity of orange roughy in the eastern zone is significantly higher than it was historically. This aside, the precautionary principle is that historical catches may impact recruitment. It is important therefore that the harvest control rules in place will ensure that overfishing is highly unlikely to occur and there is sufficient monitoring in place to regularly track abundance.

For Principle 2, there is excellent information on the extent and nature of bottom habitats in the orange roughy fishing areas. In addition, observer records provide full and up-to-date catch accounting data as well as records of interactions with Endangered, Threatened and Protected species. Management of impacts to ETP species and habitats is comprehensive, however for the Pedra Branca ORMA, discarding of primary (quota) species is around 10%. Though this is not significant from the overall perspective of the fishery and discarded stocks, it could be improved.

For Principle 3 there is a strong Governance system in place which falls under two principle acts: *Fisheries Management Act 1991* (FMA) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). DAFF is responsible for overarching policy implementation and AFMA for the implementation of fishery specific management actions. The deliberation of these actions follows an extensive consultation process through the workings of the Management Advisory Committees (MACs) and direct consultative processes with interested stakeholders. Similarly, the decision-making process takes on board these consultative processes and adheres to primary legislation and to the fishery specific management plan. Compliance systems are also very strong and there is no evidence of systematic non-compliance. All agencies also regularly undertake internal, as well as occasional external reviews.

4 Report details

4.1 Authorship and peer review details

The Australia orange roughy eastern zone trawl fishery assessment team consists of three individuals: Cameron Dixon (Principle 1 Team Member), Richard Banks (Principle 3 Team Member), and Amanda

Stern-Pirlot (Team Leader and Principle 2 Team member). In addition, we have contracted Dr. Trevor Branch as an expert advisor to the assessment team.

Ms. Amanda Stern-Pirlot (Team Leader and P2). Amanda is an M.Sc. graduate of the University of Bremen, Center for Marine Tropical Ecology (ZMT) in marine ecology and fisheries biology. Ms. Stern-Pirlot joined MRAG Americas in mid-June 2014 as MSC Certification Manager (now Director of the Fishery Certification Division) and is currently serving on several different assessment teams as team leader and team member. She has worked together with other scientists, conservationists, fisheries managers and producer groups on international fisheries sustainability issues for over 15 years. With the Institute for Marine Research (IFM-GEOMAR) in Kiel, Germany, she led a work package on simple indicators for sustainability within the EU-funded international cooperation project INCOFISH, followed by five years within the Standards Department at the Marine Stewardship Council (MSC) in London, developing standards, policies and assessment methods informed by best practices in fisheries management around the globe. Most recently she has worked with the Alaska pollock industry as a resources analyst, within the North Pacific Fisheries Management Council process, focusing on bycatch and ecosystem-based management issues, and managing the day-to-day operations of the offshore pollock cooperative. She has co-authored a dozen publications on fisheries sustainability in the developing world and the functioning of the MSC as an instrument for transforming fisheries to a sustainable basis.

Dr. Cameron Dixon (P1). Cameron Dixon works as a senior fisheries consultant at MRAG Asia Pacific. His recent work includes Marine Stewardship Council assessment and peer review, most recently as a team member on the South Australia sardine MSC full assessment and the Australian Small Pelagic Fishery full assessment. Cameron currently leads a contract for Stock Assessment of the Victorian Abalone Fishery. In addition, he has undertaken independent reviews of fisheries assessed against the Coles' Responsible Sourcing Seafood Assessment framework and the World Wildlife Fund's Ecological Sustainability Evaluation of Seafood framework. Cameron is currently the Chair of the Northern Territory's Coastal Line Fishery Management Advisory Committee and is a Technical Advisor for FisheryProgress.org. Prior to becoming a consultant, he worked as a Senior Fisheries Scientist for 20 years in South Australia and Victoria, during which time he completed his PhD with Melbourne University researching density-dependence in abalone stocks.

Mr. Richard Banks (P3). Richard Banks has considerable MSC experience having served as the Lead Assessor for four prawn trawl fisheries in Australia and on the PNA free school skipjack full assessment. Richard has also designed several fishery improvement plans in South East Asia and the Pacific, and acted as external reviewer to a number of MSC assessments on behalf of WWF. Richard currently works as an advisor to Parties to the Nauru Agreement. Richard is an economist and fisheries management and policy programming specialist having worked on similar issues for international agencies, Commonwealth and State Fisheries. Richard holds a bachelor's degree in Fisheries Economics and a Masters in Agricultural Economics from the University of Portsmouth, and Wye College, London, respectively.

Peer Reviewers

Duncan Leadbitter was employed by the MSC during the period 2000 to 2009 in roles that involved him in the early development of MSC systems such as the creation of version 2 of the fisheries certification methodology (FCM) and the creation of the enhanced fisheries requirements of the FCM. Whilst working for the MSC and subsequent clients he has gained a great deal of practical experience in the evaluation of fisheries against the MSC Standard and other standards, particularly in regards to establishing fishery improvement projects.

His primary involvement has been in the Asia Pacific region and in recent years much of his work has revolved around tropical trawl fisheries and other fisheries that supply raw material for the fish meal and surimi sectors.

Mr Leadbitter has also provided advice to a variety of NGO and industry clients on sustainable seafood sourcing as well as liaising with governments and intergovernmental organisations on the nature of incentive programs for facilitating the involvement of the private sector in the drive towards sustainability.

Dr Johanna Pierre is a consultant specialising in fisheries and marine management. Her fisheries experience spans more than 15 years and encompasses fisheries management, policy, research, regulation, audit and evaluation. Dr Pierre has conducted pre-assessments, assessments, surveillance audits and peer reviews for Marine Stewardship Council fishery certification processes. She has also assessed and audited fisheries under other frameworks, including Monterey Bay Aquarium's Seafood Watch, and the Commission for the Conservation of Southern Bluefin Tuna's Quality Assurance Review. Her consulting experience also includes a substantial body of work on reducing the environmental effects of commercial fishing, and fisheries reporting and monitoring programmes.

Prior to becoming a consultant and forming her company - JPEC Ltd - in 2011, Dr Pierre was a science advisor and then manager of the New Zealand Department of Conservation's Marine Conservation Services Programme. This is focused on managing and mitigating the effects of commercial fishing on marine protected species. She also worked on international science policy and diplomacy with New Zealand's Ministry of Science and Innovation.

Dr Pierre has a Ph.D. in environmental biology and ecology from the University of Alberta, Canada, where she worked in the forestry sector and developed her passion for evidence-based natural resource management. She then completed a post-doctoral fellowship in biodiversity science at the University of Tokyo, Japan, sponsored by the Japanese government. Her B.Sc. (Hons I) from the University of Canterbury, New Zealand, focused on ecology.

4.2 Version details

Table 1. Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	Version 2.1
MSC Fisheries Standard	Version 2.01
MSC General Certification Requirements	Version 2.4.1
MSC Reporting Template	Version 1.1

5 Unit(s) of Assessment and Certification and results overview

5.1 Unit(s) of Assessment and Unit(s) of Certification

5.1.1 Unit(s) of Assessment

Scope

MRAG Americas confirms that this fishery is within scope of the MSC Fisheries Standard. It is not enhanced, nor is it based on an introduced species. It does not use poisons or explosives, nor does it target mammals, reptiles or amphibians. It does not take place under a controversial unilateral exemption to an

international agreement, nor is it overwhelmed by dispute. Finally, the client fishing companies have not been successfully prosecuted for forced or child labour violations.

Regarding Conservation Dependent Status

In Australia, threatened species of flora and fauna are managed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Technically, under MSC definitions for Endangered, Threatened and Protected (ETP) species, a species managed under the EPBC Act would be considered as ETP. Orange Roughy is one such species, and in the present assessment, is the target species, and not assessed under the ETP component. The rationale for this is as follows.

Species recognized under the EPBC Act may be listed under several categories:

- extinct
- extinct in the wild
- critically endangered
- endangered
- vulnerable
- conservation dependent

While any individual can nominate a species for listing, its inclusion as a listed species depends on the outcome of a scientific assessment of the species' threat status undertaken by the Threatened Species Scientific Committee (TSSC). The TSSC assesses the species against a set of criteria set out in guidelines for nominating and assessing threatened species and ecological communities.

Prior to 2006, no specific provisions for the listing of commercially fished species in the conservation dependent category existed (as they do now). Nominations were made against one of the categories and assessed by the TSSC against the criteria. In late 2005 or early 2006, orange roughy was nominated as endangered under the Act, with the TSSC concluding that the species was eligible for listing as endangered under Criterion 1. Criterion 1 is equivalent to the IUCN Criterion A which states that where the cause of the reduction has not ceased the IUCN Guidelines indicate that this Criterion can be met with a population size reduction of =50% over ten years or three generations either in the past, now, or in the future. The practical effect of an endangered species listing would be to prohibit all targeted fishing.

An independent review of the TSSC's decision to list orange roughy as endangered was conducted by Sainsbury et al (28 August 2006) (Appendix 12.9). The review examined the Department of Environment and Heritage's analysis of the species and the TSSC's subsequent advice. The review disputed the validity of the listing based on a range of arguments, several of which are of direct relevance for assessment against the MSC framework.

Firstly, regarding the IUCN criteria that were used to nominate the species under the EPBC Act, the reviewers state "*if the current Criterion A was applied to every Commonwealth managed fishery, nearly all of them (not just orange roughy) would meet this Criterion – including some of our most well managed and demonstrably sustainable fisheries. The criterion is not a good measure of extinction probability for marine fish*". The authors point out that the appropriateness of Criterion A for harvested and managed marine fish species has been seriously questioned before (Mace 1999).

Secondly, the authors identified that up to date information was not included in the assessment. They report "*the current total roughy spawning biomass (pooled across stocks) in the EEZ is estimated at over 64,000 tonnes comprising over 28 million mature fish. This biomass represents 26% of the unfished biomass (243,000t) and is above the limit reference point. This does not include estimates from the GAB or STR fisheries. It is important to note that all of these stocks are still receiving recruits (fish up to 30 years old)*".

spawned from an unfished biomass and will continue to do so for the next decade. This information is not consistent with a stock that is at high risk of extinction in the wild”.

The review argued there is a clear distinction between fishery collapse, stock collapse and extinction, concluding “*For marine bony fish, a fishery or stock collapse does not imply that there is a significant risk of local or global extinction*”. In demonstrating this point and arguing that depensation does not appear to be prevalent for orange roughy stocks, they report “*The ORH 7A (Challenger Plateau) stock was reduced to about 3% of the unfished level when it was closed to fishing in 2000. By 2005 surveys showed that the stock had increased by 50% (from less than 11,000t to 16,000t). This increase in abundance is good evidence that orange roughy stocks will recover from depletion, even quite severe depletion, if protected from fishing..... So the present cessation / reduction of fishing on the currently depleted Australian stocks is confidently expected to result in recovery of those stocks, and not stock extinction*”. Finally, the review concludes that “*There is little merit in the TSSC argument that there is a high risk of extinction*”.

The other complication of EPBC listing in the context of commercially-harvested fish is that the listing applies to entire species. Thus, despite some stocks of orange roughy being relatively healthy at the time of nomination, the listing would have applied to the species throughout its range in Australia.

In recognition of the challenges in applying the existing EPBC Act listing criteria to commercially-fished species, the then Australian Government amended the Act to include specific provision to allow for the listing of fish species as ‘conservation dependent’. The new sub-section of the Act is set out in bold below:

Conservation Dependent (section 179(6))

A native species is eligible to be included in the Conservation Dependent category at a particular time if, at that time:

(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming Vulnerable, Endangered or Critically Endangered; or

(b) the following subparagraphs are satisfied:

(i) the species is a species of fish;

(ii) the 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;

(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory;

(iv) cessation of the plan of management would adversely affect the conservation status of the species.

In practice, the new provisions allow for the continuation of targeted fishing under a conservation dependent listing, while at the same time providing the Environment Minister a level of oversight of measures for recovery implemented under plans of management administered by fisheries agencies. If at any time the Environment Minister was not satisfied that the species would not become vulnerable, endangered or critically endangered within five years, he/she could choose to list the species in a higher category (having regard to new information available at the time)¹.

To address the overfishing prevalent in several orange roughy stocks, AFMA implemented a range of new fishery management arrangements. In 2006, an Orange Roughy Conservation Programme (ORCP) was established to ensure that orange roughy did not become vulnerable, endangered or critically endangered under the EPBC 1999 within a period of five years (AFMA 2006). The ORCP objective was "to conserve Orange Roughy to ensure its long-term survival in nature and recover the species to ecologically sustainable levels" (AFMA 2006). In 2014, the ORCP was replaced by the Orange Roughy Rebuilding Strategy (ORRS, AFMA 2014). The specific objectives of the ORRS were to:

¹ See for example https://www.anao.gov.au/sites/default/files/ANAO_Report_2006-2007_31.pdf

1. 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 (BLIM) of 20 per cent of the unfished spawning biomass within a biologically reasonable time frame; being one mean generation time (56 years) plus 10 years (66 years) from the start of the ORCP. That is, to reach BLIM by no later than 2072;
2. having reached BLIM, rebuild these stocks to the maximum sustainable yield biomass level of 40 per cent of the unfished spawning biomass (BMSY)² using the harvest control rules outlined in the SESSF Harvest Strategy Framework. These harvest control rules provide for a restricted TAC to allow limited fishing whilst rebuilding from BLIM to BMSY; and
3. once BMSY is reached, pursue the default maximum economic yield biomass level of 48 per cent of unfished spawning biomass (BMEY).

These objectives are broadly consistent with the main features of the Australian Government Harvest Strategy Policy governing the management of all Commonwealth-managed fisheries - i.e. that stocks below the LRP should be rebuilt to the LRP within a biologically-reasonable timeframe, and thereafter to a BMSY and BMEY.

MSC's definition of ETP species includes species that are "recognised by national ETP legislation" (SA3.1.5.1). No definition of 'recognised' is provided and no general interpretation has been provided to CABs to date. The distinction between 'species' and 'stock' in an ETP species context is recognised in GSA3.1.1 – 3.1.4 which states "*As in Principle 1 (see Box GSA3), it is the MSC's intent that the term 'species' as used in Principle 2 could mean an entire species or only a stock or population of a species, as appropriate to the species and the context of the fishery in assessment*".

While a broad reading of the MSC's ETP species definition in the context of Australia's national environmental legislation could be interpreted as including orange roughy, we have treated it here as a Principle 1 species on the following basis:

- the challenges involved in applying generic endangered species listing criteria to commercially-fished species are well recognised – in practice, many MSC certified species would meet IUCN criterion A for listing as endangered. The creation of the broader conservation-dependent category under the EPBC Act in 2006 was an attempt to accommodate these challenges;
- the species does not meet any other MSC criteria for assigning as an ETP species (e.g. CITES Appendix 1, etc)
- the species remains primarily (almost wholly) managed by the relevant fisheries agency (AFMA), rather than the environment department;
- the objectives of the ORRS are consistent with the general policy framework applying to all Commonwealth-management stocks under the Australian Government's Harvest Strategy Policy;
- population modelling indicates the UoA stock is around BMSY and is unlikely to have been below the limit reference point previously. In practice, management of the stock is little different to many other Commonwealth-managed species which sit between the LRP and TRP and are managed according to the HSP framework.
- The Principle 1 assessment of this stock includes everything that is assessed under the P2 ETP component, and more. In other words, in the case of a "conservation dependent" species, with a managed fishery targeting one (not depleted) stock, the status, information, management and policy requirements are more rigorous under Principle 1, and the assessment team and CAB are confident that it is thus adequately precautionary and appropriate to assess this fishery against MSC's sustainability standard.

² BMSY here refers to the default Harvest Strategy value of 40%B0, which is well above the estimated BMSY for the species (Haddon 2017)

Table 2. Units of Assessment (UoAs)

UoA 1	Eastern ORMA
Species	Orange Roughy (<i>Hoplostethus atlanticus</i>)
Stock	Australia Eastern Stock-- incorporating the stock from the Eastern Zone and the Pedra Branca area in the southern zone
Geographical area	South-eastern Australia, FAO major fishing area 57, subarea 6 and FAO major fishing area 81. Eastern Orange Roughy Management Area (ORMA)

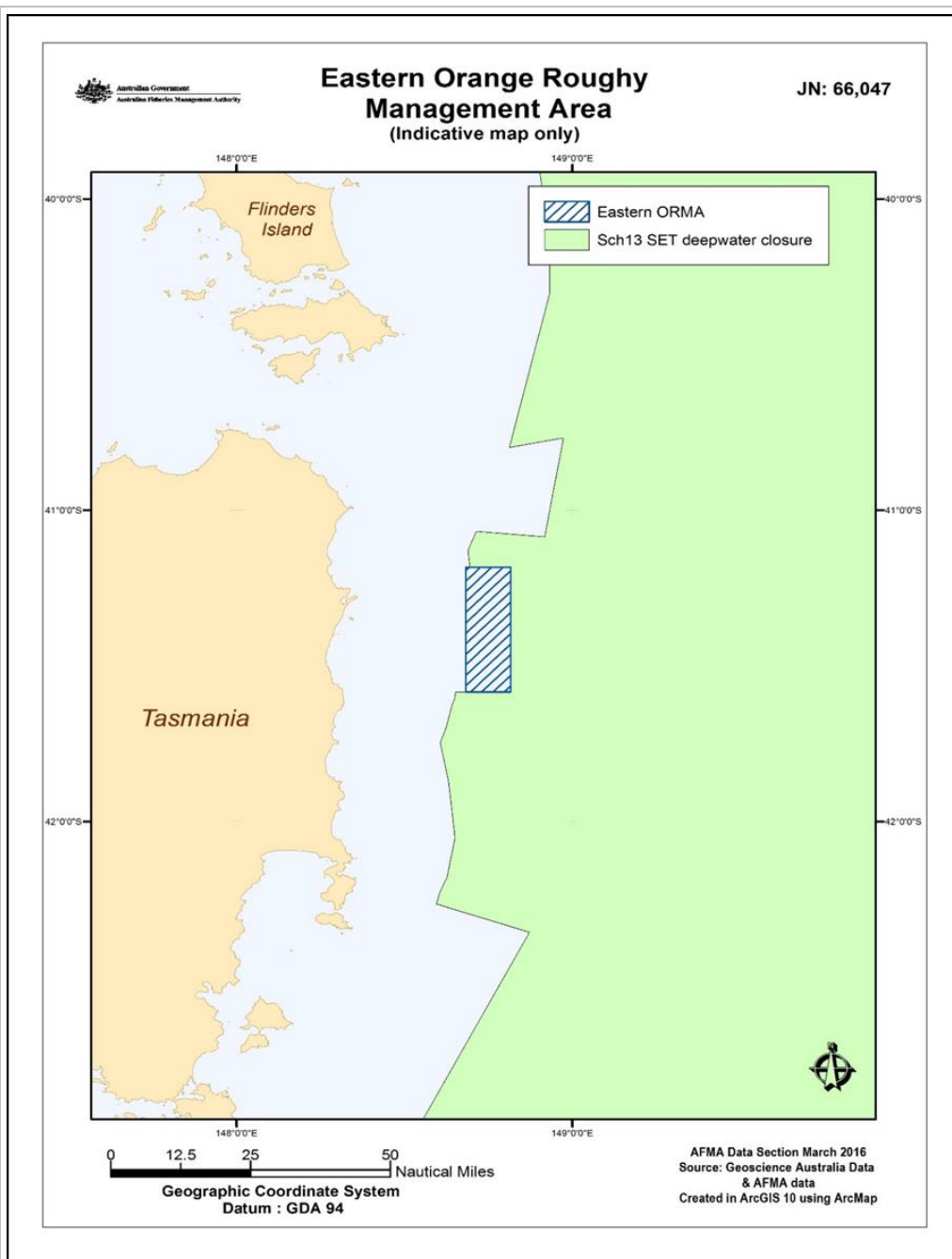


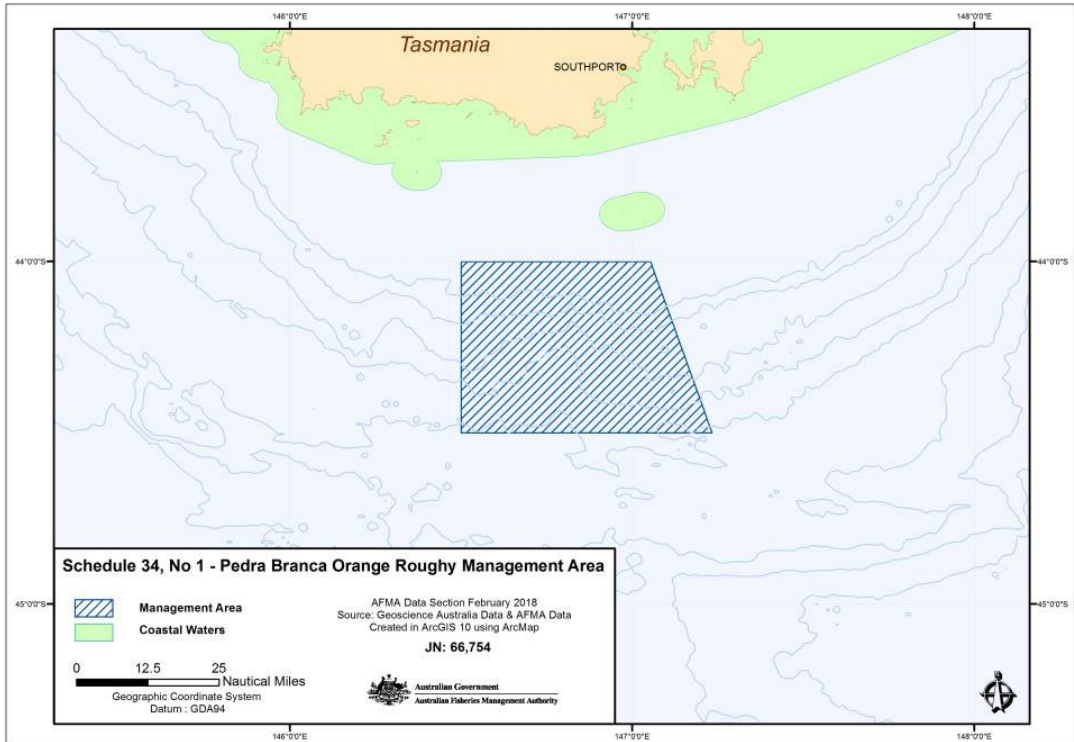
Figure 1. Eastern ORMA

Harvest method / gear Demersal Otter Trawl

Client group Atlantis Consulting Group

Other eligible fishers

UoA 2	Description
Species	Orange Roughy (<i>Hoplostethus atlanticus</i>)

Stock	Australia Eastern Stock-- incorporating the stock from the Eastern Zone and the Pedra Branca area in the southern zone
Geographical area	<p>South-eastern Australia, FAO major fishing area 57, subarea 6 and FAO major fishing area 81, Pedra Branca ORMA</p>  <p>Figure 2. Pedra Branca ORMA</p>
Harvest method / gear	Demersal Otter Trawl
Client group	Atlantis Consulting Group
Other eligible fishers	

5.1.2 Unit(s) of Certification

Same as UoAs above

5.2 Assessment results overview

5.2.1 Determination, formal conclusion and agreement

To be drafted at Final Draft Report

To be completed at Public Certification Report

The report shall include a formal statement as to the certification determination recommendation reached by the assessment team on whether the fishery should be certified.

The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

Reference(s): FCP v2.1 Section 7.21

5.2.2 Principle level scores

Table 3. Principle-level scores

Overall weighted Principle-level scores	EORMA	PB
Principle 1 - Target species	90.8	90.8
Principle 2 - Ecosystem	88.7	88.0
Principle 3 - Management	99.4	99.4

5.2.3 Summary of conditions

Not applicable, no conditions have been raised.

5.2.4 Recommendations

None.

6 Traceability and eligibility

6.1 Eligibility date

If this fishery is certified, the eligibility date will be the date of publication of the Public Comment Draft Report, 21 May 2020. This date is the earliest possible eligibility date and ensures if the certification is successful that product from the 2020 fishing season will be eligible.

6.2 Traceability within the fishery

Table 4. Traceability within the fishery

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)?	No.
If Yes, please describe: <ul style="list-style-type: none"> - If this may occur on the same trip, on the same vessels, or during the same season; - How any risks are mitigated. 	

<p>Will vessels in the UoC also fish outside the UoC geographic area?</p> <p>If Yes, please describe:</p> <ul style="list-style-type: none"> - If this may occur on the same trip; - How any risks are mitigated. 	<p>Yes. However, there are rules in place to prevent orange roughy from one zone being decremented against another zone's quota.</p> <p>Section 15 of the Trawl Boat General Conditions mandates that if boats are operating outside of the eastern Orange Roughy Management Areas (ORMAs) and they have orange roughy on board and wish to transit another orange roughy zone the skipper must notify AFMA. They must also travel by the most direct route with all fishing gear stowed. AFMA must also be notified prior to leaving the fishing area for the purpose of unloading fish.</p> <p>Notwithstanding the above AFMA runs a Vessel Monitoring System (VMS) that tracks the location and speed of all Australian fishing boats at all times.</p> <p>In addition, it is extremely unlikely for vessels to fish inside and outside the UoA areas on single trips given the geography of the fishery.</p>
<p>Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities.</p> <ul style="list-style-type: none"> - Transport - Storage - Processing - Landing - Auction <p>If Yes, please describe how any risks are mitigated.</p>	<p>Yes, fishery client members hold a mixture of species on board until they are landed (at which point chain of custody would begin). However, there is very little risk of mixing during transport on the boat (from net to landing) because all species are readily visually distinguishable.</p> <p>Fish are received by the auction house (fish agent) in 25kg fish bins after arriving in trucks after unloading from the boat.</p> <p>Trucks never pick up between a UoC and non UoC before delivering to processing plant.</p>
<p>Does transshipment occur within the fishery?</p> <p>If Yes, please describe:</p> <ul style="list-style-type: none"> - If transshipment takes place at-sea, in port, or both; - If the transshipment vessel may handle product from outside the UoC; - How any risks are mitigated. 	<p>No</p>
<p>Are there any other risks of mixing or substitution between certified and non-certified fish?</p> <p>If Yes, please describe how any risks are mitigated.</p>	<p>No. Any other orange roughy that is possibly caught outside of the UoA areas is from a different season and sold for local market (i.e. entirely separate supply chain), and logbooks linked to landing records indicate where the fish was caught (i.e. within the UoA areas or in a different area).</p>

6.3 Eligibility to enter further chains of custody

To be drafted at Announcement Comment Draft Report stage

To be completed at Public Certification Report stage

The team confirms that product coming from this fishery if certified will be eligible to enter certified chains of custody. The Units of Certification are confirmed as including the following eligible parties:

- All boats holding a Commonwealth South East Trawl Boat Statutory Fishing Right (SFR) and orange roughy (east) quota SFR, for orange roughy catches from within the Eastern and Pedra Branca ORMAAs.

Landing records (Catch Disposal Records; CDRs) completed by the vessel captain link to mandatory logbooks wherein haul location, composition, and weight information is recorded. CDRs are submitted by the vessel to AFMA and to the Licensed Fish Receiver (LFR). The LFR then weighs the fish and completes the final part of the CDR confirming the weight of each species in the shipment, and also then submits a completed copy to AFMA.

An example logbook with instructions for completion can be found here:

https://afma.govcms.gov.au/sites/default/files/uploads/2014/02/eft01b-eastern-finfish-trawl-logbook.pdf?acsf_files_redirect

An example CDR form with instructions for completion by each party can be found here:

https://afma.govcms.gov.au/sites/default/files/sess2b_catch_disposal_record_0.pdf

As the completed CDR links back to the logbooks, and both are official records of landings and location of catch, the fishery certificate extends to the point of transfer to the licensed fish receiver, or to the point of first sale, whichever comes first, after which Chain of Custody certification will be required.

6.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to enter further chains of custody

No IPI species.

7 Scoring

7.1 Summary of Performance Indicator level scores

Performance Indicator (PI)		Weight	EORMA	PB
1.1.1	Stock status	1.000	90	90
1.2.1	Harvest strategy	0.250	95	95
1.2.2	Harvest control rules & tools	0.250	95	95
1.2.3	Information & monitoring	0.250	80	80
1.2.4	Assessment of stock status	0.250	95	95
2.1.1	Outcome	0.333	95	90
2.1.2	Management strategy	0.333	90	90
2.1.3	Information/Monitoring	0.333	95	90
2.2.1	Outcome	0.333	90	90

2.2.2	Management strategy	0.333	85	85
2.2.3	Information/Monitoring	0.333	95	95
2.3.1	Outcome	0.333	95	95
2.3.2	Management strategy	0.333	95	95
2.3.3	Information strategy	0.333	80	80
2.4.1	Outcome	0.333	85	85
2.4.2	Management strategy	0.333	80	80
2.4.3	Information	0.333	85	85
2.5.1	Outcome	0.333	80	80
2.5.2	Management	0.333	90	90
2.5.3	Information	0.333	90	90
3.1.1	Legal &/or customary framework	0.333	100	100
3.1.2	Consultation, roles & responsibilities	0.333	100	100
3.1.3	Long term objectives	0.333	100	100
3.2.1	Fishery specific objectives	0.250	100	100
3.2.2	Decision making processes	0.250	100	100
3.2.3	Compliance & enforcement	0.250	100	100
3.2.4	Monitoring & management performance evaluation	0.250	95	95

Overall weighted Principle-level scores	EORMA	PB
Principle 1 - Target species	90.8	90.8
Principle 2 - Ecosystem	88.7	88.0
Principle 3 - Management	99.4	99.4

8 Principle 1

8.1.1 Distribution and stock structure

The following is modified from AFMA (2014) and Upston *et al.* (2014).

Orange roughy occurs in southern Australian waters from New South Wales, south around Tasmania and west to southern Western Australia. They also occur off New Zealand, southern Africa, the Atlantic Ocean and Mediterranean Sea. Orange Roughy mainly occur in cold waters at depths of 700-1,400 m. They form dense spawning and feeding aggregations over topographic features such as the edge of the continental shelf and seamounts. They also disperse more widely over smooth and rough bottom types. The species is benthopelagic, generally occurring on the bottom but at times rising 50-100 m off the bottom to feed or spawn (Kailoloa *et al.* 1993, Branch 2001, Gomon *et al.* 2008).

Statistically significant genetic differences have been identified between stocks from the North Atlantic, western Africa, Chile and Australia/New Zealand (Goncalves da Silva *et al.* 2012), however the stock structure of orange roughy in Australian waters remains uncertain. While studies within Australian waters found only low levels of genetic differentiation between stocks, AFMA (2014) concluded that available evidence suggests that fish from the eastern and western coasts of Tasmania appear to be distinct from each other, and from those on the Cascade Plateau and South Tasman Rise (Upston *et al.* 2014). This hypothesis was partly based on a theory that a proportion of Southern Zone orange roughy migrate to the main spawning grounds in the Eastern Zone (St Helens Hill or the nearby St Patricks Head) to spawn in winter. It excludes the possibility that orange roughy in other areas of the Southern Zone (e.g. Maatsuyker, near to Pedra Branca), and indeed other Zones, also migrate to spawn in the Eastern Zone (Upston *et al.* 2014).

To test the impact of this assumption, Wayte (2007) was the first to examine the impact on modelled biomass from various plausible stock structure hypotheses. In a review of the orange roughy stock assessment, Stokes (2009) suggested that this was a reasonable approach in the absence of information on stock structure. Upston *et al.* (2014) provided further testing of this assumption, stating “*The stock structure hypothesis used in the models will influence estimates of unfished biomass and current biomass, but not necessarily depletion estimates. Thus a potential “scaling” issue, stemming from an incorrect stock structure assumption (or some other factor), might become evident if the model consistently over- or under-estimates current spawning biomass when compared with a reliable time series of absolute biomass indices.*” No such biases were evident and thus the most recent stock assessment (Haddon 2017) maintained the single stock assumption, stating “*As in the last assessment it assumes a stock structure that combines the Eastern Zone (primarily St Helens Hill and St Patricks Head) and Pedra Branca from the Southern Zone*”.

On this basis, the Eastern Zone UoA and the Pedra Branca UoA are assessed as a single unit stock.

8.1.2 Life History

The following is modified from AFMA (2014).

Orange Roughy grow slowly to a maximum size of ~ 50 cm (Gomon *et al.* 2008), are slow to mature (~ 30 years), have a mean generation time of about 56 years (J. Upston, pers. comm., as cited in AFMA 2014) and are long lived (>100 years) (Kailola *et al.* 2003). They are synchronous spawners (Pankhurst *et al.* 1987) with spawning events occurring annually although individuals may not spawn every year (Bell *et al.* 1992). Males appear to spawn over a 1-2 week period and females spawn for up to one week producing between 10,000 and 90,000 large (2.0–2.5 mm diameter) eggs (Pankhurst *et al.* 1987). It is believed to take at least three decades for larval fish to grow and enter the fishery (Haddon 2017). These traits, combined with the predictability of spawning events in both space and time, make this species particularly vulnerable to overfishing.

8.1.3 Fishery history

Orange roughy were first recorded in trawl surveys off New South Wales in 1972, with the first commercial catches made in 1982 (Tingley and Dunn 2018). The first large aggregation was discovered off western Tasmania in 1986 and catches rapidly increased thereafter. Catches increased significantly in 1989 with the discovery of a large spawning aggregation at St Helen's Hill, a seamount off eastern Tasmania (in the Orange Roughy eastern zone), and other non-spawning aggregations in waters adjacent to Maatsuyker and Pedra Branca (also Orange Roughy eastern zone) Islands off southern Tasmania (AFMA 2014) and landings increased to around 35,000 t in 1990 (Table 1). Catches rapidly declined thereafter and were less than 5,000 t by 1994. Catches around 2,000 t and below were harvested up until 2006 under an ever decreasing TAC, when orange roughy were listed as conservation dependent under the EPBC Act (with the exception of a 500 t TAC for the Cascade Plateau Zone, whose stock was deemed to be above the biomass Target Reference Point) (Tuck 2018). A 5-year conservation plan was put in place in 2007 and was replaced by a formal rebuilding strategy (AFMA, 2014).

A workshop organised by AFMA (including New Zealand participants) was held at CSIRO Hobart in May 2014 to discuss the Eastern Zone orange roughy fishery and stock assessment, including the development of a base-case model specification. The final agreed base case model indicated that stocks were above the limit reference level and the stock was continuing to recover towards target levels. Following the rules from the harvest strategy, a Recommended Biological Catch (RBC) of 381 t was suggested as a level precautionary enough to ensure stock recovery within agreed timeframes. Thereafter, stock assessment modelling has continued to improve, and TACs based on conservative RBCs have ensured harvest at levels that have enabled continued recovery of the stock.

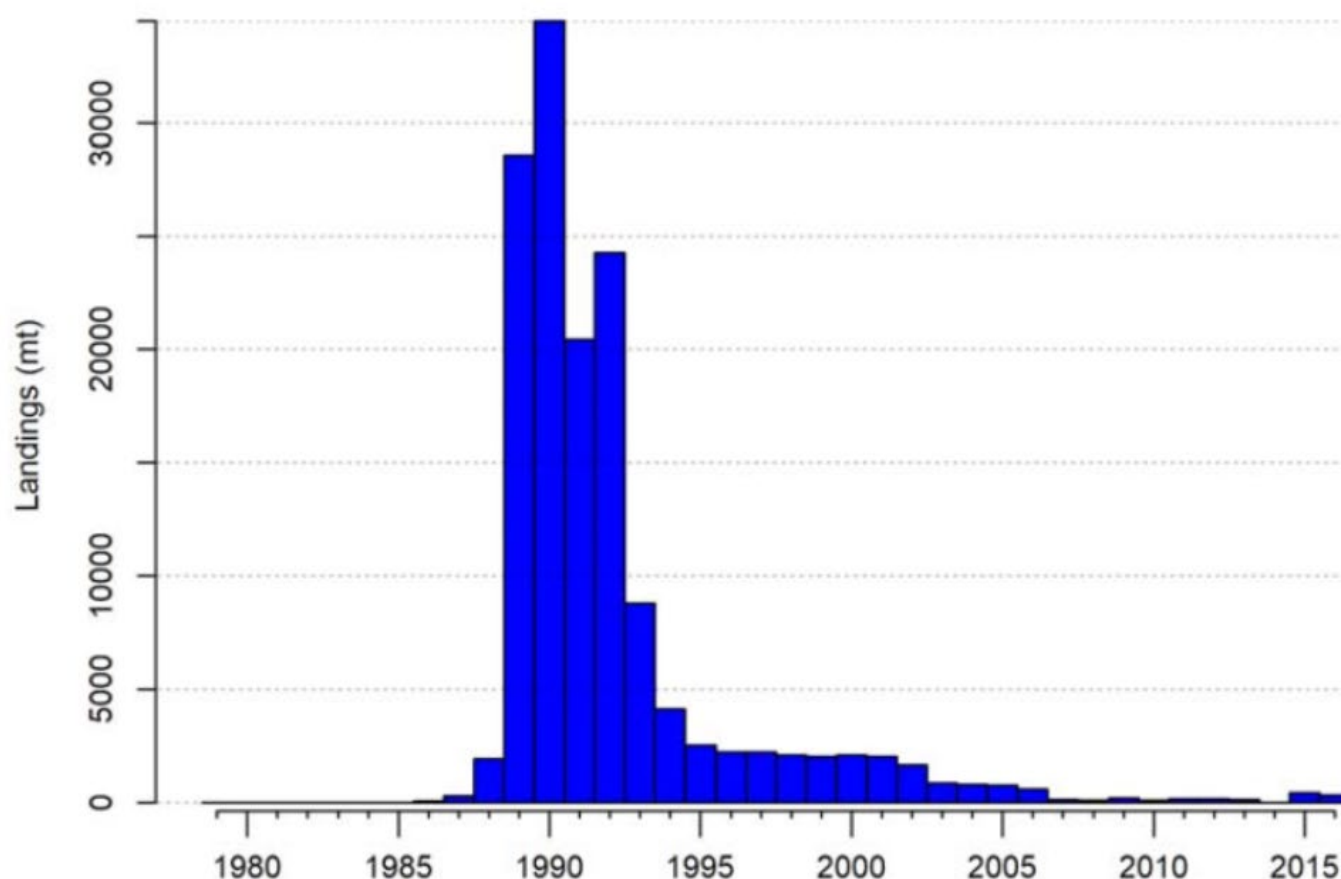


Figure 3 Total reported landed catch of Eastern Zone Orange Roughy 1985 – 2016 (Haddon 2017).

8.1.4 Abundance estimates

Acoustic surveys to estimate orange roughy biomass were started in the Eastern Zone in 1990 (Table 5). The most recent survey was conducted in 2019, however results are not yet available (Rudy Kloser pers comm.). The “Hull Mounted” system was used discontinued in 1992, with the “Towed” system the preferred method. There have been ten towed acoustic surveys from 1991 to 2016. A Daily Egg Production Survey (DEPS) was conducted in 1992 but has not been repeated. The DEPS aims to provide an absolute measure of biomass, whereas the acoustic surveys provide only a relative measure. There have been no surveys conducted in the Pedra Branca ORMA.

Table 5 The three abundance indices used in the Eastern Zone Orange Roughy assessment. DEPS is the daily egg production survey. The DEPS is treated as an absolute abundance estimate, the others are treated as relative abundance indices (Source Tuck 2018).

System	Year	Biomass	CV	Catchability
Hull	1990	120239	0.63	N(0.95, 0.92)
Hull	1991	71213	0.58	N(0.95, 0.92)
Hull	1992	48985	0.59	N(0.95, 0.92)
Towed	1991	59481	0.49	N(0.95, 0.3)
Towed	1992	56106	0.50	N(0.95, 0.3)
Towed	1993	22811	0.53	N(0.95, 0.3)
Towed	1996	20372	0.45	N(0.95, 0.3)
Towed	1999	25838	0.39	N(0.95, 0.3)
Towed	2006	17541	0.31	N(0.95, 0.3)
Towed	2010	24000	0.25	N(0.95, 0.3)
Towed	2012	13605	0.29	N(0.95, 0.3)
Towed	2013	14368*	0.29	N(0.95, 0.3)
Towed	2016	24037	0.17	N(0.95, 0.3)
DEPS	1992	15922	0.50	0.9 (fixed)

8.1.5 Age composition data

Otolith samples have been taken from Eastern Zone spawning aggregations in 1992, 1995, 1999, 2001, 2004, 2010, 2012, 2016 and 2019 (results pending). This has permitted the age-composition of the sampled stock to be determined for both males and females. No data have been collected from the Pedra Branca ORMA.

The age and nature of orange roughy otoliths brings about a high risk in ageing errors made up of differences between readers and differences between years brought about by changing experience (Francis 2006, as cited in Tuck 2018). Upston et al. (2015) describe this potential risk and as a result an ageing error matrix is included into the stock assessments to adjust the observed distribution of ages in the model fitting process. While this source of error is substantial, it is well understood, and the uncertainty is incorporated into the model.

8.1.6 Stock assessment modelling and assessment of stock status

The following is modified from Haddon (2017).

The stock is assessed as a single unit stock, with data used to inform the model and assessment of stock status limited to the Eastern Zone only. The model also assumes that only Eastern Zone orange roughy contribute spawning and recruitment to the stock.

Early stock assessments for orange roughy (Bax, 2000) used stock reduction analysis (Kimura et al., 1984) to generate estimates of unfished biomass, current biomass and projected biomass under various TAC scenarios. From the early 2000’s, relatively simple age structured stock assessment models were developed

that were fitted using maximum likelihood methods and Bayesian approaches. From 2006 and onwards, fully integrated stock assessments using the Stock Synthesis software have been conducted.

The current model for the Eastern Zone is a two-sex stock assessment using the software package Stock Synthesis (SS 3.3; Methot et al 2017). Differences by sex are restricted to weight at length, which, along with the age data being separated by sex, is used to inform the relative biomass of each sex. Thus, spawning biomass (and its depletion levels relative to B_0) is able to be estimated. Stock Synthesis (SS) is a statistical age- and length-structured model that can be used to fit the various data streams simultaneously. The population dynamics model, and the statistical approach used in the fitting of the model to the various types of data, are described in the SS operating manual (Methot et al 2017) and the more technical description (Methot and Wetzel 2013).

The model fits to data from independent acoustic surveys as well as length at age distributions. The former has a higher weighting in the fitting process because the length samples obtained from the catch are not considered to be representative of the size structure of the population. The assumptions underpinning these data sets, and the uncertainty associated with them are detailed in each of the stock assessment reports (e.g. Haddon 2017). The model does not fit to CPUE data because most of the catch is taken when orange roughy are spawning, which causes hyperstability in CPUE that can mask declines in abundance (e.g. Rose and Kulka 1999).

Based on the long period of time required for recruitment to the fishery, the current model suggests that the impact of the high catches in the late 1980's and early 1990's are yet to impact on recruitment, and this is likely to occur in the next decade. This unusual feature of the model, which results from the long-lived nature of the species and the long duration before fish are recruited to the stock (i.e. >30 years), has caused some problems in the model (discussed in Haddon 2017) however these issues do not appear to compromise its robustness. Despite the examination of a high number of alternative scenarios regarding the sensitivity of individual parameters, all previous models have predicted stock recovery since at least 2006, suggesting that the model is likely to be a reasonable representation of the biological system.

For the current assessment, Haddon (2017) updated the base-case model with data up to and including 2016 and presented the results to the Research Assessment Group (RAG). Subsequently, the author examined the likelihood profiles of selected variables and presented a model sensitivity with lower natural mortality and lower steepness of the stock recruitment relationship at the following RAG. While this is presented in Haddon (2017) as an alternative base case model, at the RAG meeting it was agreed that the original base case model would be used to determine the 3 year TAC as there was insufficient time to thoroughly examine the alternative model. Following, a cross catch-risk assessment was completed (Tuck 2018) that examined two values for natural mortality across three projected catch scenarios. Each of the six scenarios indicated that there was no threat to the long-term sustainability of the stock. As expected, the lowest natural mortality and highest catch scenario resulted in the lowest biomass trajectory, with stocks stabilising at 30% of original biomass (Tuck 2018). In addition, the RAG requested a review of the natural mortality likelihood profile by DR Andre Punt (Punt 2018). The outcome from the review suggested that the current base case estimate of natural mortality was adequate (>90%) but, as reported by Haddon (2017), not optimal. Further work has been commissioned to examine natural mortality estimates for the revised model due in 2021.

The base case model estimates biomass at 33%B₀ with 95% confidence intervals from 26-42% B₀. For noting, the model sensitivity with lower natural mortality and steepness indicated that current biomass was at 29%B₀. The model produces estimates of BMSY that are also presented in Haddon (2017). The base-case model indicates that BMSY is 21%, while the model sensitivity indicates that BMSY is 29%. The Limit Reference Point (LRP) for the fishery is 20%B₀, which is consistent with the Commonwealth Harvest Strategy and the MSC guidance where GSA2.2.3.1 states "In the case where BMSY is analytically determined to be lower than 40%B₀ (as in some highly productive stocks), and there is no analytical determination of the PRI, the default PRI should be 20%B₀".

Haddon (2017) describes the uncertainties in the model, with emphasis on the ageing data as well as the described parameter estimates. The range of sensitivities examined over the years appear to be consistent in

their assessment of consistent stock recovery under conservative TACs with similar estimates of current biomass. The current base-case model suggests that the 95% confidence limits of the spawning biomass estimate are clearly above the LRP. Estimates of BMSY in the model appear to be more sensitive. While the estimate from the base-case model is intuitively low (21%B₀), even the lower productivity model indicated that current biomass approximated BMSY. On this basis, it is argued that biomass is likely but not highly likely, to be at or around BMSY.

8.1.7 Harvest Strategy and Harvest Control Rules

The MSC definition of Harvest Strategy is “*The combination of monitoring, stock assessment, harvest control rules and management actions, which may include an MP or an MP (implicit) and be tested by MSE*” (MSC 2018a). The MSC definition of a Harvest Control Rule is “*A set of well-defined pre-agreed rules or actions used for determining a management action in response to changes in indicators of stock status with respect to reference points*” (MSC 2018a).

Orange Roughy is a target species in the Southern and Eastern Scalefish and Shark Fishery (SESSF). The SESSF is managed in accordance with the *Southern and Eastern Scalefish and Shark Fishery Management Plan 2003* and operates under a mixture of input controls, output controls and monitoring tools that are specifically designed to ensure stock recovery of orange roughy to appropriate levels. The two UoAs are managed as separate Orange Roughy Management Areas (ORMAs): the Eastern ORMA and the Pedra Branca ORMA (Figure 4). The current management arrangements are legislated in the various Acts and Regulations applicable to the fishery and described in the SESSF Management Arrangements Booklet 2019 (AFMA 2019) and include:

- licence limitation;
- a total allowable catch (TAC);
- gear restrictions;
- spatial management of the catch and spatial closures;
- a Vessel Monitoring System (VMS);
- a well-managed compliance program;
- an on-board observer program;
- fishery-independent acoustic surveys and;
- stock assessment modelling informed by various inputs including biological data collection.

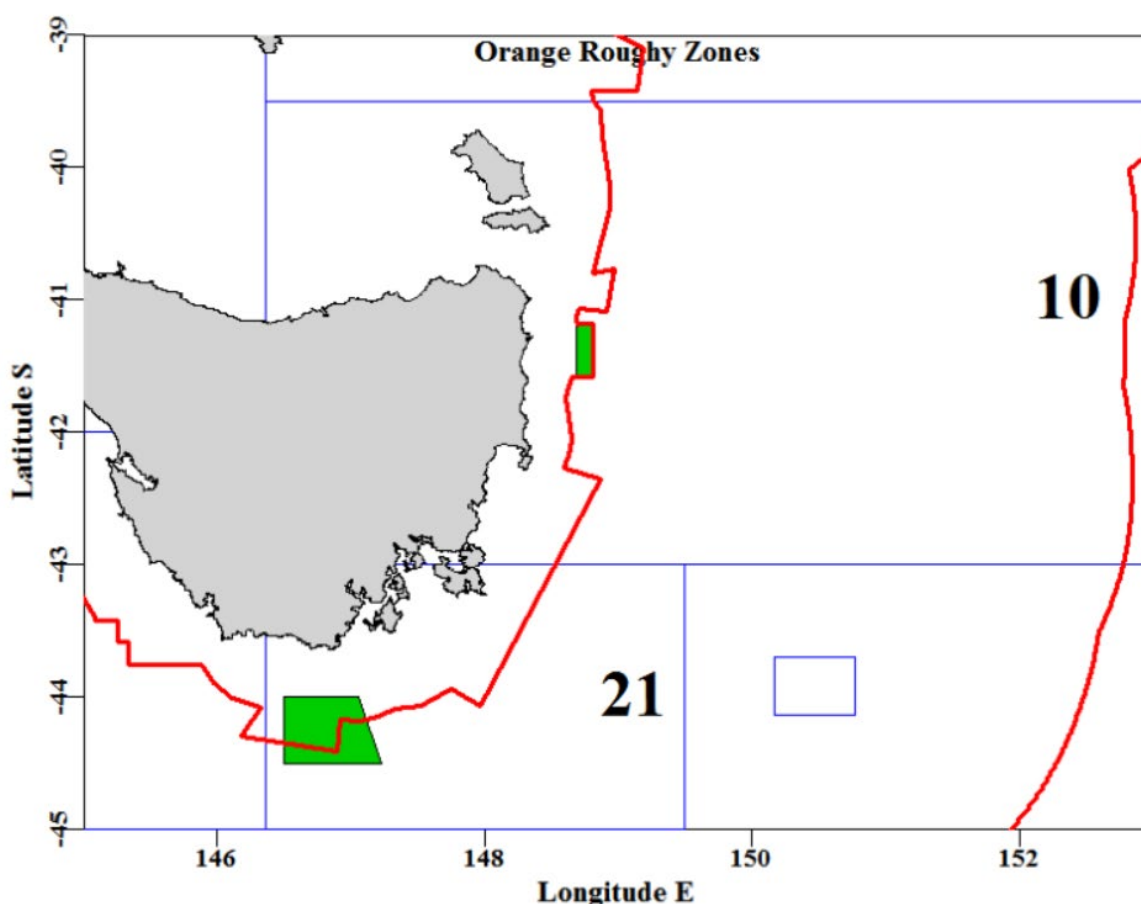


Figure 4 Map of the Eastern ORMA (green block in Zone 10) and the Pedra Branca ORMA (green block in Zone 21). The red lines denote the current definition of the 700 m deepwater closure (with the exclusion of the ORMAs). Source: Haddon (2017).

In 2014, the Orange Roughy Rebuilding Strategy (ORRS) replaced the Orange Roughy Conservation Program 2006 (ORCP). The objective of the ORCP was to conserve Orange Roughy to ensure recovery to ecologically sustainable levels. Recognising progress made under the ORCP, the ORRS was established to recover stocks to levels where they can be harvested in an ecologically sustainable manner consistent with the Commonwealth Fisheries Harvest Strategy Policy 2007 (HSP).

The orange roughy fishery is assessed as a Tier 1 stock under the HSP because there is a formal stock assessment that estimates biomass relative to B_0 . The HSP has default Limit Reference Point (LRP, 20% B_0), Trigger RP (35% B_0) and Target RP (48% B_0). The HCRs are termed as the “20:35:48 rule”, the origin of which is described in Day (2009). In summary, at biomass levels below the LRP targeted fishing does not occur. The Trigger RP is a point of inflection where fishing mortality changes; below 35% B_0 the fishing mortality (F) is dropped below the $F_{48\%}$ level, while above the 35% B_0 fishing mortality is fixed at the maximum. Above the Target RP a constant fishing mortality ($F_{48\%}$) is applied. Given the current estimates for $BMSY$ of 29% B_0 (Haddon 2017), the default HSP provides relatively conservative HCRs for the orange roughy stock, with fishing mortality rates that are always well below $FMSY$.

An RBC is determined for the Eastern Zone based on the current stock status assessed against the rules above for spawning biomass, and through projections forward using the optimal fitting model for a certain number of years. There are no other extractions from the fishery to consider. As a result of following the HSP, the RBC for Eastern Zone orange roughy ensures that TACs are set well below the levels needed to maintain stocks at $BMSY$. All modelling work done to date indicates that this has enabled stocks to recover for well over a decade. The Pedra Branca TAC is determined as a conservative proportion of Eastern Zone TAC based on catch history (Malcolm Haddon pers comm.). To ensure additional conservatism for this region, only a small proportion of the area is made available for fishing. The Eastern ORMA TAC for the

2019/20 season was set at 900 t, while the Pedra Branca ORMA TAC for 2019/20 was set at 63 t. The Pedra Branca TAC is part of a Southern catch limit of 94 t total, with the additional 31 t as an incidental TAC for other catches of orange roughy in the Southern Zone that are not considered to come from the UoA stock.

Historically, one of the greatest management concerns for the fishery was high discarding rates. At the peak of the fishery, anecdotal reports were that catches could be so large that fishing gear would fail, or catches would exceed vessel storage capacity. Currently, a range of measures are in place to minimise discarding, including minimum quota holdings, under-catch/over-catch provisions and on-board observers for the first three trips for an inexperienced skipper (Daniel Corrie pers comm.). In addition, vessels are equipped with technology that enables them to control the volume of catch for any particular shot through the use of sonar, depth monitors and catch monitors (Tamre Sarhan pers comm.). Thomson *et al.* (2017) reported that levels of discards have ranged from 1-3% since the late 1990s, with the most recent observer data estimating a total of 13 t being discarded in 2016 at a discard rate of 3.2% (Thomson *et al.* 2018).

As previously discussed, one of the most unusual features of this fishery is that the expected impact of high catches in the late 1980s and early 1990s on recruitment have not been seen with regard to recruitment to the stock. Pitman *et al.* (2013) found that fecundity and reproductive potential of eastern zone orange roughy was negatively related to stock size, indicating a likely density dependent response. There remains considerable uncertainty on the extent of the potential impact of this on recruitment to the fishery. Despite this uncertainty, given the current status of the stock relative to BMSY, the conservative TACs being set through the implementation of HCRs that have been MSE tested (see below), and the regular monitoring of biomass through independent surveys, biological sampling and stock assessment every three years, the Harvest Strategy appears capable of ensuring that exploitation levels will be reduced if recruitment to the fishery is impacted to the extent that spawning biomass begins to decline over the next decade.

8.1.8 Management Strategy Evaluation

A Management Strategy Evaluation (MSE) of the original Harvest Strategy Framework (now the HSP) for SESSF species was documented in 2009 (Wayte 2009). For Tier 1 species, the HCRs were tested for three species types – “flathead-like, school whiting-like and orange roughy-like”. Two RBCs were calculated for 2007 based on both a 20:40:40 and a 20:40:48 HCR applied to 2008 projected biomass. The HCRs were assessed at three levels of current relative stock biomass – low, target and high – for each.

Wayte (2009) note “*While the operating models are based on the existing Tier 1 assessments it should be emphasised that these models do not represent the ‘real’ species. They are intended to be species that have the same biological characteristics and catch history as SESSF species, but in some cases the input data has been manipulated to obtain the required current stock scenario for testing*”.

The authors concluded “*Application of the Tier 1 HCR leads to all stocks stabilising at the target level. The time taken to reach the target depends on the initial stock status, and the species’ biological characteristics.....The formal testing of the harvest strategy framework provides all stakeholders with confidence that the fishery is being managed in accordance with agreed sustainability objectives*”.

The MSE does provide some confidence that the HCRs are highly likely to maintain stocks at target levels long-term. Firstly, the *orange roughy – like* species data were the same data used for the orange roughy stock assessment. Secondly, while the inflection point used for the MSE study was 40% B₀, which is higher than the current level of 35% B₀, estimates of BMSY for orange roughy are around 29% B₀ and thus the lower inflection point was only likely to influence the time taken to reach the target, not the probability of reaching the target. The greatest limitation to this work appears to relate to its age, given it is over a decade old and the stock assessment model has developed considerably in that time.

8.1.9 Catch profiles

8.1.10 Total Allowable Catch (TAC) and catch data

Table 6. Total Allowable Catch (TAC) and catch data

TAC	Season	2018/19	Amount	689 t
UoA share of TAC	Season	2018/19	Amount	698t*
UoA share of total TAC	Season	2018/19	Amount	698t*
Total green weight catch by UoC	Season (most recent)	2018/19	Amount	856t*
Total green weight catch by UoC	Season (second most recent)	2017/18	Amount	297t

* The TAC or catch is greater than the seasonal TAC due to uncaught quota being carried over from the previous year. The total TAC, including amount carried over, was 966t.

8.2 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guide post	It is likely that the stock is above the point where recruitment would be impaired (PRI).	It is highly likely that the stock is above the PRI.	There is a high degree of certainty that the stock is above the PRI.
	Met?	Yes	Yes	Yes

Rationale:

The stock is assessed as a single unit stock, with data used to inform the model and assessment of stock status limited to the Eastern Zone only. In the assessment, the Pedra Branca stock does not contribute recruits to the fishery. The assessment uses an integrated stock assessment model implemented using Stock Synthesis software. The current model and related sensitivities all indicate a continuing trend of recent increases in spawning biomass (Haddon 2017, Tuck 2018). The accepted base-case model estimates current biomass at 33%B₀ with 95% confidence intervals of 26-42% B₀. The Limit Reference Point (LRP) for the fishery is 20%B₀, consistent with the Commonwealth Harvest Strategy. This is also consistent with the GSA2.2.3.1 for stocks with a BMSY below 40%B₀. The current modelling suggests that the 95% Confidence Limits of the biomass estimate are above the current LRP, and therefore there is a high degree of certainty that the stock is currently above PRI and thus SG100 is met.

b Stock status in relation to achievement of Maximum Sustainable Yield (MSY)

	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		Yes	No

Rationale:

The current base case model estimates BMSY at 21%B₀, while a less productive model developed as a sensitivity study estimated BMSY at 29% B₀ (Haddon 2017). Even the more conservative model suggests that stocks have recovered to levels above BMSY (B_{current} 30%B₀), with the recovery consistent over time in each scenario. It is also noted that the current TAC's result in a fishing mortality that is well below F_{MSY} and the Target Reference Point (TRP) for the fishery is 48%B₀. On this basis, the stock is likely to be fluctuating around a level consistent with MSY and thus SG80 is met. However, model is sensitive to several parameters, particularly natural mortality and steepness of the recruitment curve, and there is currently some uncertainty regarding the estimate of natural mortality used in the base case model. Also, due to other inherent uncertainties in the data (e.g. ageing error) the confidence intervals around estimates of B_{current} are relatively large (26-42%B₀). On this basis, it cannot be argued that there is a high degree of certainty that the stock is fluctuating at a level consistent with BMSY, and thus SG100 is not met. It is noted that modelling predicts the high rates of depletion imparted on the stock early in the fishery's history will likely impact recruitment within the next decade, however the extent of this impact is uncertain (see Pitman et al 2013). At this point stock recovery is expected to slow, however there are sufficient data regularly collected to monitor the changes in recruitment and biomass, and the HCRs will ensure that catches are reduced if biomass declines, such that the stock should remain around or above levels consistent with BMSY.

References:

Haddon, M. (2017) Orange Roughy East (*Hoplostethus atlanticus*) stock assessment using data to 2016 Report to November 2017 SE RAG meeting. CSIRO, Oceans and Atmosphere, Australia. 51p.
Pitman, L. and Haddy, J. and Kloser, R. 2013. Fishing and fecundity: The impact of exploitation on the reproductive potential of a deep-water fish, orange roughy (*Hoplostethus atlanticus*). Fisheries Research. 147: pp. 312-319.
Tuck, G.N. (ed.) 2018. Stock Assessment for the Southern and Eastern Scalefish and Shark Fishery 2016 and 2017. Part 2, 2017. Australian Fisheries Management Authority and CSIRO Oceans and Atmosphere, Hobart. 837p.

Stock status relative to reference points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	Default PRI: GSA 3.2.2.1 (20%B ₀)	20%B ₀	33%B ₀
Reference point used in scoring stock relative to MSY (SIb)	BMSY	21%B ₀	33%B ₀

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	>80
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Information gap indicator	Information sufficient to score PI
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Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	N/A

PI 1.1.2 – Stock rebuilding [**This PI is Not Applicable**]

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the stock that is the shorter of 20 years or 2 times its generation time . For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the stock.
	Met?	N/A		N/A
Rationale				

N/A

b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, or it is likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe .	There is strong evidence that the rebuilding strategies are rebuilding stocks, or it is highly likely based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe .
	Met?	N/A	N/A	N/A
Rationale				

N/A

References

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	<60 / 60-79 / ≥80
Information gap indicator	More information sought / Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	N/A
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Condition number (if relevant)

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	Yes	Yes	Yes

Rationale:

The stock is assessed as a single unit stock across the two UoAs and in line with this principle, the Harvest Strategy generally applies to both UoAs, with some differences between UoAs described below.

Orange roughy stocks were heavily depleted at the inception of these Australian fisheries in the late 1980's and early 1990's. Catches of this long-lived species declined rapidly until all stocks were closed to fishing to facilitate stock recovery. In 2014, a rebuilding strategy was established for orange roughy that aimed to recover stocks to levels well above BMSY, in line with Australia's *Commonwealth Harvest Strategy Policy and Guidelines*³ (HSP).

The fishery has a mixture of input controls, output controls and monitoring tools that are specifically designed to ensure stock recovery to target levels. These include: licence limitation; a total allowable catch (TAC); gear restrictions; spatial management of the catch and spatial closures; a Vessel Monitoring System (VMS); a well-managed compliance program; an on-board observer program; fishery-independent acoustic surveys (Eastern ORMA only) and; stock assessment modelling (Eastern ORMA only).

While the stock assessment modelling for the Eastern ORMA has inherent uncertainties, it is considered robust (Haddon 2017) and several sensitivities have been examined in detail over time. Recently, a "cross-catch risk assessment" was conducted to examine the potential effects of a range of scenarios of projected catch and current stock status from base-case models considered biologically acceptable.

Fishery-independent acoustic surveys have been regularly conducted for the Eastern ORMA in the last two decades. Several improvements to the surveys have been made over time, and the uncertainties in the parameters and their accuracy as a measure of relative biomass is well understood. The estimates of relative biomass are used in model fitting, and they are weighted higher than ageing data in the model due to their perceived reliability.

Historically, one of the greatest management concerns for the fishery was high discarding rates. A range of measures are in place to minimise discarding, including minimum quota holdings, under-catch/over-catch provisions and on-board observers for the first three trips for an inexperienced skipper. In addition, vessels are equipped with technology that enables them to control the volume of catch for any particular shot. Recent estimates of discards have not exceeded 3.2%, suggesting that the discard reduction measures are highly effective (Thomson et al. 2017, 2018). The compliance program ensures that catches are maintained within TACs and that the spatial distribution of the catch is monitored (through VMS). There are no other extractions from the stock. In combination, these elements of the harvest strategy are expected to achieve stock management objectives reflected in PI 1.1.1 SG80 and thus SG60 is met for both UoAs.

³ http://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy

The harvest strategy is also responsive to the state of the stock. The LRP for the fishery is 20%B₀, below which no targeted fishing can occur. When the stock is determined to be above the LRP, controlled fishing can occur at levels that still enable stock recovery to target levels within a specified timeframe. The maximum fishing mortality that can be applied through the HCRs is that which will allow the stock to recover to 48% B₀, which is well below FMSY. TACs for the Eastern ORMA UoA are obtained from Recommended Biological Catches (RBCs) determined through model forecasting following the HCRs. While the modelling does not include data from the Pedra Branca region, the two areas are considered to be harvesting from the same stock, and the Pedra Branca TAC is determined as a conservative proportion of the Eastern Zone TAC based on historic catches. To apply additional conservatism to the Pedra Branca UoA, only a small proportion the available habitat is open to fishing. Given these measures, the harvest strategy is considered responsive to the state of the stock and the elements of the harvest strategy work together towards achieving stock management objectives reflected in PI 1.1.1 SG80, and therefore PI 1.2.1a SG80 is met for both UoAs.

There is a sound understanding of the biology of the stock, including recruitment to the fishery. While the initial high catches occurred three decades ago, the impact of this severe depletion is believed to have not yet been imparted on the stock. Modelling projections are precautionary suggesting that within the next decade recruitment to the fishery will decline, and stock recovery will slow. To offset these expected declines in recruitment, RBCs based on these predictions will be lowered substantially to ensure that the trajectory of stock recovery is maintained. On this basis, the harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in PI 1.1.1 SG80. Thus, SG100 for PI 1.2.1(a) is met for both UoAs.

Harvest strategy evaluation				
b	Guide post	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.
	Met?	Yes	Yes	No

Rationale:

The harvest strategy is underpinned by common elements for all Australian Commonwealth fisheries. The combination of input and output controls with regular monitoring, stock assessment and compliance, all following a formal stock rebuilding strategy, suggest that the harvest strategy is likely to work, and thus SG60 is met.

There is also substantial evidence that the harvest strategy is achieving its objectives. At the inception of the fishery there were few controls on the fishery and catches reached unsustainable levels very quickly. Following the rapid decline in catches, monitoring continued until all fisheries were closed and the rebuilding strategy implemented. Acoustic surveys and thoroughly tested stock assessment modelling suggest that the rebuilding strategy is achieving its objectives. While Pedra Branca catches are determined only from relative historic catch levels, it is reasonable to assume the sporadic catches from this region are sustainable given the consistent stock recovery observed in recent years at the stock level (under the assumption of a single stock with Eastern Zone). Although the stock that underpins these UoAs did not fall below the LRP historically, the latest modelling suggests that there has been significant stock recovery, and even the most conservative accepted scenario suggests that current biomass exceeds BMSY. On this basis, SG80 is met.

A formal Management Strategy Evaluation (MSE) of the HCRs for SESSF species was conducted by Wayte (2009) and this included MSE testing of the Tier 1 harvest control rule for a “orange roughy-like” species. While the MSE suggested that the harvest strategy would maintain stocks at target levels (B48%) under all scenarios, this work is now over a decade old. To meet SG100 evidence needs to demonstrate that the strategy is clearly able to maintain stocks at target levels. While stock recovery to date has been consistent and substantial, stock status has only reached BMSY in recent years. Further, the trajectory of stock recovery over the next decade is unclear given that the expected impact on recruitment from high catches in the 1980s and 1990s have not yet been observed (although there is much uncertainty around the extent of this impact). On this basis, SG100 is not met.

Harvest strategy monitoring				
c	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Yes		

Rationale

The monitoring program includes: monitoring of the catch and effort against the three-year TAC; monitoring of the size- and spatial distribution of the catch; monitoring of the spawning biomass through fishery independent acoustic surveys at the main spawning grounds of the Eastern ORMA; annual reporting of fishery data including catch, effort, CPUE and age and size frequency of the catch, and; regular stock assessment modelling.

This monitoring is likely to be sufficient to determine whether the harvest strategy is working, and on this basis this SI is met.

Harvest strategy review				
d	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Yes

Rationale

The harvest strategy is regularly reviewed through the RAG process. While all data are considered on an annual basis as they are gathered, stock assessments and TACs are set on a three-yearly basis. The current HCRs for the fishery are aligned with the Commonwealth Harvest Strategy Policy, and therefore a specific “Orange Roughy Harvest Strategy” has not been needed to be developed as has been done for other fisheries (e.g. Small Pelagic Fishery). Given the longevity of the species and the highly conservative TACs that are set well below the catches required to maintain the species at BMSY, this is sufficient to meet the SG100 for this SI.

Shark finning				
e	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	N/A	N/A	N/A

Not relevant, target species is not a shark.

Review of alternative measures				
f	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are

			implemented as appropriate.	implemented, as appropriate.
	Met?	N/A	N/A	N/A

Rationale

The orange roughy fishery catches only adult fish. While there were high levels of discarding in the early years of the fishery before quotas were introduced, levels of discards have ranged from 1-3% since the late 1990s (Thomson et al. 2017). Recent observer data estimated a total of 13 t being discarded in 2016 at a discard rate of 3.2% (Thomson et al. 2018). On this basis a review of measures to reduce UoA-related mortality of unwanted catch is unnecessary and thus this SI is not scored.

References:

Cordue, P (2014) A Management Strategy Evaluation for orange roughy. ISL Client Report for Deepwater Group Ltd
Haddon, M. (2017) Orange Roughy East (*Hoplostethus atlanticus*) stock assessment using data to 2016 Report to November 2017 SE RAG meeting. CSIRO, Oceans and Atmosphere, Australia. 51p.
Thomson, R, Deng, R, Althaus, F, Fuller, M and Castillo-Jordan, C. (2017). Data summary for the Southern and Eastern Scalefish and Shark Fishery: Logbook, Landings and Observer Data to 2015. Prepared for the SERAG Meeting, 20-22 September 2017, Hobart.
Thomson, R, Deng, R and Castillo-Jordan, C (2018). Integrated Scientific Monitoring Program for the Southern and Eastern Scalefish and Shark Fishery – discards for 2016.
Tuck, G.N., Castillo-Jordán, C. and Burch, P. (2018). Orange roughy east (*Hoplostethus atlanticus*) cross-catch risk assessment based upon the 2017 stock assessment. Technical paper presented to the SERAG, 14-16 November 2018, Hobart, Australia.
Wayte, S.E. (ed.) 2009. Evaluation of new harvest strategies for SESSF species. CSIRO Marine and Atmospheric Research, Hobart and Australian Fisheries Management Authority, Canberra. 137p.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	95
Condition number (if relevant)	N/A

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Yes	Yes	Yes

Rationale

The HCRs are in line with Australia's *Commonwealth Harvest Strategy Policy and Guidelines*⁴ (HSP) for Tier 1 stocks. The 20:35:48 HCR applies, the origin of which is described in Day (2009). In summary, at biomass levels below the LRP (i.e. 20 in the rule, 20%B₀) targeted fishing does not occur. The 35 (i.e. 35% B₀) is where the change in fishing mortality with changes in stock size is altered, below 35% the fishing mortality is dropped below the F_{48%} while above the 35% fishing mortality is fixed at the maximum. Above the target level a constant fishing mortality (F_{48%}) is applied.

The RBC for the Eastern Zone is determined based on the current stock status assessed against the rules above for spawning biomass, and also through projections forward using the optimal fitting model for a certain number of years. The RBC has ensured that TACs are set well below the levels needed to maintain stocks at BMSY. This has enabled stocks recover to levels approximating BMSY based on even the most conservative stock assessment scenarios. The TAC for the Pedra Branca UoA is set at 7% of the TAC from the Eastern ORMA, which was determined based on historic catches from the two regions. Given that fishing mortality never exceeds the level that would achieve B_{48%} in the long term, and is even lower at biomass levels below 35%B₀, which is well above BMSY, the HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY and thus SG100 is met.

HCRs robustness to uncertainty				
b	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Yes	No

⁴ http://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy

Rationale

When comparing model estimates of BMSY (21-29%B0) to target levels (48%B0), the HCRs are set at conservative levels that would appear to account for the long-lived nature of the species and ecological role of the stock. The 2009 MSE of the Commonwealth HCRs (Wayte 2009) examined a range of species with varying life history characteristics, one of those being based on orange roughy data from the Eastern Zone. While the MSE provides sufficient quantitative evidence to suggest the HCRs are likely to be robust to the main uncertainties (i.e, SG80 is met), the assessment is now over a decade old and was based on an abbreviated version of the stock synthesis model at that time. On this basis, it cannot be argued that the MSE considers a wide range of uncertainties specific to the current assessment and TAC setting process. The SG100 is not met.

HCRs evaluation				
c	Guide post	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Yes	Yes	Yes

Rationale

The guidance for PI 1.2.2(c) states “teams must review the ability of the tools associated with the HCRs to achieve the exploitation levels. Such tools would include management measures like total allowable catches (TACs) and fishing limits, and arrangements for sharing TACs between participants in the fishery, including between states in shared stock fisheries”.

The primary management tool for managing total exploitation in the fishery is the TAC. To fish in the fishery, operators must hold a South East Trawl Boat statutory fishing right (SFR), own or lease orange roughy quota SFR specific to the UoAs and must hold minimum quota holdings before fishing.

The UoA stock is not shared with any other jurisdictions.

The TAC is enforced through a commercial (electronic) logbook and catch disposal record (CDR) program. Rigorous compliance monitoring of catches is undertaken, including the compulsory use of VMS. This provides a high degree of confidence that the TAC is being complied with.

The guidance for PI 1.2.2(c) also states “*Evidence that current F is equal to or less than $FMSY$ should usually be taken as evidence that the HCR is effective*”. The current stock assessment (Haddon 2017) and the recent cross-catch risk assessment (Tuck et al 2018) provides clear evidence that F is well below $FMSY$ and that stock recovery is occurring. Thus, given that there is a high degree of compliance that the current monitoring tools are effectively limiting exploitation levels, the SG60, SG80 and SG100 levels are met.

References

- Day, J. (2009) Modified breakpoint for the 2008 Tier 1 harvest control rule. Pp 198 – 202 in Tuck, G.N. (ed.) 2009. Stock Assessment for the Southern and Eastern Scalefish and Shark Fishery 2008. Australian Fisheries Management Authority and CSIRO Marine and Atmospheric Research, Hobart. 645 p.
- Haddon, M. (2017) Orange Roughy East (Hoplostethus atlanticus) stock assessment using data to 2016 Report to November 2017 SE RAG meeting. CSIRO, Oceans and Atmosphere, Australia. 51p.
- Tuck, G.N., Castillo-Jordán, C. and Burch, P. (2018). Orange roughy east (Hoplostethus atlanticus) cross-catch risk assessment based upon the 2017 stock assessment. Technical paper presented to the SERAG, 14-16 November 2018, Hobart, Australia.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
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Information gap indicator	More information sought
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Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	95
Condition number (if relevant)	N/A

PI 1.2.3 – Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guide post	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data are available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Yes	Yes	No

Rationale

There is a broad range of information gathered for the fishery, sufficient to support the harvest strategy:

While there is some uncertainty around the stock structure of orange roughy in Australian waters, AFMA (2014) conclude “*available evidence suggests that fish from the eastern and western coasts of Tasmania appear to be distinct from each other, and from those on the Cascade Plateau and South Tasman Rise*”. Upston *et al.* (2014) examined alternative scenarios of stock structure on stock assessment modelling and concluded that there was no evidence that stocks were likely to be separate. In the most recent assessment, Haddon (2017) maintained this assumption.

The available information for the fishery includes:

- Basic biology that is well understood including distribution and abundance, reproduction, and life history traits (summarised in AFMA 2014).
- Relative biomass estimates for the Eastern ORMA determined from fishery independent acoustic surveys.
- Catch and effort data recorded in commercial logbooks that are validated through Catch and Disposal Records (CDRs).
- A good understanding of the composition of the fleet.
- VMS data for all of the fleet.
- An observer program that includes gathering of data for size and age structure of the catch.

Acoustic surveys and stock assessments are generally conducted every three years to inform multi-year TAC decisions. The key components of the harvest strategy are reviewed annually, and specific research is conducted as needed between stock assessments (e.g. the cross-catch risk assessment, Tuck *et al* 2018). There are no other sources of fishing mortality on the stock. This information is sufficient to meet both SG60 and SG80.

The SG100 guidepost requires that a comprehensive range of information is available for the fishery, including other information such as environmental data. In the MSC guidance, SA2.6.4 indicates that scoring for PI 1.2.3 should consider the veracity of the information. While there are considerable uncertainties associated with stock structure and ageing data, these issues are well understood and their implications on the assessment of stock status have been tested through empirical modelling. The key uncertainty in the available information regards juvenile orange roughy, with very little known of the distribution and abundance of sub-adults and indeed adults outside of the key spawning grounds. This knowledge is particularly relevant given that the impact of historical fishing is expected to impact recruitment in the next decade. Also, there are few “other” data sources, such as environmental data, that have incorporated or considered in the assessment. On this basis, SG100 is not met.

Monitoring				
b	Guide post	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule , and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Yes	Yes	No

Rationale

The HCRs for the fishery are based on current stock status assessed against the rules of the Commonwealth Harvest Strategy Policy, underpinned by a TAC.

Fully integrated stock assessments using Stock Synthesis have been performed since 2006. They have evolved substantially over time through rigorous peer review, sensitivity studies and risk assessments. Stock assessments are fitted to relative biomass measures obtained through acoustic surveys and are weighted higher than data on the age distribution of the catch which are also used for model fitting. The model is particularly sensitive to estimates of natural mortality and the steepness of the recruitment function. While these assumptions have been examined in detail for both Australian (e.g. Haddon 2017) and New Zealand (Cordue 2014) orange roughy fisheries, it is noted that alternative natural mortality estimates continue to be examined for the Eastern Zone assessment. A MSE was conducted for SESSF species in 2009 (Wayte 2009) and recently a cross-catch risk assessment examined the effects of applying the projected catches from a high productivity model scenario to a low productivity model scenario to determine the impact of incorrect model selection.

UoA removals are monitored through catch and effort reporting. The compliance program includes VMS, prior reporting, landing inspections, and a range of penalties for non-compliance.

While catches are monitored and reported on an annual basis, acoustic surveys and stock assessments are repeated on a three-year cycle and three-year TACs are generally set. Given the long-lived nature of orange roughy stocks and the conservative nature of the TACs relative to FMSY, this is likely sufficient frequency for the HCR.

The available information for monitoring of the fishery is sufficient to pass the SG60 and SG80 levels. However, there needs to be improvement in some inherent uncertainties in the data (e.g. ageing data) and parameters used in the model (e.g. natural mortality) to pass this SI at the SG100 level.

Comprehensiveness of information				
c	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		Yes	

Rationale:

There are no other removals from the stock

References

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	N/A

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		Yes	Yes

Rationale

GSA2.7 states “This PI considers how the fishery assesses information to provide an understanding of stock status and the effectiveness of the harvest strategy”.

Early stock assessments for the UoA used stock reduction analysis (Kimura et al. 1984, Bax 2000) to determine current biomass and the potential impact of future catches. Simple age-structured models were first developed in the early 2000’s (Wayte & Bax 2002). The first Stock Synthesis model was developed in 2006 (Wayte 2007) and there have been several incremental improvements in model development thereafter (Upston & Wayte 2012a,b, Upston et al. 2014, Haddon 2017).

The current Stock Synthesis assessment model is informed by data from the Eastern Zone only, where the majority of the catch is harvested. Recruitment is only derived from the Eastern Zone stock as well. The model fits to data from independent acoustic surveys as well as length and length at age distributions. The former has a higher weighting in the fitting process because the length samples obtained from the catch are not considered to be representative of the size structure of the population. That the model uses acoustic survey data as an index of abundance rather than or not in combination with CPUE is appropriate for the stock because the vast majority of the catch is taken when orange roughy are spawning, which causes hyperstability in CPUE that can mask declines in abundance (e.g. Rose and Kulka 1999). The model provides estimates of biomass relative to initial biomass (B₀), which are appropriate for the stock and for the HCRs. To date, previous models have predicted the recent stock recovery well, suggesting that the model is a reasonable representation of the system. Based on the long period of time required for recruitment to the fishery, the current model suggests that the impact of the high catches in the late 1980’s and early 1990’s are yet to impact on recruitment, and this is expected to occur in the next decade however there is substantial uncertainty regarding the extent of this effect. This unusual feature of the model, which results from the long-lived nature of the species, has caused some problems in the model (discussed in Haddon 2017) however these issues do not appear to compromise its robustness. On this basis, the assessment is appropriate for the stock and the HCRs and thus SG80 is met. The assessment also takes into account the major features relevant to the biology of the species and the nature of the UoA and thus SG100 is met.

Assessment approach				
b	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	Yes	Yes	

Rationale

The model provides estimates of biomass relative to initial biomass (B_0), which are appropriate for the stock and for the HCRs. Orange roughy is assessed against the Tier 1 Commonwealth Harvest Strategy, which operates under the 20:35:48 rule (Day 2009) where 20% B_0 is the LRP and 48% B_0 is the TRP. The 35 rule is the point where fishing mortality rate can be increased slightly as the stock is at healthier levels although not yet at target (i.e. at levels between 20% B_0 and 35% B_0 fishing mortality is greatly reduced to promote stock recovery). The most conservative of the current accepted model scenarios indicates that BMSY is approximately 29% B_0 , which suggests that the TRP and the 35 rule are highly conservative and therefore appropriate for the stock. The current LRP of 20% B_0 conforms with the default PRI for species with a BMSY between 27 and 40% of B_0 . On this basis both the SG60 and SG80 are met.

Uncertainty in the assessment				
c	Guide post	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Yes	Yes	No

Rationale

Each iteration of the stock assessment model has clearly documented the changes in the model, specifically examining the major sources of uncertainty. Thus, SG60 is met.

The current model explicitly takes uncertainty into account (Haddon 2017) and thus SG80 is met. The approaches that incorporate uncertainty include:

- The index of spawning biomass from acoustic surveys.
- Age composition data, including an ageing error matrix.
- Weighting of fitting data following Francis (2011).
- Examination of the likelihood profiles around the fixed parameters of natural mortality (M), the stock recruitment relationships steepness (h) and selectivity.
- A cross-catch risk assessment was also undertaken, to examine the effects of applying the projected catches from a high productivity model scenario to a low productivity model scenario to determine the impact of incorrect model selection (Tuck et al 2018).

Haddon (2017) report “*Even though the model fits to the available data were reasonable the model remains uncertain with relatively wide confidence intervals the fitted data time-series and consequently around the median stock estimates. This reflects the uncertainties in the available data.*”.

Estimates of spawning biomass relative to unfished levels provided in the reports are bounded by 95% confidence limits and thus stock status is evaluated in a probabilistic way. However, reference points are assessed against maximum posterior density (MPD) estimates (i.e. the mode of the distribution) of relative spawning biomass derived from the model (Haddon 2017). Thus, while the Reference Points are inherently conservative, the harvest control rules do not explicitly incorporate the uncertainty in the assessment when evaluating stock status against the Reference Points. On this basis SG100 is not met.

Evaluation of assessment				
d	Guide post	The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.		
	Met?			Yes

Rationale

The use of Stock Synthesis as the preferred modelling approach follows the initial use of Stock Reduction Analysis and Age-Structured models. Stock Synthesis has been widely tested and shown to be a robust methodology.

A range of alternative hypotheses and assessment approaches have been explored since the first Stock Synthesis model was developed in 2006. Areas of research where these alternative hypotheses have been examined and documented include: stock recruitment relationships, natural mortality, selectivity, alternative stock structures, target strength values, acoustic biomass estimates, catch history, and ageing data. On this basis the SG100 is met.

Peer review of assessment				
e	Guide post		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Yes	Yes

Rationale

The stock assessment is subject to regular internal peer review within the CSIRO stock assessment group and also within the independent Research Assessment Group (RAG) which includes two external scientists and an external scientist as Chairperson. Two external reviews of the orange roughy stock assessment have also been undertaken (Francis and Hilborn 2002, Stokes 2009), with the latter being a review of the early Stock Synthesis model. Ad-hoc reviews of components of the model or its outputs are also undertaken (e.g. recent review of the natural mortality likelihood profile Punt (2018)). This is sufficient to meet SG80 and SG100.

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Wayte, S. (2007) Eastern Zone Orange roughy. pp 429 – 447 in Tuck, G.N. (ed) (2007) Stock Assessment for the Southern and Eastern Scalefish and Shark Fishery 2006/2007. Volume 1: 2006. Australian Fisheries Management Authority and CSIRO Marine and Atmospheric Research, Hobart. 570 p.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	95
Condition number (if relevant)	

9 Principle 2

9.1.1 Principle 2 definitions

Species categorization in P2:

Primary species in Principle 2 are those that meet the following criteria:

- Species in the catch that are not covered under P1 because they are not included in the UoA;
- Species that are within scope of the MSC program as defined in FCR 7.4.1.1; and
- Species where management tools and measures are in place, intended to achieve stock management objectives reflected in either limit or target reference points.

Secondary species are classified as follows:

- They are not considered ‘primary’ as defined in SA 3.1.3; or
- They are out of scope for MSC certification (i.e., birds, reptiles or mammals) but are not ETP species.

The assessment team used species information presented in AFMA (2019) to separate Primary from Secondary species, based on the establishment of target and or limit reference points for the species presented. As the Australian harvest strategy calls for target and limit reference points, species listed in AFMA (2019) were generally Primary, while unlisted species were considered Secondary. The team determined that catches averaging below 100kg per year (approximately 0.1% of total catch) would have little impact on the status of incidental species, considered smaller catches as *de minimis*, and did not further consider them.

We designate “main” primary and secondary species as those which comprise at least 5% of the total catch, or at least 2% of the total catch for “more vulnerable/less resilient” species, whose life history characteristics may make them more prone to overexploitation. All “out of scope” secondary species must be classified as “main.”

The definition of ETP species includes those protected by national or international legislation, and names a number of international lists/agreements where, if a species is listed, it must be considered as ETP regardless of other national protection. The list of agreements is as follows:

- Annex 1 of the Convention on International Trade in Endangered Species (CITES) unless it can be shown that the particular stock of the CITES listed species impacted by the UoA is not endangered;
- Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);
- Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);
- Agreement on the Conservation of Small Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);
- Wadden Sea Seals Agreement; and
- Any other binding agreements that list relevant ETP species concluded under the Convention on Migratory Species (CMS).

Habitats categorization in P2:

MSC requires that if a fishery interacts with benthic habitats, they shall be categorized according to the characteristics “substratum, geomorphology, and biota,” and requires that encountered habitats are classified as “commonly encountered, VME, or minor/other” according to the following definitions:

- “A commonly encountered habitat shall be defined as a habitat that regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat’s range within the management area(s) covered by the governance body(s) relevant to the UoA; and

- A VME shall be defined as is done in paragraph 42 subparagraphs (i)-(v) of the FAO Guidelines⁷ (definition provided in GSA3.13.3.22) [as having one or more of the following characteristics: uniqueness or rarity, functional significance, fragility, Life-history traits of component species that make recovery difficult, and/or structural complexity]. This definition shall be applied both inside and outside EEZs and irrespective of depth.”

Both commonly encountered and VME habitats are considered ‘main’ habitats for scoring purposes

9.1.2 Primary and Secondary species

At the time of the ACDR, AFMA had released no publicly available observer or other catch data for the orange roughy licensed trawl fleet because the number of active vessels is less than that which is required for minimum data aggregation for the public (<5). A pre-assessment team (Daume et al. 2018) received observer data from fishing tows wherein at least 50kg of orange roughy were caught for the years 2015-2017 and these data are presented in Table 7. Table 7 shows no main primary or secondary species, as no species reached or exceeded the 5%, or 2% for vulnerable species, threshold for main species. These data represent a broader area than the two UoAs, the ORMA fishery and the Pedra Branca fishery, and do not provide the level of detail sought for evaluating the UoAs.

Table 7. The average percentage of the retained, discarded and total catch of the top 20 species (and all other species combined) recorded from fishing for orange roughy¹ in 2015, 2016 and 2017, the maximum percentage for these years, and the assigned category for the purposes of an MSC assessment (from Daume, et al, 2018).

Species	Scientific name	Av % of Ret Catch	Av % of Disc Catch	Av % of Total Catch	Max % of Total Catch	MSC category
Orange Roughy	<i>Hoplostethus atlanticus</i>	95.7%	0.5%	96.2%	97.7%	Target
Spikey Oreo dory	<i>Neocyttus rhomboidalis</i>	1.45%	0.09%	1.54%	3.34%	Primary
Longsnout Dogfish	<i>Deania quadrispinosa</i>	0.10%	0.01%	0.10%	0.44%	Primary
Black Shark	<i>Dalatias licha</i>	0.06%	0.25%	0.31%	0.84%	Primary
Black Deepsea Cardinalfish	<i>Epigonus telescopus</i>	0.51%	0.03%	0.54%	1.82%	Primary
Ribaldo	<i>Mora moro</i>	0.12%	0.02%	0.14%	0.26%	Primary
Brier Shark	<i>Deania calcea</i>	0.17%	0.03%	0.20%	0.63%	Primary
Blue Grenadier	<i>Macruronus novaezelandiae</i>	0.05%	0.02%	0.07%	0.09%	Primary
Deepsea Cardinalfish	<i>Epigonus spp</i>	0.09%	0.00%	0.09%	0.34%	Secondary
Owston's Dogfish	<i>Centroscymnus owstonii</i>	0.01%	0.00%	0.01%	0.02%	Secondary
Pink Ling	<i>Genypterus blacodes</i>	0.01%	0.00%	0.01%	0.04%	Primary
Blue-eye Trevalla	<i>Hyperoglyphe antarctica</i>	0.03%	0.00%	0.03%	0.09%	Primary
Alfonsino	<i>Beryx splendens</i>	0.03%	0.00%	0.03%	0.10%	Primary
Giant Cod	<i>Lepidion inosimae</i>	0.00%	0.00%	0.00%	0.00%	Secondary
Smooth Oreo	<i>Pseudocyttus maculatus</i>	0.01%	0.00%	0.02%	0.04%	Primary
Ogilby's Ghostshark	<i>Hydrolagus ogilbyi</i>	0.00%	0.00%	0.00%	0.00%	Secondary
Pacific Spookfish	<i>Rhinochimaera pacifica</i>	0.00%	0.00%	0.00%	0.01%	Secondary

Species	Scientific name	Av % of Ret Catch	Av % of Disc Catch	Av % of Total Catch	Max % of Total Catch	MSC category
Sleeper Sharks (mixed)	<i>Centroscyllium spp</i>	0.02%	0.00%	0.02%	0.07%	Secondary
Robust cardinalfish	<i>Epigonus robustus</i>	0.01%	0.00%	0.01%	0.02%	Secondary
Bigeye Ocean Perch	<i>Helicolenus barathri</i>	0.00%	0.00%	0.00%	0.01%	Primary
All other species		0.01%	0.6%	0.6%	1.6%	Mixed

Following release of the ACDR, the MRAG Americas assessment team signed a confidentiality agreement so that AFMA could release confidential observer data for 2015-2019 to the team covering the UoA for ORMA and the UoA for Pedra Branca. Data releases covered ORMA (Table 8) and the Pedra Branca region (Table 9). This is a more restricted definition than that used in Daume et al. (2018), and the final list and categorization differs from what is presented in Table 7. The Assessment team used the updated species composition data to determine Main and Minor species and the information in AFMA (2018) to determine Primary and Secondary species.

Table 8 Species composition of orange roughy fisheries in Eastern Zone Orange Roughy Management Areas (Eastern ORMA UoA). Because of the small amounts of non-orange roughy species, only the top 20 species are presented. Confidential data from AFMA, released by fishermen for use in this assessment. (T = target species; P = Primary species; S = Secondary species; and Mixed represents likely mix of Primary and Secondary)

Species	2013	2015	2016	2017	2018	Grand Total	Average	% Total	% Discarded	MSC Category
Orange Roughy	68,966	374,402	154,052	153,039	328,292	1,078,750	215,750	92.75%	0%	T
Spikey Oreodory	3,817	4,634	7,137	4,154	1,098	20,839	4,168	1.79%	4%	P
Toothed Whiptail	6,669	0	2,481	2,429	870	12,449	2,490	1.07%	100%	S
Longsnout Dogfish	6,212	14	3	985	111	7,325	1,465	0.63%	44%	P
Black Shark	2,843	322	1,564	434	256	5,418	1,084	0.47%	47%	P
Ribaldo	1,394	204	1,737	884	524	4,743	949	0.41%	8%	P
Brier Shark	7	189	3,268	1,040	109	4,613	923	0.40%	25%	P
Slender Cod	2,505	58	359	740	599	4,261	852	0.37%	100%	S
Black Deepsea Cardinalfish	50	176	3,362	505	121	4,214	843	0.36%	6%	S
Blue Grenadier	1,682	191	407	1,096	279	3,654	731	0.31%	59%	P
Longtail slickhead	2,946					2,946	2,946	0.25%	100%	S
Whiptails	490	71	762	115		1,438	360	0.12%	100%	S
Grand Total	100,099	381,691	178,270	169,040	333,946	1,163,045	232,609	100.00%	3.4%	

Table 9. Species composition of orange roughy fisheries in Southern Zone Pedra Branca Areas (Pedra Branca UoA). Because of the small amounts of many non-orange roughy species, only the species $\geq 0.10\%$ are presented. Confidential data from AFMA, released by fishermen for use in this assessment. (T = target species; P = Primary species; S = Secondary species; and H = habitat). Highlighted species are Main.)

Species	2015	2018	Grand Total	Average	% total	% discarded	MSC Category
Orange Roughy	11134	130	11264	5632	59.77%	0.6%	T
Smooth Oreodory	3517	0	3517	1759	18.66%	3.6%	P
Spikey Oreodory	655	1147	1802	901	9.56%	42.3%	P
Blue Grenadier	0	1396	1396	698	7.41%	11.9%	P
Black Shark	229	21.9	251	125	1.33%	100.0%	P
Brier Shark	86	0	86	43	0.46%	100.0%	P
Ribaldo	37	40	77	39	0.41%	48.1%	P
Banded whiptail	0	66	66	33	0.35%	100.0%	S
King Dory	0	62	62	31	0.33%	26.9%	P
Whiptails	49	0	49	25	0.26%	100.0%	S
Banded Bellowsfish	0	44	44	22	0.23%	100.0%	S
Frostfish	0	44	44	22	0.23%	100.0%	S
Toothed Whiptail	0	31	31	16	0.17%	100.0%	S
Benthos	0	30	30	15	0.16%	100.0%	H
Ogilby's Ghostshark	0	30	30	15	0.16%	0.0%	S
Deepsea Flathead	0	28	28	14	0.15%	100.0%	P
Leafscale gulper shark	24	0	24	12	0.13%	100.0%	P
Pink Ling	0	20	20	10	0.11%	0.0%	P
Grand Total	15731	3114	18845.4	9422.69	100.00%	9.7%	

For scoring purposes, primary and secondary species $\geq 0.1\%$ of the total catch in a UoA are evaluated. Table 10 presents scored species, the tier level of the assessment, whether overfished, and whether highly likely to be above PRI. Because species (or groups) are assessed over the entire SESSF area or large areas that include both UoAs, the table applies in both areas. AFMA (2018) summarized the status of species and stocks caught in the SESSF. The minor species of the Eastern ORMA and Pedra Branca UoAs are assessed using Tiers 3, 4, or 5. Most species are above Btarget (either B48% or B40%) and have low or very low likelihood of falling below Blim. Species assessed as above Btarget and with low or very low likelihood of falling below Blim are scored at SG80, as was the case for smooth and spiky oreo in scoring issue a. For species with current biomass above Blim but below Btarget were scored as not reaching highly likely because of uncertainties in stock structure and in Tier 3, 4, and 5 assessments. Species in assessment baskets (deep water shark and mixed oreos) – other than the dominant species – were determined as not meeting highly likely because the assessments do not meet the requirements of SA2.2.5 and SA 2.2.6 or the requirements of Box GSA3 for assessment of stock complexes.

Table 10 Categorization of Minor Primary species that make up at least 0.1% of total catch (see Table 7 and Table 8).

Species	Assessment	>Btarget	>BLimit	Low prob falling to Blim	Basket	Highly likely - Eastern ORMA	Highly likely - Pedra Branca
Smooth oreo	Tier 5	Yes	Yes	Yes	No	NA	NA
Mixed oreo (oxeye, king, etc.)	Tier 4	Yes	Yes	Yes	Yes	No	No

Species	Assessment	>Btarget	>BLimit	Low prob falling to Blim	Basket	Highly likely - Eastern ORMA	Highly likely - Pedra Branca
Spiky oreo	Tier 4	Yes	Yes	Yes	Y - Dominant	Yes	NA
Shark basket (platypus, black, dogfish)	Tier 4	No	Yes	Yes	Yes	No	No
Brier shark	Tier 4	No	Yes	Yes	Y - Dominant	NA	No
Blue eyed trevalla	Tier 4	No	Yes	Yes	No	No	No
Ribaldo	Tier 4	Yes	Yes	Yes	No	Yes	Yes
Alfonsino	Tier 3	Uncertain	Uncertain	Uncertain	No	No	No
Blue Grenadier	Tier 1	Yes	Yes	Yes	No	Yes	NA
Reef ocean perch	Tier 4	Yes	Yes	Yes	No	NA	Yes
Pink ling	Tier 1	Yes	Yes	Yes	No	NA	Yes
Deepsea Flathead	Tier 1	Yes	Yes	Yes	No	NA	Yes

Eastern ORMA UoA

In spite of the species composition differences from Table 7, no main species occurred for Primary species as no species reached the 5% or 2% thresholds.

Regarding minor species status, AFMA (2018) provides stock status for primary species in the Eastern ORMA UoA, as summarized in Table 10, using the rationale described above.

Pedra Branca UoA

The species composition for the Pedra Branca fishery has orange roughly making up 59.8% of the catch, and three other species exceeding 5% (Table 8). Smooth oreo (18.7%), spiky oreo (9.6), and blue grenadier (7.4%) are all managed with reference points so are considered as Primary species. No secondary species reached the Main level.

Smooth oreo status. Little is known about the stock structure of smooth oreo (AFMA 2018). For assessment and management purposes they are treated as a single unit of stock through the SESSF excluding the Cascade Plateau and South Tasman Rise. Smooth oreo were assessed using a Tier 5 depletion based stock reduction analysis (DBSRA) for the first time in 2015. DBSRA is used to search for the level of yield (RBC) that would lead to a yield equivalent to a target depletion of 48 per cent of unfished biomass while maintaining the probability of the spawning biomass remaining above 20 per cent of unfished biomass above 0.9. When last assessed, the CPUE was variable but with a slight positive trend. Low catch and effort levels since 2009 have precluded any updates. The constant catch projections indicate that the risk of the stock declining to below the limit reference point is low. The stock is considered neither overfished nor undergoing overfishing.

Spiky oreo status. Spiky oreodordy are assessed as members of an oreo basket containing several species (AFMA 2018). The majority of mixed oreo catches are spikey oreo. Little is known about the stock structure of the Oreo species in this basket quota. They are benthopelagic species that are caught mainly below 600m. For assessment and management purposes they are treated as a single unit of stock through the SESSF. The oreo basket is assessed as a Tier 4 species using CPUE targets as a proxy of biomass targets. The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels. The limit reference point is 40% of the target reference point. Standardized CPUE is above the target reference point and has been for the last three years. The stock is considered neither overfished nor undergoing overfishing.

Blue grenadier status. Blue Grenadier is assessed as one stock; however, there is some evidence of separate stocks occurring across the SESSF (AFMA 2018). There are two defined sub-fisheries, the spawning fishery dominated by catches off western Tasmania and the widely spread catches of the non-spawning fishery. Blue grenadier has a Tier 1 assessment using a two-sex age-structured model. Stock biomass is estimated at 122% of B_0 , with target biomass at 48% B_0 and limit biomass at 20% B_0 . Biomass has increased to be above virgin stock biomass (122% B_0) at the start of 2019 due to high recruitment from 2010 to 2015. The majority of the most recent catch of blue grenadier is MSC certified. The lower 95% confidence interval for abundance is above B_{target} , and reduction of the stock to B_{target} if fished at F_{target} is projected to take on the order of 20 years. The stock is neither overfished nor subject to overfishing.

Minor species status. AFMA (2018) provides stock status for primary species in the Pedra Branca UoA, as summarized in Table 10, using the rationale described above.

Primary and Secondary Species Management

Australia has set a national Harvest Strategy Policy (HSP) for its federally-managed fisheries and associated guidance to the HSP (https://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy), with an objective of sustainable and profitable use of Australia's Commonwealth fisheries in perpetuity through the implementation of harvest strategies that maintain key commercial stocks at ecologically sustainable levels, and within this context, maximize the economic returns to the Australian community. To meet this objective, harvest strategies are designed to pursue an exploitation rate that keeps fish stocks at a level required to produce maximum economic yield (MEY) and ensure stocks remain above a limit biomass level (BLIM) at least 90% of the time. Alternative reference points may be adopted for some stocks to better pursue the objective of maximizing economic returns across the fishery as a whole.

Following a **review of the Harvest Strategy Policy and Guidelines**, the revised *Commonwealth Fisheries Harvest Strategy Policy and Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy* were released on 21 November 2018. The Harvest Strategy Policy and its associated implementation guidelines were revised following the review to capture new developments in fisheries management and science. The policy revisions ensure that the policy settings continue to allow the government to pursue fisheries management objectives in a way that represents world's best practice. Changes in the 2018 policy include more direction on meeting environmental and economic objectives in multispecies fisheries and the application of the policy to internationally managed fisheries. Further, by-product species are now covered within the scope of the policy.

The revised policy was subject to **public consultation** in 2017. The department also held consultation workshops with targeted stakeholders (scientists, industry, recreational fishers and environmental non-government organisations) on the policies and guidelines.

A Harvest Strategy Framework for the SESSF (HSF) was developed in 2005 and regularly reviewed and updated to maintain consistency with the HSP (AFMA 2019). The HSF uses a three-tier approach designed to apply different types of assessments and cater for different amount of data available for different stocks. The HSF adopts increased levels of precaution that correspond to increasing levels of uncertainty about stock status, in order to reduce the level of risk associated with uncertainty. In this approach, each stock is assessed using one of three types of assessment depending on the amount and type of information available to assess stock status, where Tier 1 represents the highest quality of information available (i.e. a robust integrated quantitative stock assessment). Tier 3 and Tier 4 assessments use other indicators (relating to fishing mortality and catch rates respectively) and reference points which are taken as proxies for the biomass reference points for Tier 1. The SE RAG may make RBC recommendations based on alternative assessment methods where it considers the method is more appropriate for a quota species than the assessment method outlined for Tier 1, Tier 3, or Tier 4 and meets the intent of the HSP. In such circumstances, the RAG should provide advice on any discount factor to be applied and the expected reliability of any associated harvest control rule. A variety of 'Tier 5' approaches have been used to inform

TAC setting in different circumstances, these include catch-MSY and age-structured stock reduction analysis approaches.

The biological and economic conditions in the fishery are monitored using logbooks and catch records, the Integrated Scientific Monitoring Program (ISMP), and fishery independent surveys (FIS).

AFMA requires fishers to record catch and effort information in logbooks at sea, and in catch disposal records (CDRs) which record the actual landed catch at port. CDRs are considered more accurate than logbook records. The following data are recorded for each fishing operation: the port and date of departure and return; gear type and fishing method; number of fish kept and discarded; and resultant catch including what is included in the weight (e.g. trunked, gutted, filleted, whole).

A key component of the ISMP is the sampling and recording of catches at ports and on-board fishing vessels using fishery-independent observers. The purpose of the ISMP is to provide reliable, verified and accurate information on the fishing catch, effort and practice of a wide range of vessels operating inside and, periodically, outside the Australian Fishing Zone. Biological and environmental data are collected on: catch composition including size and weight; amount and type of incidental catch; number of fish kept and discarded; fate of target and non-target species; interactions with ETP species; and fishing effort. Further information on the Observer program is available at: <http://www.afma.gov.au/services-for-industry/observer-program/>.

Small numbers of sharks are caught in the two UoAs. Shark finning at-sea is illegal in Commonwealth fisheries. This means that the removal of shark fins at sea and the dumping of the carcass are prohibited. To prevent this occurring, all fisheries are subject to Fisheries Management Regulation 9ZO that makes it an offence for the caudal lobe, caudal fin, pectoral fin and dorsal fin to be removed from the shark at sea before it is in the possession of a fish receiver. Fishermen may sell fins from sharks legally landed with fins attached. The SESSF management booklet (AFMA 2019) provides details of at-sea shark processing. To assure compliance with the shark finning prohibition, AFMA has high levels (~50%) of observer coverage on SESSF orange roughy fishing trips and has port monitoring with coverage based on a risk assessment to confirm high levels of reporting of catch and discards (see Section 7.4.4 for details), and prohibits wire traces (leaders) to reduce catch of sharks (not relevant for trawls but part of the SESSF management arrangements for other gear types). The combination of monitoring and reports substantially reduces risk of shark finning in the SESSF generally, and on orange roughy vessels more specifically.

The FIS is an industry-based fishery-independent resource survey which provides a time-series of relative abundance indices for key target species. A FIS has been conducted for Deepwater Flathead and Bight Redfish in the Great Australian Bight Trawl Sector (GABTS) since 2005, and for key target species in the SESSF since 2008. Biological and environmental data are collected such as: target species; catch rate (kg/shot); fishing method; and fishing depth. Information which provides a relative abundance index of other main byproduct and incidental catch species is also obtained.

The ability to meet the objectives of the HSF relies on obtaining the required data in time for stock assessments to be carried out. Future information and ongoing monitoring requirements are identified through regular reporting from the above monitoring programs, and regular meetings of RAGs which are responsible for overseeing and managing the stock assessment process under the HSF.

Bycatch and Discarding Workplans are developed in consultation with industry and research partners to find practical and affordable solutions to minimising bycatch and the discarding of target species (<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>). These fishery specific workplans focus on ‘high risk’ bycatch and threatened, endangered and protected species identified through the [ecological risk assessment](#) process and in accordance with the [AFMA Bycatch Strategy: Mitigating protected species interactions and general bycatch 2017-2022](#). The SESSF has specific Bycatch and Discarding Workplans for each major fishery.

Bycatch and Discarding Workplans are largely output focused. The action items included here are only some of the measures AFMA undertakes as part of the Ecological Risk Management (ERM) Strategy and it is difficult to measure the specific contribution of an action item to the overall objectives of the ERM Strategy. As part of the ERM Strategy AFMA have specific and measurable objectives with outcomes to be quantitatively assessed as part of the annual review. The Commonwealth Trawl Sector Workplan is effective as of May 2018 and will be reviewed:

- every 6 months to
 - ensure actions are progressing well
 - determine if any additional actions can be taken
- as part of the annual ERM Strategy Review to
 - ensure actions are progressing well
 - ensure that objectives of the ERM Strategy are being met
 - determine if any additional actions can be taken
- final review at 24 months as part of the annual ERM Strategy Review to
 - to ensure that action items have been completed
 - report against performance indicators
 - determine actions for subsequent Workplans.

Two main primary species have substantial discard percentages in the Pedra Branca UoA (42.3% for spiky oreo and 11.9% for blue grenadier), and numerous minor primary and secondary species have discards up to 100% in the Eastern ORMA and Pedra Branca (Table 8, Table 9). Overall, the Eastern ORMA reached 3.4% discards and Pedra Branca reached 9.7% discards. Although discard percentage for spiky oreo and blue grenadier is high in the context of this UoA area only, these represent a very small portion of the catches and discards of these two stocks across their ranges and the fisheries that encounter them. In addition, the bycatch and discarding workplan focuses on mitigating impact to species identified as “high-risk” in the ERA process, and neither of these are on that list.

9.1.3 ETP species

Based on the ETP definition above, Table 8 lists the ETP species and the recorded interactions with the CTS otter trawl fishery between 2017 and 2019. Table 12 lists these species and the management measures that require their protection. The Agreement on the Conservation of Albatrosses and Petrels (ACAP) is a multilateral agreement that was introduced in 2004. It seeks to protect albatrosses and petrels by coordinating international activities to mitigate known population threats. There are currently 13 member countries, and Australia is one of them. ACAP currently covers 31 species of albatrosses, petrels, and shearwaters.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS) is an international agreement that aims to protect migratory species. It went into force in 1983 and has 129 Member States. The CMS has two appendices – I is for endangered species and II is for species requiring international cooperation. Species are added or removed via a proposal process, utilizing the advice of the CMS Scientific Council, and the appendices are amended at a meeting of the Conference of Parties.

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a multilateral treaty established to protect endangered plants and animals. It was drafted at a meeting of members of the IUCN and became effective in 1975. It aims to ensure that the international trade of wild animals and plants does not threaten the survival of these species, and it extends varying degrees of protection to more than 35,000 animal and plant species. Each CITES-protected species is assigned an appendix, which specifies the extent of the threat and the trade controls applied to that species. CITES Appendix I, the highest level, includes the species that are threatened with extinction and are, or may be, affected by trade.

The IUCN Red List of Threatened Species was introduced in 1994 with the goal of providing information and analyses on the status, trends, and threats to species in order to inform and catalyze conservation action. To achieve this goal, The IUCN Red List aims to:

- Establish a baseline for monitoring species status changes
- Provide a global context for the establishment of local level conservation priorities
- Monitor, on a continuing basis, the status of a representative selection of species that covers all major ecosystems

The Environment Protection and Biodiversity Conservation (EPBC) Act 1999 is Australian environmental legislation that provides the legal framework for protecting and managing flora, fauna, ecological communities, and heritage places for their national environmental significance. Under the EPBC Act, all cetaceans, seal and sea lions, and seabirds occurring in Australian waters are protected.

Table 11. Summary of ETP species interactions with status listed as either injured or dead within the entire CTS otter trawl fishery (2017-2019). Source: AFMA 2020

Common Name	Scientific Name	2017	2018	2019
Marine mammals				
Australian fur seal	<i>Arctocephalus pusillus doriferus</i>	87	106	92
New Zealand fur seal	<i>A. forsteri</i>	0	16	0
Short-beaked common dolphin	<i>Delphinus delphis</i>	3	0	1
Bottlenose dolphin	<i>Tursiops truncatus</i>	1	2	0
Dolphins		4	2	4
Seals		5	23	19
Seabirds				
Black-browed albatross	<i>Thalassarche melanophrys</i>	1	0	0
Buller's albatross	<i>T. bulleri</i>	0	0	1
Grey-headed albatross	<i>T. chrysostoma</i>	0	1	0
Shy albatross	<i>T. cauta</i>	2	2	1
Albatrosses	<i>Thalassarche spp.</i>	17	38	21

Table 12. The protection measures and status (where relevant) of the ETP species encountered by the UoA. Sources: <https://acap.aq/en/acap-species/307-acap-species-list/file>, <https://www.cms.int/en/species>, <https://www.iucnredlist.org/species/22698398/132644834>, <https://www.iucnredlist.org/species/22728372/132657962>, <https://www.environment.gov.au/marine/marine-species/marine-species-list>, <https://www.environment.gov.au/epbc/about/epbc-act-lists#species>

Species	Protection Measure and Status				
	ACAP	CITES Appx. I	CMS	IUCN Red List	EPBC Act
Marine mammals					
Australian fur seal					X
New Zealand fur seal					X

Short-beaked common dolphin			X		X
Bottlenose dolphin					
Seabirds					
Black-browed albatross	X		X		X
Buller's albatross	X		X	Near Threatened	X
Grey-headed albatross	X		X	Endangered	X
Shy albatross	X		X		X

9.1.4 Marine mammals

Australian fur seal

The background information below has been adapted from Lack et al, 2014 and Mackay et al, 2016.

The Australian fur seal is listed as Marine under the EPBC Act. Globally, the species is listed as least concern under the IUCN Red List and is listed in Appendix II of CITES (Lack et al, 2014).

There are two subspecies of the Afro-Australian fur seal (*Arctocephalus pusillus*), the Cape or South African fur seal (*Arctocephalus pusillus pusillus*) and the Australian (or brown fur seal) (*Arctocephalus pusillus doriferus*). The Australian subspecies is endemic to southeastern Australian waters and are found from the coast of NSW, Tasmania to Victoria and across to SA with the centre of their distribution in Bass Strait (Kirkwood et al. 2010 in Lack et al, 2014). There are 21 known breeding sites (Kirkwood et al. 2010, Shaughnessy et al. 2010, McIntosh et al. 2014, Shaughnessy et al. 2014 in Lack et al, 2014). The range of the species is expanding, with the new colonies in NSW and SA all establishing in the past 10 years. Historical ranges prior to colonial sealing (pre-1800s) are unknown (Lack et al, 2014).

Population size and trends

Three national surveys of pup production for the species have been done at approximately five-yearly intervals since 2002–03. One undertaken in 2002–03 estimated a pup production of 19,820, another undertaken in 2007–08 estimated a pup production of 21,881, and the most recent survey undertaken in 2013–14 estimated a pup production of 15,063 (Kirkwood et al. 2005, Kirkwood et al. 2010, McIntosh et al. 2014 in Lack et al, 2014). The rate of increase in pup production between 1986 and 2002–03 was estimated to be 5 per cent per year, slowing to 0.3 per cent per year between 2002–03 and 2007–08 seasons (McIntosh et al. 2014 in Lack et al, 2014). It is not clear if the apparent 6 per cent per year decline between the 2007–08 and 2013–14 estimate is due to a poor pupping season in 2013–14 or represents a real decline in population over that period, as there is no colony that is monitored on an annual basis (McIntosh et al. 2014 in Lack et al, 2014). Based on the 2007–08 surveys, two colonies adjacent to the Victorian coast, Seal Rocks (5660 pups) and Lady Julia Percy Island (5574 pups), account for more than half (51 per cent) the total pup production (Kirkwood et al. 2010). Based on these surveys the total Australian fur seal population is estimated to be 120,000 individuals (Kirkwood et al. 2010 in Lack et al, 2014).

Australian fur seals have an annual synchronous breeding season, with most pups born over a five-week period between early November and mid-December, with the peak in breeding usually in late November/early December. Most pups are weaned when they are 10–11 months old, just prior to the commencement of the next breeding season, although some may continue into a second year (Kirkwood and Goldsworthy 2013 in Lack et al, 2014).

The Australian fur seal forages almost exclusively in association with the sea floor and rarely leaves the continental shelf, which reflects the benthic nature of their foraging (Arnould and Kirkwood 2008, Kirkwood and Arnould 2011, Kirkwood and Goldsworthy 2013 in Lack et al, 2014). Satellite tracking studies show that lactating adult females from the main breeding colony in eastern Bass Strait (The Skerries)

travelled the shortest distance (20–60 km) while those in central Bass Strait (Seal Rocks, Kanowna Island) and western Bass Strait (Lady Julia Percy Island) typically forage out to 60 and 150 km from the colony (Arnould and Kirkwood 2008, Kirkwood and Arnould 2011 in Lack et al, 2014). Foraging trip durations of lactating females last approximately six days, with most (greater than 90 per cent) time spent within 150 km of the colony (Kirkwood and Arnould 2011 in Lack et al, 2014). Analysis of habitat use has indicated that individual seals selected areas with depths of 60–80 m, significantly more than other depths (Arnould and Kirkwood 2008 in Lack et al 2014). Females from colonies adjacent to productive shelf-edge waters (e.g. Lady Julia Percy Island and The Skerries) typically have shorter foraging trips, have smaller foraging ranges, forage closer to colonies and exhibit less diversity in foraging trip strategies than females from colonies more distant from the shelf-edge (e.g. Seal Rocks and Kanowna Island) (Kirkwood and Arnould 2011 in Lack et al 2014). Females typically show strong fidelities to individual foraging hotspots (Arnould and Kirkwood 2008, Kirkwood and Arnould 2011 in Lack et al 2014).

Information on the movement of adult males comes mainly from animals' satellite tracked from one colony (Seal Rock). Most foraged in western Bass Strait with many also travelling down the west coast of Tasmania to forage in southern Tasmanian waters, 500 km from Seal Rocks. One adult male travelled west of the Eyre Peninsula (SA), 1200 km from Seal Rocks (Kirkwood et al. 2007 in Lack et al, 2014). A number of adult male Australian fur seals interacting with mid-water trawl gear on freezer vessels off the west coast of Tasmania in the winter blue grenadier (*Macruronus novaezelandiae*) fishery have also been satellite tracked (Tilzey et al. 2006 in Lack et al 2014). The tracked seals continually targeted the fishing operations, resting between foraging trips at haul-outs on Tasmania's west coast, until the fishing season ended. The seals then moved on to forage in southern Tasmania or Bass Strait (Tilzey et al. 2006 in Lack et al 2014). Juvenile Australian fur seals tracked from Lady Julia Percy Island and Seal Rocks display similar ranges to adult females (Kirkwood and Goldsworthy 2013 in Lack et al 2014).

The diet of Australian fur seals is reasonably well understood, with dietary studies having been undertaken across most of the species' range. In Bass Strait, southern Tasmania and SA they predominantly forage benthically but also eat a wide range of pelagic fish and cephalopod species. Key fish prey includes redbait, leatherjackets, jack mackerel, barracouta, red rock cod and flatheads. Cephalopods are also important prey with key species being Gould's squid, octopus, and cuttlefish. Most of the dietary studies have used analyses of prey hard parts recovered from faecal (scat) samples, a method that can both under and over-represent prey species. One study analysed faecal DNA from samples collected at the three main Victorian colonies (Lady Julia Percy Island, Seal Rock, The Skerries). The study confirmed, based on the prevalence of sequences from redbait and jack mackerel, the importance of these species in seals diet. However, blue mackerel was also found to be important, suggesting hard-part analyses methods may have under-represented the importance of this species in their diet (Deagle et al. 2009 in Lack et al 2014).

Kirkwood et al. (2008 in Lack et al 2014) analysed annual variation in the diet of Australian fur seals at Seal Rocks over a nine-year period (1997–2006). The importance in the diet of redbait and jack mackerel varied considerably across the period, prevalent in some years, and near absent in others when it was replaced by increased proportions of barracouta, red cod and leatherjackets (Figure 5). Statistical analyses indicated that annual variation in redbait prevalence in the diet was significantly related to changes in mean sea surface temperatures in western Bass Strait where the seals foraged (Kirkwood et al. 2008 in Lack et al 2014). They found no correlation between the prevalence of redbait in the diet with fishing effort (annual fisheries catch-per-unit-effort) nor the annual mean Southern Oscillation Index (Kirkwood et al. 2008 in Lack et al 2014).

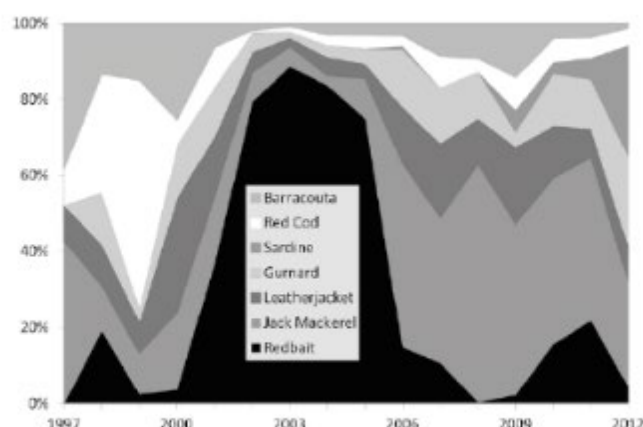


Figure 5. Annual variation in the diet of Australian fur seals at Seal Rocks (Victoria) based on prey hard-part analyses for scats collected at a nearly bimonthly frequency over nine years (1997–2012). Note the importance and variability of redbait and jack mackerel in the diet. Source: Lack et al, 2014

Mackay et al (2016), estimated the potential maximum cumulative anthropogenic mortality limits (PBR) of key marine mammal species, including seals, to inform management in the southeast fishing area encompassing the two orange roughy UoA areas. For the proposed single management zone, the most conservative PBR for Australian fur seal was estimated range as 2,623 (Figure 6).

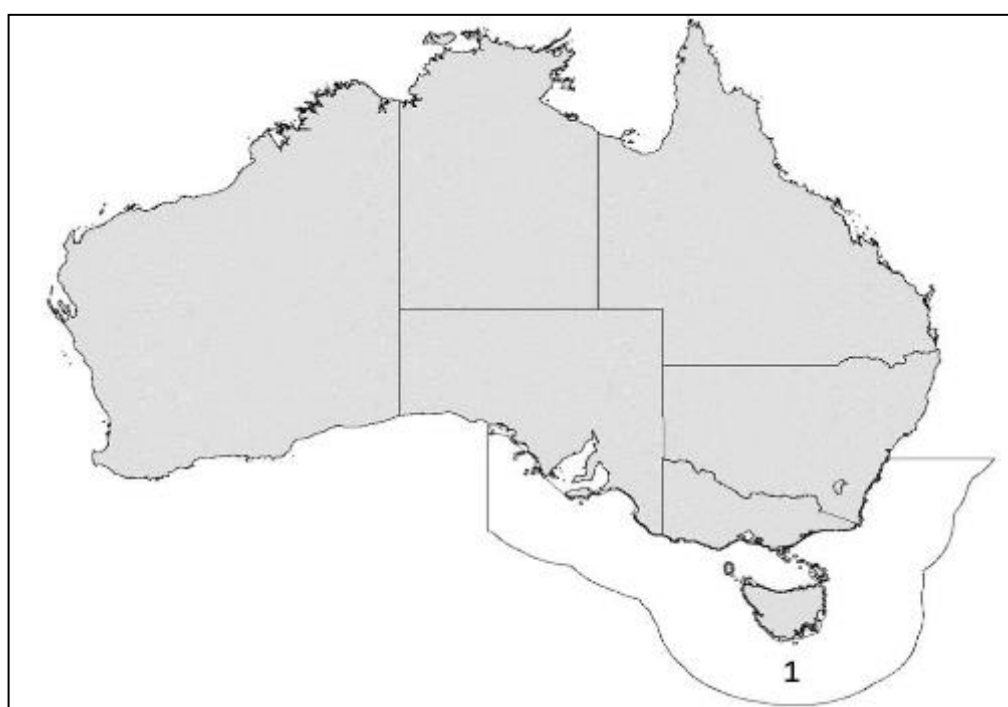


Figure 6. The single management zones considered by participants during Closed Technical Workshop for calculating estimates of abundance of Australian fur seal. Source: Mackay et al 2006.

Over the past three fishing seasons, there was an average of 95 reported fatal interactions between the Commonwealth Trawl Sector (CTS) otter trawl fishery and Australian fur seal (AFMA 2020). The orange roughy fishery is only one of several components of the CTS fishery, takes place almost exclusively in the third quarter of the year and in deeper waters adjacent to the Continental slope generally not visited by Australian Fur Seals. The current interaction rate in the Orange Roughy fishery is low (Table 13) compared to the estimated PBR, and the range of the species is expanding. From seal satellite tracking studies, it is

apparent that male seals are more likely to interact with trawl fishing (Lack et al, 2014) thus lactating females are less likely to die due to the fishery and create unobserved mortality of their pups as a consequence. These suggest that the UoAs are highly unlikely to hinder recovery of the Australian fur seal.

Table 13. Observer-recorded ETP observations in the Eastern ORMA

Year	Standard Name	Life Status Name	Contact Type Name	Sex Description	Age Class Name	Owl-no. of animals
2013	Australian fur seal	Dead, in rigour	Wildlife Hooked, Caught or Entangled in Net	Male	Adult	1
2016	Buller's Albatross	Alive and vigorous	Heavy contact, wildlife dragged under	Unknown	Unknown	1
2018	Australian fur seal	Alive and vigorous	Wildlife Hooked, Caught or Entangled in Net	Male	Adult	1

New-Zealand Fur Seal (*Arctocephalus forster*)

The New Zealand fur seal is listed as “Marine” under the EPBC Act. Globally, the species is listed as Least Concern under the IUCN Red List and are listed in Appendix II of CITES.

The background information below has been adapted from Lack et al, 2014 and Mackay et al, 2016.

The New Zealand (or long-nosed) fur seal is a native mammal of Australia that occurs in both New Zealand and Australian waters. The species was subject to heavy exploitation by colonial sealers between 1800 and 1830, resulting in major reductions in range and abundance (Kirkwood and Goldsworthy 2013 in Lack et al 2014). Numbers remained at very low levels for almost 140 years, after which they slowly began to build up and new colonies were established across their former range. In Australia, New Zealand fur seals occur in the coastal waters and on the offshore islands of South and Western Australia, from just east of Kangaroo Island, west to the south-west corner of the continent in WA, and also in southern Tasmania (Shaughnessy et al. 1994 in Lack et al 2014). Small populations have recently been establishing in Bass Strait and Victorian and southern NSW coastal waters (Kirkwood and Goldsworthy 2013 in Lack et al 2014). In New Zealand, this species occurs around both the North and South Islands, with newly formed breeding colonies now established on the North Island and established and predominantly expanding breeding colonies around the entire South Island (Boren et al. 2006, Bouma et al. 2008 in Lack et al 2014). There are well established and expanding colonies also found on Stewart Island and all of New Zealand’s sub Antarctic islands. Their range extends to Australia’s Macquarie Island. Vagrants have been recorded in New Caledonia (Shaughnessy 1999 in Lack et al 2014).

The Australian population of the species is centered off South Australia (SA) where more than 80 per cent of the national New Zealand fur seal population occurs, with key breeding sites at Kangaroo Island, the Neptune Islands and Liguanea Island (Shaughnessy et al. 2014 in Lack et al 2014). In Tasmania, the New Zealand fur seal mainly occurs on the west and south coasts with a small number breeding on remote islands off the south coast (Lack et al 2014).

There are 65 known breeding sites for the species in Australia, most (86 per cent) are in South and Western Australia (SA 36; WA 20; Tasmania four; Victoria four; NSW one) (McIntosh et al. 2014, Shaughnessy et al. 2014, Campbell et al. in press in Lack et al 2014). Pup production surveys were undertaken over the 2013–14 breeding season in SA, Victoria, Tasmania and NSW, and in the 2011–12 season in WA, which provide a comprehensive and current assessment of the status of the species' Australian population. The maximum pup production for the Australian population based on these surveys is 24,656, with most pup production in SA (83%) and WA (14%). Based on a pup-to-total-population multiplier of 4.76 (developed by Goldsworthy and Page 2007 in Lack et al 2014) the Australian population is currently estimated to number approximately 117,400.

Populations of New Zealand fur seals in Australian waters appeared to begin their major recovery in the 1970s and 1980s. Between the 1989–90 and 2013–14 breeding seasons, the fur seal population in SA has increased 3.6 fold, with the average annual increase in pup production being 5.3 per cent (Shaughnessy et al. 2014 in Lack et al 2014). Recovery rates at some sites have been much greater. For example, in the Cape Gantheaume Wilderness Protection Area on Kangaroo Island, annual monitoring of pup production over a 26-year period from 1988–89 (457 pups) to 2013–14 (5333 pups), demonstrates an 11.7-fold increase at an average rate of 10% per year (Goldsworthy et al. 2014c in Lack et al 2014). In contrast, pup production at the Neptune and Liguanea islands appears to have peaked in the mid-2000s, with most of the available breeding habitat now full (Shaughnessy et al. 2014 in Lack et al 2014). The center of population expansion is now on Kangaroo Island. The growth of New Zealand fur seal populations since the 1970s and 1980s in Australia is attributable to recovery from 19th century sealing (1800– 1830) and subsequent take (Shaughnessy et al. 2014 in Lack et al 2014).

New Zealand fur seals have an annual synchronous breeding season, with most pups (90 per cent) being born over a five-week period between late November and early January. On Kangaroo Island the breeding season peaks around 25–26 December (Goldsworthy and Shaughnessy 1994 in Lack et al 2014). Lactating females alternate between shore bouts lasting approximately 1.7 days in duration (when pups are nursed) and foraging trips to sea which increase in duration from about three to five days early in lactation, to eight to 11 days late in lactation (Goldsworthy 2006 in Lack et al 2014). However, foraging trips lasting more than 20 days are not uncommon (Goldsworthy 2006 in Lack et al 2014).

The core of Australia's New Zealand fur seal breeding distribution in SA is distributed across a relatively small geographic range characterized by narrow shelves in proximity to localized seasonal upwelling in summer and autumn. Satellite tracking studies show that early in lactation (December to March), females undertake short foraging trips to mid-outer shelf waters (70–90 km from the colony), in regions associated with localized upwelling (Page et al. 2006, Baylis et al. 2008a in Lack et al 2014). However, between April to May most females switch to foraging in distant oceanic waters associated with the Subtropical Front, 700–1000 km to the south of breeding colonies and continue foraging in these waters up until the weaning of their pups in September/October (Baylis et al. 2008a, Baylis et al. 2008b, Baylis et al. 2012 in Lack et al. 2014). These winter foraging trips last between 15 and 25 days. Once weaned, the pups head for oceanic waters south of Australia, and as juveniles, also forage in distant oceanic waters (mean maximum distance of 1095 km from the colony) (Baylis et al. 2005, Page et al. 2006 in Lack et al. 2014). In contrast to juveniles and adult females, adult males focus their forage efforts along the continental slope (Page et al. 2006 in Lack et al. 2014).

New Zealand fur seals forage both on the shelf, where they target pelagic and benthic-pelagic prey, and off the shelf, where they target epipelagic prey that exhibit daily vertical migrations (Kirkwood and Goldsworthy 2013 in Lack et al 2014). Adults can therefore forage both near or on the benthos in water depths ranging up to 200 m, and in the water column where the sea-floor might be less than 20 m or greater than 2000 m (Kirkwood and Goldsworthy 2013 in Lack et al 2014).

An estimated PBR of 81 seals was the most conservative PBR for the New Zealand fur seal within the management zone 3 (overlapping with the orange roughy UoAs, Figure 7). The reason for the low PBR estimate is that zone 3 does not contain the core of the population distribution which is in zone 2 (PBR = 2499).

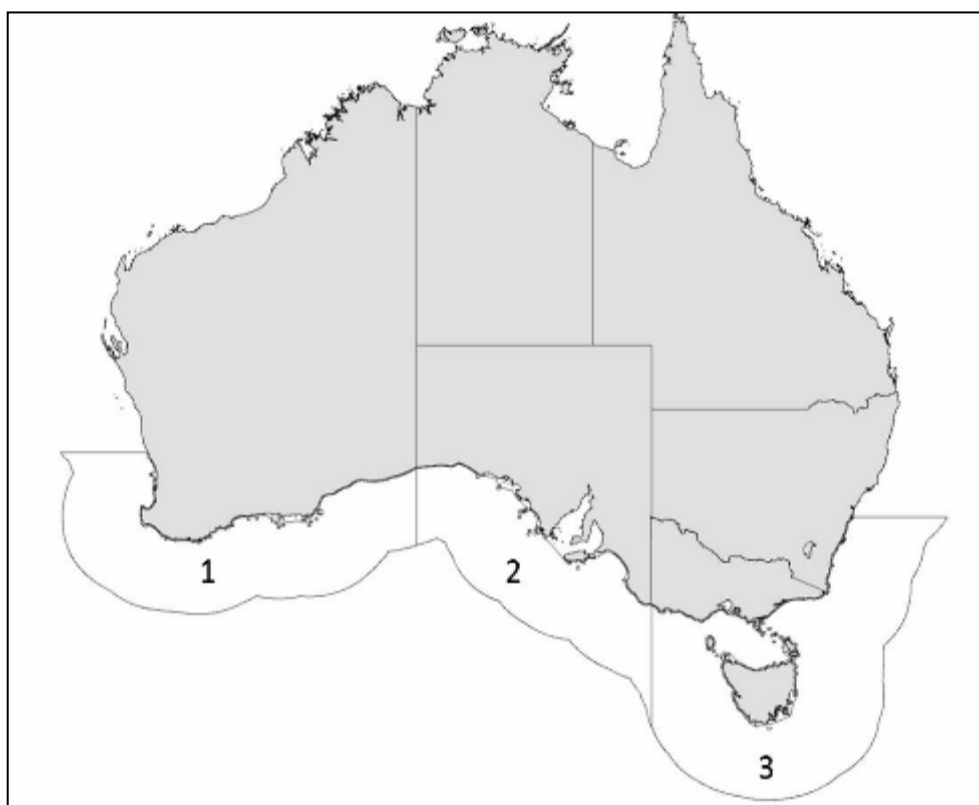


Figure 7. The three management zones considered by participants during Closed Technical Workshop for calculating estimates of abundance of New Zealand fur seal. Source: Mackay et al 2006.

Nonetheless, sixteen New Zealand fur seals were recorded as injured or killed by the CTS otter trawl fishery over the past three fishing years (all in 2018). If one were to also assume that all unidentified seals were NZ fur seals, this brings the total to 63 over the past three years for the entire CTS otter trawl fishery. In the third quarter of each of the past three years, this total is 13 NZ fur seals + unidentified seals (AFMA 2020), and no interactions were recorded in the ORMAs. The orange roughy targeting component of the CTS otter trawl fishery does not overlap with the core population of the New Zealand fur seal, although seals pup production is increasing within the fishery's range. The population has increased over the last 30 years and still expanding. The Orange Roughy UoAs are highly unlikely to hinder recovery of this species (SG80 is achieved for SI 2.3.1b).

Unidentified seal interactions

Not all reported animals interacting with the CTS otter trawl fishery could be identified to species level, although reporting to species has improved in recent years. However, unidentified seals are most likely either Australian or New Zealand fur seals because these are the species with distribution ranges that include this fishery. The number of unidentified seals interactions does not significantly increase the risk to the populations and does not justify changes in outcome scores.

Short-beaked common dolphin

The background information has been adapted from Lack et al, 2014.

The short-beaked common dolphin is widely distributed in continental shelf and pelagic waters from tropical

to cool temperate regions in the Pacific and North Atlantic Oceans and is possibly absent from most of the South Atlantic and Indian Oceans (Rice 1998, Jefferson et al. 2008, Perrin 2009a, Amaral et al. 2012 in Lack et al, 2014). This species has been recorded from all Australian states and Northern Territory waters, including subtropical Lord Howe Island off NSW and southwestern Australia, with few records from north-western Australia (Bannister et al. 1996, Chatto and Warneke 2000, Bell et al. 2002, Hutton and Harrison 2004, Kemper et al. 2005, Kemper 2008 in Lack et al, 2014). There appear to be two main locations in Australian waters with one cluster occurring in the southern south-eastern Indian Ocean and another in the Tasman Sea (Woinarski et al. 2014 in Lack et al, 2014).

Common dolphins may be the most numerous dolphins in Australian waters and are often reported in coastal waters of southern Australia (Kemper 2008 in Lack et al, 2014), but there are no robust estimates of the Australian population size or trends (Woinarski et al. 2014 in Lack et al, 2014). Substantial genetic differentiation has been recorded between common dolphin subpopulations in SA and those in eastern Australia including Tasmania, with finer levels of subpopulation substructuring along the south-eastern and southern Australian coasts, possibly associated with spatial variation in oceanographic currents, upwellings or fish distributions (Bilgmann et al. 2008, 2014a, 2014b, Möller et al. 2011).

Globally, this species is considered to be very abundant, but there is no robust estimate of global population size and population trends are unknown (Hammond et al. 2008 in Lack et al, 2014). Overseas, regional population estimates include about 3,000,000 in the eastern tropical Pacific region, and about 370,000 from the western United States coast (Jefferson et al. 2008, in Lack et al, 2014).

Möller et al. (2011) investigated the genetic structure of common dolphins from 115 tissue samples collected at six locations, covering approximately 1,000 km of the NSW coastline between 2003 and 2006 and identified at least three genetically differentiated populations, separated at a scale of a few hundred kilometres. Genetic variation was determined to be highest in the southern NSW population (Tasman Sea / Pacific Ocean).

Bilgmann et al. (2014) analysed 308 common dolphins biopsy samples from 11 locations in southern and south-eastern Australia between 2004 and 2012. Analyses indicated genetic structuring between Indian Ocean / Southern Ocean and Pacific Ocean (NSW) samples. Further sub-structuring was determined to be present in the Indian Ocean samples. Based on their results, the authors suggested the presence of six genetic populations for the species between Esperance (WA), and Eden (NSW). Altogether, population genetic analyses suggest there are a minimum of eight populations of common dolphin along the southern and eastern Australian coasts (Bilgmann et al. 2014, Möller et al. 2011). The biopsy data also indicated movements of common dolphins occur from the Pacific Ocean (south-eastern Australia) into the Indian Ocean (southern Australia). The proposed Pacific Ocean genetic population is also suggested as the main source of migrants to the “mixed water” central NSW population (Möller et al. 2011). This indicates spatial mixing of proposed common dolphin populations across at least part of the region.

The CTW described in Mackay et al 2016 considered seven management zones for estimates of common dolphin abundance. These seven management zones were previously used by AFMA to manage dolphin interactions, although currently, only an eastern and a western sub-area are used. The current UoAs overlap with zones 5 and 6.

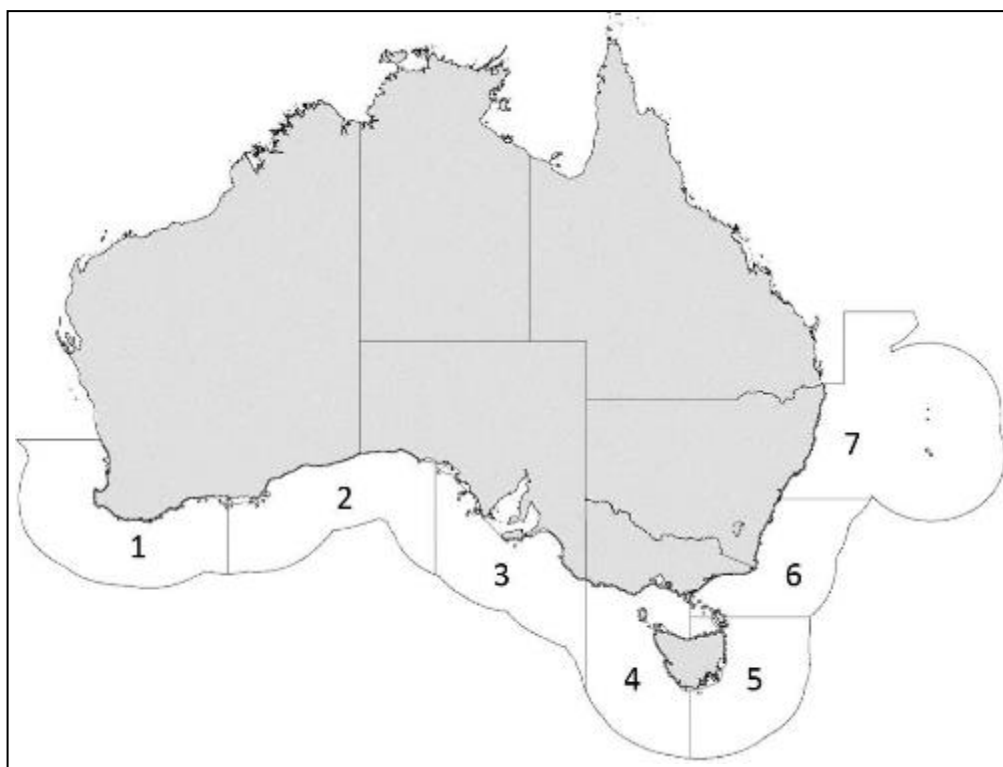


Figure 8. The seven management zones considered by participants during Closed Technical Workshop for calculating estimates of common dolphin abundance. Source: Mackay et al 2006.

For each of these zones, abundance information is available as follows (source: Mackay et al, 2016):

- Zone 5: There have been no systematic surveys for common dolphin in Zone 5. A synthesis of DPIPWE sighting and strandings and AMMC data indicate the occurrence of the species throughout the zone. One expert of the CTW reported that common dolphins are encountered regularly during boat work in groups up to ~350 individuals and that the species is seen occasionally in the Derwent River (SE Tasmania) and during boat surveys off south Bruny Island.
- Zone 6: There are no systematic abundance estimates for common dolphin for this zone. Genetic analyses suggest that there are at least two populations in Zone 6 (Möller et al. 2011), with higher genetic diversity in samples collected from the southern NSW area. This latter population is the Pacific Ocean management unit described in Bilgmann et al. (2014b). Sightings and strandings data for Zone 6 from the AMMC database are limited to the autumn and winter months and include two sightings of 17-150 individuals. Strandings and sighting data from DIPWE in the south-west area of Zone 6 are from summer and spring and are of group sizes of 1-16 individuals. Sightings of common dolphin were also recorded in the south-west area of Zone 6 to the seismic survey Cetacean Sightings Application. There are stranding records for 91 common dolphins along the NSW coast (which also encompasses Zone 7) (Lloyd and Ross 2015 in Mackay et al, 2016). The majority of cetacean stranding records in the NSW database have been recorded since 1960.

Although a PBR value of 261 dolphins could be calculated for Zone 3, which is outside the UoAs fishing area, no PBRs could be calculated for Zones 5 and 6.

Considering:

- the existing information on common dolphin abundance on the south-eastern Australia coast,
- the evidence that significant interactions in the CTS otter trawl are not commonly occurring,
- in the new ERA common dolphins were considered to be at medium risk from the CTS otter trawl, and

- there are no recorded interactions between the orange roughy fishery and dolphins

it is at least highly likely that the UoAs do not hinder recovery (SG 80 met for SI 2.3.1.b for common dolphin).

9.1.4.1 Seabirds

Black-browed albatross

The black-browed albatross “has a circumpolar distribution ranging from subtropical to polar waters (ACAP 2009a), breeding in the Falkland Islands (Islas Malvinas), Islas Diego Ramirez, Ildefonso, Diego de Almagro, Isla Evangelistas and islets in Tierra del Fuego and in the Mallaganes region (Chile), South Georgia (Georgias del Sur), Crozet and Kerguelen Islands (French Southern Territories), Heard, McDonald and Macquarie Islands (Australia), and Campbell and Antipodes Islands, New Zealand (Croxall and Gales 1998, ACAP 2009)” (Figure 9; BirdLife International 2018a). The estimated global population is 1,400,000 and appears to be increasing (BirdLife International 2018a). Various human impacts (e.g., fishing) have known effects on the species. It is unknown at this time whether or not some sort of catch limit is in place for this species. This information as well as up-to-date interaction details are needed to determine the UoA’s impact on the population. However, based on this data, the UoA appears to have a negligible impact.

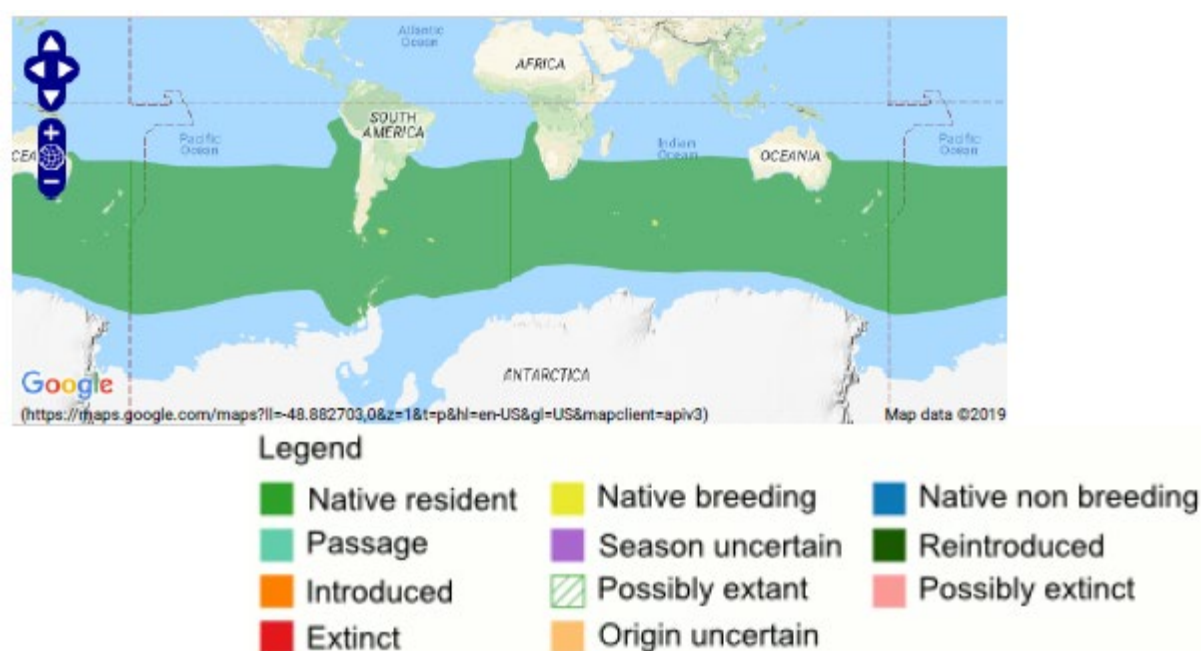


Figure 9 Range of the black-browed albatross. Source:
<http://datazone.birdlife.org/species/factsheet/black-browed-albatross-thalassarche-melanophrys>

Grey-headed albatross

The grey-headed albatross is distributed over cold subantarctic and Antarctic waters and breeds on South Georgian, Chilean, South African, French Southern Territories, New Zealand, and Australian islands (Figure 10; ACAP 2009b, Clay et al. 2016, BirdLife International 2018d). The estimated global population is 250,000 and appears to be decreasing (BirdLife International 2018d). Various human impacts (e.g., fishing) have known effects on the species.

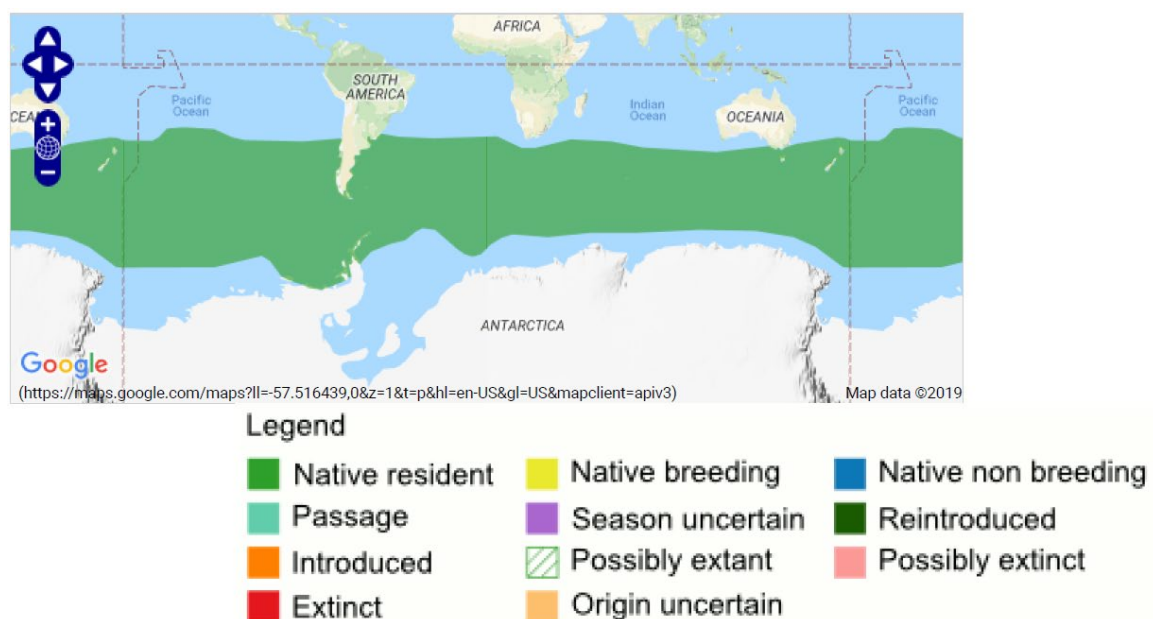


Figure 10 Range of the grey-headed albatross. Source:
<http://datazone.birdlife.org/species/factsheet/grey-headed-albatross-thalassarche-chrysostoma>

Shy albatross

The shy albatross “is an endemic breeder in Australia, with colonies on three islands off Tasmania... During the breeding season, adults are relatively sedentary and are concentrated around Tasmania and southern Australia (Garnett and Crowley 2000, Hedd et al. 2001, BirdLife International 2004, Baker et al. 2007). However, juvenile birds from Mewstone (Tasmania) are known to migrate to South Africa (BirdLife International 2004, Baker et al. 2007).” (Figure 11; BirdLife International 2020e). The estimated global population is 30,700, but the trend is unknown. The species has been labeled as “near threatened” on the IUCN Red List. (BirdLife International 2018g). Various human impacts (e.g., fishing) have known effects on the species.

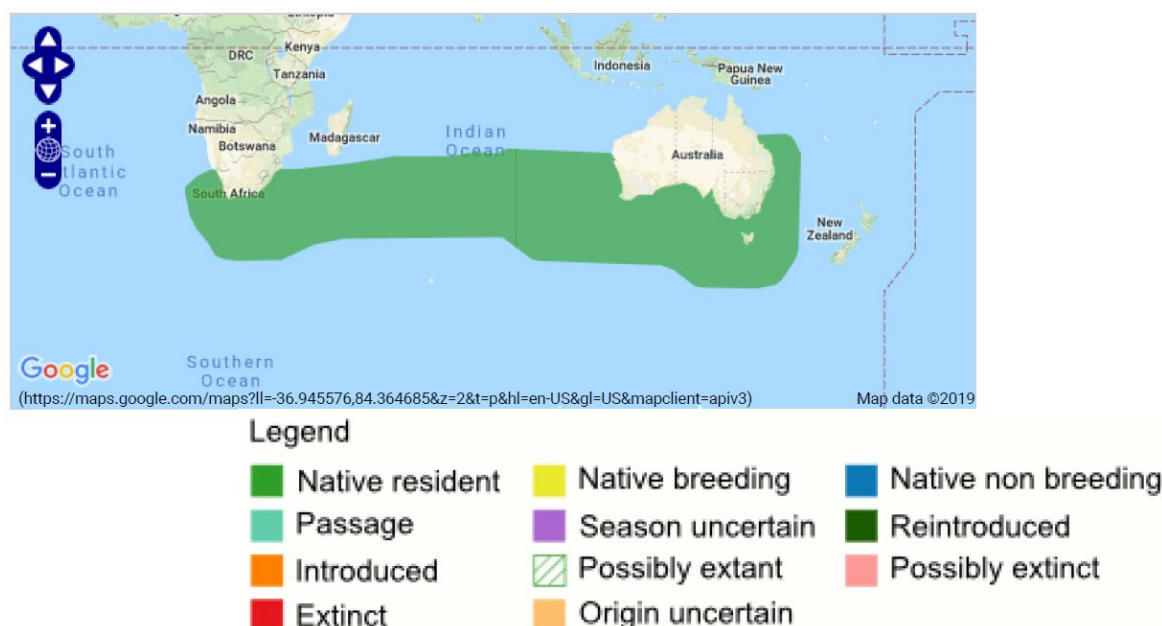


Figure 11 Range of the shy albatross. Source: <http://datazone.birdlife.org/species/factsheet/shy-albatross-thalassarche-cauta>

9.1.4.2 ETP management

In addition to the national and international agreements discussed above, the Southern and Eastern Scalefish and Shark Fishery Management Plan 2003 (last amended in 2006) requires that the UoA comply with the protection requirements of the EPBC Act and with any relevant bycatch action plans. The 2018-2019 Commonwealth's trawl sector bycatch plan covering this UoA

(https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf) was developed to support the Southern and Eastern Scalefish and Shark Ecological Risk Management (ERM) Strategy, which has the following objectives:

- Reduce the number of high risks assessed through AFMA's ERM process⁵
- Avoid interactions with EPBC-listed species
- Reduce target and non-target species discards to as close to zero as practically possible
- Minimise overall, long-term bycatch

According to the 2012 risk assessment of the Southern and Eastern Scalefish and Shark Fishery (of which the UoA is part), the fishery's risk levels with the relevant ETP species are as follows

(<https://www.afma.gov.au/sites/default/files/uploads/2014/11/SESSF-CTS-Otter-board-trawl-residual-risk-assessment-2012.pdf>):

- Australian fur seal – High
- New Zealand fur seal – Medium
- Short-beaked common dolphin – Medium
- Bottlenose dolphin--
- Black-browed albatross – Medium
- Buller's albatross—Medium
- Grey-headed albatross – Medium
- Short-tailed shearwater – Medium
- Shy albatross – Medium

⁵ The ERM process is described at <https://www.afma.gov.au/sustainability-environment/ecological-risk-management-strategies>.

Marine mammals

On the national level, some parts of the fishery use seal excluder devices and all follow the Industry Code of Practice to Minimise Interactions with Seals

(http://www.fishwell.com.au/app_cmslib/media/lib/0908/m337_v1_seal%20code%20of%20practice-%20final.pdf) to minimize its impact on the the Australian and New Zealand fur seals. These management measures were considered when determining whether or not the risk score should be lowered. In the case of the Australian fur seal, the residual risk score was not lowered but was lowered in the case of the New Zealand fur seal. The main reason for the high-risk score is the fact that Australian fur seals have low productivity and high susceptibility. With regard to the short-beaked common dolphin, there are not specific national management measures in place, so the residual risk score is unchanged.

Seabirds

Interactions with seabirds can happen when boats are trawling, and the bird comes into contact with the wires used to drag the net. AFMA managed trawl fisheries introduced seabird management plans (SMP) in Commonwealth Trawl Sector (CTS) of the Southern and Eastern Shark and Scalefish Fishery in 2011. SMPs are tailored to individual fishing boats and identify the main threats posed to seabirds by that boat. It also sets out the mitigation measures the concession holder has agreed to implement to reduce the risk of seabird interactions, the UoA must follow a seabird management plan

(https://www.afma.gov.au/sites/g/files/net5531/f/seabird_bycatch_operational_guidelines.pdf), which requires a physical device as well as the management of biological waste discharge. Bafflers are currently used in the fishery and were found in the CTS to reduce interactions by more than 90% vs bare warps (Koopman et. al. 2018). Recently, in an effort to further lower seabird interactions AFMA has begun to implement a rollout of a rule that does not allow the release of biological material (offal and trash fish) while fishing gear such as warps are in the water. This roll-out will be complete by 1 July 2020 when all trawl vessels in the CTS fishing south of 39 S (the southern latitudes) will be subject to this rule. This management measures as well as the level and severity (i.e., the bird was released alive versus dead) of interaction were considered when determining whether the risk score should be lowered.

9.1.5 Habitats

9.1.5.1 Habitat types

According to the MSC Standard, the assessment of the habitats component of the Standard shall be done in relation to the effects of the UoA on the structure and function of the habitats impacted by the UoA. Furthermore, if benthic habitat is being assessed, the team shall recognize habitat categories based on the habitat characteristics substratum, geomorphology, and biota. Fortunately for the present assessment, these characteristics have been derived from the Australian Ecological Risk Assessment Framework as applied to habitats, therefore the habitats encountered by the Commonwealth Trawl Sector fishery in general and the orange roughy management areas specifically, are categorized accordingly already.

Habitats the fishery interacts with are classified as either “commonly encountered”, “Vulnerable Marine Ecosystem (VME), or “minor.” Commonly encountered habitats regularly comes into contact with a gear used by the UoA, considering the spatial (geographical) overlap of fishing effort with the habitat’s range within the management area(s) covered by the governance body(s) relevant to the UoA. VMEs are defined within the MSC standard as having one or more of the following characteristics: uniqueness or rarity, functional significance, fragility, life-history traits of component species that

make recovery difficult, and/or structural complexity. This definition shall be applied both inside and outside EEZs and irrespective of depth.

Extensive habitat mapping has occurred all around Australia. Figures 12-14 show the percent of mud, sand, and gravel, respectively, occurring within the outer limit of Australia's water column jurisdiction. Figure 15 shows the sponge distribution, and Figure 16 shows (among other things) the predicted distributions of corals, sponges, and sea pens.

Williams, et al., (2006) conducted habitat mapping of the offshore region of the SESSF fishery (from 3nm offshore to 1300m depth) at scales relevant to fishing operations. The data along with the outputs of the ERA (Wayte et al. 2007) were used to develop the Commonwealth Marine Reserves (CMR). CMR and fishery closures together cover 46.7% of the total area of the CTS at depths 0-1,500m (Pitcher, et al., 2016). Williams, et al., (2006) reported an estimated 48% of the total area of the CTS inside the 1,300 m depth contour is "untrawlable ground" i.e. it is not possible to tow the gear along the seabed, or there is a high risk of damaging gear. Those features making these areas untrawlable (high relief, rocky outcropping, etc.), also make them suitable for diverse communities of corals and sponges (Williams et al 2006).

Orange roughy fishing within the UoA areas occurs on the "mid-slope" between 700 and 1500m depth, and are confined to the two management areas identified in Figure 1 and Figure 2. These are the only areas below 700m open to bottom trawling. At these depths, the ERA process (Wayte et. al. 2007) identified 16 "high-risk" habitats including several categories of hard bottom accessible to trawl gear with epifauna consisting of octocorals, crinoids, small sponges, and sedentary animals. Habitats of seamount and canyon features occur at this depth zone, including those within the UoA areas.

Based on this information, the UoA's commonly encountered habitats are mud, sand, and gravel, and the UoA's VMEs are corals, sponges, and sea pens, present on the hills within the ORMAS. There may be other minor habitats encountered but the present assessment has not identified these.

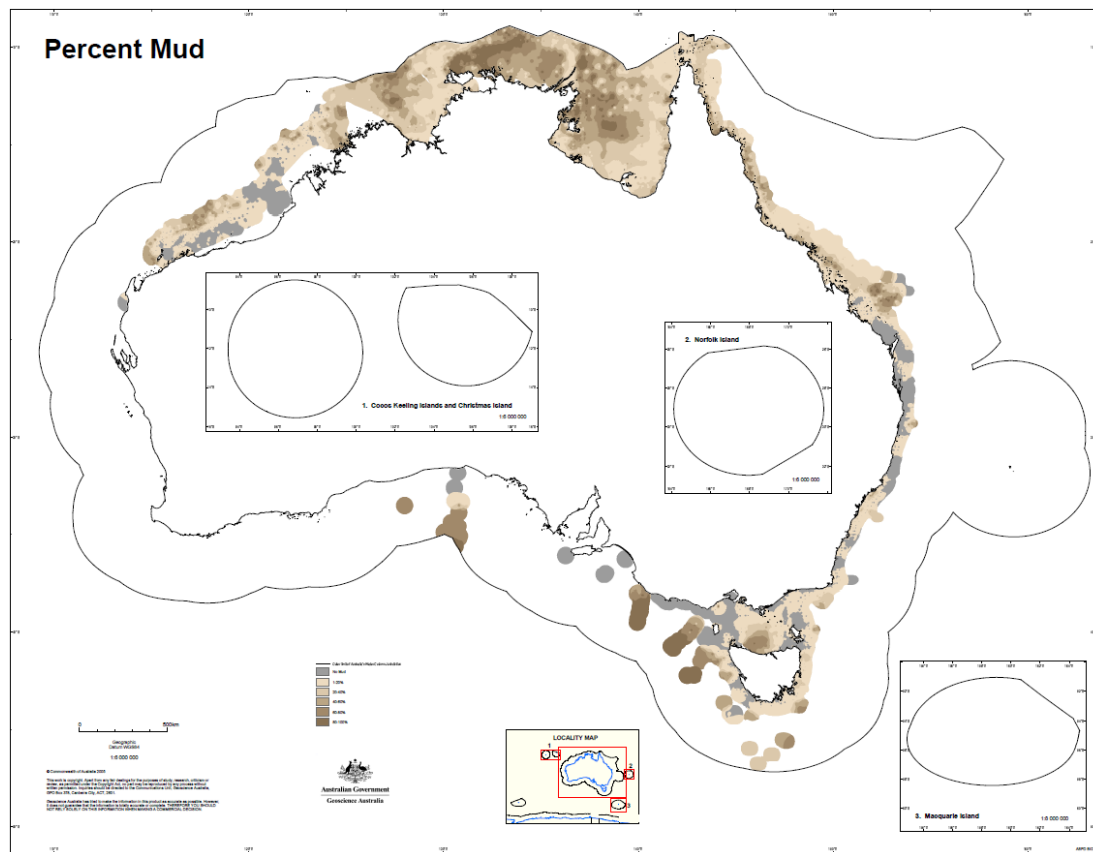


Figure 12. Percent of mud on the seafloor. Source:
<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>

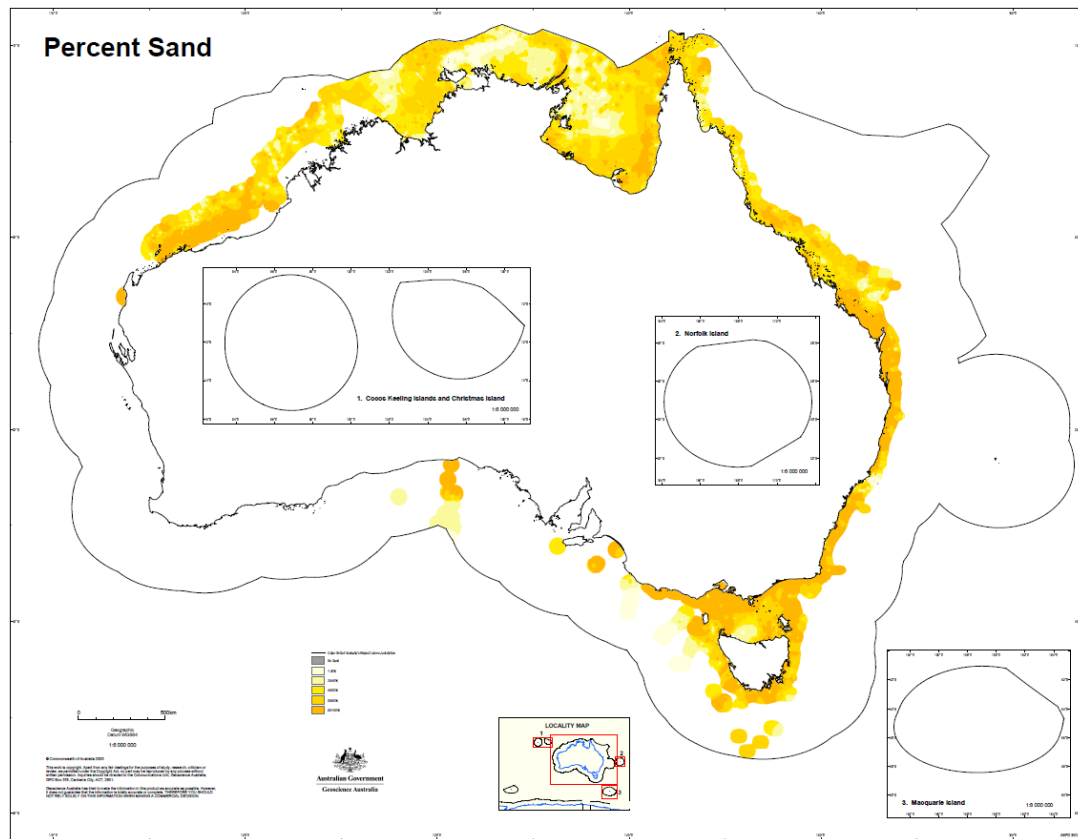


Figure 13. Percent of sand on the seafloor. Source:
<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>

MRAG Americas – US2620 Australia Orange Roughy—Eastern Zone Trawl Fishery PCDR

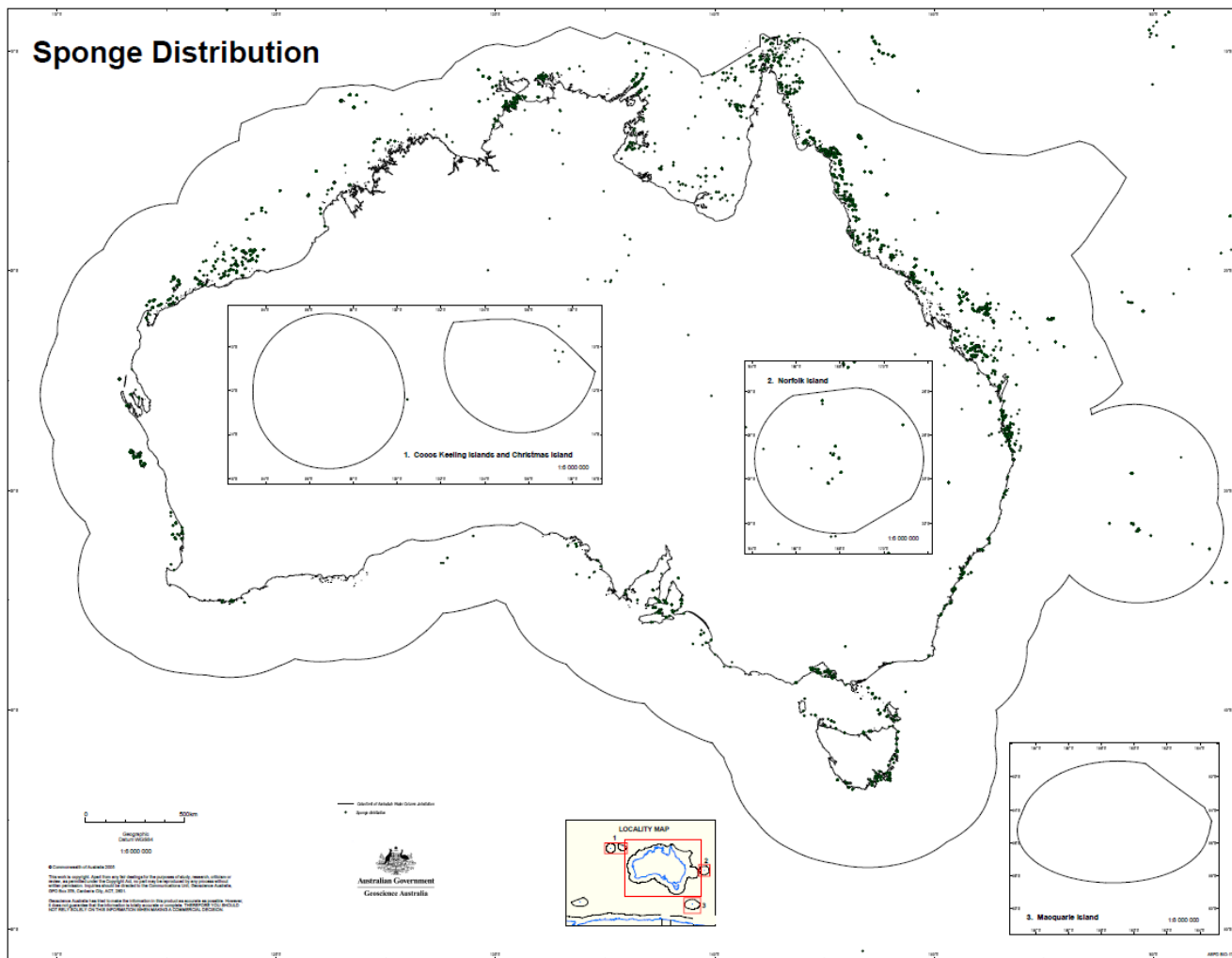


Figure 15. Distribution of sponge on the seafloor. Source:
<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>

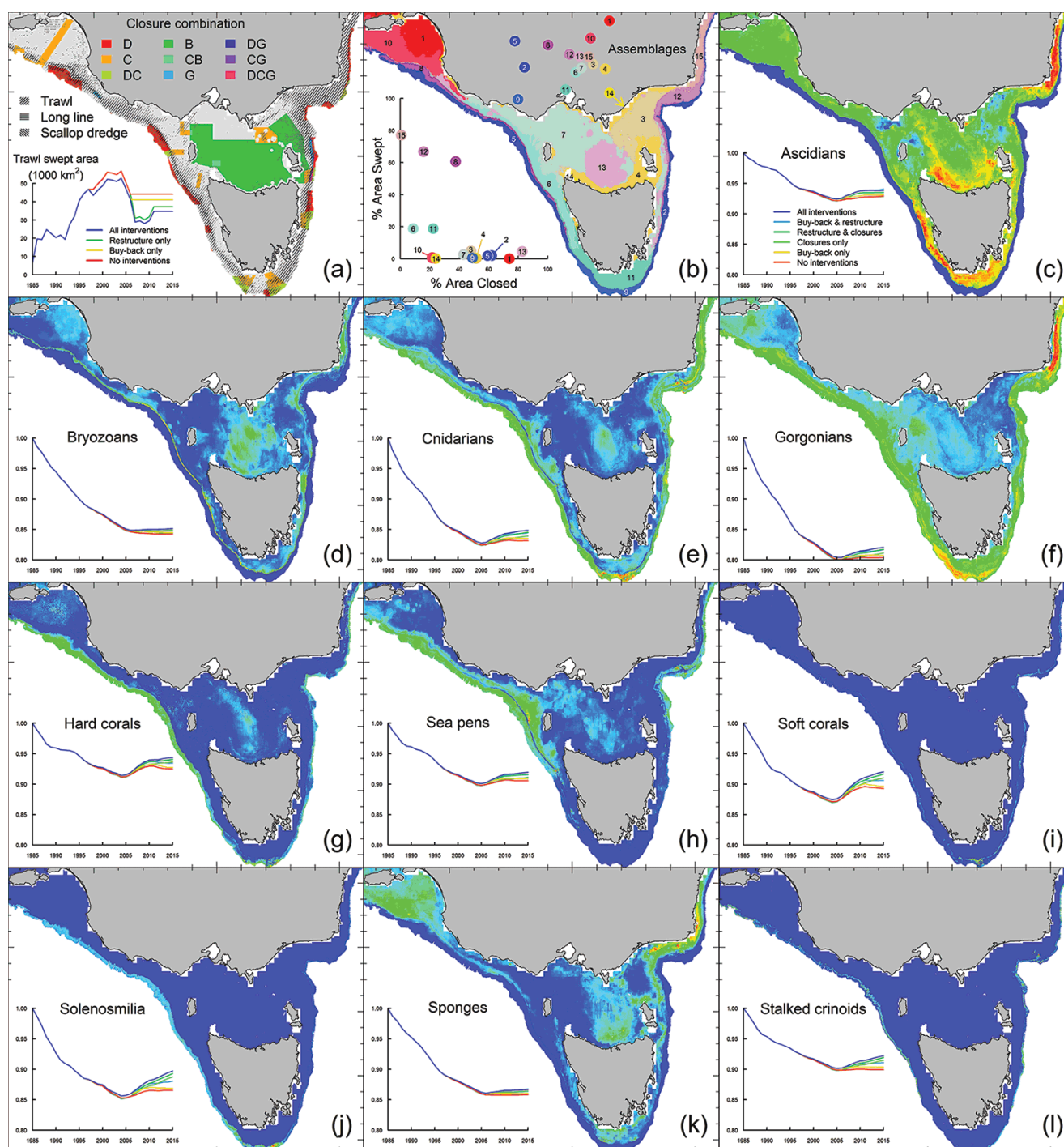


Figure 16. (a) Post-1985 footprints of the main bottom fisheries (cross-hatching) over four main 2013 trawl closure types: [D] Deep water closure, [C] Commonwealth Marine Reserves, [B] Bass Strait closure and [G] Gulper shark closures. (Light grey shading: open areas.) The inset plot shows actual trawl effort time-series and alternative effort scenarios. (b) Biophysical characterization with 15 predicted species assemblages (environments in which biological composition is expected to be relatively similar, and between which composition is expected to vary). Their degree of similarity is indicated by the proximity and color of the legend symbols. Assemblages may not be spatially continuous. The inset plot shows the inclusion of assemblages in closed areas, and exposure to trawling. (c-l) Images and predicted distributions of 10 major taxa types of habitat forming benthos (relative density: blue=low through to red=high). Each inset plot shows predicted abundance time-series, relative to 1985, from simulation modelling of trawl effort on the taxa type distribution (from no management interventions to all interventions). Source: <http://nerpmarinebiodiversity2015.report/predicting-benthic-impacts-and-recovery-to-support-biodiversity-management-in-the-south-east-marine-region/>

9.1.5.2 Habitat protection measures

Bottom-contacting gear has long been known to impact benthic ecosystems and organisms by changing the functional composition of the community and reducing organism biomass, diversity, and body size (Jennings and Kaiser, 1998; Collie et al., 2000; Kaiser et al., 2006; Collie et al., 2017). Soft-bottom habitat is thought to recover more quickly since it is already less stable and more likely to be disturbed than hard-bottom habitat, which are thought to be the most sensitive to trawl gear fishing impacts because they are normally relatively stable and have high habitat complexity (Auster and Langton 1999; Kaiser et al. 2002, 2003).

An Ecological Risk Management (ERM) Strategy for the SESSF (AFMA 2015) sets out the management actions necessary to support the objectives of the *Fisheries Management Act 1991* and *Commonwealth Policy on Fisheries Bycatch 2000*, in particular:

ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development (which include the exercise of the precautionary principle), in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment.

To pursue this, the objectives of this ERM Strategy are to:

- implement management arrangements to minimise fishing impact on non-target species and habitats, with a particular focus on high risk species and habitats assessed through AFMA's Ecological Risk Assessment process
- minimise interactions with species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) excluding conservation dependent species.

Key to this ERM Strategy is addressing the high-risk species as assessed through the Australian Fisheries Management Authority (AFMA) ERA process. The ERA provides a hierarchical framework for a comprehensive assessment of the ecological risks arising from fishing activities and was conducted for four of the main fishing methods across the SESSF, including otter board trawl in the Commonwealth Trawl Sector.

AFMA has implemented spatial closures aimed at reducing the impact of fishing on byproduct, bycatch and ETP species. Some of these closures are also designed to protect vulnerable habitats from the impact of fishing. Closures implemented to protect specific species may also have a flow-on effect and afford some protection to other species or habitats that have similar geographical distribution or behavioral traits. Due to the nature of demersal otter board trawling, the impact on benthic habitats is higher than more passive methods. Sixteen habitats were assessed as at high risk on the mid-slope in waters between 700-1500 m. The 700 m depth closure was initially introduced to protect stocks of orange roughy and other deepwater species but has effectively eliminated trawling in that area except for in the small orange roughy management (UoA) areas.

Approximately 86 per cent of trawl grounds have been closed within the CTS, including large areas of Bass Strait and coastal areas in South Australia (Figure 17). Trawling that does occur tends to be over grounds that have been trawled historically and research suggests that only 6% of the grounds available to the CTS (between 3 miles from shore and 1,000m) are trawled at all, and the trawl footprint is not expanding (NERP 2015). The orange roughy UoAs represent a small portion of the remaining open areas and are the only open areas at greater than 700m depth.

Figure 17-Figure 19 show the various relevant trawl closures within the UoAs range. Additionally, all areas deeper than 700 m are closed to fishing outside of the Eastern ORMA. These areas were selected based on Bioregional Marine Planning mapping (Williams et al. 2006) and work that identified vulnerable benthic habitats (Wayte et al. 2007).

Orange roughly UoA represent a small portion of the remaining open areas: The Eastern ORMA is a limited block off the east coast of Tasmania (Figure 1) and Pedra Branca is a small block south of Tasmania (Figure 2).

Australia has well-established and reviewed procedures for protection of VME in its high seas' fisheries (Williams et al. 2011a, Williams et al. 2011b, Commonwealth of Australia 2018). These measures meet the requirements of the South Pacific Regional Fishery Management Organization (SPRFMO) and the Southern Indian Ocean Fisheries Agreement (SIOFA). However, no information was presented that comparable management occurs in domestic waters. It is not clear that Australia has defined VME in domestic waters as such, but the large CMA and Marine Park areas protect VME assemblages that are also exposed to orange roughly trawling (Pitcher et al 2016). The management relies on large scale trawl closures and limited fishing area of the UoA to minimize impacts on VME.

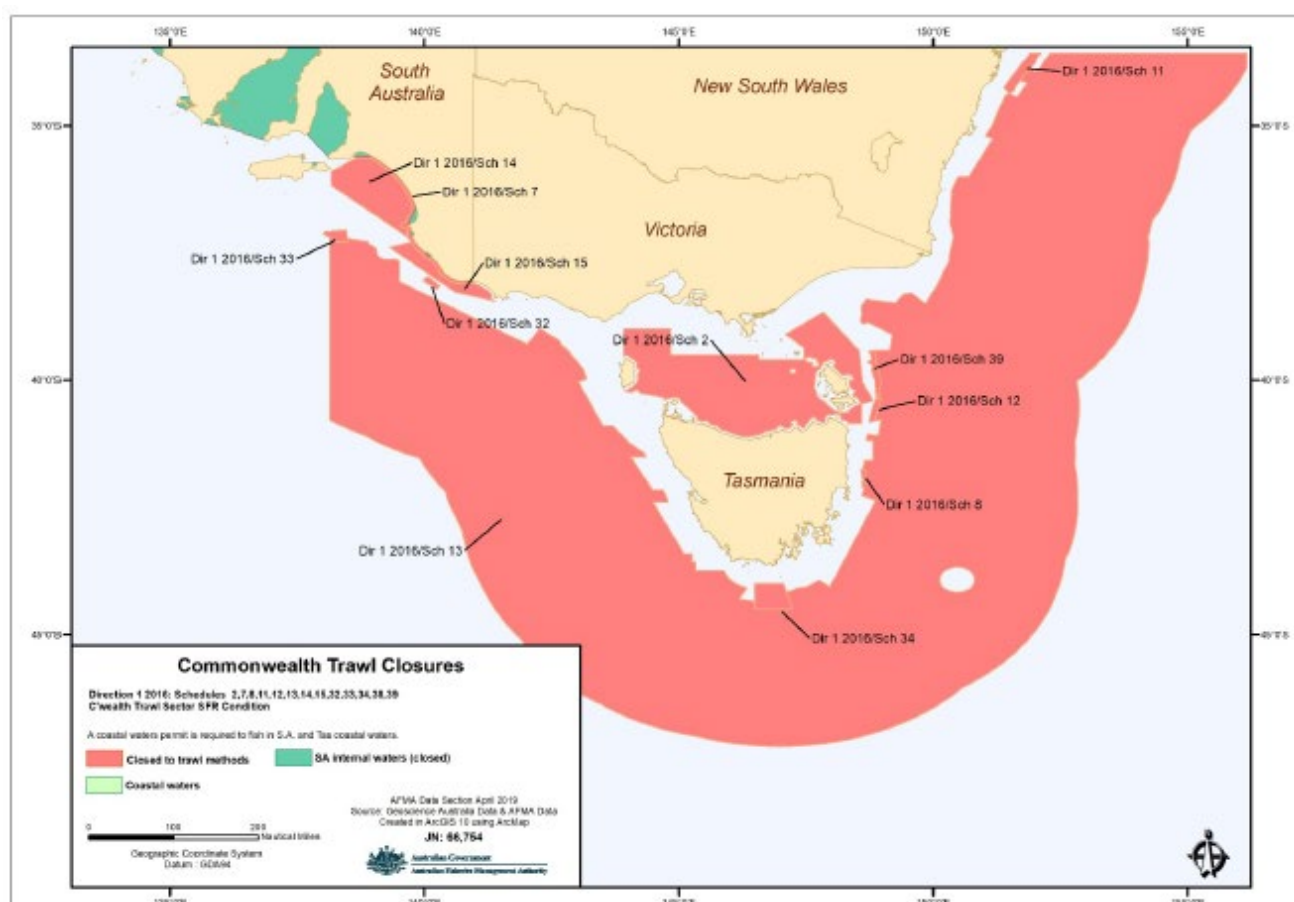


Figure 17. Commonwealth trawl closures within the SESSF. Source: AFMA 2019

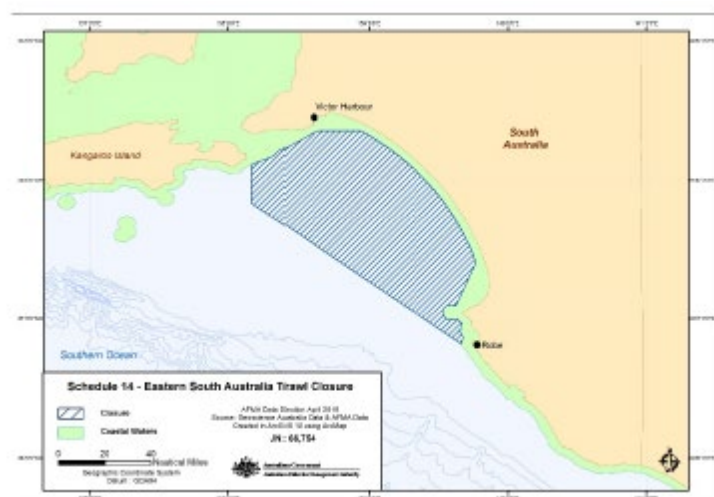


Figure 18. Eastern South Australia trawl closure. Source: AFMA 2019

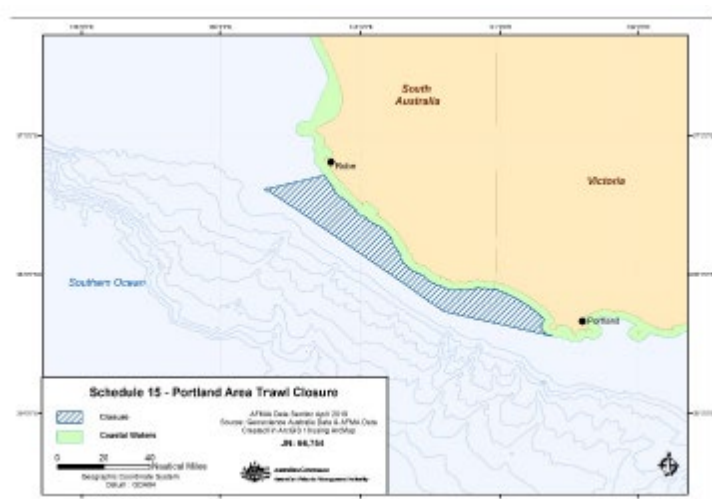


Figure 19. Portland Area trawl closure. Source: AFMA 2019

9.1.5.3 Habitat recovery

“Various studies (e.g., Collie et al. 2000, Hiddink et al. 2006, Kaiser et al. 2006) show that recovery rates are slowest within stable, muddy or structurally complex habitats when compared to sandy sediment communities that show little change after two to three bottom trawl passes a year. Less abundant, more vulnerable long-lived species are likely to recover more slowly. It can take an organism anywhere from a few months to many decades to recover (Hutchings 2000, Kaiser et al. 2006, Hill et al. 2011)” (MSC in prep). Hiddink et al. (2017) quantifies bottom trawling impacts and seafloor biota recovery by synthesizing data from trawling studies. Trawling frequencies of 1 y^{-1} caused an average decline of 15.5% in biota biomass. The study also determined that otter trawl gear resulted in the least depletion, removing only 6% of the biota per pass.

South-East Australia contains one of the world’s largest network of continental shelf and deepwater marine parks with 14 parks in the 388,464km² South East Marine Reserve Network.

CSIRO’s National Environmental Research Program Marine Biodiversity Hub integrated many data sets to produce three types of maps for the south-east:

1) Maps of where habitat forming bottom invertebrate (animals without backbones) groups occur based on previous surveys and computer modelling with depth, sediments, currents, temperature, nutrients and others.

2) A map of 15 different seafloor habitat types, or assemblages, obtained from existing survey data for all fishes, using invertebrates as indicators of different types of habitat and by again using computer modelling of things like depth.

3) A map of the trawl fishery's swept area. Deepwater trawl fishing vessels log their position and width of their gear each time they shoot and haul their net and record the width of their fishing gear.

Existing research about the damage that trawl fishing gear causes to these invertebrate groups, and their recovery afterwards, was also considered.

CSIRO research calculated the effect of various management interventions including the removal of 86 trawl licences, establishing the South East Commonwealth Marine Reserve and other fishery area closures.

Key findings of this work were:

1) Only 6% of the seafloor is currently trawled annually because trawling is aggregated into a small area.

2) Some assemblages of invertebrates are not ever trawled because the area of seafloor where they live is either closed by fishery closures, protected by marine parks or is not trawled because it is unproductive or too rough. Large areas (44%) of the region are closed through fishery closures (39%) and marine parks (9%) with some overlap.

3) All 10 groups of seafloor invertebrates declined after trawling started to a low point around the year 2005 when these invertebrates reached 80-93% of their un-trawled abundance.

4) Closures, marine parks and licence buy-backs contributed to the recovery of invertebrates by 1-3% to 82-94% of their un-trawled abundance. Licence buybacks improved the status of all groups and closures contributed for most groups. However, most fishery closures and marine parks had little detectable influence on the abundance of invertebrates.

9.1.5.4 Cumulative habitat management

The MSC Fisheries Certification Requirements (MSC 2014) require cumulative management of VMEs. That is, this UoA needs to consider what other MSC UoAs as well as non-MSC fisheries have done to protect VMEs. The UoA needs to comply with its management requirements as well as protection measures put in place by other MSC UoAs/non-MSC fisheries. Within Commonwealth waters in the Southeast fishing area, other relevant MSC UoAs include the South Australia Sardine fishery, winter Blue Grenadier freezer boat fishery (adjacent to western Tasmania) and Small Pelagic Fishery. However, neither these, nor non-MSC fisheries have separate VME designations or closure areas requiring recognition by the orange roughy fishery. The only fishery operating in the UoA areas is the orange roughy fishery.

9.1.6 Ecosystems

The Commonwealth Trawl Sector (CTS) fishery operates within the Australian Fishing Zone (AFZ) extending southward from Barrenjoey Point (north of Sydney) around the New South Wales, Victorian and Tasmanian coastlines to Cape Jervis in South Australia from State waters (generally three nautical miles from shore) to the limit of the Australian Exclusive Economic Zone (EEZ). Fishing generally occurs at a depth range of 20 to 1300 m. This is broadly defined as the South-east marine region (Commonwealth of Australia 2015)

This vast area is host to a large variety and diversity of marine species suited to different ecological conditions. The warm tropical water of the East Australian Current head down the eastern coast of Australia to Tasmania, meeting and mixing with the cooler, nutrient rich waters of the Southern Ocean. This unique mixing of marine waters with differing temperatures and nutrients, alongside the Tasmanian coastline, provides marine species with a variety of environments to inhabit and create a variety of unique ecosystems.

Within the South-east marine region, several “provincial bioregions” have been identified as follows:

- Bonney coast upwelling

- East Tasmania subtropical convergence zone
- Bass cascade
- Upwelling east of Eden
- Big horseshoe canyon
- West Tasmania canyons
- Seamounts south and east of Tasmania
- Shelf rocky reefs and hard substrates

Key ecosystem elements are defined by MSC as features of an ecosystem considered as being most crucial to giving the ecosystem its characteristic nature and dynamics and are considered relative to the scale and intensity of the UoA. They are features most crucial to maintaining the integrity of an ecosystem's structure and functions and are the key determinants of the ecosystem resilience and productivity.

Key ecosystem features of the South-east Marine Region are shown on the figure below (from Commonwealth of Australia 2015).

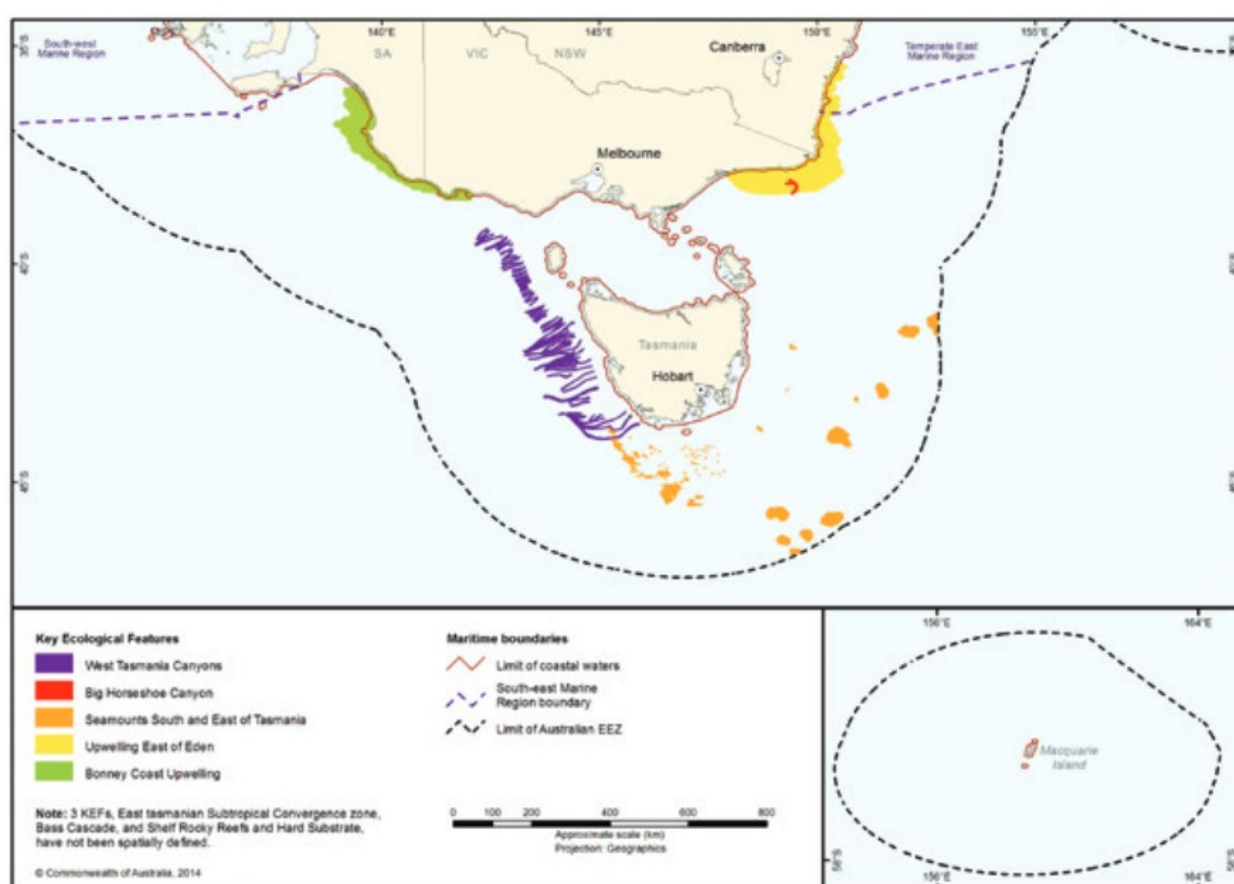


Figure 20. Key ecological features in the South-east Marine Region (Commonwealth of Australia 2015).

The SESSF southeast trawl sector orange roughy fishery targets orange roughy in the Cascade Plateau and Eastern Zone. The Cascade Plateau has been identified as an important habitat for orange roughy, particularly as it is a spawning aggregation site but is not within the UoA fishing areas. Seamounts generally are characterized by high productivity and aggregations of marine life. Seamounts can sometimes influence and intensify currents, creating localised upwelling and turbulent mixing. Accelerated water flows are thought to create upwellings of nutrient rich waters from the seafloor. Seamounts with hard substrate

summits and slopes provide attachment points for sessile invertebrates, while soft sediments can be habitat for species that burrow into the sediments. More generally, winter spawning aggregations of orange roughy are usually associated with submerged hills or pinnacles which have many of the same ecological functions of seamounts but to a lesser degree due to their smaller sizes.

Table 14. Scoring Elements

Component	Scoring elements	Designation	Data-deficient
Target (P1)	Orange Roughy	N/A	No
ETP	Australian Fur Seal	N/A	No
ETP	New Zealand Fur Seal	N/A	No
ETP	Black-Browed Albatross	N/A	No
ETB	Buller's Albatross	N/A	No
ETP	Bottlenose Dolphin	N/A	No
ETP	Short-beaked Common Dolphin	N/A	No
ETP	Grey-Headed Albatross	N/A	No
ETP	Shy Albatross	N/A	No
Primary	See Tables 7 and 8	Minor	No
Secondary	See Tables 7 and 8	Minor	No
Habitat	Mud	Main (commonly encountered)	No
Habitat	Sand	Main (commonly encountered)	No
Habitat	Gravel	Main (commonly encountered)	No
Habitat	Sponge	Main (VME)	No
Habitat	Coral	Main (VME)	No
Habitat	Sea pens	Main (VME)	No
Habitat	Unassessed	Minor	Not assessed
Ecosystem	South-east marine region	Main	No

9.1.7 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	<p>Main primary species are likely to be above the PRI.</p> <p>OR</p> <p>If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main primary species are highly likely to be above the PRI.</p> <p>OR</p> <p>If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main, to ensure that they collectively do not hinder recovery and rebuilding.</p>	<p>There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.</p>
	Met?	Yes	Yes	Eastern ORMA – Yes Pedra Branca – Blue Grenadier – Yes; others – No
Rationale				

Eastern ORMA UoA. No main Primary species have been identified (Table 8). Therefore, scoring issue a scores SG100 by default.

Pedra Branca UoA. The species composition (Table 9) shows three Main Primary species: Smooth oreo, spiky oreo, and blue grenadier. Section 7.3.2 provides details on stock status. The assessments and subsequent management (AFMA2018) are designed to keep abundance well above the limit reference point.

The indices used to assess abundance demonstrate that both smooth and spiky oreo are above the target reference point. The Recommended Biological Catch is extremely conservative as 90 per cent of the smooth oreo catch was taken from waters that are now closed. Low catch and effort levels since 2009 have reduced pressure on the smooth oreo stock. The constant catch projections indicate that the risk of the smooth oreo stock declining to below the limit reference point is low, and that available information leads to a conclusion that the quota could increase. Spiky oreo – as the dominant catch in the oreo basket – has been above the target reference point of B48% for the last three years (2014-2017) of the assessment. Mixed oreos are a potential candidate for a lower target reference point to B40 and there is little biological risk to doing so. The likelihood of catches under current management driving abundance to the limit reference point is very unlikely. The smooth and oreo basket (spiky oreo) assessments did not provide probabilistic estimates but determined both stocks unlikely to fall below the limit reference point and that both stocks could sustain quota increases. Therefore, the overall evidence shows these species are highly likely to be above the limit reference point and meet the SG80. Uncertainty in stock structure and use of Tier 4 and 5 assessments of smooth and spiky oreo preclude reaching SG100.

Blue Grenadier is assessed as one stock; however, there is some evidence of separate stocks occurring across the SESSF (AFMA 2018). There are two defined sub-fisheries, the spawning fishery dominated by catches off western Tasmania and the widely spread catches of the non-spawning fishery. The model shows that biomass fell below the target (48%B₀) in 2012 for four years. Biomass has increased to be above virgin stock biomass (122%B₀) at the start of 2019 due to high recruitment from 2010 to 2015. The lower bound of the 95% confidence intervals is above the target reference point. The catch in the Blue Grenadier spawning fishery is increasing but is still below 2000 levels. Catches in the non-spawning fishery have decreased. Given the current high biomass, fishing at F_{target} would take many years to reduce the stock to target reference point. The confidence intervals on stock biomass show a high degree of certainty that the stock is above P_{RI} and fluctuating above B_{msy}. Therefore, blue grenadier meets SG100.

Minor primary species stock status				
b	Guide post			Minor primary species are highly likely to be above the P _{RI} . OR If below the P _{RI} , there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
	Met?			See Table 10 Eastern ORMA scoring elements: 3 of 7 Pedra Branca scoring elements: 4 of 9
Rationale				

AFMA (2018) summarized the status of species and stocks caught in the SESSF. The minor species of the ORMA and Pedra Branca UoAs are assessed using Tiers 3, 4, or 5. Most species are above B_{target} (either B48% or B40%) and have low or very low likelihood of falling below B_{lim}. Species assessed as above B_{target} and with low or very low likelihood of falling below B_{lim} are scored at SG80, as was the case for smooth and spiky oreo in scoring issue a. For species with current biomass above B_{lim} but below B_{target} were scored as not reaching highly likely because of uncertainties in stock structure and in Tier 3, 4, and 5 assessments. Species in assessment baskets (deep water shark and mixed oreos) – other than the dominant species – were determined as not meeting highly likely because the assessments do not meet the requirements of SA2.2.5 and SA 2.2.6 or the requirements of Box GSA3 for assessment of stock complexes. Table 10 lists minor species and the rationale for scoring. For the ORMA UoA, 3 of 7 minor species met the requirement for highly likely above P_{RI}, and the Pedra Branca UoA had 4 of 9 minor species meet the requirement for highly likely above P_{RI}. Thus, both UoAs meet the ‘Some’ criterion for scoring elements, with roughly half the elements scoring 100 and half the elements scoring 80.

References

AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.

AFMA 2019. Harvest Strategy Framework for the Southern And Eastern Scalefish and Shark Fishery.

https://afma.govcms.gov.au/sites/default/files/ssf_harvest_strategy_framework_2019_amendment.pdf.

Daume et al (2018). MSC Pre-assessment Report of the Australian Eastern Orange Roughy Fishery. Prepared for Atlantis Fisheries Consulting Group. Confidential Document.

https://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 95 Pedra Branca – 90
Condition number (if relevant)	

PI 2.1.2 – Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a partial strategy in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a strategy in place for the UoA for managing main and minor primary species.
	Met?	Both UoAs-Yes	Both UoAs-Yes	Both UoAs-Yes

Rationale

All species identified as main or minor primary are quota species within the SESSF FMP and subject to the national HSP and to the SESSF HSF. Harvest strategies under HSP are designed to pursue an exploitation rate that keeps fish stocks at a level required to produce maximum economic yield (MEY) and ensure stocks remain above a limit biomass level (BLIM) at least 90% of the time. Alternative reference points may be adopted for some stocks to better pursue the objective of maximizing economic returns across the fishery as a whole. The SESSF HSF uses a three-tiered approach designed to apply different types of assessments and cater for different amount of data available for different stocks. The HSF adopts increased levels of precaution that correspond to increasing levels of uncertainty about stock status, in order to reduce the level of risk associated with uncertainty. In this approach, each stock is assessed using one of three types of assessment depending on the amount and type of information available to assess stock status, where Tier 1 represents the highest quality of information available (i.e. a robust integrated quantitative stock assessment). Tier 3 and Tier 4 assessments use other indicators (relating to fishing mortality and catch rates, respectively) and reference points which are taken as proxies for the biomass reference points for Tier 1. Quotas are set based on the assessments. The biological and economic conditions in the fishery are monitored using logbooks and catch records, the Integrated Scientific Monitoring Program (ISMP), and fishery independent surveys (FIS). Information and ongoing monitoring requirements are identified through regular reporting from the above monitoring programs, and regular meetings of RAGs which are responsible for overseeing and managing the stock assessment process under the HSF. Therefore, scoring issue a meets the requirements for a harvest strategy, and scores SG100.

Management strategy evaluation				
b	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Both UoAs-Yes	Both UoAs-Yes	Both UoAs-No
Rationale				

All primary species are quota species, and all have been subject to an ecological risk assessment as part of the Commonwealth Trawl Sector and are subject to the national HSP and to the SESSF HSF. The ongoing reviews of the HSP and HSF produce evaluations that demonstrate the efficacy of the HSP and HSF. The status of the minor Primary Species is above the limit reference point, and mostly above the target reference point. This provides an objective basis for confidence that the partial strategy/strategy is working to ensure overharvesting is not occurring reaching SG80. It is not clear that testing supports high confidence, given the uncertainty in Tier 3 and 4 assessments.

Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its overall objective as set out in scoring issue (a) .
	Met?		Both UoAs-Yes	Both UoAs-Yes
Rationale				

Evidence in the form of lack of quota overages and effective risk management as prescribed by the ecological risk assessment, as well as stock status reports for minor primary species provide at least some evidence that the partial strategy/strategy is being implemented successfully. The strategy to use scientifically-based assessments and resultant quotas to keep all managed species at or above target levels and to avoid falling to the limit reference point at least 90% of the time has been successfully met for main and minor Primary species. This is clear evidence of successful implementation and achievement of overall objectives, meeting the SG100.

Shark finning				
d	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Both UoAs-Yes	Both UoAs-Yes	Both UoAs-Yes
Rationale				

Small numbers of sharks are caught in the two UoAs. Shark finning at-sea is illegal in Commonwealth fisheries and sharks must be landed with their fins naturally attached. This means that the removal of shark fins at sea and the dumping of the carcass are prohibited. To prevent this occurring, all fisheries are subject to Fisheries Management Regulation 9ZO that makes it an offence for the caudal lobe, caudal fin, pectoral fin and dorsal fin to be removed from the shark at sea before it is in the possession of a fish receiver. Fishermen may legally sell fins from sharks legally landed with fins attached. The SESSF management booklet (AFMA 2019) provides details of at-sea shark processing. To assure compliance with the shark finning prohibition, AFMA has high levels (~50%) of observer coverage on SESSF orange roughy fishing trips and has port monitoring with coverage based on a risk assessment to confirm high levels of reporting of catch and discards (see Section 7.4.4 for details), and prohibits wire traces (leaders) to reduce catch of sharks (although not relevant for trawl fisheries this measure exists within the SESSF management booklet for shark mitigation in general). The combination of monitoring and reporting requirements substantially reduces risk of shark finning on orange roughy vessels. This provides evidence of sharks landed with fins naturally attached and some external validation such that there is a high degree of certainty that shark finning is not taking place, meeting the SG100.

e	Review of alternative measures
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	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	Both UoAs-Yes	Eastern ORMA-Yes Pedra Branca-Yes	Both UoAs-No
Rationale				

Bycatch and Discarding Workplans are developed in consultation with industry and research partners to find practical and affordable solutions to minimising bycatch and the discarding of target species. These fishery specific workplans focus on ‘high risk’ bycatch and threatened, endangered and protected species identified through the [ecological risk assessment](#) process and in accordance with the [AFMA Bycatch Strategy: Mitigating protected species interactions and general bycatch 2017-2022](#). The SESSF has specific Bycatch and Discarding Workplans for each major fishery.

The Commonwealth Trawl Sector Workplan is effective as of May 2018 and will be reviewed:

- every 6 months to
 - ensure actions are progressing well
 - determine if any additional actions can be taken
- as part of the annual Ecological Risk Management Strategy Review to
 - ensure actions are progressing well
 - ensure that objectives of the ERM Strategy are being met
 - determine if any additional actions can be taken
- final review at 24 months as part of the annual Ecological Risk Management Strategy Review to
 - to ensure that action items have been completed
 - report against performance indicators
 - determine actions for subsequent Workplans.

The Bycatch and Discarding Workplans provide evidence that SESSF fisheries, including the orange roughy UoA, undergo biennial review to minimise bycatch of unwanted species. Bycatch and Discarding Workshops regularly review catches and implement improvements in crew education and discard monitoring and are focused on high risk species groups identified from the Residual Risk Assessment of Level 2 Productivity Susceptibility Analysis for the CTS. None of the three main primary species in the Pedra Branca UoA are considered as high risk according to this classification. Overall, Eastern ORMA reached 3.4% discards and Pedra Branca reached 9.7% discards. Both UoA meet the SG60 as a result of the Trawl Sector Workplan. The Eastern ORMA UoA has no main primary species, so scores SG80 by default. Although two main primary species in Pedra Branca have substantial discards (42.3% for spiky oreo and 11.9% for blue grenadier) in this UoA area, discards of these species are negligible relative to the overall catches/discarding of these stocks over their managed range and neither species is identified as high-risk. Numerous minor primary and secondary species have discards up to 100% in eastern ORMA and Pedra Branca (Table 8, Table 9), but none of these are on the high-risk list either. It is clear that management strategies in the workplan are actioned and implemented as appropriate, and regular monitoring will ensure that if any new high-risk discard species are identified, appropriate measures follow. It is not clear that alternative measures are implemented for all primary species, so the UoA does not meet SG100.

References

AFMA. 2014. Residual Risk Assessment; Teleost and Chondrichthyan Species. [2014 residual risk assessment](#)

AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.
 AFMA 2019. Harvest Strategy Framework for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_harvest_strategy_framework_2019_amendment.pdf.
<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>
https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 90 Pedra Branca - 90
Condition number (if relevant)	

PI 2.1.3 – Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.
	Met?	Yes	Yes	Eastern ORMA - Yes Pedra Branca: – blue grenadier-Y Smooth oreo-N Spikey oreo-N
Rationale				

No main primary species occurred in the eastern ORMA fishery (Table 8), hence the SG100 is met. Three main species occurred in the Pedra Branca fishery. One species, blue grenadier, has a Tier 1 assessment with lower 95% confidence intervals above the limit biomass. Therefore, blue grenadier has a high degree of certainty of the impact of the fishery. The other two species, smooth and spikey oreo, are assessed with Tier 4 or 5 assessments. These assessments use quantitative information, such as CPUE (Tier 5) or catch time series (Tier 5) to determine impact of the fishery. Uncertainty in stock structure and other uncertainties in the assessments preclude assessing the impacts of fishing on the stocks with a high degree of certainty. Smooth and spikey oreos meet the SG80 but not the SG100.

Information adequacy for assessment of impact on minor primary species				
b	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Yes

Rationale

The majority of minor species are assessed at the Tier 4 level, which requires CPUE data. Tier 3 assessments require information (usually from length frequencies) needed to calculate F. Therefore, the minor species of the ORMA and Pedra Branca species have CPUE and or length frequency data, which provide some quantitative information to estimate the impact of the fisheries on stock status. In addition, there is good quantitative reporting of catches by both observers and fishermen's logbooks. This meets the SG100.

Information adequacy for management strategy

c	Guide post	Information is adequate to support measures to manage main primary species.	Information is adequate to support a partial strategy to manage main primary species.	Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Yes	Yes	No

Rationale

The information supports a strategy to manage all Primary species, but sufficient uncertainty in stock structure and in Tier 3, 4, and 5 assessments that a high degree of certainty does not exist that the strategy achieves its objective of keeping species at or near the target reference point and keeping stocks above the limit reference point 90% of the time.

References

AFMA. 2014. Residual Risk Assessment; Teleost and Chondrichthyan Species. 2014 residual risk assessment
 AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.
 AFMA 2019. Harvest Strategy Framework for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_harvest_strategy_framework_2019_amendment.pdf.
<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>
https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 95 Pedra Branca – 90
Condition number (if relevant)	

PI 2.2.1 – Secondary species outcome

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	<p>Main secondary species are likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there are measures in place expected to ensure that the UoA does not hinder recovery and rebuilding.</p>	<p>Main secondary species are highly likely to be above biologically based limits.</p> <p>OR</p> <p>If below biologically based limits, there is either evidence of recovery or a demonstrably effective partial strategy in place such that the UoA does not hinder recovery and rebuilding.</p> <p>AND</p> <p>Where catches of a main secondary species outside of biological limits are considerable, there is either evidence of recovery or a, demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species, to ensure that they collectively do not hinder recovery and rebuilding.</p>	There is a high degree of certainty that main secondary species are above biologically based limits.
	Met?	Both UoAs Yes	Both UoAs Yes	Both UoAs Yes
Rationale				

No main secondary species occur in either UoA (Table 8, Table 9). Therefore, scoring issue a scores SG100 by default.

b	Minor secondary species stock status			
	Guide post			Minor secondary species are highly likely to be above biologically based limits.

				OR
				If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			No
Rationale				

There has been no evaluation of minor secondary species as yet, hence the SG100 is not met.

References

AFMA. 2014. Residual Risk Assessment; Teleost and Chondrichthyan Species. [2014 residual risk assessment](#)
 AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.
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<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>
https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 90 Pedra Branca – 90
Condition number (if relevant)	

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a partial strategy in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a strategy in place for the UoA for managing main and minor secondary species.
	Met?	Yes	Yes	No
Rationale				

The lack of main secondary species in both UoAs leads to meeting the SG80 by default. No evaluation of minor secondary species has yet been made regarding management strategy so neither UoA meets the SG100.

Management strategy evaluation				
b	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?	Yes	Yes	No
Rationale				

The lack of main secondary species in both UoAs leads to meeting the SG80 by default. No evaluation of minor secondary species management strategy testing has yet been made so neither UoA meets the SG100.

Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its

				objective as set out in scoring issue (a).
	Met?		Yes	No
Rationale				

The lack of main secondary species in both UoAs leads to meeting the SG80 by default. No partial strategy/strategy with objectives is set for minor secondary species so neither UoA meets the SG100.

Shark finning				
d	Guide post	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Yes	Yes	Yes
Rationale				

Small numbers of sharks are caught in the two UoAs. Shark finning at-sea is illegal in Commonwealth fisheries. This means that the removal of shark fins at sea and the dumping of the carcass are prohibited. To prevent this occurring, all fisheries are subject to Fisheries Management Regulation 9ZO that makes it an offence for the caudal lobe, caudal fin, pectoral fin and dorsal fin to be removed from the shark at sea before it is in the possession of a fish receiver. Fishermen may legally sell fins from sharks legally landed with fins attached. The SESSF management booklet (AFMA 2019) provides details of at-sea shark processing. To assure compliance with the shark finning prohibition, AFMA has high levels (~50%) of observer coverage on SESSF orange roughy fishing trips and has port monitoring with coverage based on a risk assessment to confirm high levels of reporting of catch and discards (see Section 7.4.4 for details), and prohibits wire traces (leaders) to reduce catch of sharks (although not relevant for trawl fisheries this measure exists within the SESSF management booklet for shark mitigation in general). The combination of monitoring and reporting requirements substantially reduces risk of shark finning on orange roughy vessels. This provides evidence of sharks landed with fins naturally attached and some external validation such that there is a high degree of certainty that shark finning is not taking place, meeting the SG100.

Review of alternative measures to minimise mortality of unwanted catch				
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate.
	Met?	Yes	Yes	No
Rationale				

Bycatch and Discarding Workplans are developed in consultation with industry and research partners to find practical and affordable solutions to minimising bycatch and the discarding of target species. These fishery specific workplans focus on 'high risk' bycatch and threatened, endangered and protected species identified through the [ecological risk assessment](#) process and in accordance with the [AFMA Bycatch Strategy: Mitigating protected species interactions and general bycatch 2017-2022](#). The SESSF has specific Bycatch and Discarding Workplans for each major fishery.

The Commonwealth Trawl Sector Workplan is effective as of May 2018 and will be reviewed:

- every 6 months to
 - ensure actions are progressing well
 - determine if any additional actions can be taken
- as part of the annual Ecological Risk Management Strategy Review to
 - ensure actions are progressing well
 - ensure that objectives of the ERM Strategy are being met
 - determine if any additional actions can be taken
- final review at 24 months as part of the annual Ecological Risk Management Strategy Review to
 - to ensure that action items have been completed
 - report against performance indicators
 - determine actions for subsequent Workplans.

The Bycatch and Discarding Workplans provide evidence that SESSF fisheries, including the orange roughy UoA, undergo biennial review to minimise bycatch of unwanted species. It is clear that management strategies in the workplan are actioned and implemented as appropriate, and regular monitoring will ensure that if any new high-risk discard species are identified, appropriate measures follow. It is not clear that alternative measures are implemented for all secondary species, so the UoA does not meet SG100.

References

- AFMA. 2014. Residual Risk Assessment; Teleost and Chondrichthyan Species. [2014 residual risk assessment](#)
- AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.
- AFMA 2019. Harvest Strategy Framework for the Southern And Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_harvest_strategy_framework_2019_amendment.pdf.
<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>
https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 85 Pedra Branca – 85
Condition number (if relevant)	

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts on main secondary species			
	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
	Met?	Yes	Yes	Yes
Rationale				

No main species occur in either UoA, therefore they score SG100 by default.

Information adequacy for assessment of impacts on minor secondary species				
b	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			Yes
Rationale				

Although no analysis of the status of minor secondary species has been undertaken as part of this assessment, some quantitative information in the form of catch composition records exists, and is adequate to estimate the impact of the UoA on minor secondary species in the sense that the catches in these UoAs are very low for all secondary species. In addition, none of the minor secondary species are considered to be “high risk” in the Ecological Risk Assessment. Thus, the SG100 is met.

c	Information adequacy for management strategy
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	Guide post	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective .
	Met?	Yes	Yes	No
Rationale				

No main secondary species occur in either UoA so they reach SG80. There is no evidence sufficient information for all secondary species exists to evaluate whether management achieves its objectives, so does not meet SG100.

References

AFMA. 2014. Residual Risk Assessment; Teleost and Chondrichthyan Species. [2014 residual risk assessment](#)
AFMA. 2018. 2018 Species Summaries for the Southern and Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_species_summaries_-_2018_draft.pdf.
AFMA 2019. Harvest Strategy Framework for the Southern And Eastern Scalefish and Shark Fishery.
https://afma.govcms.gov.au/sites/default/files/sessf_harvest_strategy_framework_2019_amendment.pdf.
<https://www.afma.gov.au/sustainability-environment/bycatch-discarding/bycatch-discard-workplans>
https://afma.govcms.gov.au/sites/g/files/net5531/f/cts_bycatch_and_discarding_workplan_2018-19_0.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Eastern ORMA – 95 Pedra Branca - 95
Condition number (if relevant)	

PI 2.3.1 – ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guide post	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/ stock are known and likely to be within these limits.	Where national and/or international requirements set limits for ETP species, the combined effects of the MSC UoAs on the population /stock are known and highly likely to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a high degree of certainty that the combined effects of the MSC UoAs are within these limits.
	Met?	NA	NA	NA
Rationale				

The UoA's ETP species are Australian fur seal, New Zealand fur seal, short-beaked common dolphin, bottlenose dolphin, black-browed albatross, Buller's albatross, grey-headed albatross, and shy albatross. Although Mackay et. Al. (2016) estimated the potential maximum cumulative anthropogenic mortality limits (PBR) for the marine mammals, these PBRs do not operate as management limits. Therefore, this scoring issue is not scored.

Direct effects				
b	Guide post	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Direct effects of the UoA are highly likely to not hinder recovery of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.
	Met?	All UoAs-Yes	All UoAs-Yes	AU fur seal-Y NZ fur seal-Y Black-browed albatross-Y Buller's albatross-Y Common dolphin-Y Bottlenose dolphin-N Grey-headed albatross-N Shy albatross-N
Rationale				

The table below summarizes the population trends of the identified ETP species in this assessment, as far as the are known, the risk assigned in the ERA, PBR (if available), and average annual captures in the CTS fishery between 2017 and 2019. For all species where the population trend is currently stable or increasing, and captures are very low relative to estimated PBR and/or trawling is not identified as a high risk in the ERA, There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species. This applies to Australian fur seal, NZ fur seal, Black-browed albatross, and Buller's albatross. Though the population trend for common dolphin is unknown, the 80 scoring guidepost is met on the basis that the number of UoA interactions with these dolphins is very small relative to its widespread abundance. Grey-headed albatross has an estimated global

population of 250,000 but appears to be decreasing. Fishing by longline has been identified as a primary threat to this species of albatross, however, as this is a trawl fishery and has only encountered one grey-headed albatross in the past three years, the SG80 is met. Shy albatross is near threatened on the IUCN red list, is an endemic breeder in Australia (off Tasmania) and has a relatively small population size at 30,700. Though its population trend is unknown, trawl fisheries are not listed as a major threat and interactions with the CTS fishery of which these UoAs are a component, are rare. The SG80 is met.

Species	Population trend	ERA risk	Average annual captures 2017-2019 over the entire CTS fishery	PBR from Mackay et. al. (2016)
Australian fur seal	Increasing	High	95	2,623
New Zealand fur seal	Increasing	Medium	5.3	81 (zone 3)
Common dolphin	Unknown (but abundant)	Medium	1.3	N/A
Bottlenose dolphin			1	N/A
Black-browed albatross	Increasing	Medium	0.3	N/A
Buller's albatross	Stable	Medium	0.3	N/A
Grey-headed albatross	Decreasing	Medium	0.3	N/A
Shy albatross	Unknown	Medium	1.6	N/A

Indirect effects				
c	Guide post		Indirect effects have been considered for the UoA and are thought to be highly likely to not create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the UoA on ETP species.
	Met?		All UoAs-Y	All UoAs-Y
Rationale				

The SESSF-CTS ERA eliminated several “hazards” in its level-1 risk assessment relevant to indirect impacts of fishing on ETP species. Eliminated hazards included gear loss (ghost fishing), discarding of catch (potential behaviour changes), activity/presence on the water (potential behaviour changes), and indirect impacts of removal of species (such as prey competition). As such and considering the orange roughy UoAs are only a subset of the entire SESSF fishery, there is a high degree of confidence that there are no significant detrimental indirect effects of the UoA on ETP species and the SG100 is met.

References

BirdLife International (2020a) Species factsheet: *Thalassarche melanophrys*. Downloaded from <http://www.birdlife.org> on 10/04/2020. Recommended citation for factsheets for more than one species:

BirdLife International (2020) IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 10/04/2020.

BirdLife International (2020b) Species factsheet: *Thalassarche bulleri*. Downloaded from <http://www.birdlife.org> on 10/04/2020. Recommended citation for factsheets for more than one species: BirdLife International (2020) IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 10/04/2020.

BirdLife International (2020c) Species factsheet: *Thalassarche chrysostoma*. Downloaded from <http://www.birdlife.org> on 10/04/2020. Recommended citation for factsheets for more than one species: BirdLife International (2020) IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 10/04/2020

BirdLife International (2020d) Species factsheet: *Thalassarche cauta*. Downloaded from <http://www.birdlife.org> on 10/04/2020. Recommended citation for factsheets for more than one species: BirdLife International (2020) IUCN Red List for birds. Downloaded from <http://www.birdlife.org> on 10/04/2020.

Mackay, A., Goldsworthy, S. and Harrison, P. (2016). Critical knowledge gaps: estimating potential maximum cumulative anthropogenic mortality limits of key marine mammal species to inform management. FRDC Final Report - 2015-035.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Scoring element	Score
	Australian fur seal	100
	New Zealand fur seal	100
	Common dolphin	100
	Bottlenose dolphin	90
	Black-browed albatross	100
	Buller's albatross	100
	Grey-headed albatross	90
	Shy albatross	90
	Overall	95
Condition number (if relevant)		

PI 2.3.2 – ETP species management strategy

PI 2.3.2		The UoA has in place precautionary management strategies designed to: <ul style="list-style-type: none"> - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are measures in place that minimise the UoA-related mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	All UoAs-Yes	All UoAs-Yes	All UoAs-No
Rationale				

In 2016, the AFMA Commission approved the following protected species management principles for Commonwealth fisheries:

- Management responses should be proportionate to the conservation status of affected species and Ecological Risk Assessment (ERA) results.
- Ensure consistency with Government policy and legislative objectives (including to 'avoid' and 'minimize') and existing national protected species management strategies such as Threat Abatement Plans and National Plans of Action.
- Incentives should encourage industry-led solutions to minimize bycatch of protected species utilizing an individual accountability approach.
- Account for cumulative impact of Commonwealth fisheries on protected species when making management decisions on mitigation.
- Appropriate, and where possible consistent monitoring and reporting arrangements should exist across fisheries (AFMA, 2017f)

These principles are consistent with the new Commonwealth Fisheries Bycatch Policy (DAWR, 2018c).

AFMA has developed mitigation strategies to avoid interactions and to minimise impacts on high risk ETP species in accord to AFMA's new Bycatch Strategy (2017b). AFMA undertakes reviews and updates these strategies as required. All CTS otter trawl vessels are required to have a vessel management plan which details vessels fishing operations and vessel specific ETP mitigation measures.

For seabirds, FMA approved seabird management plans (SMPs) are compulsory for all Commonwealth otter board trawl vessels in the SESSF. SMPs identify and set out individually tailored mitigation measures that help reduce seabird interactions with warp wires. SMPs include physical devices to reduce seabird interaction and measures to manage the discharge of biological waste from vessels to reduce seabird attraction and interaction. Trawl fishermen in the South East Trawl fishery must comply with one of the following mitigation measures: 1. bird bafflers; 2. water sprayers; 3. pinkies with zero offal discharge; the use of bird bafflers is considered by AFMA to be the most efficient and cost effective mitigation approach. Various designs have proven more effective than other designs over time, and

operators are encouraged to modify their setups to best suit their vessels. Additional information can be found on AFMA's website at www.afma.gov.au/portfolio-item/bird-baffler/ (AFMA 2019).

Regarding fur seals, trawl interactions with pinnipeds are managed by Commonwealth Trawl Sector (Otterboard trawl & Danish Seine) Bycatch and Discarding Workplan 2018 - 2019. As mentioned earlier, Australian fur seals remain categorized as "high risk" within the EREAF due to the number of interactions with the CTS fishery in general, even though the population status is increasing. Recording of number and nature of interactions is mandatory. For this sector, a trial was completed in 2009 to investigate the effectiveness of hinged Seal Excluder Devices for otter board trawl vessels (smaller "wet boats" as opposed to the factory trawlers deploying the usual SEDs). A report was produced from these trials where three different SEDs were tested, with the results indicating that one of the three types of SEDs could be possible with modifications and future trials, however it has not been considered appropriate to mandate their use as yet, particularly in light of the improving populations of sea lions and infrequent interactions with the fishery, and unintended consequences of the SED as currently configured (e.g. skate and sponge bycatches). A further project (Python) is currently underway to assess the use of shortened codendes to mitigate seal interactions in the SESSF (Koopman et. Al 2014). Bycatch mitigation research for high risk ETP species is clearly regular and ongoing.

Together, this comprises a strategy for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be **highly likely to achieve** national and international requirements for the protection of ETP species. This is arguably also a comprehensive strategy as required by SG100, but it is not designed to achieve "above" national and international requirements, hence the SG80 is met for all scoring elements, but not the SG100.

Management strategy in place (alternative)				
b	Guide post	There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a comprehensive strategy in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	NA	NA	NA
Rationale				

Not applicable since there are national and international requirements in place for the ETP species. Therefore, they are assessed under SI a since either SI a or b is scored.

Management strategy evaluation				
c	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the measures/strategy will work, based on information directly about the fishery and/or the species involved.	The strategy/comprehensive strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	All UoAs -Yes	All UoAs -Yes	No-Cetaceans No-NZ fur seal Yes-AU fur seal Yes-all seabirds
Rationale				

There is an objective basis for confidence that the strategy will work. The UoAs have generally had very little bycatch of the ETP species, showing that the strategy has worked and will likely continue to work. Further, the strategy is based on information directly about the fishery and the ETP species involved. Measures, such as gear modifications, and closed area management arrangements are done with the UoAs and species in mind to ensure intended bycatch minimization and/or recovery goals are met. Therefore, SG60 and SG80 are met for all species. In addition, for all seabirds and Australian fur seals, SG100 is met, because quantitative analyses have been done to inform the most effective measures within the management strategy (e.g. use of bird bafflers) and monitoring of effectiveness is regular and frequent. In addition, monitoring and reporting of interactions through observers and logbooks informs management on an ongoing basis, and quantitative analyses on potential biological removals (Mackay et. al. 2016) constitutes a quantitative analysis supporting high confidence that the current strategy is working (estimated PBRs well above fishery removals).

Management strategy implementation				
d	Guide post		There is some evidence that the measures/strategy is being implemented successfully.	There is clear evidence that the strategy/comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		All UoAs -Yes	All UoAs -Yes
Rationale				

Overall, the UoA continues to have minimal interactions with ETP species and are compliant with requirements for bycatch mitigation plans, use of deterrents and excluder devices, on-board monitoring, etc. Therefore, there clear evidence that the strategy is being implemented successfully and it appears to be achieving its objectives as set out in the previous scoring issues. SG100 is met.

Review of alternative measures to minimize mortality of ETP species				
e	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	Yes	Yes	Yes
Rationale				

All ETPs

The Bycatch and Discarding Workplans, describing the mitigation measures for ETP interactions have been reviewed annually and renewed every two years. With the implementation of the new AFMA Bycatch Strategy, bycatch and discarding workplans are going to be integrated in the bycatch section of the Fishery Management Strategy for each

fishery, which will contain annual deliverables, thus reviewed annually (AFMA, 2017b). Also, there is an ongoing development and review of the effectiveness of mitigation devices (SEDs for mammals and mitigation devices for seabirds) through scientific and industry trials, as well as by follow-up investigations after an interaction occurs. This workplan focuses on species identified as “high risk” through the EREAF process, and specifically related to ETP species identified within this assessment this includes several seabird species, and Australian fur seals.

For seabirds, FMA approved seabird management plans (SMPs) are compulsory for all Commonwealth otter board trawl vessels in the SESSF. SMPs identify and set out individually tailored mitigation measures that help reduce seabird interactions with warp wires. SMPs include physical devices to reduce seabird interaction and measures to manage the discharge of biological waste from vessels to reduce seabird attraction and interaction. Trawl fishermen in the South East Trawl fishery must comply with one of the following mitigation measures: 1. bird bafflers; 2. water sprayers; 3. pinkies with zero offal discharge; the use of bird bafflers is considered by AFMA to be the most efficient and cost effective mitigation approach. Various designs have proven more effective than other designs over time, and operators are encouraged to modify their setups to best suit their vessels. Additional information can be found on AFMA’s website at www.afma.gov.au/portfolio-item/bird-baffler/ (AFMA 2019).

Regarding fur seals, trawl interactions with pinnipeds are managed by Commonwealth Trawl Sector (Otterboard trawl & Danish Seine) Bycatch and Discarding Workplan 2018 - 2019. As mentioned earlier, Australian fur seals remain categorized as “high risk” within the EREAF due to the number of interactions with the CTS fishery in general, even though the population status is increasing. Recording of number and nature of interactions is mandatory. For this sector, a trial was completed in 2009 to investigate the effectiveness of hinged Seal Excluder Devices for otter board trawl vessels (smaller “wet boats” as opposed to the factory trawlers deploying the usual SEDs). A report was produced from these trials where three different SEDs were tested, with the results indicating that one of the three types of SEDs could be possible with modifications and future trials, however it has not been considered appropriate to mandate their use as yet, particularly in light of the improving populations of sea lions and infrequent interactions with the fishery, and unintended consequences of the SED as currently configured (e.g. skate and sponge bycatches). A further project (Python) is currently underway to assess the use of shortened codendes to mitigate seal interactions in the SESSF (Koopman et. Al 2014). Bycatch mitigation research for high risk ETP species is clearly regular and ongoing.

The requirement that there is at least a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate, is met.

SG60, 80 and 100 are met.

References

AFMA (2017) AFMA Bycatch Strategy Mitigating protected species interactions and general bycatch 2017-2022 <https://www.afma.gov.au/sites/default/files/uploads/2017/07/Fishery-Management-Paper-Number-15-Final-AFMAs-bycatch-strategy-030717.pdf>

AFMA (2018b) Seabird Bycatch Operational Guidelines for Commonwealth Fisheries https://afma.govcms.gov.au/sites/g/files/net5531/f/seabird_bycatch_operational_guidelines.pdf

AFMA (2019b) SESSF Management Arrangements 2019 https://www.afma.gov.au/sites/default/files/sessf_management_arrangements_booklet_2019_final_updated_july_2019.pdf

Koopman, M, S. Boag, G.N. Tuck, R. Hudson, I. Knuckey, and R. Alderman (2018). Industry-based development of effective new seabird mitigation devices in the southern Australian trawl fisheries. *Endangered Species Research*. Volume 36: 197-211.

Koopman, M, S. Boag and I. Knuckey (2014). Assessment of the use of shortened codends to mitigate seal interactions in the SESSF. AFMA Report 2012/0828 29/10/2014.

Pierre, J., Gerner, M. and Pennrose, L. (2014). Assessing the effectiveness of seabird mitigation devices in the trawl sectors of the Southern and Eastern Scalefish and Shark Fishery in Australia.

<https://www.afma.gov.au/sites/default/files/uploads/2014/12/Seabird-Mitigation-Assessment-Report.pdf>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Scoring Elements AU fur seal, 4 albatross spp (5)-95 Scoring elements NZ fur seal, dolphins (3)-90 Overall score: 95
Condition number (if relevant)	

PI 2.3.3 – ETP species information

PI 2.3.3		Relevant information is collected to support the management of UoA impacts on ETP species, including:		
		<ul style="list-style-type: none"> - Information for the development of the management strategy; - Information to assess the effectiveness of the management strategy; and - Information to determine the outcome status of ETP species 		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guide post	Qualitative information is adequate to estimate the UoA related mortality on ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.	Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. OR If RBF is used to score PI 2.3.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.	Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Yes	Yes	No
Rationale				

Fishery interactions with ETP species are collected annually and categorized in terms of the nature of the interaction and state of the animal when released. The CTS otter trawl fishery as a whole generally has relatively low interactions with ETP species. In addition, information on population sizes and/or trends for these species that is updated with sufficient frequency to detect changes. Thus, it is currently possible to conclude that, for all ETP species, some quantitative information is **adequate to assess** the UoA related mortality and impact and to determine whether the UoA may be a threat to their protection and recovery. The SG80 is met. However, in order to achieve the SG100 level, more specific quantitative information on interactions within the orange roughy UoAs would have to be reported (rather than at CTS level).

Information adequacy for management strategy				
b	Guide post	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a

				strategy is achieving its objectives.
	Met?	Yes	Yes	No
Rationale				

With annual data collection and analysis and observer coverage, it can be concluded that the information is adequate to measure the CTS otter trawl fishery catch trends and support the strategy for managing the impacts. Therefore, SG60 and SG80 are met. Although there is a comprehensive strategy to manage impacts and minimize mortality and injury of ETP species, there is not enough information to evaluate with a high degree of certainty whether the strategy is achieving its objectives, according to MSC definitions.

References

AFMA (2020). TEP interaction records

AFMA (2019b) SESSF Management Arrangements 2019

https://www.afma.gov.au/sites/default/files/sessf_management_arrangements_booklet_2019_final_updated_july_2019.pdf

<https://www.afma.gov.au/sites/default/files/uploads/2017/07/Fishery-Management-Paper-Number-15-Final-AFMAs-bycatch-strategy-030717.pdf>, <https://www.afma.gov.au/sustainability-environment/protected-species-management>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI but additional information could increase score

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	

PI 2.4.1 – Habitats outcome

PI 2.4.1		The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates		
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	Met?	Yes	Yes	Yes
Rationale				

Based on available information, it appears that the commonly encountered habitats would include mud, sand, and gravel. Several studies show stable, muddy or structurally complex habitats recover more slowly than sandy sediment. However, the commonly encountered habitats in this area all recover within 5-20 years. Therefore, it is unlikely that serious or irreversible harm is occurring. Approximately 86 per cent of trawl grounds have been closed within the CTS, including large areas of Bass Strait and coastal areas in South Australia (Figure 16). Other research shows that CTS trawling occurs in 6% of grounds between 3 miles (the State limit) and 1,000m. Further, although not deepwater, specific research suggests that when invertebrates were split into 10 groups that all. Since then, given that less trawling occurs it is likely that they have continued to recover. declined after trawling started to a low point around the year 2005 when these invertebrates reached 80-93% of their un-trawled abundance. Trawling that does occur tends to be over grounds that have been trawled historically, i.e., the trawling footprint is not expanding. Orange roughy UoA represent a small portion of the remaining open areas: The Eastern ORMA is a limited block off the east coast of Tasmania (Figure 1) and Pedra Branca is a small block south of Tasmania (Figure 2). The limited amount of fishing area in the two UoAs is substantially less than 20% of the trawlable area and are the only areas at greater than 700m depth are open to trawling. Thus, this constitutes evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point of serious or irreversible harm meeting SG100.

VME habitat status				
b	Guide post	The UoA is unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	Met?	Yes	Yes	No
Rationale				

The potential VME habitats in this area appear to be underwater topographical features with sessile fauna including sponges, corals, and sea pens. Orange roughy fishing within the UoA areas occurs on the “mid-slope” between 700 and 1500m depth, and are confined to the two management areas identified in Figure 1 and Figure

2. These are the only areas below 700m open to bottom trawling. At these depths, the ERA process (Wayte et al. 2007) identified 16 “high-risk” habitats including several categories of hard bottom accessible to trawl gear with epifauna consisting of octocorals, crinoids, small sponges, and sedentary animals. Habitats of seamount and canyon features occur at this depth zone, including those within the UoA areas.

These habitats are known to be fragile and slow to recover. However, the orange roughy UoAs are two small areas, and approximately 86 percent of trawl grounds (home to VME-type habitats) have been closed within the CTS, including large areas of Bass Strait and coastal areas in South Australia (Figure 16). Trawling that does occur tends to be over grounds that have been trawled historically and research suggests that only 6% of the grounds available to the CTS (between 3 miles from shore and 1,000m) are trawled at all, and the trawl footprint is not expanding. Orange roughy UoAs represent a small portion of the remaining open areas and are the only open areas at greater than 700m depth. The limited amount of fishing area in the two UoAs is substantially less than 20% of the area in which these habitats exist, hence the SG80 is met. Lack of information on recovery of historically or presently trawled VME habitat prohibits reaching the SG100 level.

Minor habitat status				
c	Guide post			There is evidence that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	Met?			No
Rationale				

The present assessment has not classified or investigated minor habitats in the detail required to justify a score of SG100 here. The SG100 is therefore not met.

References

Auster and Langton 1999; Collie et al. 2000, 2017; Hiddink et al. 2006, 2017; Hill et al. 2011; Jennings and Kaiser 1998; Kaiser et al. 2002, 2003, 2006; <https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>; <http://nerpmarinebiodiversity2015.report/predicting-benthic-impacts-and-recovery-to-support-biodiversity-management-in-the-south-east-marine-region/>
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Williams, A., Althaus, F., Fuller, M., Klaer, N. and Barker, B., 2011a. *Bottom fishery impact assessment: Australian report for the South Pacific Regional Fisheries Management Organisation (SPRFMO)*, SWG-10-DW-01a, CSIRO Marine and Atmospheric Research, Hobart. Accessed 16 February 2018. http://www.afma.gov.au/wp-content/uploads/2011/11/bottom_fishery_impact_assessment_sprfmo.pdf
Williams, A., Althaus, F., Fuller, M., Klaer, N. and Barker, B., 2011b. *Bottom Fishery Impact Assessment: Australian report for the Southern Indian Ocean Fisheries Agreement (SIOFA)*, CSIRO Marine and Atmospheric Research, Hobart. Accessed 16 February 2018. http://www.afma.gov.au/wp-content/uploads/2014/02/bottom_fishery_impact_assessment_siofa.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	Both UoAs-85
Condition number (if relevant)	

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.
	Met?	Yes	Yes	No
Rationale				

While Australia does not have a comprehensive habitat management strategy, it recognizes that area closures will have benefits to habitats even if it implemented the closures for reasons other than habitat. The area closures of 86% of the trawlable grounds that are in place can be considered at least a partial strategy, which is expected to ensure that serious or irreversible harm does not occur. Further research shows that the CTS trawl fishery only trawls 6% of the grounds between 3 miles from shore and 1,000 of depth. SG60 and SG80 are met.

Management strategy evaluation				
b	Guide post	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.
	Met?	Yes	Yes	No
Rationale				

The two UoA represent substantially less than 20% of the trawlable area, due to closures and the small area of the UoA. Research and inference provide some objective basis for confidence that identifying sensitive areas and implementing measures to protect them, to the extent practicable, will work. SG60 and SG80 are met.

Management strategy implementation				
c	Guide post		There is some quantitative evidence that the measures/partial strategy is being implemented successfully.	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		Yes	No
Rationale				

The trawl closures area monitored by observers and VMS. This provides some quantitative evidence that more than 86% of the trawl area remains closed, meeting the SG60 and SG80.

Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs				
d	Guide post	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is some quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is clear quantitative evidence that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	Yes	Yes	Yes
Rationale				

The fishery is required to comply with closed areas and other regulations so SG60 is met. Australia federal domestic waters do not appear to have an explicit management for VME, though certain fishing closures have been made in order to protect habitat, particularly vulnerable assemblages with VME characteristics. The assessment team confirmed that area protection is respected and compliance is high within these UoAs and generally within the SESSF such that it can be said that the UoAs comply with both their own management requirements and those afforded to VMEs by others. This constitutes clear quantitative evidence that the UoA complies with all required management through avoidance of closed areas as monitored through VMS. The SG100 is met.

References

AFMA 2019; Auster and Langton 1999; Collie et al. 2000, 2017; Hiddink et al. 2006, 2017; Hill et al. 2011;

Jennings and Kaiser 1998; Kaiser et al. 2002, 2003, 2006; Wayte et al. 2007; Williams et al. 2006;

<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>;

<http://nerpmarinebiodiversity2015.report/predicting-benthic-impacts-and-recovery-to-support-biodiversity-management-in-the-south-east-marine-region/>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	85
Condition number (if relevant)	N/A

PI 2.4.3 – Habitats information

PI 2.4.3	Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue	SG 60	SG 80	SG 100

Information quality				
a	Guide post	<p>The types and distribution of the main habitats are broadly understood.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.</p>	<p>The nature, distribution and vulnerability of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.</p>	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Yes	Yes	No

Rationale

A comprehensive inventory of bottom habitat data has been done. The types, distributions, and vulnerability of the main habitats are known at the scale relevant to the UoA (Figure 12-Figure 16). Therefore, SG60 and SG80 are met. SG100 is not met since the distribution of all habitats is not known over their range.

Information adequacy for assessment of impacts				
b	Guide post	<p>Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.</p>	<p>Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.</p> <p>OR</p> <p>If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.</p>	The physical impacts of the gear on all habitats have been quantified fully.
	Met?	Yes	Yes	No

Rationale

The potential for bottom trawl gear to damage bottom habitats is broadly understood and sufficient to identify main impacts on main habitats (Section 7.3.4); the widespread trawl closure and limited areas open to the two UoAs (Figure 16, Figure 1, and Figure 2), combined with verification through VMS and observer data that these closures are complied with, demonstrate knowledge of spatial extent of interaction and the location of use of the fishing gear by the UoA. This meets SG60 and SG80. SG100 is not met because there is not full quantification of the physical impacts of gear on all habitats.

Monitoring				
c	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		Yes	No
Rationale				

Studies continue to be done to understand the risk fishing gear has on the main habitats and some of these studies have been done over the long term. For example, the predictive modelling done under the NERP program (NERP 2015; Figure 9) shows recovery of several sensitive benthic organisms with current trawl restrictions in place, relative to previous (pre-1985) trawl footprints. The risk to the main habitats is limited to the designated areas for the two UoA and monitoring by observers and through VMS provides evidence that these boundaries are respected, so risk cannot increase without expansion of the designated areas. The SG80 is met. SG100 is not met because the distribution of all habitats over time is not measured.

References

Auster and Langton 1999; Collie et al. 2000, 2017; Hiddink et al. 2006, 2017; Hill et al. 2011; Jennings and Kaiser 1998; Kaiser et al. 2002, 2003, 2006;

<https://parksaustralia.gov.au/marine/management/resources/scientific-publications/benthic-maps/>;

NERP 2015. <http://nerpmarinebiodiversity2015.report/predicting-benthic-impacts-and-recovery-to-support-biodiversity-management-in-the-south-east-marine-region/>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	60-79
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guide post	The UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Yes	Yes	No
Rationale				

Key ecosystem elements are defined by MSC as features of an ecosystem considered as being most crucial to giving the ecosystem its characteristic nature and dynamics, and are considered relative to the scale and intensity of the UoA. They are features most crucial to maintaining the integrity of an ecosystem's structure and functions and are the key determinants of the ecosystem resilience and productivity.

This fishery takes place in the South-east Marine Region of Australia (Commonwealth of Australia 2015), which is a very ecologically diverse area comprising several "provincial bioregions." This fishery is concentrated on orange roughy winter spawning aggregations, generally associated with hills, pinnacles, and seamounts. The main ecological properties of these features are high productivity due to localized upwelling, and high biodiversity relative to the surrounding areas of the seabed. An integrated management approach is used, with Ecological Risk Assessment as the primary tool for prioritizing research and management activities. This has been confirmed in Management Strategy Evaluation work underpinned by ecosystem modeling carried out by Fulton et. al. (2014) to be an effective approach for balancing environmental, social and economic needs.

The SESSF fishery as a whole was subject to a detailed analysis against the guidelines of the ecologically sustainable management of fisheries (Commonwealth of Australia 2019) by the Department of Environment and Energy. The analysis concluded "The Department considers that the management regime for the fishery provides for fishing operations to be managed in a manner that minimizes its impact on the structure, productivity, function and biological diversity of the ecosystem." This conclusion was based on the comprehensiveness of the ERA framework for assessing and managing the potential fishery impacts on the five components of the marine environment (target, byproduct, bycatch/discards, protected species, and the habitats and communities in which those species occur. It is acknowledged that while very little information is available in relation to direct impacts of fishing on the physical environment, such impacts are estimated through an understanding of the biological characteristics of species, substrate geomorphology and the gear used.

Specifically in relation to ecosystem characteristics that support orange roughy, there is evidence that habitat disturbance caused by trawling on spawning aggregations could impact spawning/recruitment success of orange roughy. However, due to the spatial scale of the fishery relative to the overall extent of the ecosystem types in question, and the fact that spawning aggregations continue to persist over time despite targeted fishing (Haddon 2017), it remains highly unlikely that the fishery would disrupt key ecological elements to the degree that there would be serious or irreversible harm to the ecosystem in which it occurs. The SG80 is met. A lack of direct evidence as highlighted in the 2019 Department of Environment review, precludes a score of 100.

References

Commonwealth of Australia (2015). South-east marine region profile: A description of the ecosystems, conservation values and uses of the South-east Marine Region

Commonwealth of Australia (2019) Assessment of the Commonwealth Southern and Eastern Scalefish and Shark Fishery February 2019.

Fulton EA, Smith ADM, Smith DC, Johnson P (2014) An Integrated Approach Is Needed for Ecosystem Based Fisheries Management: Insights from Ecosystem-Level Management Strategy Evaluation. PLoS ONE 9(1): e84242. <https://doi.org/10.1371/journal.pone.0084242>

Haddon, M. (2017). Orange Roughy East (*Hoplostethus atlanticus*) stock assessment using data to 2016. Report to November 2017 SE RAG meeting. CSIRO, Oceans and Atmosphere, Australia. 51p.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	80
Condition number (if relevant)	

PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are measures in place, if necessary which take into account the potential impacts of the UoA on key elements of the ecosystem.	There is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a strategy that consists of a plan , in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place.
	Met?	Yes	Yes	Yes
Rationale				

A range of conservation values have been identified in the South-east Marine Region, many of which are underpinned by a management strategy expected to restrain the impacts of the UoA (Commonwealth of Australia 2015). Areas identified as key ecosystem features and biologically important areas have special conservation measures/strategies, as

do species listed under the EPBC act, including orange roughy. As mentioned under the habitat's PIs, several marine protected areas have been designated taking into consideration their ecological value. The South-east Australian Marine Park Network covers an area of approximately 388 464 km² with a depth range of 40 m - 4600 m, areas off the continental shelf and over deeper waters. A variety of marine reserves are established, and all exclude bottom trawling. These were selected based on Bioregional Marine Planning, mapping work conducted by Williams et al. (2006) and the Ecological Risk Assessment (ERA) work identified vulnerable benthic habitats (Wayte et al. 2007). This is consistent with the SG100 level because the strategy here has resulted in a plan consisting of identifying vulnerable ecosystem elements and benthic assemblages and closing them to trawling. The habitats ERA is repeated sufficiently frequently to allow for adaptation of this strategy/plan if information dictates that necessity (e.g AFMA 2012).

Management strategy evaluation				
b	Guide post	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	There is some objective basis for confidence that the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	Testing supports high confidence that the partial strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	Yes	Yes	No
Rationale				

As the structure and function of the ecosystems in which orange roughy fishing takes place have broadly persisted over the past multiple decades at least, it is expected that there is some objective basis for confidence that the measures/partial strategy will work to maintain ecosystem structure and function. The network of closed areas and special protections in place and the persistence of key ecosystem elements as described in Commonwealth of Australia (2015) provide that confidence. In addition, management strategy evaluation modelling carried out by Fulton et. al. (2014) supports the effectiveness of the integrated approach to fisheries management implemented by AFMA underpinned by the ERA as discussed under PI 2.5.1. While this is all sufficient to support an objective basis for confidence, more specific testing related to the UoA would be needed to achieve SG100.

Management strategy implementation				
c	Guide post		There is some evidence that the measures/partial strategy is being implemented successfully .	There is clear evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) .
	Met?		Yes	Yes
Rationale				

Compliance with closed area management and lack of overfishing provides clear evidence that the partial strategy/strategy to prevent the fishery from seriously or irreversibly harming the ecosystem is being implemented successfully and achieving its objectives. In addition, observers provide records of impacts such as gear loss, discards and protected species interactions. SG100 is met.

References

Commonwealth of Australia (2015). South-east marine region profile. A description of the ecosystems, conservation values, and uses of the South-east Marine Region. June 2015. Accessed at:

<https://www.environment.gov.au/system/files/resources/7a110303-f9c7-44e4-b337-00cb2e4b9fbf/files/south-east-marine-region-profile.pdf>

AFMA 2012. Residual Risk Assessment of the Level 2 Productivity Susceptibility Analysis for Non-Teleost and Non-Chondrichthyan Species. Report for the Otter Board Trawl Method of the Commonwealth Trawl Sector. Accessed at: <https://www.afma.gov.au/sites/default/files/uploads/2014/11/SESSF-CTS-Otter-board-trawl-residual-risk-assessment-2012.pdf>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	

PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Yes	Yes	
Rationale				

The key species have been well studied and their roles in the ecosystem have been identified and discussed in relation to the fishery. Commonwealth of Australia (2015) provides good information on key elements of the ecosystem (South-east Marine Region and provincial subregions) in which the orange roughy fishery takes place. In addition, ecosystem modelling is available for the SESSF fishery (e.g. Fulton et. al 2014).

Investigation of UoA impacts				
b	Guide post	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail .	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail .
	Met?	Yes	Yes	Yes
Rationale				

The main ecosystem impacts of this fishery are likely better covered in the habitats component of this assessment, as the fishery occurs on spawning aggregations that associate with submarine features such as hills and pinnacles. Therefore, the habitat is also the ecosystem in the sense that the spawning success of the species depends on the benthic ecosystem/habitat provided. The particular ecological impacts of bottom trawling on underwater features has been investigated in detail (e.g. Hiddink et. al 2017; Mazor et al 2017). In addition, Fulton et. al. (2014) modelled a range of different management approaches using an Atlantis-based ecosystem model, investigating in detail the main interactions between the UoA and other fisheries in the SESSF and ecosystem elements, as well as social and economic factors, under different management scenarios, including one very similar to the integrated approach currently implemented in this fishery. The SG100 is met.

Understanding of component functions				
c	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known .	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are understood .
	Met?		Yes	No

Rationale

The main functions of the ecosystem components are known (e.g. trophic relationships as described in Fulton et al 2007; and descriptions given under the primary, secondary, ETP and habitats components of this assessment). In addition, the ERA process provides an excellent framework for assessing the likely impacts, or risk of negative impacts, of fisheries (including the UoA) on main components of the ecosystem. Thus, the SG80 is met. The SG100 is not fully met because the information and analysis available probably doesn't rise to the level of understanding required of this scoring issue.

Information relevance				
d	Guide post		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Yes	Yes

Rationale

Good information exists on the impact of the UoA on ecosystem components (primary, secondary and ETP species, and habitats) and this continues to be collected as described in the corresponding Performance Indicators, above. In addition, there is a good body of knowledge on the main consequences of fishing on feature-associated spawning aggregations specifically, and of the main consequences of fisheries operating within the SESSF on ecosystem components and elements more generally (e.g. Fulton et. al 2014, Wayte et. al. 2007)). In the ERA process, information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.

- Impacts on ecological communities
- Benthic communities
- Ecologically related, associated or dependent species
- Water column communities
- Impacts on food chains
- Structure
- Productivity/flows
- Impacts on the physical environment
- Physical habitat
- Water quality

This body of information is sufficient to allow the main consequences for the ecosystem to be inferred, meeting the SG100.

Monitoring				
e	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		Yes	No

Rationale

Information on ecosystem components is collected continually and ecological risk assessment is regularly carried out within this fishery and region. This is sufficient to reach at least the 80 level for this scoring issue.

References

Commonwealth of Australia (2015). South-east marine region profile. A description of the ecosystems, conservation values, and uses of the South-east Marine Region. June 2015. Accessed at: <https://www.environment.gov.au/system/files/resources/7a110303-f9c7-44e4-b337-00cb2e4b9fbf/files/south-east-marine-region-profile.pdf>

Fulton EA, Smith ADM, Smith DC, Johnson P (2014) An Integrated Approach Is Needed for Ecosystem Based Fisheries Management: Insights from Ecosystem-Level Management Strategy Evaluation. PLoS ONE 9(1): e84242. <https://doi.org/10.1371/journal.pone.0084242>

Fulton, E.A., Bax, N.J., Bustamante, R. H., Dambacher, J. M., Dichmont, C., Dunstan, P. K., Hayes, K. R., Hobday, A. J., Pitcher, R., Pleganyi, E. E., Punt, A. E., Savina-Rolland, M., Smith A. D. M., Smith, D. C. (2015). Modelling marine protected areas: insights and hurdles. Phil. Trans. R. Soc. B 380: 20140278.

Hiddink, J. G., Jennings, S., Sciberras, M., Szosteka, C.L., Hughes, K. M., Ellis, N., Rijnsdorpe, A.D., McConnaughey, R. A., Mazor, T., Hilborn, R., Collie, J. S., C., Pitcher, R., Amoroso, R. O., Parma, A. M., Suuronen, P., and Kaiser, M. J. (2017). Global analysis of depletion and recovery of seabed biota after bottom trawling disturbance. PNAS V. 114(21): 8301-8306.

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	90
Condition number (if relevant)	

10 Principle 3: Management System Background

10.1.1 Legal and Customary Framework (PI 3.1.1)

As a matter of Australian domestic law, the Offshore Constitutional Settlement provides for the Australian states and the Northern Territory to manage fisheries out to 3 nautical miles from the coast, and for the Australian Government to manage fisheries from three to 200 nautical miles. The settlement is not set out in one single document but is found in the legislation that implements it. However, these default arrangements are frequently varied through instruments known as Offshore Constitutional Settlement (OCS) arrangements.

The OCS provided for the Commonwealth, the States and the NT to agree to adjust these arrangements by passing management responsibility for particular fisheries exclusively to the Commonwealth or to the adjacent States/Northern Territories (NT); or alternatively, for the Commonwealth and the States/NT to jointly manage a fishery in waters relevant to the Commonwealth and one or more States/NT (Borthwick, 2012).

These arrangements require the Australian Government Minister responsible for fisheries (the Commonwealth Member) and the relevant State/NT Government Minister administering the state legislation relating to marine fishing (the State Member) to administer fisheries in the respective zones.

There are currently 59 OCSs in place. These include an arrangement between the Commonwealth of Australia, and these include OCS agreements with Queensland, New South Wales (NSW), Victoria, Tasmania, South Australia (SA), and Western Australia (WA). Gazette S 531, 1996 demarcates management responsibility for the fishery for finfish to be managed under Commonwealth Law in waters relevant to Tasmania. These are binding arrangements requiring both State and Commonwealth to implement fisheries management arrangements in their respective jurisdictions.

Australia is a signatory to a number of international agreements and conventions (which it applies within its EEZ), such as:

- *United Nations Convention on the Law of the Sea* (regulation of ocean space);
- *Convention on Biological Diversity and Agenda 21* (sustainable development and ecosystem-based fisheries management);
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES; protection of threatened, endangered and protected species);
- *Code of Conduct for Responsible Fisheries* (standards of behaviour for responsible practices regarding sustainable development);
- *United Nations Fish Stocks Agreement*; and
- State Member of the *International Union for Conservation of Nature* (marine protected areas).

The *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*⁶ is the Australian Government's (hereafter referred to as the 'Commonwealth Government') central piece of environmental legislation. The EPBC Act is administered by the Commonwealth Department of Agriculture Water and the Environment (DAWE) and provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as matters of national environmental significance. DAWE is responsible for acting on international obligations on a national level, by enacting policy and/or legislation to implement strategies to address those obligations.

The Commonwealth DAWE, through the Commonwealth Minister, has a legislative responsibility to ensure that all managed fisheries undergo strategic environmental impact assessment before new management

⁶ <http://www.environment.gov.au/epbc>

arrangements are brought into effect; and all fisheries in Australia from which product is exported undergo assessment to determine the extent to which management arrangements will ensure the fishery is managed in an ecologically sustainable way in the long term.

All Commonwealth managed fisheries conform to Commonwealth Government fisheries and environmental law, including the EPBC Act. The SET Orange Roughy Fishery is located in the Australian EEZ outside of 3 nautical miles, from New South Wales, south around Tasmania and west to southern Western Australia. The fishery is managed by the Australian Fisheries Management Authority (AFMA)⁷ in accordance with the *Fisheries Management Act 1991* (FMA) of 1991 and *Fisheries Management Regulations 1992*, the *Fisheries Administration Act 1991* and the *Fisheries (Administration) Regulations 1992*. Commonwealth-managed fisheries are also subject to aspects of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the *Environment Protection and Biodiversity Conservation Regulations 2000*. The SESS fisheries have been assessed using the Australian National ESD Framework for fisheries, in particular, the *Guidelines for the Ecologically Sustainable Management of Fisheries*, 2007 (DOEE, 2007). The ESD includes the principles of ecologically sustainable target and bycatch species, ecological viability of bycatch species, and impact of the broader marine ecosystem.

The above laws created a statutory authority model for fisheries management whereby day-to-day management of fisheries are vested with AFMA, with the broader fisheries policy, international negotiations and strategic issues being administered by DAWR⁸. The *Fisheries Administration Act* establishes AFMA to manage Commonwealth fisheries. The overall objectives of the FMA 1991 form the basis for the management of all Commonwealth fisheries. The key EPBC Act 1999 requirements that apply relate to the need for a strategic assessment of the fishery management arrangements, and the management of protected areas and species.

Key aspects of the policy framework for Commonwealth fisheries are articulated in:

- The AFMA Corporate Plan (2015-2018)
- Commonwealth Fisheries Harvest Strategy Policy (DAWR, 2018).

Sections 161 and 165 of the FMA provide appeal rights for decisions taken by AFMA through administrative means (internal AFMA review, appeal to the Administrative Appeals Tribunal and the Statutory Fishing Rights Allocation Review Panel) and judicial means through appeal to the Federal Court. Australian Fisheries Management Authority decisions to apply the precautionary principle have been upheld in a number of cases, following referral to the Administrative Appeals Tribunal (AAT) (Weier & Loke, 2007). Fishers are advised of their appeal rights and the processes involved. In addition to these processes, the consultation and advisory processes established by AFMA provide mechanisms for the airing and discussion of different perspectives on fisheries management issues by stakeholders. Legal advice on management and appeals is provided by legal expertise within AFMA and by external, independent legal advisers as required.

The consultation and decision-making process in place actively seeks to avoid legal challenges. Five forms of dispute resolutions are as follows (Mark Lindsey Temple, AFMA, pers com, 14 February 2017, cited in MRAG, 2018).

(1) Sections 161 and 165 of the FMA provide appeal rights for decisions taken by AFMA through administrative means (internal AFMA review, appeal to the Administrative Appeals Tribunal and the Statutory Fishing Rights Allocation Review Panel (SFRARP)) and judicial means through appeal to the Federal Court (AFMA, undated). The allocation system would initially appear in the draft Management Plan which is subject to extensive consultative arrangements, consideration of submissions, determination by AFMA and acceptance by the Minister. These dispute resolution mechanisms have been tested (Weier & Loke, 2007) and proven to be effective. Cases such as *Arno Blank vs AFMA*⁹ challenged the application of

⁷ <http://www.afma.gov.au/>

⁸ <http://www.daff.gov.au/fisheries>

⁹ <http://www.austlii.edu.au/au/cases/cth/AATA/2000/1027.html>

the precautionary principle. AFMA's application of the precautionary principle was upheld. Similarly, the allocation of SFRs in various fisheries have been challenged in court (Nick Reyns, pers. comm, December 2019).

(2) Plans of Management (made pursuant to section 17) where AFMA must, in writing, after consultation and after giving due consideration to any representations mentioned in subsection (3), determine plans of management for all fisheries. Before determining a plan of management for a fishery, AFMA must prepare a draft of the plan and, by public notice: (a) state that it intends to determine a plan of management in respect of the fishery; and (b) invite interested persons to make representations in connection with the draft plan by a date specified in the notice, not being less than one month after the date of publication of the notice in the Gazette;

(3) Fishers are advised of their appeal rights and the processes involved. In addition to these processes, the consultation and advisory processes established by AFMA provide mechanisms for the airing and discussion of different perspectives on fisheries management and arguably serve to avoid potential legal disputes. Legal advice on management and appeals is provided by legal expertise within AFMA and by external, independent legal advisers as required. Historically a legal challenge was made to Northern Prawn Fishery 1989 Management Plan in relation to the compulsory reduction in effort within the fishery. The main arguments were that the amendments to the plan to implement the reduction in effort were ultra vires, and the restructuring program represented an acquisition of rights on unjust terms under the constitution. The challenge was unsuccessful (Josh Fielding, AFMA, email of 21/12/2011, cited in MRAG, 2018).

(4) AFMA has set out a Client Service Charter (<https://www.afma.gov.au/about/corporate-publications/afmas-client-service-charter/7>) which sets out AFMA's service commitments accord with the Australian Public Service Values and Code of Conduct and provides for any deficiencies in AFMA's administration to the attention of the Commonwealth Ombudsman have certain fisheries management decisions.

A system or mechanism to formally commit to the legal rights created explicit or established by custom on people dependent on fishing for food (non-commercial use) is enshrined in the *Native Title Act, 1993*". This allows for special provision for 'traditional fishing' to be made where they might apply in the context of both Commonwealth and State Fisheries Law. The SET Orange Roughy fishery is a specialist offshore commercial fishery so is not affected by this Law. Indigenous rights are considered in the context of *The Aboriginal Land Act 1978 (NT)* 12(1)¹⁰ which empowers the Administrator to close the seas adjoining and within 2km of Aboriginal land to others who are not Aborigines entitled by tradition to enter and use the seas in accordance with that tradition. Before doing so he may (and in case of dispute he must) refer a proposed sea closure to the Aboriginal Land Commissioner.

10.1.2 Roles and Responsibilities and Consultation (PI 3.1.2)

AFMA is a statutory authority with policy input being provided to the Minister via DAWE. All aspects of the fishery management system including the research, surveys, stock assessments, harvest strategies, and management controls are controlled by AFMA.

The Commonwealth model of fisheries management has a number of features that distinguish it from many other countries, the most prominent of which is the partnership approach with industry and other stakeholders. Under this model, the involvement of industry is recognised as being vital to successful fisheries management. For administrative purposes, AFMA has grouped the fishery resources in the Australian Fishing Zone into 21 fisheries that are identified by species, fishing method and/or area.

AFMA's responsibilities are shared between a Commission and the Chief Executive Officer:

- The Commission is responsible for domestic fisheries management.

¹⁰ <http://www.austlii.edu.au/au/legis/nt/consolact/ala126/s12.html>

- The Chief Executive Officer is responsible for foreign compliance, and for assisting the Commission and giving effect to its decisions.
- The Chief Executive Officer is responsible for the agency that supports these functions.

The CEO is also a Commissioner and is appointed on a full-time basis. All other Commissioners are appointed on a part-time basis. Appointments are made by the Australian Government Minister responsible for fisheries (currently the Agriculture Minister).

Commissioners are appointed on the basis of their high level of expertise in one or more of the fields of fisheries management, fishing industry operations, science, natural resource management, economics, business or financial management, law, public sector administration or governance. Commissioners cannot hold any executive position in a fishing industry association, nor can they have a controlling interest or executive role in any entity holding a Commonwealth fishing concession. The current eight Commissioners were appointed on 1 July 2019 for terms of office varying from 3 to 5 years.

The Minister tends to set the policy framework (e.g., see the Ministerial Direction) – the Commissioners oversee the application of the framework in Commonwealth managed fisheries and for ensuring that adequate resources and expertise are available to meet AFMA's legislative obligations. The Commission has three committees to assist in the conduct of its business: The Finance and Audit Committee, the Research Committee and the Environment Committee. The outcomes of Commission meetings are reported to stakeholders as well as to the public through the AFMA website.

As part of AFMA's partnership approach to fisheries management, it has established Management Advisory Committees (MACs) for each major fishery that it manages. MACs are AFMA's main point of contact with client groups in each fishery and play an important role in helping AFMA to fulfil its legislative functions and pursue its objectives. The Committees provide advice to AFMA on a variety of issues, including on-going measures required to manage the fishery, the development of management plans, research priorities and projects for the fishery. The MACs are also charged with ensuring that processes are in place for industry and other interested stakeholders to receive advice from researchers in a form appropriate to the audience.

Roles and responsibilities and advice about operation and participation in MACs and Resource Assessment Groups (RAGs) are provided in:

- Management Advisory Committee, Fisheries Management Paper. No 1 (AFMA, 2018a)
- Fisheries Administration Paper (FMP) No.7 - Information and Advice for Industry Members on AFMA Committees (AFMA, 1999).
- Fisheries Administration Paper Series No. 12 Resource Assessment Groups - Roles, Responsibilities and Relationship with Management Advisory Committees (AFMA, 2018b)

The MACs are intended to complement the work of fishery managers by providing a broader perspective on management options and a wide range of expertise. MACs therefore provide a forum where issues relating to a fishery are discussed, problems identified, and possible solutions developed. The outcomes of these deliberations determine the recommendations that the MAC will make to the AFMA Commission. AFMA's legislation limits the number of members on a MAC to ten, in addition to the Chairperson and an AFMA officer. Increasingly, and where appropriate, AFMA has included a broader range of interest groups in this consultative process. The AFMA Commission decides on a fishery-by-fishery basis whether membership of a MAC should also reflect these wider community interests. As a general rule, revised membership arrangements are considered upon expiry of terms of appointment of existing members. Specific arrangements are being made to review the role of recreational and indigenous groups on each MAC.

The MAC that covers the management of the CTS is known as the South East Management Advisory Committee (SEMAC), and includes three fisheries, the Southern and Eastern Scalefish and Shark Fishery (SESSF), of which the SET fishery is a subset. There are currently seven statutory members of SEMAC comprising the Chairman, four from industry, one from the conservation community, a research member, and an AFMA Member (usually the Fishery Senior Manager). Historically, with SEMAC State Government

representatives (New South Wales, Tasmania, and Victoria) attend as invited observers. A recreational stakeholder on SEMAC is statutory but has not yet to be filled. Recreational representatives also attend as invited observers. Invited Observers usually include one or more AFMA Commissioner, CSIRO scientists, and a representative from ABARES. Invited observers can also include indigenous representatives.

The first meeting of SEMAC was held in 2009 Minutes of SEMAC meetings are publicly available on the AFMA website¹¹.

SEMAC is made up of key stakeholders (see above). AFMA Commission decides on a fishery-by-fishery basis whether membership of a MAC should also reflect these wider community interests. The Government of Australia enacted the *Fisheries Legislation Amendment (Representation) Act, 2017*, in order to ensure effective representation of indigenous and recreational fishing interests onto MACs. Discussions are presently ongoing with the MAC, which would allow for permanent representation of both recreational and indigenous representative as full members on each MAC.

RAG membership, roles, criteria, and appointment process are set out in Fisheries Administration Paper 12. (https://afma.govcms.gov.au/sites/g/files/net5531/f/fap12_to_reflect_legislative_changes_and_economic_advice_-_october_2018.pdf). There are provisions for appointment of a conservation member to the RAG, see Section 4.2.6. FAP 12 was revised in October 2018, before this time there was no provision for a specific RAG Conservation Member, and there is no record of conservation interests attending the RAG. However, if “non-members wish to attend meetings from time to time as an observer, their attendance at the meeting is at the discretion of the RAG Chair in consultation with AFMA”. Other regular attendees to SERAG meetings include AFMA, CSIRO, State’s Fishery Departments, Industry Members and the Industry Associations.

A new co-management arrangement was made in May 2020, between the Australian Fisheries Management Authority (AFMA) and the South East Trawl Fishing Industry Association (SETFIA), including a new Seine and Trawl Advisory Group (STAG) to provide expert advice on operational aspects of the Commonwealth Trawl Sector (CTS) to better inform fisheries management decisions made by AFMA and the AFMA Commission. The advisory group is to meet twice yearly, and its members will include trawl operators from across the CTS, a hook operator, and representation from AFMA.

AFMA formally consults with key stakeholder groups and the broader community through public comment opportunities which are advertised on AFMA’s website. AFMA also conducts species workshops, port visits, pre-season briefings and management meetings that are attended by a range of representative groups.

In addition to the opportunities for stakeholder engagement provided by the MACs, AFMA provides opportunities for public comment on fisheries management plans; requires each MAC to hold an annual public meeting; and holds around half of AFMA’s Commission meetings in regional centres providing opportunities for direct access to AFMA Commissioners by stakeholders and the general public.

DAWR provided the opportunity for stakeholder consultation. on key non-specific Commonwealth fishery policy areas such as harvest strategy development and bycatch management plans, Bodies consulted included the commercial fishing industry, environmental non-government organisations, the recreational fishing industry, state fisheries departments, scientific research organisations and government organisations. Throughout the consultation process, information about the review and how to make a submission was available online and in hardcopy on request. The review was advertised in several mediums including the Fisheries Research and Development Corporation’s Fish Magazine and the AFMA website. The public consultation period was open for six weeks to give stakeholders the opportunity to consider their submissions and provide input. DAWR consulted government, the commercial fishing industry, environmental non-government organisations, the recreational fishing industry, state fisheries departments, scientific research organisations and government organisations. The department also developed a discussion

¹¹ <https://afma.govcms.gov.au/fisheries/committees/south-east-management-advisory-committee-semac/south-east-mac-past-meetings>

paper for public consultation, as part of the review process. The discussion paper was released in November 2012 for a 6-week public consultation period.

A final report on the review outcomes is available on:

<http://www.agriculture.gov.au/SiteCollectionDocuments/fisheries/environment/bycatch/report-harvest-strategy.pdf>

10.1.3 Long Term Objectives (PI 3.1.3)

Clear long-term objectives are explicit in Australia's Commonwealth environmental and fisheries laws.

Commonwealth Fisheries Management Act, 1991 (GoA 1991) requires that all State Governments conform to the following objectives:

- (a) ensuring, through proper conservation and management measures, that the living resources of the Australian Fishing Zone (AFZ) are not endangered by over-exploitation; and
- (b) achieving the optimum utilisation of the living resources of the AFZ; and
- (c) ensuring that conservation and management measures in the AFZ and the high seas implement Australia's obligations under international agreements that deal with fish stocks.

The following principles are *principles of ecologically sustainable development as defined in the Act*:

- (a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations;
- (b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- (c) the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;
- (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making; and
- (e) improved valuation, pricing and incentive mechanisms should be promoted.

The National Strategy for Ecologically Sustainable Development (DOE, 1992a) requires that fisheries management agencies throughout Australia to adopt a fisheries ecosystem management framework which will provide a more holistic and sustainable approach to management of aquatic resources. Governments will seek to enhance the decision-making capacity of management authorities, resource users and individuals, in particular through enabling them to make decisions that are based on knowledge of the likely consequences for the resource and the environment. Elements of a fisheries ecosystem management approach include: data collection and research on fish stocks and environmental factors to enhance management on an ecosystem basis; steps to address cross-sectoral issues between coastal management, total catchment management and fisheries management; awareness and education campaigns, for both users and the general public; and development of strategic management plans, framed within the principles of ESD, in conjunction with rationalisation of fishing capacity and over exploited fisheries. The principle objectives of the strategy are:

- to ensure that fisheries management agencies work within a framework of resource stewardship
- to develop national guidelines for state of the aquatic environment reporting
- to disseminate information on the principles of ESD to fishers and the wider community

State Governments are then required to review, and where necessary amend, fisheries legislation to ensure it provides the basis for managing the fishery resource in ways which are consistent with the principles of ESD; conduct a review of fishing fleet capacity by fisheries management authorities; examine mechanisms for addressing the prioritisation of scientific and economic research activities to help research agencies coordinate their programs and direct their scarce resources to areas of greatest importance; cooperatively

work to resolve management boundaries between the Commonwealth and the States/Territories, and between adjoining States and Territories, on a biological/ecological basis; seek to involve representatives from the fisheries industry in discussions on prioritisation of research and resolution of management boundaries; seek to formalise international commitments covering fishing on the high seas, driftnetting, reductions in land-based sources of marine pollution, shipping standards and implementation of the United Nations Convention on the Law of the Sea.

The Intergovernmental Agreement on the Environment, 1992 (DOE, 1992b) requires that where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by careful evaluation to avoid, wherever practicable, serious, or irreversible damage to the environment, and an assessment of the risk-weighted consequences of various options.

The Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act) (DOE, 1999) is the Australian Government's central piece of environmental legislation and provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as matters of national environmental significance. Its objectives are:

- to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; and
- to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources;
- to apply the precautionary principle in decision making
- to promote the conservation of biodiversity;
- to provide for the protection and conservation of heritage; and
- to promote a co-operative approach to the protection and management of the environment involving governments, the community, landholders and Indigenous peoples; and
- to assist in the co-operative implementation of Australia's international environmental responsibilities; and
- to recognize the role of Indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and
- to promote the use of Indigenous people's knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

The long-term objectives that must be pursued by AFMA in the management of Commonwealth fisheries are prescribed in the *Fisheries Management Act 1991*. These are:

- (a) implementing efficient and cost-effective fisheries management on behalf of the Commonwealth; and
- (b) ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development (which include the exercise of the precautionary principle), in particular the need to have regard to the impact of fishing activities on non-target species and the long-term sustainability of the marine environment; and
- (c) maximising the net economic returns to the Australian community from the management of Australian fisheries; and
- (d) ensuring accountability to the fishing industry and to the Australian community in AFMA's management of fisheries resources; and
- (e) achieving government targets in relation to the recovery of the costs of AFMA.

In addition, the Act specifies that the Minister, AFMA and Joint Authorities are to have regard to the objectives of:

- (a) ensuring, through proper conservation and management measures, that the living resources of the AFZ are not endangered by over-exploitation; and
- (b) achieving the optimum utilisation of the living resources of the AFZ; and
- (c) ensuring that conservation and management measures in the AFZ and the high seas implement Australia's obligations under international agreements that deal with fish stocks.

To assist AFMA in the application of these objectives, the Australian Government also made changes to both the *Commonwealth Fisheries Harvest Strategy Policy* ("the Policy") (DAWR, 2018a) and the *Commonwealth Fisheries Bycatch Policy*

The objective of the Policy is the ecologically sustainable and profitable use of Australia's Commonwealth commercial fisheries resources (where ecological sustainability takes priority)—through implementation of harvest strategies.

To pursue this objective the Australian Government will implement harvest strategies that:

- ensure exploitation of fisheries resources and related activities are conducted in a manner consistent with the principles of ecologically sustainable development, including the exercise of the precautionary principle
- maximise net economic returns to the Australian community from management of Australian fisheries—always in the context of maintaining commercial fish stocks at sustainable levels
- maintain key commercial fish stocks, on average, at the required target biomass to produce maximum economic yield from the fishery
- maintain all commercial fish stocks, including byproduct, above a biomass limit where the risk to the stock is regarded as unacceptable (BLIM), at least 90 per cent of the time
- ensure fishing is conducted in a manner that does not lead to overfishing—where overfishing of a stock is identified, action will be taken immediately to cease overfishing
- minimise discarding of commercial species as much as possible
- are consistent with the *Environment Protection and Biodiversity Conservation Act 1999* and the *Guidelines for the Ecologically Sustainable Management of Fisheries* (2nd edition).

The Bycatch Policy aims to minimise fishing-related impacts on general bycatch species in a manner consistent with the principles of ecologically sustainable development and regarding the structure, productivity, function and biological diversity of the ecosystem.

To pursue this objective the Australian Government will implement bycatch mitigation strategies for general bycatch species that:

- draw on best-practice approaches to avoid or minimise all bycatch, and minimise the mortality of bycatch that cannot be avoided
- manage fishing-related impacts on general bycatch species to ensure that populations (that is, discrete biological stocks) are not depleted below a level where the risk of recruitment impairment is regarded as unacceptably high
- in instances where fishing-related impacts have caused a bycatch population to fall below a level where the risk of recruitment impairment is regarded as unacceptably high, implement management arrangements to support those populations rebuilding to biomass levels above that level.

The AFMA Bycatch Strategy (the Strategy) (AFMA, 2017) has been developed to provide consistency in and guide the management of bycatch across all Commonwealth fisheries. The Strategy aims to achieve more consistency, transparency and practicality to bycatch management and improved monitoring and reporting of bycatch interactions in Commonwealth fisheries.

The Strategy establishes guiding principles that AFMA will use in identifying bycatch issues in order to minimise and avoid bycatch of protected and general species. These principles have been developed to provide a consistent approach to management decisions while remaining flexible enough to tailor these

decisions and responses for different gear types, spatial and temporal variations and degree of risk identified in the ecological risk assessment for the fishery. The five guiding principles are:

- Principle 1. Management responses are proportionate to the conservation status of bycatch species and Ecological Risk Assessment results
- Principle 2. Consistency with Government Policy and legislative objectives (including to avoid and minimise) and existing national protected species management strategies such as the threat abatement plan and national plans of action
- Principle 3. Incentives should encourage industry-led solutions to minimise bycatch of protected species utilising an individual accountability approach
- Principle 4. Accounting for cumulative impact of Commonwealth Fisheries on protected species when making management decisions on mitigation
- Principle 5. Appropriate and consistent monitoring and reporting arrangements across fisheries.

The primary management instrument for most fisheries is a statutory fishery management plan developed under the FMA. Fishery level objectives, as specified in management plans, are the same as the longer-term strategic objectives specified in the FMA. Each Plan incorporates measures that seek to achieve stock sustainability, maximising net economic returns and application of the EAFM.

All Commonwealth fisheries are also required to comply with relevant requirements of the EPBC Act. The objectives of the EPBC Act are to:

- provide for the protection of the environment, especially matters of national environmental significance
- conserve Australian biodiversity
- provide a streamlined national environmental assessment and approvals process
- enhance the protection and management of important natural and cultural places
- control the international movement of plants and animals (wildlife), wildlife specimens and products made or derived from wildlife
- promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources

One of the main provisions of the EPBC Act relating to fisheries is the strategic assessment process. Environmental Guidelines for Ecologically Sustainable Management of Fisheries (DEE, 2007):

The fishery shall be conducted at catch levels that maintain ecologically stock levels at an agreed point or range with acceptable levels of probability. The objective is subdivided into assessment, management response and information, all of which are entirely consistent with the scoring PIs as set out in MSC principle 1;

Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

The guidelines contain core objectives, accompanied by stipulated measurable indicators, which are consistent with MSC principle 2.

- The fishery is conducted in a manner that does not threaten bycatch species.
- The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities
- The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally.

Each of these objectives contains associated performance indicators on information requirements, assessments and management responses.

10.1.4 Fishery Specific Management Objectives (PI 3.2.1)

Southern and Eastern Scalefish and Shark Fishery Management Plan 2003 reinforces the long-term objectives of the FMA as the long-term objectives of the Plan. Fishery specific (short-term) objectives are identified in the *Southern and Eastern Scalefish and Shark Fishery Harvest Strategy Framework 2009* (amended 2017), and these are reviewed on a regular basis. The short-term objectives within the Harvest Strategy include:

- Principles for recommending TACs and Recommended Biological Catches (RBCs)
- Assessment and monitoring;
- Harvest Strategy Framework
- Decision Rules and Reference Points
- Review

The Strategy contains well defined measurable indicators, with supporting key performance indicators:

- Indicators (data from the fishery)
- Monitoring (agreed protocols to get data)
- Reference points (targets and limits)
- Method of assessment (e.g. stock assessment, Catch per Unit of Effort (CPUE) standardisation)
- Decision rules (agreed rules for setting catch levels).

Clause 5 of the plan outlines the fishery specific long-term objectives. The specific biological, socio-economic and ecosystem objectives outlined in the SESSF Harvest Strategy. Biological objectives include:

- To maintain stocks at (on average), or return to, a target biomass point BTARG or equivalent proxy (e.g. FTARG or CPUETARG) equal to the stock size that aims to maximise net economic returns for the fishery as a whole.
- To maintain stocks above the limit biomass level, or an appropriate proxy, at least 90% of the time.
- A reduced level of fishing if a stock is below BTARG but above BLIM (or an appropriate proxy).
- To implement rebuilding strategies, no-targeting and incidental bycatch TACs if a stock move below BLIM (or an appropriate proxy).
- To ensure the sustainability of fisheries resources, including consideration of the individual fishery circumstances and individual species or stock characteristics, when developing a management approach.

Socio-economic objectives include:

- To maintain stocks at (on average), or return to, a target biomass point BTARG equal to the stock size that aims to maximise net economic returns for the fishery as a whole.
- To maximise the profitability of the fishing industry and the net economic returns to the Australian community.
- To minimise costs to the fishing industry, including consideration of the impacts on the industry of large or small changes in TACs and the appropriateness of multi-year TACs.

The primary objective of the 2014 Orange Roughy Rebuilding Strategy (AFMA 2014) is to rebuild orange roughy stocks to levels where they can be harvested in an ecologically sustainable manner consistent with the Commonwealth Fisheries Harvest Strategy Policy 2007 (HSP) and ultimately maximise the economic returns to the Australian community.

Specific objectives of the Strategy are:

- to rebuild orange roughy stocks in the area of the SESSF to the limit reference biomass point (BLIM) of 20 per cent of the unfished spawning biomass within a biologically reasonable time frame; being

one mean generation time (56 years) plus 10 years (66 years) from the start of the ORCP. That is, to reach BLIM by no later than 2072;

- having reached BLIM, rebuild these stocks to the maximum sustainable yield biomass level of 40 per cent of the unfished spawning biomass (BMSY) using the harvest control rules outlined in the SESSF Harvest Strategy Framework. These harvest control rules provide for a restricted TAC to allow limited fishing whilst rebuilding from BLIM to BMSY; and
- once BMSY is reached, pursue the default maximum economic yield biomass level of 48 per cent of unfished spawning biomass (BMEY).

To be able to fish within the SESSF, AFMA must allocate Statutory Fishing Rights (SFR). In the SESSF, SFRs allow the holder to take a particular quantity of fish (quota SFR) or use a boat in the fishery (boat SFR). The amount of quota an operator is allocated depends on the amount of rights they hold, with the ability of a SFRs to be permanently transferred to another person or company or leased. This may also be known as individually transferable quota.

In the Commonwealth South East Trawl Sector (SET) there are currently 57 SFRs. A quota species such as orange roughy requires a quota SFR and a Trawl Boat SFR to allow a fisher to use a nominated boat in an area of the fishery using specified methods.

Fishing permits are granted for the fishing year and contain conditions the permit holder must comply with. The conditions are prescribed in the *Fisheries Management Regulations 1992* and Sections of the plan that must be complied with as well as certain obligations pertaining to finfish, sharks, quota balancing, observer/monitoring, directions, temporary orders, navigating in closed zones, gear limitations and seabird management plans.

The SESSF is a complex multi-sector, multi-species fishery. Orange roughy are targeted as part of the CTS which is managed using a mix of input and output controls that are reviewed annually. The entire orange roughy fishery is divided into nine Orange Roughy Management Areas. The eastern stock only applies to the eastern OR zone plus the Pedra Branca ORMA. The other stocks are managed separately to the eastern stock. The following general management measures are currently in place:

- Limited entry fishery
- Statutory Fishing Rights (SFR Quota and Boat) can be permanently transferred or leased to another person or company
- Operators must hold a fishing permit which prescribes the area in which to fish, permitted method (Boat SFR) and if fishing for quota species, relevant quota holdings for that species (Quota SFR)
- Trip limits
- Total Allowable Catch (TAC) for each quota species and certain non-quota species
- Gear restrictions – mesh size specifications, codend requirements, bycatch reduction devices
- Implementation of a Seabird Management Plan
- Prohibited species
- Spatial and temporal closures
- Navigation regulations that require boat to maintain a speed over 5 knots when navigating in a closure
- Nominated boat must be fitted with a Vessel Monitoring System
- Incidental catch limits and size limits
- Fish Receiver permits are required, and permit holders must complete the catch and disposal record
- Logbooks, catch and disposal forms and transit forms must be completed by operators or nominated authorized agent and submitted to AFMA (by post or electronically)
- AFMA Observers.

The AFMA SESSF Management Booklet 2019 describes specific management arrangements for the eastern ORMA (in the Eastern zone) and the Pedra Branca ORMA (Southern zone). 100 per cent AFMA observer coverage is required for the first three trips on boats while fishing in the eastern and Pedra Branca ORMA during the period 1 June to 31 August each year. Where the master (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 will only be required on the first trip and every second trip thereafter. The fishing concession holder must:

- Give the AFMA Observer section at least 72 hours notice of an intention to depart on a fishing trip
- Not fish unless an AFMA Observer is carried onboard the nominated boat.
- Permit holders must complete the catch and disposal record.
- Before entering or fishing in the EORMA hold a minimum of 30 tonnes of uncaught orange roughy (eastern) quota for that fishing year
- To remain fishing in the EORMA must hold a minimum of 2.5 tonnes of uncaught orange roughy (eastern) quota at all times for that fishing year
- Before entering or fishing in the PBORMA hold a minimum of 10 tonnes of uncaught orange roughy (southern) quota for that fishing year
- To remain fishing in the EORMA must hold a minimum of 500 kilograms of uncaught orange roughy (southern) quota at all times for that fishing year.

The SESSF Harvest Strategy Framework 2015 (HSF) is another tool that sets out the management actions necessary to achieve defined biological and economic objectives and the rules applied to determine the recommended total allowable catches. Importantly, the HSF Guidelines also describe the processes for amending harvest strategies under certain circumstances. For example, external drivers may increase the risk to a fishery and fish stocks. In such cases, it may be necessary to amend the harvest strategy to reduce fishing intensity.

A by-catch work plan conforms to the requirements as laid down in the EPBC Act, 1999 and the Guidelines for the Ecologically Sustainable Management of Fisheries, 2007. Objectives of the Work Plan include:

- information gathered about the impact of the fishery on by-catch species; and
- all reasonable steps are taken to minimise incidental interactions with seabirds, deepwater sharks, marine mammals and fish of a kind mentioned in sections 15 and 15A of the Act; and
- the ecological impacts of fishing operations on habitats in the area of the fishery are minimised and kept at an acceptable level; and
- by-catch is reduced to, or kept at, a minimum, and below a level that might threaten by-catch species.

Work Plan strategies include:

- Respond to high ecological risks assessed through AFMA's Ecological Risk Assessment for the Effect of Fishing (ERAEF) and other assessment processes;
- Avoid interactions with species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Reduce discarding of target species to as close to zero as practically possible; and
- Minimise overall bycatch in the fishery over the long-term.

The Bycatch and Discarding Workplan identifies four focus areas:

- Reduce the number of high risks assessed through AFMA's Ecological Risk Assessment process
- Avoid interactions with species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Reduce discarding of target and non-target species to as close to zero as practically possible
- Minimise overall bycatch in the fishery over the long-term.

10.1.5 Decision-Making Processes (PI 3.2.2)

The Australian Government delegates AFMA to implement management decisions in respect to all Commonwealth Fisheries (FMA, 1991). Decisions on the implementation of the policy are taken by the AFMA Commission, following advice from SEMAC, as well as AFMA officers. AFMA Commission meeting records are not made public however a Chairman's summary outlining decision outcomes and justifications are made public on the AFMA website (<https://www.afma.gov.au/61st-afma-commission-meeting-chairmans-summary>) following meetings. Further, SEMAC receives a letter from the Commission outlining decisions made on SET management recommendations, including explanations as to acceptance or rejecting of such recommendations.

The harvest strategies and control rules incorporate a precautionary approach to the decision-making process by requiring a review when the target reference level is not met. This ensures that any warning signs are recognised and investigated / addressed in their early stages. The frequency of evaluation (both annually and in-season) and review means that management action to investigate and, where required, alleviate adverse impacts on stocks is always taken before the performance indicators reach the limit reference level.

The application of the research, monitoring and evaluation within the SESSF Management Plan, Harvest Strategy and Bycatch Work Plan provides the tool to assess the relative risks to target species, bycatch and ETP species, initiating when appropriate, actions to deal with at risk species. Examples of precautionary actions include reducing the number of licensed vessels, establishing an MEY based management and closed areas.

AFMA and CSIRO provide a comprehensive range of reports which confirm fishery performance and how management has responded to findings from recommendations emerging from research, monitoring, evaluation and review activity (<https://www.afma.gov.au/fisheries/small-pelagic-fishery>). These include stock status reports; catch data including target species, byproduct (retained species), bycatch and ETP species; Ecological Risk Assessments; Sustainability assessment reports, and Harvest Strategy reviews.

Explanations are provided for actions or lack of actions by the organisations tasked with implementation. Failure to achieve the management reference levels is discussed at SEMAC and advice provided to AFMA. AFMA provide responses through the MAC how information is reviewed and the management decisions made (See South East Management Advisory Committee past meetings (<https://www.afma.gov.au/fisheries/committees/south-east-management-advisory-committee-semac>)). It then becomes the responsibility of AFMA to rectify failure to achieve specific management outcomes.

The Harvest Strategy (AFMA, 2018), Bycatch and Discards Workplan (AFMA, 2014) contain monitoring and performance indicators and provided the basis for incorporating relevant recommendations emerging from research, monitoring, evaluation and review activity.

The consultation and advisory processes ensure that the management system in the fishery acts proactively to avoid legal disputes. No legal challenges or judicial decisions have taken place in the SET Orange Roughy fishery. An appeals procedure exists to the Federal Court for Statutory Fishing Rights Allocations, but has not been tested within this fishery. The AAT and consultative processes, described above, shows how the management system or fishery acts proactively to avoid legal disputes.

10.1.6 Compliance and enforcement (PI 3.2.3)

The management system takes a risk-based approach to compliance (AFMA, 2017b). Compliance risk assessments are undertaken by the Operations Management Committee (AFMA, 2017c), and compliance plans are developed for each Commonwealth fishery (AFMA, 2018d). Primary compliance tools include vessel monitoring systems on all vessels (Vessel monitoring systems), landing reports, catch disposal records and fish receiver records. At-sea and in-port vessel inspection, fish receiver inspections, trip and landing inspections are also carried out.

AFMA compliance is subject to both internal (AFMA, 2018d) and external review (ANAO, 2013) and demonstrated to have been effective.

Compliance resourcing

AFMA adopts a centralised model for its domestic compliance program and delivers its program from Canberra. Compliance staff are also stationed at Darwin, Thursday and at Lakes Entrance.

Key components of the program include:

- compliance intelligence - collection, analysis and reporting of intelligence information to support the compliance function;
- risk assessment and planning - a biennial risk assessment process to assist in the targeted planning of compliance activities;
- communications - education and awareness activities to increase rates of voluntary compliance with fisheries management requirements;
- compliance monitoring - incorporating a planned general deterrence program, targeted activities addressing key identified compliance risks, and special operations to address specific issues or fishing operators; and
- enforcement - seeking to affect a timely and appropriate response to non-compliance.

Fisheries Officers (FO) undertake regular land and sea patrols using a compliance delivery model supported by a risk assessment process and associated operational planning framework. The SET ORF uses VMS and electronic monitoring as support to its monitoring activity and a combination of at sea patrols and port inspections.

AFMA applies a resourcing of the intelligence function, through development of intelligence reports and analytical tools to support the risk-based compliance approach and case management system to help ensure consistency in enforcement action

The Operations Division reviews the compliance risk assessments each year. The risk assessment process can also be triggered by the introduction of new supporting legislation¹² in a fishery / resource or the identification of any new major issues that would require compliance managers to assess their compliance program.

The SESSF is subject to a biennial National Compliance Risk Assessment (2019-21). The compliance risk assessment process identifies modes of offending, compliance counter measures and risks and relies on a weight-of-evidence approach, considering information available from specialist units, trends and issues identified by inspectors and priorities set AFMA. As outlined in the National Compliance and Enforcement Program, the risk assessment methodology sorts risks into three categories, as *Endemic*, *Sporadic* and *Bedding down* risks. Endemic risks require continuous monitoring and enforcement, when necessary. Sporadic risks include identified risks which require specific short-term treatment. Bedding down risks include risks which require targeted operations as a result of new or altered fisheries management arrangements. In addition to these three categories, a business as usual risk treatment program is also in place (for risks that require general maintenance throughout the time period).

The prioritised risks that are the focus of the 2019-21 program are:

- Quota evasion
- Bycatch mishandling
- Failure to report interaction / retention of protected or prohibited species

There were no prioritised sporadic or bedding down risks identified in the 2019-21 risk assessment. However, three additional business as usual risks were identified as needing continuous monitoring and action if necessary. These three risks relate to the SESSF and, by extension, orange roughy. These risks are:

- Vessel monitoring system and electronic monitoring system non-compliance
- Closure monitoring

¹² 'Supporting legislation' refers to any Regulation or Gazette that would allow non-compliance with the management framework to be detected and prosecuted with a reasonable chance of securing a conviction.

- Quota reconciliation

Like the three endemic risks noted above, these three business as usual risks are continuously monitored by the National Compliance Strategy section.

The Operations Manager Compliance (OMC) is responsible for the allocation of resources and the day-to-day direction of AFMA's national compliance program. Importantly, the OMC will be constantly balancing resources and making tradeoffs between risk treatment (proactive), investigation/monitoring (reactive) and general deterrence (routine) programs.

The allocated resources and compliance strategies (i.e. monitoring, surveillance and education activities), specifies planned hours and staff allocated to key compliance tasks and duties. This planning and delivery process allow for more-targeted, effective and relevant compliance service in terms of both cost and activities.

There is also flexibility within the region to allocate additional resources to respond to changes, such as the need for a planned tactical operation in response to fresh intelligence. Redirecting existing resources or seeking additional resources from other areas or units may achieve this. Similarly, changing priorities and resourcing on a local level can involve reducing planned delivery of compliance services to ensure resources are directed to where they are most needed.

FOs are formally appointed pursuant to the FMA, which clearly sets out their powers to enforce fisheries legislation, enter and search premises, obtain information and inspect catches. FOs are highly trained; they must have a thorough knowledge of the legislation they are responsible for enforcing and follow a strict protocol for undertaking their duties in accordance with FMA and in recording information relating to the number and type of contacts, offences detected and sanctions applied.

Operational planning

Compliance staff utilise a number of formal monitoring and surveillance activities and control mechanisms in the SET ORF.

Fisheries legislation forms the one component of the control system for commercial fisheries in the SET ORF, and these are applied through Licence conditions. The SET ORF is subject to controls under:

- *Fisheries Management Act, 1991* (Commonwealth)
- *Fisheries Management Regulations (Commonwealth), 1992*
- The EPBC Act (export exemptions)
- *Southern and Eastern Scalefish and Shark Fishery Management Plan 2003*
- The Fisheries Management (Total Allowable Catch – Quota Species)
- Fisheries Management (SET Fishery Overcatch)
- *The Southern and Eastern Scalefish and Shark Fishery and Small Pelagic Fishery (Closures) Direction 2016*
- Monitoring the effectiveness of the Bycatch and Discarding Work Plan and
- Licensing Conditions that embrace the above requirements.

A description of the control measures in place is provided in Table 15.

Table 15. Description of the control measures and instruments of implementation in the SET

Measure	Description	Instrument
Limited Entry	Entry is limited through restricting the number of boat Statutory Fishing Rights (SFR) in the relevant sub-area of the fishery.	Southern and Eastern Scalefish and Shark Fishery Management Plan 2003

Measure	Description	Instrument
Catch limits	TAC for target species TAC limits for some non-target species Catch limits for some by-product species	<i>Southern and Eastern Scalefish and Shark Fishery Management Plan 2003</i>
Vessel Management Plans	A VMP setting out the day-to-day operational rules that apply and includes measures primarily aimed at reducing interactions with protected species and reporting requirements.	Bycatch Work Plan
Spatial Closures	Spatial closures that apply to the mid- water trawl methods in the SET Fishery.	<i>The Southern and Eastern Scalefish and Shark Fishery and Small Pelagic Fishery (Closures) Direction 2016</i>
Spatial Management Arrangements	Benthic habitats and exclusion zones to protect orange roughy stocks	<i>Southern and Eastern Scalefish and Shark Fishery and Small Pelagic Fishery (Closures) Direction 2016</i>
Marine Parks	Demersal (bottom) Trawl are prohibited under the Commonwealth Marine reserve Closure. Refer to:	South East Network Management Plan
Non target species	Gear limits	Commonwealth Trawl Sector (Otterboard trawl & Danish Seine) - Bycatch and Discarding Workplan 2018 – 2019
Fisher Receiver Permits	Commonwealth operators dispose of landed fish to the holder of a Commonwealth Fish Receiver Permit (FRP).	<i>The Fisheries Management Regulations 1992</i>
VMS reporting	All boats nominated to the SET quota SFR is fitted with a Vessel Monitoring System (VMS)	Fisheries Management Act 1991
Reporting	Compulsory logbook reporting, , catch disposal records and fish receiver records.	<i>Fisheries Management Act 1991</i> <i>Fisheries Management Regulations, 1992</i>

Boardings take place at sea, where the primary activity is to check compliance with the license conditions and the application of. Ad hoc monitoring occurs on land to check on violations, as well as regular landing inspections. Actions may be determined as part of a regular review or through intelligence provided by industry.

The Division has also implemented an initiative called Crimefish¹³, whereby the community can report instances of suspected illegal fishing. The Crimefish phone line provides a confidential quick and easy way to report any suspicious activity to AFMA compliance staff.

Enforcement measures

The *Fisheries Management Act 1991* and Regulations allow for a range of enforcement measures. These measures (or tools) can be used in combination, separately or for particular types of incidents in order to achieve the most appropriate outcome. AFMA will use the range of measures available in its “toolbox” to achieve the most efficient and cost-effective outcome. As mentioned earlier, Vessel Monitoring System and closure monitoring represent the main tools used in the SET OR fishery along with quota reconciliation.

¹³ <http://www.afma.gov.au/monitoring-enforcement/report-illegal-fishing-activity/>

Quota reconciliation is monitored via electronic catch logbooks, catch disposal records and fish receiver records.

Boats currently entitled fish Orange Roughy do not currently use electronic monitoring. However, AFMA has commenced initial electronic monitoring (EM) trials for SESSF trawl boats and this management arrangement will likely be implemented soon.

Warnings

Verbal or written warnings may be given by a Fisheries Officer where the impact caused by an offence is minimal, the breach of a legislative instrument or regulation is of a minor technical nature a warning is fair and appropriate and the matter is one which can quickly and simply be addressed.

Warnings are used in the circumstance of a minor event. In deciding whether a warning is an adequate response the Fisheries Officer must have regard to the principles contained in the policy. Warnings may also be contained in a caution. Warnings (verbal or written) will be recorded for future reference.

Cautions

Written cautions may be given by a Fisheries Officer where:

- the impact caused by an offence is minor,
- the breach of a legislative instrument or regulation is minor or a “first occurrence”,
- a caution is fair and appropriate,
- the matter is one which can quickly and simply be put right, and
- it is appropriate to advise the responsible party that a repeat occurrence will lead to more serious action being taken.

Cautions are used for more serious matters and only if the Fisheries Officer believes there to be prima facie evidence of an offence. In deciding whether a caution is an adequate response the Fisheries Officer must have regard to the principles contained in the Policy. Where a caution is not complied with in the period specified further enforcement measures may be pursued.

Observer Compliance Notices (OCN)

An OCN is a non-statutory means of providing a person with clear written notice of an apparent breach of the observer requirements under the FMA and *Fisheries Management Regulations 1992*. The OCN will detail the actions which need to be undertaken by that person to rectify the situation. It also gives notice that further enforcement action may follow, especially if the situation is not rectified within the specified time. Failure to comply with an OCN is not in itself an offence but rather a form of caution.

Commonwealth Fisheries Infringement Notices (CFINs)

The regulations provide for infringement notices to be issued for breaches of fisheries management rules. These infringement notices require payment of the fine within a specified timeframe.

The Policy considerations for issuing a Commonwealth Fisheries Infringement Notice (CFIN) rather than prosecution are:

- the offence is one that may be dealt with by imposition of a fine under the FMA,
- the nature of the incident, whether it is well defined or not,
- the severity of the impact,
- the evidence discloses a prima facie case against the person with reasonable prospects of success,
- the previous history of the person the culpability of the person,
- notification of the incident to AFMA, voluntary action to mitigate the impacts and a commitment to prevent future incidents.

Amendments to fishing concession conditions

Longer term action may be required to address ongoing non-compliance. Amendment to concession conditions can be used where there is a need to take additional action arising from a breach of the legislation or legislative instruments. Amendments represent an alternative to other enforcement action to achieve compliance with the FMA. Amendments to license conditions are subject to appeal provisions under the FMA. Failure to comply with fishing concession conditions is an offence. Generally new or alterations to existing conditions will be subject to AFMA's regulatory review process.

Directions by fisheries officers

Under Section 84 of the FMA, Fisheries Officers may direct the process by which various enforcement actions implemented; these being: land and boarding inspections. Directions by Fisheries Officers will be used where there is imminent risk of severe impacts or there are other reasonable grounds for doing so. Such reasonable grounds may include (but are not limited to) where further inspection of a boat is required for investigation of detected (or suspected) offences, or where it will directly assist in ensuring compliance for future fishing (e.g. to repair fishing gear or a VMS unit).

However, as there are no appeal provisions, these powers will only be used where consideration has been given to the likely consequences of such a direction.

Failure to comply with an instruction from a fisheries officer, without reasonable excuse, is an offence.

Suspension or cancellation of fishing concessions

Pursuant to Sections 38 and 39 of the FMA, fishing concessions may be suspended or cancelled under certain circumstances where:

- a fee, levy, charge, or other moneys has not been paid by the due date there are reasonable grounds that a condition has been breached
- there are reasonable grounds false or misleading information has been furnished to AFMA
- in accordance with a condition on the concession certain international sanctions have been applied and are not complied with.

Since, in most cases, this would result in ceasing of fishing activity and resultant loss of income, suspension or cancellation will be used in those circumstances that pose an unacceptable impact or where there is an attitude of non-compliance or evidence of a deliberate attempt to gain financial advantage from non-compliance.

The CEO or other delegate will, when exercising this enforcement measure, give the person a reasonable opportunity to show cause in writing why the power should not be exercised. Suspension or cancellation should only be used for serious offences.

Failure to comply with a suspension or cancellation of a fishing concession is an offence.

Prosecution

Prosecutions will be initiated, consistent with the principles and criteria of the Policy, where there is prima facie evidence of breaches of the FMA (or other relevant Commonwealth Acts) on a case-by-case basis, where prosecution is the most appropriate response to achieve personal and/or public deterrence.

A number of factors will be taken into account in considering whether an offence is serious enough to warrant suspension or cancellation of a fishing concession or quota. Examples of serious offences include:

- fishing without a valid license, authorisation or permit;
- failing to maintain accurate records of catch and catch-related data or serious misreporting of catch;
- fishing in a closed area, fishing during a closed season or fishing without quota where no action is taken to cover outstanding catches;
- directed fishing for a stock that is subject to a moratorium or for which fishing is prohibited;
- using prohibited gear;
- falsifying or concealing the markings, identity or registration of a fishing boat;

- concealing, tampering with or disposing of evidence relating to an investigation
- multiple violations which together constitute a serious disregard of conservation and management measures; or
- such other violations as identified on a case by case basis.

Minor would cover offences for which infringement notices are issued (may include a fine) but no further action is taken. Typically, this may include minor deviations from legislation that are unintentional in nature.

Major relates to offences which are referred (along with a brief of evidence) to the department of public prosecutions, it is then in their discretion to pursue through the court (Steve Bolton, pers com, AFMA, January, 2017, cited in MRAG, 2018).

Offences are specified in Section 95 of the FMA, 1991 and incorporated into the Fisheries Management Regulations (1992). Offence penalties are determined on a per unit system, with penalty units specified for each offence and up to a maximum of up to 250 points (Index to Offences, Fisheries Management Regulations, 1992). The current assigned value assigned per unit is AUD 180/unit.

In the last 3 years (2016-2018), from 45 inspections, 5 offences were detected in the SE Trawl Fishery. These offences were deemed to be minor (Ashley Mooney, AFMA, pers com August, 2019).

The Observer Program

AFMA's observer program is operated as an independent group within the AFMA Operations Branch and is a science-based data collection program operated across all of AFMA's fisheries. The group has an observer pool of 20 field observers. Observers have fishing industry experience and/or environmental science or management qualifications. Observers often provide the most reliable data on catch composition, fate of target and non-target species and fishing effort. All operators are required to carry observers when requested by AFMA.

- The observers undergo pre training prior to deployment, which includes vessel work experience along with experienced observers. Observers are required to follow a manual and complete an excel reporting spreadsheet divided into several modules. Observers undergo a pre-briefing and debriefing process.
- Observers are not designated fishery compliance officers but may provide evidential support to fishery prosecutions.

On-board observers are used randomly in all sectors. Observers monitor and report catch data, fishing effort, bycatch/discards, and protected species interactions. During the period 1 June to 31 August each year, a boat nominated to the concession must carry an observer for the first three trips in the ORMA and every second trip thereafter.

10.1.7 Monitoring and Management Performance Evaluation (PI 3.2.4)

The Australia Government commissioned two independent reviews of the core Acts (EPBC Act and FMA) governing the environment and fisheries (Hawke, 2009, and Borthwick, 2012). The Borthwick review also included reviews of policy settings, recasting AFMA's objectives, fisheries management plans, the Minister's powers to vary fisheries management plans, integrating fisheries and environmental assessments, Research, fisheries management and industry levies, Offshore Constitutional Settlements (OCS), Recreational Fishing, Aquaculture, Compliance and enforcement and Co-management. The Government response to the Borthwick Review was announced in March 2013 (Australia Government, 2013). DAWR thereafter initiated a public consultation process (DAFF (2012/2013), followed by specific Reports on Harvest Strategy and Bycatch management strategy (DAWR 2013a, DAWR 2013b). A revised national harvest strategy and national bycatch management policy and guidelines were produced in 2018 (DAWR 2018a, DAWR 2018b, DAWR 2018c and DAWR 2018d).

The Commonwealth harvest strategy was subject to a FRDC review in 2015 (Haddon et al 2015). The monitoring and assessment of the SESSF was subject to a strategic review in 2017 (Knuckey, et al 2017).

In addition, AFMA's management system is subject to internal and external performance evaluation including (Nick Reyns, AFMA, January 2017, MRAG, 2017):

Internal peer reviews, which include:

- The requirement to report in AFMA's Annual Report on overall performance against the legislative objectives, statutory requirements and financial reporting, the effectiveness of internal controls and adequacy of systems, and the Authority's risk management processes
- AFMA and the MAC to periodically assess the effectiveness of the management measures taken to achieve the objectives of this Management Plan by reference to the performance criteria specified in the Plan
- An AFMA MAC/Scientific Panel Workshop focusing on managing conflicts of interest, the Productivity Commission review of commercial fisheries management, the regulatory outlook etc.
- AFMA and SEMAC developing performance measures
- SEMAC research proposals reviewed by the AFMA Research Committee and those for FRDC funding by the Commonwealth Research Advisory Committee
- The SESSF harvest strategy is reviewed based on the revised Australian Government's Harvest Strategy Policy. *Parts of the existing HS are reviewed from time to time to adopt minor changes, however there is a broader review underway as part of the FRDC project - Development and evaluation of multi-species harvest strategies in the SESSF. This is being undertaken with the objectives of the (not so new anymore) HSP.*
- Review of AFMA's ERA-ERM Framework – new Guidelines for fisheries have been finalised in 2017; and
- AFMA also has an internal quality assurance program to determine whether Compliance best practice has been followed.

External reviews, which include:

- Questioning by the Senate Standing Committee on Rural and Regional Affairs and Transport in Senate Estimates hearings (three times/year);
- Annual reporting of SESSF performance against protected species and export approval requirements under the EPBC Act consistent with the Guidelines for the Ecologically Sustainable Management of Fisheries (See below);
- The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) annual Fisheries Status Reports (last published late 2019) on the ecological and economic sustainability of fisheries managed by AFMA;
- The Productivity Commission review of commercial fisheries regulation in Australia which has made a number of recommendations relevant to AFMA (GoA, 2016);
- The Australian National Audit Office periodic reviews of aspects of AFMA's performance. This includes an audit of AFMA's risk management procedure (AFMA, 2016b).
- An independent review of AFMA's fisheries management, organisation and governance, has also just been completed.

CSIRO's internal and external review procedures (Haddon and Tuck, pers com December 2019) comprise the following:

- Internal sensitivity test procedures of research paper outputs,
- paper reviews by 2 scientists and principal scientific officer to sign off,
- a 5 yearly CSIRO Science Review of research methodologies, using independent experts,
- External review of journal papers,

- a specific external review of the stock assessment model used in the orange roughy fishery (Stokes, K., 2009),
- A Review of the use of likelihood profiles in fisheries stock assessment (Punt, A. E. 2018); and
- RAG member response to papers

All FRDC funded research papers are also subject to external review.

The ANAO regularly reviews the AFMA Compliance Program (ANAO, 2013a), and these recommendations are adopted into the AFMA Compliance Program (AFMA 2017-2018).

The implementation of the EPBC Act requires the Australian Government to assess the environmental performance of fisheries and promote ecologically sustainable management. The independent assessment of all export and all Australian Government managed fisheries is required. These assessments ensure that, over time, fisheries are managed in an ecologically sustainable way. The Assessment of the Commonwealth Southern and Eastern Scalefish Fishery (DOEE, 2018) is available at DOEE website, Available at <http://www.environment.gov.au/system/files/pages/bbf3e30a-2fa3-45d6-b20c-7623b995cbcd/files/assessment-southern-eastern-scalefish-shark-fishery-2019.pdf>.

This includes the accreditation:

Given the management measures described, the Department has determined that product taken in the Commonwealth Small Pelagic Fishery should be included in the list of exempt native specimens under Part 13A of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) until 21 October 2023. (DOEE, 2018).

10.2 Principle 3 Performance Indicator scores and rationales

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it:		
		<ul style="list-style-type: none"> - Is capable of delivering sustainability in the UoA(s); - Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and - Incorporates an appropriate dispute resolution framework 		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guide post	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Yes	Yes	Yes

Australia is a signatory to a number of international agreements and conventions (which it applied within its EEZ). These include: *United Nations Convention on the Law of the Sea* (regulation of ocean space); *Convention on Biological Diversity and Agenda 21* (sustainable development and ecosystem based fisheries management); *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES; protection of threatened, endangered and protected species); *Code of Conduct for Responsible Fisheries* (standards of behaviour for responsible practices regarding sustainable development); *United Nations Fish Stocks Agreement*; and State Member of the *International Union for Conservation of Nature* (marine protected areas).

The *Offshore Constitutional Settlement* provides for the demarcation of fisheries management responsibility between the States and Australian Commonwealth. The Commonwealth has responsibility for management outside to manage fisheries beyond 3 nautical miles (Borthwick, 2012). There are 59 OCS arrangements. These include Offshore Constitutional Settlement agreements with Queensland, New South Wales (NSW), Victoria, Tasmania, South Australia (SA), and Western Australia (WA).

Gazette S 531, 1996 demarcates management responsibility for the fishery for finfish to be managed under Commonwealth Law in waters relevant to Tasmania. These are binding arrangements requiring both State and Commonwealth to implement fisheries management arrangements in their respective jurisdictions.

The fishery is managed by the Australian Fisheries Management Authority (AFMA) in accordance with the Fisheries Management Act 1991 (FMA), the *Fisheries Administration Act* (FAA) and *Fisheries Management Regulations 1992*, and the *Fisheries (Administration) Regulations 1992*. Commonwealth-managed fisheries are also subject to aspects of the EPBC Act and the *Environment Protection and Biodiversity Conservation Regulations 2000*. The Commonwealth SESSF Trawl Fishery – Orange Roughy East commercial export fisheries have been assessed using the Australian National ESD Framework for Fisheries, in particular, the *Guidelines for the Ecologically Sustainable Management of Fisheries* (DEWR, 2007). The ESD includes the principles of ecologically sustainable target and bycatch species, ecological viability of bycatch species, and impact of the broader marine ecosystem.

The FAA establishes AFMA to manage Commonwealth fisheries. The overall objectives of the FMA 1991 form the basis for the management of all Commonwealth fisheries. The key EPBC Act 1999 requirements that apply relate to the need for a strategic assessment of the fishery management arrangements, and the management of protected areas

and species. Key aspects of the policy framework for Commonwealth fisheries are articulated in: The AFMA Corporate Plan (2015-2018), and the *Commonwealth Fisheries Harvest Strategy Policy* (DAWR, 2018).

Therefore, the national legal system and governing binding governance cooperation meets SG60, SG80 and SG100.

Resolution of disputes				
b	Guide Post	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the UoA.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective .
	Met?	Yes	Yes	Yes
<p>The consultation and decision-making process in place actively seeks to avoid legal challenges. Five forms of dispute resolutions are as follows:</p> <p>(1) Sections 161 and 165 of the FMA provide appeal rights for decisions taken by AFMA through administrative means (internal AFMA review, appeal to the Administrative Appeals Tribunal and the Statutory Fishing Rights Allocation Review Panel) and judicial means through appeal to the Federal Court. These dispute resolution mechanisms have been tested (Weir & Loke, 2007) and proven to be effective. Cases such as <i>Arno Blank vs AFMA</i> (AAT, 2000) challenged the application of the precautionary principle. AFMA's application of the precautionary principle was upheld. There have also been challenges to the allocation of Statutory Fishing Rights in various fisheries (Nick Raynes, pers comm., December 2019)</p> <p>(2) Plans of Management (made pursuant to section 17) where AFMA must, in writing, after consultation and after giving due consideration to any representations mentioned in subsection (3), determine plans of management for all fisheries. Before determining a plan of management for a fishery, AFMA must prepare a draft of the plan and, by public notice: (a) state that it intends to determine a plan of management in respect of the fishery; and (b) invite interested persons to make representations in connection with the draft plan by a date specified in the notice, not being less than one month after the date of publication of the notice in the Gazette;</p> <p>(3) Fishers are advised of their appeal rights and the processes involved. In addition to these processes, the consultation and advisory processes established by AFMA provide mechanisms for the airing and discussion of different perspectives on fisheries management and arguably serve to avoid potential legal disputes. Legal advice on management and appeals is provided by legal expertise within AFMA and by external, independent legal advisers as required. Historically one legal challenge was made to NPF 1989 Management Plan in relation to the compulsory reduction in effort within the fishery. The main arguments were that the amendments to the plan to implement the reduction in effort were ultra vires, and the restructuring program represented an acquisition of rights on unjust terms under the constitution. The challenge was unsuccessful.</p> <p>(4) AFMA has set out a Client Service Charter (https://www.afma.gov.au/about/corporate-publications/afmas-client-service-charter/7) which sets out AFMA's service commitments accord with the Australian Public Service Values and Code of Conduct and provides for any deficiencies in AFMA's administration to the attention of the Commonwealth Ombudsman have certain fisheries management decisions.</p> <p>Therefore, the national legal system provides for a transparent mechanism for the resolution of legal disputes and meets SG60, SG80 and SG100.</p>				

c Respect for rights

	Guide post	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Yes	Yes	Yes

Special provision for ‘traditional fishing’ is made where they might apply in the contexts of both Commonwealth and State Fisheries Law. A system or mechanism to formally commit to the legal rights created explicit or established by custom on people dependent on fishing for food (non-commercial use) is enshrined in the *Native Title Act*. This allows for special provision for ‘traditional fishing’ is made where they might apply in the contexts of both Commonwealth and State Fisheries Law.

The Aboriginal Land Act 1978 (NT) 12(1) empowers the Administrator to close the seas adjoining and within 2km of Aboriginal land to others who are not Aborigines entitled by tradition to enter and use the seas in accordance with that tradition. The Commonwealth South East Trawl Fishery (SET) – Orange Roughy East, is a specialist offshore commercial fishery. Indigenous rights are not specifically relevant.

Therefore, the management system formally commits to the legal rights created explicitly or established by custom of people and meets SG60, SG80 and SG100.

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The Aboriginal Land Act 1978 (NT) 12, <http://www.austlii.edu.au/au/legis/nt/consolact/ala126/s12.html>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	

PI 3.1.2 – Consultation, roles and responsibilities

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	Roles and responsibilities			
	Guide post	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood .	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Yes	Yes	Yes
<p>AFMA undertakes the day to day management of the Commonwealth fisheries under powers outlined in the FMA and FAA. Overarching policy direction is set by the Australian Government through the relevant Minister responsible for fisheries, acting upon advice from the Australian Government Department of Agriculture, Fisheries and Forestry.</p> <p>Roles and responsibilities and advice about operation and participation in MACs and Resource Assessment Groups (RAGs) are provided in:</p> <ul style="list-style-type: none"> • Management Advisory Committee, Fisheries Management Paper. No 1 (AFMA, 2018a) • Fisheries Administration Paper (FMP) No.7 - Information and Advice for Industry Members on AFMA Committees (AFMA, 1999). • Fisheries Administration Paper Series No. 12 Resource Assessment Groups - Roles, Responsibilities and Relationship with Management Advisory Committees (AFMA, 2018b) <p>Roles and responsibilities are divided between the respective management organisation (AFMA), the South Eastern Management Committee (SEMAG) (https://www.afma.gov.au/fisheries/committees/south-east-management-advisory-committee-semag).</p> <p>As part of AFMA's partnership approach to fisheries management, it has established SEMAG, which is AFMA's main point of contact with client groups in the Commonwealth South East Trawl Fishery (SET) and plays an important role in helping AFMA to fulfil its legislative functions and pursue its objectives (Smith <i>et al.</i>, 1999). The MAC comprises representatives of the SET fishery, an environmental representative, research interests and fishery managers. Invited observers may also attend, which may include the Australian States, with specific transboundary interests in the fishery, Recreational interests,</p> <p>The Resource Assessment Group (RAG) provides specific scientific advice in relation to AFMA's legislative objectives, and the processes, roles and to assist the AFMA Commission in making decisions, and to support the formulation of management advice by the MACs.</p> <p>The Department of Environment, Australian Bureau of Agriculture and Resource Economics (ABARES), and representatives of CSIRO. SEMAG provides advice to AFMA on a variety of issues, including the harvest strategy and other on-going measures required to manage the fishery, including the development of management plans, research priorities and projects for the fishery.</p> <p>The functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction and meet SG60, SG80 and SG100.</p>				

Consultation processes				
b	Guide post	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used .
	Met?	Yes	Yes	Yes
<p>AFMA Commission decisions are explained in an annotated summary Commissioner meeting minutes. These take account of advice provided by the various advisory forums including advice received from the RAG and MAC.</p> <p>The MACs are intended to complement the work of fishery managers by providing a broader perspective on management options and a wide range of expertise. MACs therefore provide a forum where issues relating to a fishery are discussed, problems identified, and possible solutions developed. The outcomes of these deliberations determine the recommendations that the MAC will make to the AFMA Commission. AFMA's legislation limits the number of members on a MAC to ten, in addition to the Chairperson and an AFMA officer. Increasingly, and where appropriate, AFMA has included a broader range of interest groups in this consultative process.</p> <p>The AFMA Commission decides on a fishery-by-fishery basis whether membership of a MAC should also reflect these wider community interests. As a general rule, revised membership arrangements are considered upon expiry of terms of appointment of existing members. Specific arrangements are being made to review the role of recreational and indigenous groups on each MAC (AFMA, 2018c).</p> <p>AFMA also formally consults with key stakeholder groups and the broader community through public comment opportunities which are advertised on AFMA's website. These include species workshops, port visits, pre-season briefings and management meetings that are attended by a range of representative groups.</p> <p>The MAC that covers the management of the South East Trawl Fishery (SET) is known as the South East Management Advisory Committee (SEMAC), and includes three fisheries, the Small Pelagic Fishery and the Southern and Eastern Scalefish and Shark Fishery (SESSF) and the Southern Squid Jig Fishery (SSJF). There are currently seven statutory members of SEMAC comprising the Chairman, four from industry, one from the conservation community, a research member, and an AFMA Member (usually the Fishery Senior Manager). Historically, with SEMAC State Government representatives (New South Wales, Tasmania, and Victoria) and a recreational stakeholder are invited participants. A recreational member is therefore not currently on SEMAC, but there is an allocated position on the MAC for a member, when appointed.</p> <p>Indigenous fishing members may be appointed where there are identifiable fishing interests in a particular fishery. Invited Observers usually include one or more AFMA Commissioner, CSIRO scientists, and a representative from ABARES. Invited observers can also include indigenous and recreational fisher representatives or any other observer where their views are considered relevant to the outcomes including local knowledge.</p> <p>The first meeting of SEMAC was held in 2009. Minutes of SEMAC meetings are publicly available on the AFMA website.</p> <p>SEMAC receives scientific advice from the South East Resource Assessment Group (SERAG)(https://www.afma.gov.au/fisheries/committees/south-east-resource-assessment-group). The committee uses this scientific advice to inform their management advice. The SERAG is not a body of the MACs and operate independently from them, although the two groups work closely together. All advice presented by SERAG Panel is</p>				

given without bias. The MACs consider the advice of SERAG and provide recommendations to the Commission based on how the alternatives will contribute to meeting overall objectives for the particular fishery (risk management) and, ultimately, to the pursuit of AFMA's legislative objectives.

A new co-management arrangement was made in May 2020, between the Australian Fisheries Management Authority (AFMA) and the South East Trawl Fishing Industry Association (SETFIA), including a new Seine and Trawl Advisory Group (STAG) to provide expert advice on operational aspects of the Commonwealth Trawl Sector (CTS) to better inform fisheries management decisions made by AFMA and the AFMA Commission. The advisory group is to meet twice yearly and its members will include trawl operators from across the CTS, a hook operator, and representation from AFMA.

The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used. SG60, SG80 and SG 100 are met.

Participation				
C	Guide post		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Yes	Yes

DAWR consulted government organisations, the commercial fishing industry, environmental non-government organisations, the recreational fishing industry, state fisheries departments, scientific research organisations and government organisations on the development of a revised Commonwealth harvest strategy. The department also developed a discussion paper for public consultation, as part of the review process. The discussion paper was released in November 2012 for a 6-week public consultation period (see above).

AFMA holds an annual public meeting and holds around half of AFMA's Commission meetings in regional centres providing opportunities for direct access to AFMA Commissioners by stakeholders and the general public.

SEMAG is made up of key stakeholders (see above). AFMA Commission decides on a fishery-by-fishery basis whether membership of a MAC should also reflect these wider community interests. The Government of Australia enacted the *Fisheries Legislation Amendment (Representation) Act, 2017*, in order to ensure effective representation of indigenous and recreational fishing interests onto MACs. Discussions are presently ongoing with the MAC, which would allow for permanent representation of both recreational and indigenous representative as full members on each MAC.

RAG membership, roles, criteria and appointment process are set out in Fisheries Administration Paper 12. (https://afma.govcms.gov.au/sites/g/files/net5531/f/fap12_to_reflect_legislative_changes_and_economic_advice_-_october_2018.pdf). There are provisions for appointment of a conservation member to the RAG, see Section 4.2.6. FAP 12 was revised in October 2018, before this time there was no provision for a specific RAG Conservation Member, and there is no record of conservation interests attending SERAG. However, if "non-members wish to attend meetings from time to time as an observer, their attendance at the meeting is at the discretion of the RAG Chair in consultation with AFMA. Other regular attendees to SERAG meetings include AFMA, CSIRO, States Fishery Departments and the Industry Associations.

The MAC considers the wide range of information including local knowledge as part of its advisory processes. It has in, the past invited, observers to MAC meetings where their views are considered relevant to the outcomes.

AFMA formally consults with key stakeholder groups and the broader community through public comment opportunities which are advertised on AFMA's website. AFMA also conducts species workshops, port visits, pre-season briefings and management meetings that are attended by a range of representative groups.

Public comments were received on the AFMA submission to the DAWE and annual report (DoEE 2019). The public comments highlighted a number of issues requiring management attention, including that AFMA:

- Revise and update bycatch and discard work plans and strategies for all sectors of the fishery to address the impact of fishing on high risk and protected species.
- Continue to manage marine debris, compliance, data reporting, and protected species interactions by further developing cross-jurisdictional management arrangements, and using an appropriate level of independent human observers.
- Continue to monitor the effects of fishing on species and the marine environment, review risk management strategies, and work towards implementing appropriate management measures in consultation with key stakeholders.
- Work towards finalising the harvest strategy for the fishery and implement appropriate measures to ensure that all species are fished sustainably.
- Facilitate ongoing research, particularly in areas identified as high risk for impacts on protected species and the marine environment in which the fishery operates.

The Department's assessment considered the public comments received on the submission and addressed the issues through conditions under Part 13 and Part 13A (Section 4).

AFMA keeps eNGOs informed of proposed substantial changes to management arrangements such as TAC levels and changes to fishing arrangements for listed species. DAWE also consults with eNGOs as part of the listing of species under the EPBC Act. The list of organisations consulted includes WWF Australia and WWF New Zealand, Australian Marine Conservation Society, Birdlife Australia, Greenpeace, Human Society International and the Australian Recreational Fishing Foundation. The list of issues discussed has included TEP interactions, Orange roughy harvesting, Trawl fishing and EPBC Act listings.

The South East Trawl Fishing Industry Association (SETFIA) plays an integral role in ongoing consultation with interest groups through monthly external newsletters to subscribers, internal newsletters to members and short communications on specific issues. The above ENGOS listed are sent a copy of the Newsletter.

The consultation process provides opportunity and encouragement for all interested and affected parties to be involved and facilitates their effective engagement. SG60, SG80 and SG 100 are met SG100.

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SETFIA Newsletter, March 2018

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	N/A

PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are explicit within and required by management policy.
	Met?	Yes	Yes	Yes
<p>The long-term objectives of the management system are specified in the FMA and the EPBC Act, and further defined in the Commonwealth Fisheries Harvest Strategy Policy and Guidelines, and the Commonwealth Bycatch Management Policy. The objectives and policy guidance are consistent with MSC's Principles and Criteria and explicitly require application of the precautionary principle. The fishery is also subject to the Commonwealth EPBC Act which requires periodic assessment against the <i>Guidelines for the Ecologically Sustainable Management of Fisheries</i>. These Guidelines are consistent with the MSC Principles and Criteria and encourage practical application of the ecosystem approach to fisheries management. Both the Commonwealth Harvest Strategy and Commonwealth Bycatch Management Policy contain guidelines, and these guidelines are used by AFMA to support the setting of fisheries specific strategies and bycatch management plans.</p>				

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	NA

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide Post	Objectives , which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery-specific management system.	Short and long-term objectives , which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.	Well defined and measurable short and long-term objectives , which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery-specific management system.
	Met?	Yes	Yes	Yes
<p><i>Southern and Eastern Scalefish and Shark Fishery Management Plan 2003</i> reinforces the long-term objectives of the FMA as the long-term objectives of the Plan. Fishery specific (short-term) objectives are identified in the <i>Southern and Eastern Scalefish and Shark Fishery Harvest Strategy Framework 2009 (amended 2017)</i>, and these are reviewed on a regular basis. The short-term objectives within the Harvest Strategy include:</p> <ul style="list-style-type: none"> • Principles for recommending TACs and Recommended Biological Catches (RBCs) • Assessment and monitoring • Harvest Strategy Framework • Decision Rules and Reference Points • Review <p>The Strategy contains well defined measurable indicators, with supporting key performance indicators:</p> <ul style="list-style-type: none"> • Indicators (data from the fishery) • Monitoring (agreed protocols to get data) • Reference points (targets and limits) • Method of assessment (e.g. stock assessment, Catch per Unit of Effort (CPUE) standardisation) • Decision rules (agreed rules for setting catch levels). <p>Clause 5 of the plan outlines the fishery specific long-term objectives. The specific biological, socio-economic and ecosystem objectives outlined in the SESSF Harvest Strategy. Biological objectives include:</p> <ul style="list-style-type: none"> • To maintain stocks at (on average), or return to, a target biomass point BTARG or equivalent proxy (e.g. FTARG or CPUETARG) equal to the stock size that aims to maximise net economic returns for the fishery as a whole. • To maintain stocks above the limit biomass level, or an appropriate proxy, at least 90% of the time. • A reduced level of fishing if a stock is below BTARG but above BLIM (or an appropriate proxy). • To implement rebuilding strategies, no targeting and incidental bycatch TACs if a stock move below BLIM (or an appropriate proxy). 				

- To ensure the sustainability of fisheries resources, including consideration of the individual fishery circumstances and individual species or stock characteristics, when developing a management approach.

Socio-economic objectives include:

- To maintain stocks at (on average), or return to, a target biomass point BTARG equal to the stock size that aims to maximise net economic returns for the fishery as a whole.
- To maximise the profitability of the fishing industry and the net economic returns to the Australian community.
- To minimise costs to the fishing industry, including consideration of the impacts on the industry of large or small changes in TACs and the appropriateness of multi-year TACs.

The primary objective of the 2014 Orange Roughy Rebuilding Strategy (AFMA 2014) is to rebuild orange roughy stocks to levels where they can be harvested in an ecologically sustainable manner consistent with the *Commonwealth Fisheries Harvest Strategy Policy 2007 (HSP)* and ultimately maximise the economic returns to the Australian community.

Specific objectives of the Strategy are:

- to rebuild orange roughy in the area of the SESSF to the limit reference biomass point (BLIM) of 20 per cent of the unfished spawning biomass within a biologically reasonable time frame; being one mean generation time (56 years) plus 10 years (66 years) from the start of the ORCP. That is, to reach BLIM by no later than 2072;
- having reached BLIM, rebuild these stocks to the maximum sustainable yield biomass level of 40 per cent of the unfished spawning biomass (BMSY) using the harvest control rules outlined in the SESSF Harvest Strategy Framework. These harvest control rules provide for a restricted TAC to allow limited fishing whilst rebuilding from BLIM to BMSY; and
- once BMSY is reached, pursue the default maximum economic yield biomass level of 48 per cent of unfished spawning biomass (BMEY).

To be able to fish within the SESSF, AFMA must allocate Statutory Fishing Rights (SFR). In the SESSF, SFRs allow the holder to take a particular quantity of fish (quota SFR) or use a boat in the fishery (boat SFR). The amount of quota an operator is allocated depends on the amount of rights they hold, with the ability of a SFRs to be permanently transferred to another person or company or leased. This may also be known as individually transferable quota.

In the Commonwealth South East Trawl Sector (SET) there are currently 57 boat SFRs. A quota species such as orange roughy requires a quota SFR and a Trawl Boat SFR to allow a fisher to use a nominated boat in an area of the fishery using specified methods.

Fishing permits are granted for the fishing year and contain conditions the permit holder must comply with. The conditions are prescribed in the *Fisheries Management Regulations 1992* and sections of the plan that must be complied with as well as certain obligations pertaining to finfish, sharks, quota balancing, observer/monitoring, directions, temporary orders, navigating in closed zones, gear limitations and seabird management plans.

The SESSF is a complex multi-sector, multi-species fishery. Orange roughy are targeted as part of the SET which is managed using a mix of input and output controls that are reviewed annually. The entire

orange roughy fishery is divided into nine Orange Roughy Management. The following general management measures are currently in place:

- Limited entry fishery
- Statutory Fishing Rights (SFR Quota and Boat) can be permanently transferred or leased to another person or company
- Operators must hold a fishing permit which prescribes the area in which to fish, permitted method (Boat SFR) and if fishing for quota species, relevant quota holdings for that species (Quota SFR)
- Trip limits
- Total Allowable Catch (TAC) for each quota species and certain non-quota species
- Gear restrictions – mesh size specifications, codend requirements, bycatch reduction devices
- Implementation of a Seabird Management Plan
- Prohibited species
- Spatial and temporal closures
- Navigation regulations that require boat to maintain a speed over 5 knots when navigating in a closure
- Nominated boat must be fitted with a Vessel Monitoring System
- Incidental catch limits and size limits
- Fish Receiver permits are required and permit holders must complete the catch and disposal record
- Logbooks, catch and disposal forms and transit forms must be completed by operators or nominated authorized agent and submitted to AFMA (by post or electronically)
- AFMA Observers.

AFMA under the new SESSF Management Booklet 2018 describes the specific management arrangements for the eastern ORMAs (in the Eastern zone) and the Pedra Branca ORMA (Southern zone). 100 per cent AFMA observer coverage is required for the first three trips on boats while fishing in the eastern and Pedra Branca ORMAs during the period 1 June to 31 August each year. Where the master (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 will only be required on the first trip and every second trip thereafter. Consideration must be given going forward, to the potential reduction in observer coverage under the new management arrangements for 2018. The fishing concession holder must:

- Give the AFMA Observer section at least 72 hours notice of an intention to depart on a fishing trip
- Not fish unless an AFMA Observer is carried onboard the nominated boat Receiver permits are required and permit holders must complete the catch and disposal record
- Before entering or fishing in the EORMA hold a minimum of 30 tonnes of uncaught orange roughy (eastern) quota for that fishing year
- To remain fishing in the EORMA must hold a minimum of 2.5 tonnes of uncaught orange roughy (eastern) quota at all times for that fishing year
- Before entering or fishing in the PBORMA hold a minimum of 10 tonnes of uncaught orange roughy (southern) quota for that fishing year
- To remain fishing in the EORMA must hold a minimum of 500 kilograms of uncaught orange roughy (southern) quota at all times for that fishing year.

The SESSF harvest strategy framework is another tool that sets out the management actions necessary to achieve defined biological and economic objectives and the rules applied to determine the recommended total allowable catches. Importantly, the HSP Guidelines also describe the processes for amending harvest strategies under certain circumstances. For example, external drivers may increase the risk to a fishery and fish stocks. In such cases, it may be necessary to amend the harvest strategy to reduce fishing intensity.

A by-catch action plan conforms to the requirements as laid down in the EPBC Act, 1999 and the Guidelines for the Ecologically Sustainable Management of Fisheries, 2007. Objectives of the Work Plan include:

- information gathered about the impact of the fishery on by-catch species; and
- all reasonable steps are taken to minimise incidental interactions with seabirds, deepwater sharks, marine mammals and fish of a kind mentioned in sections 15 and 15A of the Act; and
- the ecological impacts of fishing operations on habitats in the area of the fishery are minimised and kept at an acceptable level; and
- by-catch is reduced to, or kept at, a minimum, and below a level that might threaten by-catch species.

Work Plan's strategies include:

- Respond to high ecological risks assessed through AFMA's Ecological Risk Assessment for the Effect of Fishing (ERAEF) and other assessment processes;
- Avoid interactions with species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Reduce discarding of target species to as close to zero as practically possible; and
- Minimise overall bycatch in the fishery over the long-term.

The Bycatch and Discarding Workplan identifies four focus areas:

- Reduce the number of high risks assessed through AFMA's Ecological Risk Assessment process
- Avoid interactions with species listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Reduce discarding of target and non-target species to as close to zero as practically possible
- Minimise overall bycatch in the fishery over the long-term.

Well-defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system achieving SG60, SG80 and SG100.

References

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought / Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	N/A

PI 3.2.2 – Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Yes	Yes	
<p>DAWE has delegated the management of specific fisheries to AFMA (Australia Government, 1991), DAWE having overarching responsibility for the development of laws and policy.</p> <p>The decision-making processes by AFMA is based on advice from SEMAC (working with SERAG). The workings of the MAC and SERAG are transparent with feedback provided by the Commission directly from SEMAC and to stakeholders through media such as the regular <i>AFMA Update</i> and through the Annual public meeting of both the MAC and AFMA.</p> <p>The decision-making process for the SE Trawl Fishery is consistent with those for the broader management system and responds to the defined harvest and bycatch management strategies, which respond to research, outcomes evaluations and monitoring programs. The AFMA website contains an extensive list of evaluations, research reports and assessments, and evidence exists within the SEMAC and the SERAG that decisions respond to these findings (https://www.afma.gov.au/fisheries/small-pelagic-fishery). Therefore, both SG60 and SG80 have been met.</p>				

Responsiveness of decision-making processes				
b	Guide post	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Yes	Yes	Yes
<p>The decision-making process for the SE Trawl fishery is consistent with those for the broader Commonwealth management system and responds to the defined harvest and bycatch management strategies, which respond to all issues identified in research, outcome evaluations and monitoring programs. Specific and relevant issues are evaluated through the MAC and the SERAG and mechanisms are in place that take account of the wider implications of decisions, including reference to the AFMA commissioners. Important decisions relating to harvest strategy development, and bycatch management are all encompassed through these groups.</p> <p>Therefore, SG 60, SG 80 and SG 100 have been met.</p>				

Use of precautionary approach			
c	Guide post		Decision-making processes use the precautionary approach and are based on best available information.
	Met?		Yes

The harvest strategies and control rules applied to the fishery incorporate a precautionary approach to the decision-making process by requiring a review when the target reference level is not met. This ensures that any warning signs are recognised and investigated / addressed in their early stages. The frequency of evaluation (annually) and review means that management action to investigate and, where required, alleviate adverse impacts on stocks is always taken before the performance indicators reach the limit reference level.

The application of the research, monitoring and evaluation within the SE Trawl Management Plan, Harvest Strategy and Bycatch Management Strategy provides a good tool to assess the relative risks to target species, bycatch, ETP species and ecosystem impacts in the fishery, initiating when appropriate, actions to deal with at risk species. Examples of precautionary actions include precautionary TACs and closed fishing zones. Since there is strong evidence of precautionary actions covering both P1 and P2 management issues, the SG80 has been met.

Accountability and transparency of management system and decision-making process				
d	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	Information on the fishery's performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Yes	Yes	Yes

AFMA and CSIRO provide a comprehensive range of reports which confirm fishery performance and how management has responded to findings from recommendations emerging from research, monitoring, evaluation and review activity (<https://www.afma.gov.au/fisheries/southern-eastern-scalefish-shark-fishery>). These include stock status reports, catch data including target species, monitoring of TEP interactions and rebuilding strategies.

Explanations are provided for actions or lack of actions by the organisations tasked with implementation. Failure to achieve the management reference levels is discussed at SEMAC and advice provided to AFMA. AFMA provide responses through the MAC on how information is reviewed, and the management decisions made (See SEMAC past meetings (<https://www.afma.gov.au/fisheries/committees/south-east-management-advisory-committee-semac>)). It then becomes the responsibility of AFMA to rectify failure to achieve specific management outcomes.

The Harvest Strategy and Bycatch Workplan contain monitoring and performance indicators and provided the basis for incorporating relevant recommendations emerging from research, monitoring, evaluation and review activity

Therefore, both SG80 and SG100 have been met.

e	Approach to disputes
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	Guide Post	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Yes	Yes	Yes

The consultation and advisory processes ensure that the management system in the fishery acts proactively to avoid legal disputes. In addition, licence conditions provide for a system of dispute resolution in the event that the prescribed licence holder is not satisfied with the conditions (Part 8 161-162 of the Fisheries Management Act). No legal challenges or judicial decisions have taken place in the SE Trawl fishery. An appeals procedure exists to the Federal Court for Statutory Fishing Rights Allocations but has not been tested.

The scoring guidance outcomes SG60, SG80 and SG100 are met.

References

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AFMA Publications are available at <https://www.afma.gov.au/fisheries/small-pelagic-fishery>

Australian High Court Judgement. Available at <http://www.hcourt.gov.au/assets/publications/judgment-summaries/2013/hca47-2013-11-06.pdf>

Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	Information sufficient to score PI

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guide post	Monitoring, control and surveillance mechanisms exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive monitoring, control and surveillance system has been implemented in the fishery and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	Yes	Yes	Yes
<p>AFMA deploys a comprehensive enforcement system, including at sea patrols and boardings, pre-inspection checks and inspections on offloading (AFMA, 2017d AFMA (2018-2019)). The effectiveness of the inspection system is underlined by a system of risk assessment (AFMA 2017c), where systematic offenders are likely to be singled out. The risk-based compliance and enforcement assessment is undertaken on a biennial basis. The SESSF is subject to a biennial National Compliance Risk Assessment (2019-21). As outlined in the National Compliance and Enforcement Program, the risk assessment methodology sorts risks into three categories, as <i>Endemic</i>, <i>Sporadic</i> and <i>Bedding down</i> risks. Endemic risks require continuous monitoring and enforcement, when necessary. Sporadic risks include identified risks which require specific short-term treatment. Bedding down risks include risks which require targeted operations as a result of new or altered fisheries management arrangements. In addition to these three categories, a business as usual risk treatment program is also in place (for risks that require general maintenance throughout the time period).</p> <p>AFMA regularly analyse monthly logbooks and catch disposal records against fish receiver records. The assessment is informed by compliance intelligence, including information via Crimfish (https://www.afma.gov.au/monitoring-enforcement/report-illegal-fishing-activity). Priority risks is the SESSF are identified for ongoing investigation include quota evasion, failure to report interaction/retention of protected or prohibited species, and misreporting or mishandling of bycatch and discards. Three additional business as usual risks requiring continuous monitoring and action if necessary are: Vessel monitoring system, Closure monitoring and quota reconciliation. Boats currently entitled fish Orange Roughy do not have electronic monitoring (EM). AFMA has commenced initial EM trials for SESSF trawl boats and this management arrangement will likely be implemented soon (Ashley Mooney, Senior Intelligence Analyst, Fisheries Operations Branch, AFMA, pers com August 2019).</p> <p>A number of enforcement measures are available under fisheries legislation and regulations. On-board observers are used randomly in all sectors. Observers monitor and report catch data, fishing effort, bycatch/discards, and protected species interactions. During the period 1 June to 31 August each year, a boat nominated to the concession must carry an observer for the first three trips in the ORMA and every second trip thereafter. Where a master (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 will only be required on the first trip and every second trip thereafter. There is a special requirement in the Orange Roughy fishery to monitor overcatch in the Eastern Zone, removing the incentive for a concession holder to conduct trawl shots when only a small amount of their quota holdings remain. This reduces the risk of obtaining catches of orange roughy on aggregations that exceed quota holdings. The Southern zone is governed by a catch restriction for the targeted fishery (AFMA, Management Arrangements Booklet, 2019).</p> <p>VMS provides information on fishing effort and the position, speed and direction of vessels. Specific non-compliance areas have been prioritised, notably quota evasion, bycatch mishandling, failure to report interaction / retention of protected or prohibited species (Ashley Mooney, AFMA, pers com August 2019).</p>				

The effectiveness of AFMA's compliance system has been evaluated by the Auditor-General (ANO), 2013. Recommendations and subsequent follow up actions were directed towards improving: the quality, consistency and targeting of the general deterrence inspections program; the outcomes of enforcement actions; and compliance intelligence. These activities applied to all AFMA's fisheries.

Therefore, SG60, SG 80 and SG100 have been met.

Sanctions				
b	Guide post	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Yes	Yes	Yes

AFMA operates an effective compliance system but focuses primarily of awareness raising prior to the start of the fishing season. If infringements were to be detected, the penalty process implemented equates to the seriousness of offence, culminating in a sequence of warnings, expedited offences, and prosecutions, leading to license confiscation for serious offences. The main tool applied is AFMA Commonwealth Fisheries Infringement Notices (CFINs), which are on the spot fines.

The schedule of fines is based on a penalty unit system defined in Section 95 of the FMA, 1991, with fines offences specified on the Fisheries Management regulations (1992) with defined Index to offences.

Whilst observers do not cover a specific compliance role, their monitoring of catch reporting catch data , fishing effort, bycatch/discard, and protected species interactions provides a level of confidence that fishers are complying (Tamre Sahan, pers comm, December 2019). Bycatch and discard monitoring and protective species interactions are also closely monitored using e-monitoring, which underpins the confidence that fishers are compliant (Mike Gerner, pers comm, December 2014).

Evidence of a small number of minor offences detected is evidence that sanctions are a demonstrably effective deterrent. Therefore SG60, SG80 and SG100 have been met.

Therefore SG60, SG80 and SG100 have been met.

Compliance				
c	Guide post	Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery.	Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Yes	Yes	Yes

The Division measures compliance outcomes by estimating compliance and non-compliance rates. In the last 3 years (2016-2018), from 45 inspections, 5 offences were detected in the SE Trawl Fishery, giving a compliance rate of 88.9%. All offences detected were deemed to be minor (Ashley Mooney, AFMA, pers com August, 2019).

Fishers provide information of importance to the effective management of the fishery including VMS positions, catch logbooks and catch disposal records and fish receiver records.

Therefore SG60, SG80 and SG100 have been met.

Systematic non-compliance			
d	Guide post		There is no evidence of systematic non-compliance.
	Met?		Yes

There is no evidence of systematic non-compliance by the licensees and skippers in the SE Trawl fishery (Ashley Mooney, AFMA, pers com August 2019). SG80 has been met.

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	100
Condition number (if relevant)	N/A

PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system		
Scoring Issue		SG 60	SG 80	SG 100
a	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate some parts of the fishery-specific management system.	There are mechanisms in place to evaluate key parts of the fishery-specific management system.	There are mechanisms in place to evaluate all parts of the fishery-specific management system.
	Met?	Yes	Yes	Yes
<p>The Australia Government commissioned two independent reviews of the core Acts (EPBC Act and FMA) governing the environment and fisheries (Hawke, 2009, and Borthwick, 2012). The Borthwick review also included reviews of policy settings, recasting AFMA's objectives, fisheries management plans, the Minister's powers to vary fisheries management plans, integrating fisheries and environmental assessments, Research, fisheries management and industry levies, Offshore Constitutional Settlements (OCS), Recreational Fishing, Aquaculture, Compliance and enforcement and Co-management. The Government response to the Borthwick Review was announced in March 2013. DAWR thereafter initiated a public consultation process DAFF (2012/2013), followed by specific Reports on Harvest Strategy and Bycatch management strategy (DAFF 2013a, DAFF 2013b). Thereafter, this prompted the formulation revisions to the national harvest strategy (GoA, 2018a) and bycatch management policy (GoA, 2018c)</p> <p>AFMA regularly undertake reviews into their management system. These include Productivity Commission review (AFMA, 2016a) of commercial fisheries regulation in Australia; and an independent review of AFMA's fisheries management, organisation and governance.</p> <p>The fishery has in place mechanisms to evaluate all parts of the management system. Therefore SG60, SG80 and SG100 have been met.</p>				

Internal and/or external review				
b	Guide post	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Yes	Yes	Yes
<p>In addition, AFMA's management system is subject to internal and external performance evaluation including (Nick Rayns, AFMA, January 2017, MRAG, 2017):</p> <p>Internal peer reviews, which include:</p> <ul style="list-style-type: none"> The requirement to report in AFMA's Annual Report on overall performance against the legislative objectives, statutory requirements and financial reporting, the effectiveness of internal controls and adequacy of systems; and the Authority's risk management processes; AFMA and the MAC to periodically assess the effectiveness of the management measures taken to achieve the objectives of this Management Plan by reference to the performance criteria specified in the Plan An AFMA MAC/Scientific Panel Workshop focusing on managing conflicts of interest, the Productivity Commission review of commercial fisheries management, the regulatory outlook etc. AFMA and SEMAC developing performance measures 				

- SEMAC research proposals reviewed by the AFMA Research Committee and those for FRDC funding by the Commonwealth Research Advisory Committee
- Review of AFMA's ERA-ERM Framework – new Guidelines for fisheries have been finalised in 2017; and
- AFMA also has an internal quality assurance program to determine whether Compliance best practice has been followed

External reviews, which include:

- The Commonwealth Harvest Strategy Technical Review (Haddon et al)
- A Strategic Review of SESSF: Monitoring and Assessment ;
- Annual reporting of the Commonwealth South East Trawl fishery performance against protected species and export approval requirements under the EPBC Act consistent with the Guidelines for the Ecologically Sustainable Management of Fisheries (See below);
- The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) annual reports (last published late 2019) on the ecological and economic sustainability of fisheries managed by AFMA;
- The draft Productivity Commission review of commercial fisheries regulation in Australia which has made a number of recommendations relevant to AFMA (GoA, 2016);
- The Australian National Audit Office periodic reviews of aspects of AFMA's performance. This includes an audit of AFMA's risk management procedure (AFMA, 2016).
- An independent review of AFMA's fisheries management, organisation and governance, has also just been completed.

CSIRO's internal and external review procedures (Hadden and Tuck, pers com December, 2019) comprise the following:

- Internal sensitivity test procedures of research paper outputs
- paper reviews by 2 scientists and principal scientific officer to sign off
- A 5 yearly CSIRO Science Review of research methodologies, using independent experts
- An external review of the orange roughy stock assessment model (2009)
- External review of journal papers
- Review on the use of likelihood profiles in fisheries stock assessment.
- RAG member response to papers

All FRDC funded research papers are also subject to external review.

The ANAO regularly reviews the AFMA Compliance Program (ANAO, 2013a), and these recommendations are adopted into the AFMA Compliance Program (AFMA 2017-2018).

The implementation of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the Australian Government to assess the environmental performance of fisheries and promote ecologically sustainable management. The independent assessment of all export and all Australian Government managed fisheries is required. These assessments ensure that, over time, fisheries are managed in an ecologically sustainable way. The Assessment (DoE, 2019) is available at DoE website, Assessment of The Commonwealth Southern and Eastern Scalefish And Shark Fishery.

The fishery-specific management system is subject to occasional internal review and meets SG 80. The fishery-specific management system is subject to regular internal and occasional external review meeting SG 80. The fishery-specific management system is subject to regular internal and external review is partially met because the fishery is subject to regular review by the DAWE (DAWE 2019). However, the stock assessment model has not been externally reviewed since 2009. However, the stock assessment model itself is constantly being updated with some input from external scientists (Haddon, pers. Comm (December 2019)). SG 60, 80 and 100 are met.

[Draft scoring range and information gap indicator added at Announcement Comment Draft Report](#)

Draft scoring range	≥80
Information gap indicator	More information sought

Overall Performance Indicator scores added from Client and Peer Review Draft Report

Overall Performance Indicator score	95
Condition number (if relevant)	N/A

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12 Appendices

12.1 Evaluation processes and techniques

Information supplied by the clients and management agencies was reviewed by the assessment team ahead of the meetings, and discussions with the clients, management agencies, scientists and stakeholders centered on the content within the provided documentation. In cases where relevant documentation was not provided in advance of the meeting, it was requested by the assessment team and subsequently supplied during, or shortly after the meeting.

Sixty days prior to the audit, all identified stakeholders were informed of the opportunity to provide information to the auditors or comments on the ACDR in advance of, or during, the period of the audit. We received. We received no requests or written submissions from eNGO or other stakeholders ahead of or during the site visit.

Consultations

See Table 10 below, with respect to details of the individuals interviewed during the site visit and after, and the summary of topics discussed.

Evaluation Techniques

MRAG published an announcement of the full assessment on our website and sent a direct email to all stakeholders on our stakeholder list. MSC posted the announcement and Announcement Comment Draft Report on its Australia Eastern Zone Orange Roughy track-a-fishery page, as well as sent it by email in their Fishery Announcements newsletter to all registered recipients. At this time, MRAG Americas also announced the assessment site visit dates and location, as well as the assessment team. This was done according to the process requirements as laid out in MSC's Fisheries Certification Process v2.1. In addition, follow-up emails were sent to stakeholder groups closer to the time of the meeting to allow for remote participation, but no interest was registered. Together, these media presented the announcement to a wide audience representing industry, agencies, and other stakeholders.

The assessment team and the clients set up meetings with management and science personnel, and industry and harvest-sector representatives relevant to the fishery assessment.

12.1.1 Site visits

The full assessment site visit was held in Hobart, Australia from December 3-5, 2019

Table 10 lists the attendees and their affiliations, and Table 11 gives the schedule of meetings and who attended each.

Table 16. Australia Eastern Zone Orange Roughy MSC full assessment participants and affiliations

Name	Affiliation
Amanda Stern-Pirlot	MRAG Americas, Assessment team leader
Cameron Dixon	MRAG Asia Pacific, Assessment team
Richard Banks	Assessment team
Simon Boag	Atlantis Fisheries Consulting (client representative)
Ross Bromley	Atlantis Fisheries Consulting (client representative)
Anissa Lawrence	TierraMar and conservation member on the SEMAC
Tamre Sahan	AFMA observer program
Mike Gerner	AFMA-Electronic Monitoring
Matt Watson	Marine Stewardship Council
Andy McLoughlin	Auctioner/Licensed AFMA fish receiver

Malcolm Haddon	CSIRO Stock assessment scientist
Geoff Tuck	CSIRO Stock assessment scientist
Rudy Kloser	CSIRO Acoustic/Optical survey
Daniel Corrie	AFMA fishery manager
Roland Pitcher	CSIRO Ecosystem Scientist
Nick Rayns	Future Catch, Pty Ltd (ex AFMA executive)

Table 17. Schedule of meetings.

Unless otherwise specified, “Assessment Team” comprises Amanda Stern-Pirlot, Cameron Dixon, and Richard Banks.

Tuesday December 3rd.

Time	Attendees	Subject
09:00-10:00	Assessment Team Ross Bromley Matt Watson	Client Opening meeting, including review of confidentiality protocol
10:00-12:15	Assessment Team Ross Bromley Matt Watson	Principle 1—Harvest Strategy and Harvest controls Principle 3-Fishery Specific Management
12:15-13:15	Anissa Lawrence Assessment team Matt Watson	Principle 2: Conservation concerns Principle 3: Consultation/roles/responsibilities etc.
14:50-17:00	Assessment team	Work session

Wednesday December 4th

Time	Attendees	Subject
09:30-10:00	Assessment Team Ross Bromley Andy McLoughlin Matt Watson	Traceability
10:00-12:00	Assessment Team Ross Bromley Malcolm Haddon Geoff Tuck Matt Watson	Principle 1-stock status and stock assessment topics. Principle 2-non-target primary species, trawl closure areas
14:00-15:00	Assessment team Ross Bromley Matt Watson Tamre Sahan	MCS and observer coverage, protocols, electronic monitoring, and operational practices on vessels.
15:00-17:00	Assessment team Ross Bromley Matt Watson Nick Rayns	Historical overview and context of the orange roughy fishery; Habitats information.

Thursday December 5th

Time	Attendees	Subject
09:00-09:30	Assessment team	Assessment team meeting-pre closing meeting with client
09:30-10:30	Assessment Team Ross Bromley Matt Watson	Client closing meeting

12.1.2 Stakeholder participation

Please see section 8.2.1. regarding consultation during the site visit. In advance of the site visit, as mentioned above, a broad range of stakeholders were contacted to solicit their engagement in this assessment, including key local and international eNGOs, some of whom were very active in the New Zealand Orange Roughy assessment. The list of stakeholders was populated with assistance from MSC regional outreach. These stakeholders were emailed at least once by MRAG Americas, and some were contacted by telephone or other means as well. Nonetheless, there was no outside stakeholder engagement leading up to or during the site visit. After the site visit, there was interest in this assessment registered by one outside stakeholder (the client for the MSC-certified New Zealand orange roughy fishery).

12.1.3 Evaluation techniques

In the Fishery Standard v2.1 default assessment tree used for this assessment, the MSC has 28 ‘performance indicators’, six in Principle 1, 15 in Principle 2, and seven in Principle 3. The performance indicators are grouped in each principle by ‘component.’ Principle 1 has two components, Principle 2 has five, and Principle 3 has two. Each performance indicator consists of one or more ‘scoring issues;’ a scoring issue is a specific topic for evaluation. ‘Scoring Guideposts’ define the requirements for meeting each scoring issue at the 60 (conditional pass), 80 (full pass), and 100 (state of the art) levels.

Note that some scoring issue may not have a scoring guidepost at each of the 60, 80, and 100 levels. The scoring issues and scoring guideposts are cumulative; this means that a performance indicator is scored first at the SG60 levels. If not all of the SG scoring issues meet the 60 requirements, the fishery fails and no further scoring occurs. If all of the SG60 scoring issues are met, the fishery meets the 60 level, and the scoring moves to SG80 scoring issues. If no scoring issues meet the requirements at the SG80 level, the fishery receives a score of 60. As the fishery meets increasing numbers of SG80 scoring issues, the score increases above 60 in proportion to the number of scoring issues met; performance indicator scoring occurs at 5-point intervals. If the fishery meets half the scoring issues at the 80 level, the performance indicator would score 70; if it meets a quarter, then it would score 65; and it would score 75 by meeting three-quarters of the scoring issues. If the fishery meets all of the SG80 scoring issues, the scoring moves to the SG100 level. Scoring at the SG100 level follows the same pattern as for SG80.

Principle scores result from averaging the scores within each component, and then from averaging the component scores within each Principle. If a Principle averages less than 80, the fishery fails.

Scoring for this fishery followed a consensus process in which the assessment team discussed the information available for evaluating performance indicators to develop a broad opinion of performance of the fishery against each performance indicator. Review of the background and scoring sections by all team members assured that the assessment team was aware of the issues for each performance indicator. Subsequently, the assessment team member responsible for each principle filled in the scoring table and provided a provisional score. The assessment team members reviewed the rationales and scores, and recommended modifications as necessary, including possible changes in scores.

12.2 Peer Review reports

The following tables contain peer review comments and assessment team responses from two ambiguated peer reviewers (A and B; peer reviewer biographies are provided in section 4.1).

Peer Reviewer A general comments and team responses

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarizing the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report – PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	No	For a minority of scoring issues, I found the rationale unclear, and/or considered that it did not support the score given. These are highlighted in the detailed comments.	These issues have been responded to in the PI comments section where they have been raised.
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes		
Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]		Note: Include this row for assessments completed against FCR v1.3 and v2.0, but not for FCP v2.1 (in which the client action plan is only prepared at the same time as the peer review). Delete this text from the cell for FCR v1.3/v2.0 reviews or delete the whole row if FCP v2.1.	
Enhanced fisheries only: Does the report clearly evaluate any additional impacts that might arise from enhancement activities?		N/A	

<p>Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)</p>	<p>N/A</p>	<p>A large amount of information has been pulled together in the assessment report, which is very interesting to read and describes an extremely well-managed fishery.</p> <p>My general comments are largely focused on text presentation, and missing details. I recommend a thorough proofread is undertaken in the next step of the assessment process.</p> <ul style="list-style-type: none"> - Background Table 9: I suggest also listing live captures, due to the possibility of unobserved mortality after release (GSA3.1.8). - Page 60 section 7.3.4.1: There are no minor habitats identified. Are there any? (Links to SI 2.4.1 I). - Page 67, definition of VMEs: Are the findings of Williams and Wayte accepted by the management agency? This would then qualify VMEs as within scope for PI 2.4.1 (https://mscportal.force.com/interpret/s/article/identification-of-VMEs-SA3-13-3-1527262008557). - Please check the statements about electronic monitoring for consistency. Currently there appears to be contradictions in the background text about the use of EM. - For each scoring issue, ensure that the rationale explicitly states whether each of SG60, SG80 and SG100 were met, and why/why not. - Please check and update the table and figure references, and check the www links work. - Please ensure full references are included for all citations, both those included in the background sections and the scoring issue rationales. - Please expand acronyms at first use. - There are some highlighted sections, figure placeholders, different font colours, and other formatting issues remaining in the text. - Please ensure that all sources are acknowledged, where sections of text have been copied from reference documents. - For maximum clarity, I suggest being consistent with the common names used (oreo vs oreodory, for example). 	<p>Thank you for all of these comments, which we have responded to specifically in the PI comments if they were also raised there. For comments related to readability and proofreading, etc we thank you for your detailed reading and have done a thorough review to ensure these issues have been addressed.</p>
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Peer Reviewer A specific PI comments and team responses

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Performance Indicator (PI)	Has all available relevant information been used to score this PI?	Does the information and/or rationale used to score this PI support the given score?	Will the condition(s) raised improve the fishery's performance to the SG80 level?	<p>PRs should provide support for their answers in the left three columns by referring to specific scoring issues and/or scoring elements, and any relevant documentation as appropriate. Additional rows should be inserted for any PIs where two or more discrete comments are raised e.g. for different scoring issues, allowing CABs to give a different answer in each case. Paragraph breaks may also be made within cells using the Alt-return key combination.</p> <p>Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).</p>	<p>CABs should summarise their response to the Peer Reviewer comments in the CAB Response Code column and provide justification for their response in this column.</p> <p>Where multiple comments are raised by Peer Reviewers with more than one row for a single PI, the CAB response should relate to each of the specific issues raised in each row.</p> <p>CAB responses should include details of where different changes have been made in the report (which section #, table etc).</p>	See codes page for response options
1.1.1	Yes	Yes		<p>Scoring agreed.</p> <p>(a) It would be informative to specify the 95% confidence interval for the LRP.</p>	The LRP is selected as a static figure of 20%B0 in line with the Harevst Strategy Policy and it is also inline with MSC defaults. It was not model derived. There are no confidence intervals around the LRP.	Not accepted (no score change)
1.1.1	Yes	Yes		<p>Scoring agreed.</p> <p>(b) The comment is made that in relation to the stock level, the uncertainties are large, and confidence intervals are broad. It would be useful to provide the confidence intervals in this rationale.</p>	I have added the range into the rationale as requested.	Accepted (no score change)
1.1.2	Yes	Yes		Not applicable.		

1.2.1	Yes	Yes		Scoring agreed. (b) I agree that the assumption regarding the sustainability of Pedra Branca catches is reasonable. However, I think it is worth mentioning the fact that this assumption rests on the single-stock assumption (which has been noted elsewhere as explored but not confirmed explicitly).	Added as suggested.	Accepted (no score change)
1.2.2	Yes	Yes		Scoring agreed. (b) Any explicit or implicit consideration of the ecological role that can be reflected here, or is that another component of the rationale for not meeting SG100?	Added a comment in the rationale regarding the conservative nature of the HCRs relative to BMSY with reference to ecological role.	Accepted (no score change)
1.2.2	Yes	Yes		Scoring agreed. (c) Electronic monitoring of the catch is mentioned here. However, on p. 125 the following text appears: "Boats currently entitled to fish Orange Roughy do not currently use electronic monitoring." Please clarify which (if any) electronic monitoring methods are in use here and how those provide catch monitoring information.	Removed the reference to e-monitoring here.	Accepted (no score change)
1.2.3	Yes	Yes		Scoring agreed. (b) The rationale states that additional information is needed to meet the SG100 level. It would be useful to provide an example of the information required.	Have added explicit examples in the rationale.	Accepted (no score change)
1.2.3	No (scoring implications unknown)	No (scoring implications unknown)		(c) This rationale appears inconsistent with the statement in section 7.2.7, page 22: "the additional 31 t as an incidental TAC for other catches of orange roughy in the Southern Zone that are not a part of either UoAs catch". Please clarify.	Added a sentence in the text to highlight that the 31 t is not from this stock, it is from a separate adjacent stock.	Accepted (no score change)

1.2.4	Yes	Yes		Scoring agreed. (e) I note that the most recent full external review of the model that is cited here is 11 years old. An additional comment confirming the relevance of this review to the current version of the model would be valuable to support the scoring. (I see this issue is picked up again in 3.2.4(b)).	I have strengthened this rationale with an example of ad-hoc review done on a component to the assessment (review of natural mortality parameter estimate by Andre Punt).	Accepted (no score change)
2.1.1	Yes	No (non-material score reduction expected)		(b) In the scoring, blue grenadier appears to be included in the count of 5/10 species meeting SG100, but this species is main according to the background sections. Removing this species from the minor group would make the scoring for (b) 4 of 9 species. With the scoring of (a) as Pedra Branca meeting SG100 for 1/3 species, this UoA's scoring sits better at 85 than 90 in my view.	Thank you, the main species have been removed from the scoring element tally in Sib and corrected in Table 9. However, the score remains unchanged. Using MSC's "few/some/many" definitions, 3 of 7 and 4 of 9 are still defined as "some" so the score remains at 90 on Sib for both UoAs. The overall scores are not changed.	Accepted (no score change)
2.1.2	Yes	Yes		Scoring agreed. (d) While not using wire traces reduces shark catch, it is not clear to me how this assures compliance with shark finning prohibitions. Please clarify.	Thank you. The use of wire traces is not relevant specifically for trawl fisheries and this has been clarified in the text. It was included as part of the general description of shark abatement rules within the SESSF.	Accepted (no score change)
2.1.2+G14:J14	No (scoring implications unknown)	No (scoring implications unknown)	Yes	(e) It is unclear to me how the activities and action items in this workplan relate to the primary species here. Please highlight the specifics that are relevant to this SI. Workplan: https://afma.govcms.gov.au/sites/default/files/cts_bycatch_and_discarding_workplan_2018-19_0.pdf?acsf_files_redirect	The scoring rationale has been updated to specifically reference the focus of the bycatch mitigation strategy on species/stocks identified as "high-risk" and evidence demonstrating that these strategies are implemented effectively for high risk species. We also explained that none of the main primary species identified in the Pedra Branca UoA are in the high risk group, and considered the discards relative to overall catches and discards for these stocks. This reconsideration led to an increase in the score for this scoring issue for the PB UoA to 80 and thus eliminated the condition. See also the comment from PR B in this regard.	Accepted (score increased)

2.1.2	Yes	No (score increase expected)		For the Eastern ORMA, the scores for each Scoring Issue are 100, 80, 100, 100, 80. In my view, an overall score for the Eastern ORMA UoA for this PI would be 95, if the scoring presented currently is retained after this review stage.	Per the above row, the score for the PB UoA was raised to 90 in line with all scoring issues meeting the 80, and 3 of 5 meeting the 100 as well (with 2 not meeting the 80). As this is an odd number of Sis, we can interpret it as some meeting 100 and some not, or many meeting the 100 and few not. We choose to use the some/some definition in both directions (see 2.1.1. for a situation where the odd-number split goes the other way) and thus the overall scores are 90.	Not accepted (no score change)
2.1.3	Yes	Yes		Scoring agreed. (b) The catch reporting completed by fishers and observers could be included as part of the rationale here.	A sentence to this effect has been added to scoring issue b.	Accepted (no score change)
2.2.1	Yes	Yes		Scoring agreed.	No response required.	
2.2.2	Yes	Yes		Scoring agreed. (a), (b) Please clarify what is meant by "No evaluation of minor secondary species has yet been made". I suggest it's clearer just to state that there is no strategy in place for minor secondary species (and testing has not occurred, as per SI (b), SG100).	We have justified the score not meeting the SG100 on the basis that we haven't done a thorough evaluation of whether there is a strategy or partial strategy in place to manage all minor species. Therefore we can't determine that no strategy is in place, but equally we don't have evidence that there is one in place. No change to the rationale has been made.	Accepted (no score change)
2.2.2	Yes	Yes		Scoring agreed. (d) While not using wire traces reduces shark catch, It is not clear to me how this assures compliance with shark finning prohibitions. Please clarify.	So clarified per response to the same comment under 2.1.2.	Accepted (no score change)

2.2.2	No (scoring implications unknown)	No (scoring implications unknown)		(e) It is unclear to me how the activities and action items in the cited workplan relate to the secondary species here. Please highlight the specifics that are relevant to this SI.	Clarified per the same comment on 2.1.2. No score change.	Accepted (no score change)
2.2.3	No (scoring implications unknown)	No (scoring implications unknown)		SIs (a) & (b) consider if an evaluation is possible with the existing information, not whether it has been undertaken. Do catch records and observer data contribute some such information? Is there any life history and biological information available to inform an estimation of impact? It is concluded that catches below 100 kg would have little impact on the status of minor species, and species with these catch levels are set aside (section 7.3.1). This 'filtration' process appears to link to this SI, at least in part. I suggest comparing SI (b) to the analogous SI for primary species.	SI a meets SG100 because there are no main secondary species identified. The scoring and rationale are unchanged. For SI b, we see your point. The threshold for "some quantitative information" is likely met simply on the basis of quantification of catch amounts and confirmation that these are very small. The score has been revised upward to 95 for both UoAs accordingly.	Accepted (score increased)
2.3.1	No (scoring implications unknown)	No (scoring implications unknown)		(b) Please clarify why SG100 is not met. Based on the numbers provided in Table 9, page 48, and in the rationale here, I would have thought it would be. Is the issue the confidence level associated with these figures/estimates?	The determination for scoring at SG100 or 80 for each of the scoring elements is laid out in the first sentence of the scoring rationale. In summary, we judged the SG100 to be met when the population trends for the ETP species are stable or increasing, and captures are low or trawling is not identified as high risk in the ERA. These conditions are met for several but not all of the ETP species. This may be an overly precautionary set of criterion in this case, but the 100 bar is quite high for ETP direct effects and we are comfortable with this approach. No scoring changes have been made.	Accepted (no score change)

2.3.2	No (scoring implications unknown)	No (scoring implications unknown)		<p>(a) Please clarify relevance of the Great Australian Bight fishery measures.</p> <p>Sea lions are mentioned in some detail in the rationale. However, they do not appear to be caught in the fishery. Please clarify.</p> <p>For fur seals, a code of practice and excluder devices are mentioned in 7.3.3.3, but not in the rationale here.</p> <p>Are there measures in place for dolphins? Section 7.3.3.3 states that there are not specific management measures in place for dolphins. On that basis, I am unclear how the conclusion that a strategy is in place is drawn. (What comprises a "strategy" is set out in Table SA8 and Table GSA3).</p>	<p>a. Reference to Great Australian Bight removed. Also references to sea lions have been removed. They are not caught in this fishery. This paragraph has been replaced with a description of the pinniped management arrangements for the Commonwealth Trawl Sector in the Bycatch and Discarding Workplan 2019-2019. This also covers the mitigation for fur seals mentioned in the earlier section. Regarding dolphins, the overall strategy has been clarified.</p>	Accepted (no score change)
2.3.2	No (scoring implications unknown)	No (scoring implications unknown)		<p>(c) Please review and update as appropriate to any changes made in scoring issue (a), e.g. covering the relevant ETP components in rationale. (Currently, Australian sea lions are discussed in the rationale, but not the scoring).</p> <p>In my view, the PBR work done would be relevant to mention as a quantitative analysis that reflects on the efficacy of a strategy.</p>	<p>So reviewed and updated, and PBR work has been referenced here to bolster the rationale. Thank you for pointing that out.</p>	Accepted (no score change)
2.3.2	No (no score change expected)	Yes		<p>Scoring agreed but please clarify rationale: (d) Useful to provide some indication of what is meant by "generally" here - e.g. almost all the time, half the time, some of the time? The extent of transgressions obviously informs consideration of how successfully the strategy is being implemented.</p>	<p>Rephrased to avoid ambiguity. The intent with "generally" was to indicate they are compliant in general across the different requirements, not as a modifier of the compliance rate.</p>	Accepted (no score change)

2.3.2	No (scoring implications unknown)	No (scoring implications unknown)		(e) It is unclear to me how the activities and action items in the cited workplan relate to the ETP species specifically. Please highlight the specifics that are relevant to this SI.	Rationale has been revised to include the requested specificity.	Accepted (no score change)
2.3.3	Yes	Yes		Scoring agreed.	No response required.	
2.4.1	Yes	Yes		Scoring agreed. (b) In the references, would adding Williams et al 2006, and Wayte et al. 2007 be relevant for this SI? In the background information, it appears that these pieces of work underpin the definition of VMEs. Also, is there information on the extent of VME habitats below 700 m? It would be useful here, e.g. I note that "high risk" habitats were identified at 700 - 1500 m (Background section 7.3.4.2).	Thank you. We agree that the section on habitat classification, particularly VME, needed improvement. This has been reworked, and correspondingly, rationales for these Pis have been reworked for clarity. No score changes have resulted.	Accepted (no score change)
2.4.1	Yes	Yes		Scoring agreed based on information available (see note in General Comments, regarding the identification of minor habitats in the Background section). The rationale text for (a) contradicts the "Yes" score in the SG100 cell, but I have assumed the Yes is correct and the text will be updated.	Yes the error in the text has been corrected, thank you. Identification of minor habitats has been clarified in the text.	Accepted (no score change)

2.4.2	No (material score reduction expected to <80)	No (material score reduction expected to <80)		(a) In my view, additional rationale is needed to describe how SG60 and SG80 are met. Please see SA3.14.2. It is not clear from this text that all of the components are in place as required (e.g. local-area closures as per SA3.14.2.2(b) and precautionary measures to avoid encounters with VMEs as per 3.14.2.3(b). I also note the statement in the background section and in the rationale for SI(d) that explicit management does not appear to be in place for VMEs. If the required elements are not in place, the score is expected to decrease.	Rationales have been improved. The primary means of protecting VME and other high-risk habitats in this case, and as recommended by Williams, Wayte, and others, is area closures. These two management areas (the Eastern and Pedra Branca ORMs) are the only two areas open to any bottom fishing deeper than 700 meters. The revised rationale does a better job of tying in the existing strategy to the specific requirements in the MSC Standard. Score remains unchanged.	Accepted (no score change)
2.4.2	No (no score change expected)	Yes		Scoring agreed however please clarify rationale. (b) Is the primary element of the rationale here that spatial protection has been shown [elsewhere?] to reduce/manage/mitigate benthic impacts of trawling sensitive habitats?	Yes, spatial protection is the primary element of the rationale here. It has been shown in Australia and elsewhere to be an effective means of mitigating benthic impacts. The rationale has been clarified.	Accepted (no score change)
2.4.2	No (score increase expected)	No (score increase expected)		(d) Please clarify rationale. Based on the rationale, it appears SG100 could be met (e.g. see GSA3.14.4). Also, it would be useful to include an example or two of the relevant gear modifications relevant to this SI.	Agreed, the score has been changed to 100. However, gear modifications are not relevant here, as the evidence is based on tracking of vessel location to ensure protected areas are not transgressed.	Accepted (score increased)
2.4.3	Yes	Yes		Scoring agreed. VMS and observer information would contribute to the SG80 in (b) and (c), in my view.	Agreed and added to the rationale.	Accepted (no score change)
2.5.1	No (no score change expected)	Yes		Scoring agreed but the scoring rationale could usefully be elaborated, to mention fishery impacts on other ecosystem elements (aside from roughy). Or, if the persistence of the spawning aggregations is being used as an indicator that the fishery impacts on the other key ecosystem elements (as per the first paragraph of the rationale) are within the required limits, please cite a source supporting that.	A citation has been provided regarding the spawning aggregations. However the main rationale here is based on the very limited fishing within these UoAs relative to the extent of the ecosystems and their obvious persistence across these areas.	Accepted (no score change)

2.5.2	No (scoring implications unknown)	No (scoring implications unknown)		<p>Please complete the reference section for this PI. For example, in (a) what is the Plan, as required for SG100? The different elements may comprise a strategy but there is an additional requirement for a Plan. In (b), please cite a supporting source for the first sentence.</p> <p>Also, the citations included currently require full references.</p>	References section has been updated. The rationale has been bolstered to include specific reference to how the plan can be seen from the strategy.	Accepted (no score change)
2.5.3	No (scoring implications unknown)	No (scoring implications unknown)		(b) What are the other key elements to consider, that determine resilience and productivity and are crucial to maintaining ecosystem structure and function (as per SA3.16.3), i.e. not just maintaining roughly spawning?	Agreed. The rationale is now more comprehensive and complete. In working on this, we also reconsidered the scoring for SI c and increased the overall score to 90.	Accepted (score increased)
2.5.4	No (scoring implications unknown)	No (scoring implications unknown)		Specify why scoring issues (c) and (e) don't meet SG100.	Done, although it has been determined that scoring issue c does indeed meet the 100.	Accepted (score increased)
3.1.1	Yes	Yes		Scoring agreed.		
3.1.2	Yes	Yes		<p>Scoring agreed.</p> <p>(a) The RAG could also be mentioned in the rationale here.</p>	We have added a specific explanation on the RAG's role: to provide scientific advice in relation to AFMA's legislative objectives, and the processes, roles and to assist the AFMA Commission in making decisions, and to support the formulation of management advice by the MACs.	Accepted (no score change)

3.1.2	Yes	Yes		Scoring agreed. (b) If SG100 is met, please identify how the management system explains how it relevant info including local knowledge is used or not used. The two paragraphs in the rationale from (c) starting "The MAC...." and "AFMA formally consults...." could be usefully reflected in the rationale for (b) as well.	Included reference to AFMA formally consulting the broader stakeholder community through public comment opportunities and also using species workshops, port visits, pre-season briefings and management meetings that are attended by a range of representative groups; and referencing MACs ability to invite observers to MAC meetings to contribute to discussions where their views are considered relevant to the outcomes.	Accepted (no score change)
3.1.2	Yes	Yes		Scoring agreed. (c) What/which review process was the discussion paper mentioned in the first paragraph about?	Added on 'the development of a revised Commonwealth harvest strategy'.	Accepted (no score change)
3.1.3	Yes	Yes		Scoring agreed.		
3.2.1	Yes	Yes		Scoring agreed.		
3.2.2	No (scoring implications unknown)	No (scoring implications unknown)		In (b), SG100 deals with all issues. Is it possible to add rationale to evidence that all issues are responded to, as per the SG100 requirement? (i.e. Are "specific and relevant issues" the same as "all issues"?)	So added.	Accepted (no score change)
3.2.3	Yes	Yes		Scoring agreed. (a) Were there any audit findings or follow-up actions relevant to this SI?	Recommendations and subsequent follow up actions were directed towards improving: the quality, consistency and targeting of the general deterrence inspections program; the outcomes of enforcement actions; and compliance intelligence. These activities applied to all AFMA's fisheries.	Accepted (no score change)

3.2.3	Yes	Yes		Scoring agreed. (b) What does the statement about no offences taking place refer to? I note that in the next scoring issue, the number of offences detected is reported.	Changed to Evidence of a small number of minor offences detected is evidence that sanctions are a demonstrably effective deterrent	Accepted (no score change)
3.2.3	No (no score change expected)	Yes		Scoring agreed. (c) Can the estimated rates of compliance be included? What about observer information? Does that contribute to the level of confidence that fishers are complying?	We have added the compliance rate of 88.9%. All offences detected were deemed to be minor. We have also added: Whilst observers do not cover a specific compliance role, their monitoring of catch reporting catch data , fishing effort, bycatch/discards, and protected species interactions provides a level of confidence that fishers are complying (Tamare Sahan, pers comm, December 2019). Bycatch and discard monitoring and protective species interactions are also closely monitored using e-monitoring, which underpins the confidence that fishers are compliant (Mike Gerner, pers comm, December, 2014).	Accepted (no score change)
3.2.4	Yes	Yes		Scoring agreed.		

Peer Reviewer B general comments and assessment team responses

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	No	The scoring <u>may</u> be consistent with the MSC Standard but at times (especially in P2) the evidence presented is weak and thus, at times, the basis for scoring is not well demonstrated. Note that unless otherwise specified my comments apply to both the eastern zone and Pedra Branca fishing grounds	Improvements have been made, and specific responses are provided under the respective performance indicators.

Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	If the condition is required. The CAB's use of the term 'substantial' to describe the discarding in the PB UoA needs some thought. It may be that PI2.1.2 meets the Standard and a condition is unnecessary	Agreed. With further consideration, the score for 2.1.2 has been revised, the rationale updated, and condition removed.
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	The report needs to be properly proofread to resolve spelling errors and grammar. Given that orange roughy is listed as 'Conservation Dependent' under the EPBC Act there should be some discussion about why this listing is different to other conservation related listings as it sets a precedent that may have implications for other MSC assessments in Australia. As a general comment there is a need to bolster literature referencing such that the CAB can demonstrate a solid understanding of this fishery including how and where it operates. The habitat section in particular is very confusing as it implies that fishable habitats are far more widely distributed than they are. This is not to say that the fishery doesn't meet the Standard, it's just difficult to get a clear picture. This is also true for the ecosystem PI as there is quite a bit of literature on seamounts and there is also modelling of the role of OR in such systems.	Agreed. Proofreading and disambiguation and improvement of referencing has been carried out. The scope section has an added discussion of the EPBC Act status of roughy and the decision to assess against P1 and not P 2.3. Regarding the definition of fishable habitats, we have clarified how the habitat types have been defined and assessed (not relative to fishability for orange roughy). See specific responses under habitats PIs and reworked sections of the report.

Peer Reviewer B specific Performance Indicator comments and assessment team responses

PI	PI Information	PI Scoring	PI Condition	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Performance Indicator (PI)	Has all available relevant information been used to score this PI?	Does the information and/or rationale used to score this PI support the given score?	Will the condition(s) raised improve the fishery's performance to the SG80 level?	<p>PRs should provide support for their answers in the left three columns by referring to specific scoring issues and/or scoring elements, and any relevant documentation as appropriate. Additional rows should be inserted for any PIs where two or more discrete comments are raised e.g. for different scoring issues, allowing CABs to give a different answer in each case. Paragraph breaks may also be made within cells using the Alt-return key combination.</p> <p>Detailed justifications are only required where answers given are one of the 'No' options. In other (Yes) cases, either confirm 'scoring agreed' or identify any places where weak rationales could be strengthened (without any implications for the scores).</p>	<p>CABs should summarise their response to the Peer Reviewer comments in the CAB Response Code column and provide justification for their response in this column.</p> <p>Where multiple comments are raised by Peer Reviewers with more than one row for a single PI, the CAB response should relate to each of the specific issues raised in each row.</p> <p>CAB responses should include details of where different changes have been made in the report (which section #, table etc).</p>	See codes page for response options
1.1.1	Yes	Yes	NA	Scoring agreed	No response required	
1.1.2	Yes	Yes	NA	Scoring agreed	No response required	
1.2.1	Yes	Yes	NA	Scoring agreed	No response required	
1.2.2	Yes	Yes	NA	Scoring agreed	No response required	
1.2.3	Yes	Yes	NA	Scoring agreed	No response required	
1.2.4	Yes	Yes	NA	Scoring agreed	No response required	

2.1.1	Yes	Yes	NA	Table numbering in Section 7.3.2 needs clarification. Need consistency in species names (oreo/oreodory).	Corrected	Accepted (no score change)
2.1.2	No (scoring implications unknown)	Yes	NA	Rationale for mentioning use of wire traces as a shark catch mitigation measure in a trawl fishery needs to be explained. Bycatch action plan should be checked to see if it is applicable to the species that have been identified in the MSC assessment but are not high risk as set out in the bycatch and discarding plan.	Mention of wire traces has either been removed or clarified to have been mentioned as part of the general description of bycatch management strategies for the SESSF, though they clearly don't apply to the trawl fishery. The applicability of the bycatch action plan has been clarified, and explicit mention of if specific species are addressed under the plan has been made, along with an explanation for why they are not included if they are not included.	Accepted (no score change)
2.1.2	No (scoring implications unknown)	Yes	No	Needs to be some clearer rationale for determining that there is 'substantial' discarding for PB when the average tonnage discarded (about 0.7) is the same as for the eastern ORMA and the overall TAC for blue grenadier is over 12 000t. It may be that there is no requirement for a condition to be set.	Agreed. See response to general comment and PR A. The score has been increased and condition removed.	Accepted (score increased)
2.1.3	Yes	Yes	NA	Scoring agreed	No response required	
2.2.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	CAB may want to check for assessment of minor secondary species in "Wayte, S., Dowdney, J., Williams, A., Bulman, C., Sporic, M., Fuller, M., Smith, A. (2007) Ecological Risk Assessment for the Effects of Fishing: Report for the otter trawl sub-fishery of the Commonwealth trawl sector of the Southern and Eastern Scalefish and Shark Fishery. Report for the Australian Fisheries Management Authority, Canberra." which is not referenced.	Thanks for the suggestion. The team determined it is not presently efficient to check every minor species against the ERA results given the overall magnitude of the P2 scoring task.	Accepted (no score change)

2.2.2	No (scoring implications unknown)	No (scoring implications unknown)	NA	CAB may want to check for assessment of minor secondary species in "Wayte, S., Dowdney, J., Williams, A., Bulman, C., Sporcic, M., Fuller, M., Smith, A. (2007) Ecological Risk Assessment for the Effects of Fishing: Report for the otter trawl sub-fishery of the Commonwealth trawl sector of the Southern and Eastern Scalefish and Shark Fishery. Report for the Australian Fisheries Management Authority, Canberra." which is not referenced.	See above response. We have chosen not to assess minor secondary species.	Accepted (no score change)
2.2.3	No (scoring implications unknown)	No (scoring implications unknown)	NA	CAB may want to check for assessment of minor secondary species in "Wayte, S., Dowdney, J., Williams, A., Bulman, C., Sporcic, M., Fuller, M., Smith, A. (2007) Ecological Risk Assessment for the Effects of Fishing: Report for the otter trawl sub-fishery of the Commonwealth trawl sector of the Southern and Eastern Scalefish and Shark Fishery. Report for the Australian Fisheries Management Authority, Canberra." which is not referenced.	See above response. We have chosen not to assess minor secondary species.	Accepted (no score change)
2.3.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	CAB may want to set out what are the national/international requirements for ETP species as these are not clear and thus the argument that the fishery meets these is not clear.	According to the MSC standard, where there are no national or international limits set, this scoring issue should not be scored. There is a discussion in the rationale regarding presence of PBR values for some ETP species but these do not serve as limits or thresholds.	Not accepted (no score change)
2.3.2	Yes	Yes	NA	Scoring agreed	No response required	
2.3.3	Yes	Yes	NA	Scoring agreed	No response required	

2.4.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	The CAB needs to review the impacts on habitat in the context of the '.....habitats impacted by the UoA.' (SA3.13.1). Also need to address SA3.13.3 in regards to habitats which come into contact with the gear. Further analysis of the specific habitats affected by orange roughy fishing and the extent of these habitats (noting that the quoted literature refers to 'predicted' habitats may help bolster the assessment of both UoAs against 2.4.1. The figure of 86% of trawl grounds in the CTS being closed is not specific to the UoA.	The habitats classification and management sections of the reports and scoring rationales have been improved to clarify the heavy reliance on the very confined fishing areas impacted by these UoAs relative to the overall extent of habitats/assemblages represented within them. There has been very extensive work done in this area within AFMA and CSIRO and the updated text includes more description of this.	Accepted (no score change)
2.4.2	No (scoring implications unknown)	No (scoring implications unknown)	NA	The main argument used is the 86% of the CTS management zone is closed to trawling but as mentioned above, its unclear what proportion of habitat in which orange roughy may be found, is closed. Further review of the available literature on the location of OR fishing, the distribution of habitats that may be important for OR, the impacts of fishing and research on recovery rates would be important for evaluating whether management measures meet the Standard.	See above response. The updated text and rationales should address this concern. Habitat types/assemblages have been defined independently of the spatial extent of orange roughy occurrence in this case. This differs from the definitions in the New Zealand orange roughy fishery because in NZ, habitat types have not been defined or mapped in the extreme detail they have been in these waters of SE Australia. The ERA approach for habitats combined with studies on vulnerability vs exposure available for the SESSF fishery which includes orange roughy management areas, is comprehensive and extensive.	Accepted (no score change)
2.4.3	No (scoring implications unknown)	No (scoring implications unknown)	NA	Further literature review would help clarify whether knowledge about the UoA, as opposed to the CTS, is sufficient. All trawl shots are logged and the location in relation to mapped (and/or predicted/inferred) habitat is known.	Hopefully this has now been clarified in the text. Since the UoAs are the ORMAs only, which have clear delineations within the CTS and SESSF fishing areas, and the habitats there have been classified using the ERA (mid-slope, etc) we don't need to examine a log of trawl shots.	Accepted (no score change)

2.5.1	No (scoring implications unknown)	No (scoring implications unknown)	NA	<p>There is insufficient information reviewed to support the conclusion that the 80 level is met. The Cascade Plateau is not part of the UoA and there is research specific to the two fished areas that has not been reviewed. There are at least two ecosystem models (Atlantis and ewE) of the South East that may provide further insights and this is based on knowledge of the roles played by many species of interest, including orange roughy. The model is used to explore the implications of previous depletions and current fishing strategies. See for example Fulton et al 2016 Fisheries Research 183 (2016) 574–587, and Fulton et al 2014 PLoS ONE 9(1): e84242. doi:10.1371/journal.pone.0084242. These Atlantis models have specific boxes for the sea mounts. There are EwE models for the sea mounts Bulman et al 2002 Marine and Freshwater Research 53(1):59-72 · January 2002</p>	<p>Thank you for this comment and these references. We have now considered Fulton et al 2014 in relation to the integrated approach to fisheries management in use by AFMA for the SESSF fishery. In addition, we've reviewed the results of the Assessment of the Commonwealth Southern and Eastern Scalefish and Shark Fishery, done by the Department of the Environment and Energy and published in February of 2019, and included findings contained in this document to further substantiate the scores in the ecosystem component. The score for this PI remains unchanged, but 2.5.2 and 2.5.3 have increased.</p>	Accepted (no score change)
2.5.2	No (scoring implications unknown)	No (scoring implications unknown)	NA	<p>CAB needs to review statements to ensure consistency with other PIs (and SIss). For example, in SI b there is mention of how fishing aggregations may affect nursery habitat yet in P1.2.3a the rationale states that the habitats for juveniles are unknown.</p>	<p>Reviewed and improved for consistency. Scoring increased to 90 as a result of considering newer material on management strategy evaluation and recent management review by the DOEE.</p>	Accepted (score increased)
2.5.3	No (scoring implications unknown)	No (scoring implications unknown)	NA	<p>At present the information provided does not support the score. CAB should review and reference the modelling work for south eastern Australia to check if the UoA has access to the sort of information that would enable this PI to be addressed in detail. The references mentioned 2.5.1 provide an introduction to the available literature.</p>	<p>See response under 2.5.1 as it applies here as well. Score has been increased to 90 with the added substantiation.</p>	Accepted (score increased)
3.1.1	Yes	Yes	NA	Scoring agreed	No response required	
3.1.2	Yes	Yes	NA	Scoring agreed	No response required	

3.1.3	Yes	Yes	NA	Scoring agreed	No response required	
3.2.1	Yes	Yes	NA	Scoring agreed	No response required	
3.2.2	Yes	Yes	NA	Scoring agreed	No response required	
3.2.3	Yes	Yes	NA	Scoring agreed	No response required	
3.2.4	Yes	Yes	NA	Scoring agreed	No response required	

12.3 Stakeholder input

To be drafted at Client and Peer Review Draft Report

To be completed at Public Certification Report

The CAB shall use the stakeholder input template to include all written stakeholder input during the stakeholder input opportunities and provide a summary of verbal stakeholder input received during the site visit. Using the stakeholder input template, the team shall respond to all written stakeholder input identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a 'CAB response code'. The team may respond to the verbal summary.

Reference(s): FCP v2.1 Section 7.15

No written or verbal stakeholder input has been received as of the publication of this PCDR, other than that which is reported in the site visits record.

12.4 Conditions

N/A No conditions

12.5 Client Action Plan

N/A No conditions

12.6 Surveillance

Fishery surveillance program				
Surveillance level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit & re-certification site visit
	Off site	On site	Off site	On-site with recertification if decided.

Timing of surveillance audit			
Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	e.g. May 2018	e.g. July 2018	e.g. Scientific advice to be released in June 2018, proposal to postpone audit to include findings of scientific advice
1	TBD	Around anniversary date	
2	TBD	Around anniversary date	
3	TBD	Around anniversary date	
4	TBD	Around anniversary date	

Surveillance level rationale			
Year	Surveillance activity	Number of auditors	Rationale
1	Off-site audit	2 auditors remote	Single condition, progress required at year one is a plan provided by the client. This can be delivered remotely. All updates on the fishery can be delivered remotely.

12.7 Harmonised fishery assessments – delete if not applicable

To be drafted at Announcement Comment Draft Report stage

To be completed at Public Certification Report stage

As this is an Australian commonwealth managed fishery, Principle 3, particularly component 3.1, overlaps with several other certified fisheries.

Table 18. Overlapping fisheries

Fishery name	Certification status and date	Performance Indicators to harmonise
Australian Heard Island and McDonald Islands Toothfish & Icefish fisheries	16 March 2012 to 16 Jul 2022	3.1
Australia blue grenadier	25 Aug 2015 to 25 Aug 2020	3.1
Australia Northern prawn	19 Jan 2018 to 18 Jan 2023	3.1
South East Australia small pelagic fishery (commonwealth) mid-water trawl	13 Aug 2019 to 12 August 2024	3.1

Overlapping fisheries**Supporting information**

- Describe any background or supporting information relevant to the harmonisation activities, processes and outcomes.

N/A All harmonized

Was either FCP v2.1 Annex PB1.3.3.4 or PB1.3.4.5 applied when harmonising?

No

Date of harmonisation meeting

N/A

If applicable, describe the meeting outcome

- e.g. Agreement found among teams or lowest score adopted.

Not applicable. No discord in scoring outcomes among overlapping fisheries

12.8 Objection Procedure – delete if not applicable

To be added at Public Certification Report stage

The report shall include all written decisions arising from a ‘Notice of Objection’, if received and accepted by the Independent Adjudicator.

Reference(s): FCP v2.1 Annex PD

12.9 Review of TSSC’s advice and DEH analysis to list orange roughy as endangered in Australian waters

Review of the Threatened Species Scientific Committee’s advice and DEH analysis to list orange roughy (*Hoplostethus atlanticus*) as Endangered in Australian waters

Prepared for the orange roughy quota holders by Dr Keith Sainsbury,
Dr Ian Knuckey and Dr Malcolm Haddon

Introduction

In its advice to the Minister, the Threatened Species Scientific Committee (TSSC) found that orange roughy was eligible for listing as “Endangered” under the Environment Protection and Biodiversity Conservation (EPBC) Act 1999. The IUCN Guidelines, taken from the IUCN Red List Categories and Criteria, inform the considerations of the TSSC. Based on these Categories, Endangered is described as follows: “A taxon is Endangered when the best available evidence indicates that it meets any of the Criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild”. (The IUCN Criteria A to E are effectively equivalent to the EPBC Act Criteria 1 to 5)

The TSSC report reviews the status of orange roughy with respect to these five criteria:

- | | |
|--------------|---|
| Criterion 1. | It has undergone, is suspected to have undergone or is likely to undergo in the immediate future a very severe, severe or substantial reduction in numbers. |
| Criterion 2. | Its geographic distribution is precarious for the survival of the species and is very restricted, restricted or limited. |
| Criterion 3. | The estimated total number of mature individuals is limited to a particular degree and: (a) evidence suggests that the number will continue to decline at a particular rate; or (b) the number is likely to continue to decline and its geographic distribution is precarious for its survival. |

Criterion 4. The estimated total number of mature individuals is extremely low, very low or low.

Criterion 5. Probability of extinction in the wild.

In its advice to the Minister, the TSSC recommended that orange roughy was eligible for listing as Endangered under Criterion 1 only. Under this Criterion, where the cause of the reduction has not ceased (which it has for the orange roughy fishery) the IUCN Guidelines indicate that this Criterion can be met with a population size reduction of $\geq 50\%$ over ten years or three generations either in the past, now, or in the future. Further analysis by the Department of Environment and Heritage supported the conclusion of the TSSC.

In addition to the three month public comment period for this nomination, the TSSC recommendation and DEH analysis were made available to the public for further

comment, reflecting the significance of the recommendation, and the fact that there will be a great deal of community and sectoral interest in it.

The Minister acknowledged that his final decision must be based on the science of the species and its survival and he welcomed any relevant input on the scientific advice which he would consider, together with the Committee's advice, before making the decision.

Review

This document is a critical review of the TSSC advice and the DEH analysis.

In conducting this review, there were a number of critical issues highlighted in the TSSC advice and DEH analysis:

- ☒ Application of Criterion 1 to harvested and managed marine species;
- ☒ Lack of recent and complete information;
- ☒ Incompatibility of fishery harvest strategies and EPBC listing guidelines;
- ☒ Inappropriate use of Limit Reference Points as a risk of extinction;
- ☒ Incorrect analysis of the generation period of orange roughy;
- ☒ The distinction between fishery collapse, stock collapse, and extinction;
- ☒ Depensation is not evident in orange roughy fisheries;
- ☒ Assumptions that a low biomass creates a high risk of extinction in the wild;
- ☒ Potential implications of 2006 acoustic survey;
- ☒ Likelihood of extinction;
- ☒ Recent management changes.

Application of Criterion 1 to Harvested and Managed Marine Species

The IUCN Red List Categories and Criteria inform the considerations of the TSSC with respect to threatened species nominations under the EPBC Act. Importantly, these IUCN Criteria have been developed primarily for terrestrial species with low reproductive potential compared to most teleost fish, and the appropriateness of Criterion A for harvested and managed marine fish species has been seriously questioned (Mace 1999). This information is critical to the consideration of the listing of orange roughy but unfortunately it is not mentioned in the TSSC advice to the Minister. A summary of the relevant outcomes from the review is provided below.

The IUCN Criteria Review: The Report of the Marine Workshop (Mace 1999) questions the application of the IUCN Guidelines to managed marine species - *“Are the basic principles of extinction theory and life history evolution employed in the criteria applicable to marine as well as terrestrial species?”* The expert workshop *“....generally agreed that in its current formulation Criterion A often over-estimates extinction risk”*. A number of options in how this Criterion could be changed to better suit managed marine populations were considered. A part of their recommendation was: *“The current formulation of Criterion A is generally agreed to be too inclusive and has resulted in the*

inappropriate listing of many species. The group discussed many options and generally agreed: (1) the threshold decline rates are probably too low (and therefore include too many species); more work needs to be done to set new levels. (2) the most precautionary new formulation of Criterion A would be to develop an opt-out clause....

(3) This modification depends upon a sufficiently precautionary and widely relevant opt-out clause being devised.” The opt-out clause is intended to allow measures other than the default 50% reduction to be identified and used, and that these other measures are chosen to more reasonably reflect the risk of extinction in the species concerned. This is in direct recognition that criterion A is not appropriate for many marine fish species.

Indeed, if the current Criterion A was applied to every Commonwealth managed fishery, nearly all of them (not just orange roughy) would meet this Criterion – including some of our most well managed and demonstrably sustainable fisheries. The criterion is not a good measure of extinction probability for marine fish.

Lack of recent and complete information

It is disappointing that for such a critical issue, the TSSC did not access the most recent information available on the status of Australian orange roughy stocks from the Deepwater Assessment Group and completely omitted some stock assessment information (eg. Cascade Plateau assessment).

Table 1 provides information derived from the **most recent** base-case scientific stock assessment for each zone. It shows that the current biomass (B_{curr}) of three stocks have been reduced to below the limit reference point of 20% unfished biomass (B_{20}) and one stock is well above this reference point. An estimate is also provided for the number of mature orange roughy in the Eastern and Cascade Plateau fisheries in 2006 based on the mean weight of an adult fish (~1.5kg and 2.5kg respectively). There has been no formal stock assessment using the catch trend data in the GAB or STR fisheries. Considering the orange roughy species in the EEZ as a whole fishing has reduced the population to no less than 26%, which is above the limit reference point.

Table 1. Summary of most recent information on the status of orange roughy stocks including unfished ($B_{unfished}$) and current (B_{curr}) spawning biomass estimates and estimates on the number of mature fish. The mean weight of eastern zone fish is 1.5Kg and for Cascade fish is 2.5kg.

Zone	$B_{unfished}$ tonnes	B_{curr} tonnes	B_{20} tonnes	Date	$B_{curr}/$ $B_{unfished}$	$B_{curr}/$ B_{20}	Mature fish numbers estimate
East*	109,875	16,785	21,975	2006	15%	76%	11,300,000
South	55,821	6,871	11,164	2000	12%	62%	
West	18,619	1,478	3,724	2002	8%	40%	
Cascade	59,031	39,351	11,806	2006	67%	333%	16,700,000
Total	243,346	64,485	48,669		26%	132%	28,000,000

*The Eastern Zone biomass in 2006 is estimated from an assessment in 2002 using an acoustic survey in 1999, projecting into the future assuming model estimated recruitment and an annual catch of 800 t in 2002-2006 (actual catches in those years : 1,584, 772, 765, 754, (with 800 t TAC in the last three years))

A more detailed discussion of the assessments is provided by Deepwater Resources Assessment Group in its SESSFAG plenary update and in the individual stock assessment reports.

Based on this most recent information, the current total roughly spawning biomass (pooled across stocks) in the EEZ is estimated at over 64,000 tonnes comprising over 28 million mature fish. This biomass represents 26% of the unfished biomass (243,000t) and is above the limit reference point. This does not include estimates from the GAB or STR fisheries. It is important to note that all of these stocks are still receiving recruits (fish up to 30 years old) spawned from an unfished biomass and will continue to do so for the next decade. This information is not consistent with a stock that is at high risk of extinction in the wild.

Incompatibility of fishery harvest strategies and EPBC listing guidelines

The inappropriateness of the simple interpretation of Criterion 1 as a measure of extinction probability is illustrated in the incompatibility between that criterion and the guidelines for sustainable fishery management. The draft Harvest Strategy Policy for Commonwealth fisheries identifies a target biomass reference of around 40% of the virgin biomass (~1.2 B_{MSY}) for a sustainable, efficient and profitable fishery. However this target conflicts with the EPBC listing guideline for Criterion 1 of population size reduction of =50%, with the result that species subject to a well managed fisheries as defined by the Harvest Strategy Policy could meet Criterion 1 and so be listed as endangered.

Criterion 1 is not well suited to identifying the risk of extinction for a commercially caught marine bony fish species. Criterion 1 is based upon there being evidence of a “severe or substantial reduction” in numbers in a given species. However, many fisheries in Australia and elsewhere in the world are managed explicitly with the intent of generating such ‘severe’ reduction in numbers from unfished levels. The Australian Fisheries Management Authority has been instructed in a Ministerial Directive to adopt limit and target reference points of 20/40% or 30/50%, depending on the species and circumstance. In New Zealand the target biomass for orange roughy is 30% of the unfished level. For any new fishery, these targets and limits would constitute a ‘severe’ or ‘substantial’ reduction in numbers from the unfished state, and could meet criterion

1. But this reduction is a management intention, based on extensive empirical evidence from global fisheries, and the species involved is not in danger of extinction.

Inappropriate use of Limit Reference Points as a risk of extinction

The recent Ministerial Directive recommended that 20% unfished mature biomass should be adopted as the limit reference point for many Australian fisheries, with some fisheries adopting a more conservative 30% unfished mature biomass level. In fisheries management the objective of Limit Reference Points is to reduce the risk of the fishery being reduced to a point where productivity is reduced – and more specifically to avoid the risk of low reproductive success and ‘recruitment over-fishing’ which can cause periods of low recruitment and slow recovery. Recovery from depletion levels as low as the limit reference point is still expected however, even if there is increased risk that recovery may be slow. The limit reference point for fisheries is at a larger population size than the threshold for high risk of extinction, as evidenced by the absence of marine fish extinctions world-wide even when populations are depleted below the limit

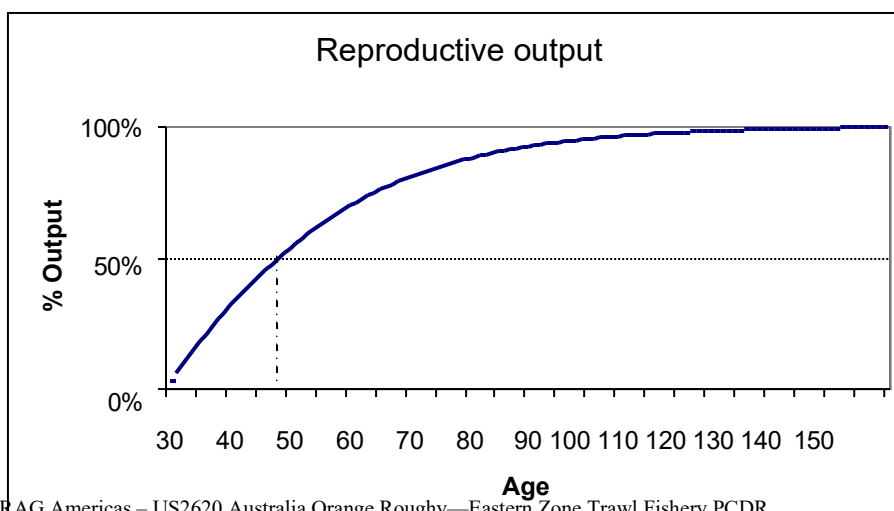
reference point. The fishery management limit reference point is not a threshold for high extinction probability, and it is not correct to use it as a proxy for such a threshold.

Limit Reference Points are designed to avoid overfishing not to avoid a risk of extinction. Using the fact that a stock is below the Limit Reference Point as a criterion for declaring a marine bony fish as threatened or endangered, is inappropriate and misleading. The Limit Reference Points and what constitutes a ‘substantial’ reduction in numbers in the context of high risk of extinction should not be confused, especially when dealing with marine bony fish. For numerous land-based species a drop in numbers by 80 – 90 % of the natural abundance could well be catastrophic and would probably constitute excellent grounds for considering a species as threatened. However, such reductions for marine bony fish, while they are not desirable in any sense and may make a commercial fishery uneconomic, they do not imply a risk of literal extinction of the species- either globally or locally.

Analysis of the Generation Period of Orange Roughy

The IUCN Guidelines (2001) state that “Generation length is the average age of parents of the current cohort”. The TSSC has incorrectly calculated the generation length and greatly overestimated it. They used an age at maturity of 30 years and a maximum age of 150 years (which are both reasonable) to calculate that the generation period is 90 years (average of $30+150 = 180/2 = 90$). There are incorrect assumptions in this approach, and it is not the standard way to estimate generation time. First, this assumes that there is the same reproductive output of a cohort of fish at 150 years old compared to a cohort of fish at 30 years old. This is not the case because the cohort size decreases over time due to mortality. 150 years is an estimated age of the oldest orange roughy in the population but in fact very few fish reach this age. Most of the population and the reproductive output is derived from younger fish. Based on IUCN Guidelines (2005) generation length can be estimated as “the age at which 50% of total reproductive output is achieved”. Based on our knowledge of the population structure, natural mortality and fecundity of orange roughy, a simple analysis of reproductive output shows that this point is reached at around 50 years of age – not 90 years.

The biological parameters as outlined in Smith and Wayte (2005) for growth, length-weight relationship and natural mortality and a relative fecundity relationship (44,000 eggs per kg body weight) adapted from Pankhurst and Conroy (1987) can be used to provide a simple model of relative reproductive output of orange roughy against age.



It is of concern that the TSSC made its considerations of the listing of orange roughy with the perception that the generation period was almost double what it actually is.

The Distinction between Fishery Collapse, Stock Collapse, and Extinction

While it is true to say that there may be an increased risk of fishery collapse below 20% (or 30%) unfished spawning biomass, there are many fisheries in the world that exist and proceed while the spawning biomass is below 20% of the unfished spawning level. The 20% rule is a rule of thumb developed from empirical experience. Below this level there appears to be a higher risk of reduced recruitment and fishery collapse compared to above this level. However, an important distinction should be made between a fishery collapse, a stock collapse or extinction. A fishery collapse occurs when it is economically unprofitable to continue fishing. Even though a fishery may collapse by becoming unprofitable this does not imply that there is a significant risk that the species will go extinct, even locally. A stock collapse is an abrupt reduction on population size or productivity, often as a result of recruitment over-fishing, natural changes in the environment or a combination of the two. Famous examples include the Peruvian anchovy, Californian sardine, North Sea herring, Canadian Atlantic cod and North Sea cod. In all cases the stock collapse reduced the population to very low levels, and well below fishery limit reference points – to less than 2% of initial biomass in the case of the two cod cases. But in none of these cases has the species become extinct, and in some the populations have recovered.

Fishery collapse and stock collapse are not in any way desirable or acceptable, and as is the case for orange roughy in Australia, management measures should avoid or recover from such situations. **For marine bony fish, a fishery or stock collapse does not imply that there is a significant risk of local or global extinction.**

Depensation is not evident in Orange Roughy Fisheries

In some living groups (such as some mammals and insects) it is possible that population numbers reach such low levels that breeding effectiveness and/or defence mechanisms against predation are reduced. At low abundances the per capita productivity decreases instead of the usual population response of an increase. In its extreme form depensation can have the effect of causing populations to dwindle to extinction below some critical threshold even if all human impacts are removed. If such “depensation” occurs in a species it increases the risk extinction from low population size. Depensation has been detected in some fish populations but it is very rare and in no examples has it been so strong as to cause a population threshold below which extinction becomes certain (Myers et al 1995, Liermann and Hilborn 1997).

In part this resilience of fish populations may be because even at very low proportions of unfished biomass there can still be literally millions of individual fish remaining in the population, above thresholds where depensation mechanisms may start to operate. For Australian orange roughy the latest scientific estimates of mature numbers of fish for East and Cascade alone are 28 million fish.

But the most direct evidence for lack of depensation in orange roughy comes from the experience with recovery of orange roughy stocks in New Zealand after fishing was stopped. There are two well documented cases of the population response to stopped or

reduced fishing. The ORH 3B stock (Spawning Box and Northeast Hills) has increased following reduction in catches, although this stock was not depleted below about 30% of the unfished level. The ORH 7A (Challenger Plateau) stock was reduced to about 3% of the unfished level when it was closed to fishing in 2000. By 2005 surveys showed that the stock had increased by 50% (from less than 11,000t to 16,000t).

This increase in abundance is good evidence that orange roughy stocks will recover from depletion, even quite severe depletion, if protected from fishing. There is no indication that the population will continue to decline in the absence of fishing, and dwindle to extinction. So the present cessation / reduction of fishing on the currently depleted Australian stocks is confidently expected to result in recovery of those stocks, and not stock extinction.

Potential implications of 2006 acoustic survey

It is surprising that the TSSC advice did not mention the critical 2006 multi- frequency towed body survey of the eastern zone population which has been planned and budgeted for as a planned part of the monitoring regime for management. The survey is planned for July 2006 and will provide a direct measurement of the abundance of orange roughy to be used in association with new age data to provide a full quantitative stock assessment. The last full quantitative assessment occurred in 1999, and the updated assessment is designed to measure recovery since that time under the much reduced catches.

This survey will provide the most scientifically robust and technologically advanced information on the current state of Eastern Zone orange roughy populations, and direct test of whether this stock is rebuilding as predicted in the stock assessment models. **It is difficult to understand that a decision on the listing of orange roughy could be made before this comprehensive and current information is available, and instead to base the decision on an assessment that is 7years old.**

Likelihood of orange roughy becoming extinct

Under the IUCN guidelines “*A taxon is Endangered when the best available evidence indicates that it meets any of the Criteria A to E for Endangered, and it is therefore considered to be “facing a very high risk of extinction in the wild”.*

Whilst the TSSC has put forward arguments to support significant reductions in orange roughy biomass, their arguments that orange roughy are facing a high risk of extinction in the wild are not supported. Also, there is evidence in the TSSC report which negates their argument of a high risk of extinction.

The TSSC stated that there is no formal stock assessment for the Cascade Plateau sector of the SESSF. This is not true and in dismissing this assessment, the TSSC has ignored probably the most compelling evidence that orange roughy will not become extinct.

There is a formal assessment of biomass of orange roughy on the Cascade Plateau based on a quantitative acoustic survey (Ryan 2006). This was the first full stock assessment for the Cascade Plateau, with management of the stock previous based on precautionary catch limits and semi-quantitative surveys. Results from this quantitative survey were available in November 2005. The Deepwater Assessment Group provided the following scientific advice to SESSFAG in regard to the Cascade Plateau orange roughy fishery. “This (2005) snapshot survey indicates that the stock is at 67% of pre fishery biomass (59 000 tonnes) In the longer term (~50 years) the recommended sustainable

biological catch would be 500 tonnes after the fish down to a 40% target biomass using this preliminary result". The biomass of orange roughy on Cascade Plateau alone is estimated at 31,600 t (at least 16 million fish), with a long term sustainable yield of 500t per year, and with scope for higher catches in the short term because the stock is well above the target level of depletion. None of this is consistent with the notion that the stock or species is at a high risk of extinction. Indeed this fishery is consistent with Australian Commonwealth and international criteria for a well managed and sustainable fishery (e.g. the criteria under Marine Stewardship Council principle 1).

Statements in the TSSC document itself also contradict the notion that Australian orange roughy is at high risk of extinction, even in the case of the stocks that are presently depleted. The TSSC document uses the stock assessments to recognize that stocks in the Eastern Zone were well below the limit reference of 20% virgin biomass. It also correctly reports that the range of stock assessments available, representing uncertainty in interpretation, show that stocks will rebuild above the limit reference point in a period of from 5 to 26 years depending on the annual TACs. The best scientific stock assessment and advice indicates that these depleted stocks will rebuild even with non-zero catches. The best scientific advice is for recovery, not extinction, under the present fishery management measure of zero fishery catch from these stocks. **There is little merit in the TSSC argument that there is a high risk of extinction.**

Recent Management Changes

Several orange roughy stocks have been overfished historically and are now at spawning biomass levels below 20% unfished (Table 2). In all cases management measures are in place to stop all overfishing and enable the stocks to recover. Strict management controls are now in place and zero TACs are projected for 2007. The Cascade stock is known to be at a high population level (67%), and able to support a significant harvest (500t) in the long term (> 50 years). This stock was managed in a much more cautious manner than those that were depleted, and in particular a low catch level was applied until information was available to allow a reliable estimate of the stock size and sustainable yield. This successful approach is now being applied by AFMA to the stocks of unknown status.

While the overfished stocks meet some aspects of a simple interpretation of criterion 1, this simple interpretation is not an appropriate measure of the risk of extinction in orange roughy and the cause of the historical reduction has already been removed by the strict fishery management arrangements outlined below.

Table 2. Current biomass estimates of orange roughy stocks and the 2006 actual TAC and the 2007 projected TACs .

Zone	B_{unfished} tonnes	B_{curr} tonnes	B_{curr}/ B_{unfished}	2006 RBC	2006 TAC	2007 Projected TAC
East	109,875	16,785	15%	0 t	700 t +100 t research	0 t
South	55,821	6,871	12%	0 t	10 t bycatch	0 t
West	18,619	1,478	8%	0 t	250 t bycatch	0 t
Cascade	59,031	39,351	67%	214 t (779)	700 t +100 t research	214 t

For the Eastern, Southern and Western zones the values are those that were used in calculating the recommended biological catches (RBC) in 2005 using the newly implemented harvest strategy framework. For the Cascade zone figures are provided, the first is based on acoustic surveys in 2003 and 2004 was used to set the 2006 RBC and the second (in parentheses) is based on an acoustic survey in 2005.

Comments on TSSC recommendations on other Criteria

Criterion 2

With respect to Criterion 2, citing the worldwide distribution of the species along with its broad distribution around Australia, the report of the TSSC stated “The geographic distribution of the Orange Roughy is neither precarious for the survival of the species, nor is it very restricted, restricted or limited.” Criterion 2 did not, therefore, concern the Committee. This is a reasonable conclusion.

Criterion 3

With respect to Criterion 3, the report of the TSSC stated: “...it is not possible to measure precisely the total number of mature individuals of a deep-sea species such as the Orange Roughy. While there is some evidence to indicate that the population is continuing to decline, there is insufficient information to enable the rate of this continuing decline to be determined.” Having said this and referring to Criterion 2, they concluded that Criterion 3 did not make the species eligible to listing as endangered.

While Criterion 3 was not concluded to make the species eligible for listing as endangered it should be pointed out that the TSSC report fails to recognize the latest management steps adopted by the Australian Fisheries Management Authority (AFMA). AFMA has recently set a zero Total Allowable Catch on those orange roughy populations estimated to be below the Limit Reference Point. In all orange roughy stocks studied overseas, strong reductions in fishing mortality have all led to improvements in the stock status in those stocks that have been monitored. Therefore, the suggestion that “... there is some evidence to indicate the population is continuing to decline” is out of date and incorrect.

Criterion 4

Under Criterion 4 the report states: “There are insufficient quantitative data available on the number of mature individuals in the Orange Roughy population, and therefore there is insufficient information available to assess the species against this criterion.”

While the committee drew no conclusions about the eligibility of orange roughy to be listed as endangered under this criterion, it is not strictly correct to state that there are insufficient information available on numbers of mature individuals. Where formal stock assessments exist, they provide estimates of the current spawning stock biomass (*i.e.* mature individuals). An average weight of 1.5 kg per fish (cited in TSSC’s report) suggests that every 1,500 tonnes of fish implies there would be 1,000,000 mature individuals. A minimum biomass estimate for orange roughy in the Australian EEZ, based just on the stocks for which there are scientific estimates of abundance, is 64,485t, corresponding to at least 28 million breeding age individuals. It is a common error to confuse low relative biomass levels with low numbers of individuals when in fact the fish can still number in their multi- millions.

Criterion 5

This criterion, probability of extinction in the wild, comes closest to explicitly identifying species that are “facing a very high risk of extinction in the wild “. Under Criterion 5 the TSSC report states “There are no quantitative data available to assess the species against this criterion”. This is not correct, and there are two lines of argument that the TSSC could and should have considered with respect to this important indicator.

One line of argument is based on the global experience with orange roughy populations. Across all known orange roughy fisheries in the World, while some have collapsed, none are known to have gone extinct - either locally extinct (i.e. on the individual fishing grounds) or regionally extinct. And this experience includes fisheries on the high seas where Illegal, Unregulated and Unreported (IUU) fishing was extensive and fisheries in the EZZs of states that apply much less rigorous fishery management than is applied in Australia. These observations could be used to provide an estimate of extinction probability for fished orange roughy populations, including highly depleted populations. And because there are no cases of even local extinction this experience would yield an extinction probability of zero.

The other line of argument is based on the orange roughy population models used for fishery assessment. While extinction probability is not commonly reported from these models it can easily be calculated. And for all the available models the probability of extinction is zero for the current management arrangements by stock. That is, **the extinction probability is zero for the currently depleted stocks at the current zero TAC, and the extinction probability is zero for the Cascade Plateau stock harvested at the recommended biological harvest.** These population models are based on the best scientific information available, and do not include depensation in the population dynamics because there is no indication that depensation occurs in orange roughy. It would be possible to build hypothetical depensatory mechanisms into the models to explore hypothetical worst case scenarios. But from first principles it would be expected that even the currently depleted orange roughy stocks would be robust to the pattern of exploitation they have experienced – that is a relatively brief period of fishing on the spawning stock followed by very low or zero catches. That is because the populations still contain many unfished year-classes of immature fish that can be expected to feed into the spawning stock and provide stock rebuilding even if the spawning stock is reduced to a level where depensation is assumed to occur. In any event it is clear that, counter to the TSSC conclusions, there are data and models available to assess the population against this criteria and all the analysis available indicate that the risk of extinction is zero or extremely small.

Conclusions

In this submission it is argued that the probability of orange roughy becoming extinct in the Australian EEZ is negligibly small, both for the species as a whole or for any of the more localised breeding stocks individually. The erroneous conclusion by the TSSC of a significant risk of extinction resulted from the use of inappropriate measures of extinction risk, misinterpretation of some information, and not considering some relevant information.

It is acknowledged that some of the individual stocks of sexually mature fish have been depleted below the intended reference points for fisheries management, and that such over-depletion is not desirable or acceptable. This historical overfishing has now been addressed through fishery management measures that prohibit further catching from these stocks.

Based on experience and observations in Australia and New Zealand there is very high confidence that these depleted stocks will recover, and not dwindle to extinction in the absence of fishing because of low reproductive effectiveness at low population size or increased vulnerability to environmental perturbations. There is no evidence of such ‘depensation’ in orange roughy at the levels of depletion involved. Furthermore, fishing has selectively removed mature fish and has left a large number of unfished immature year-classes which provide scope for rebuilding within the time to maturity for orange roughy. All the existing population models of orange roughy predict recovery of the depleted stocks. So even for the currently depleted stocks all previous experience and scientific predictions indicate that the extinction probability is extremely small or zero.

Furthermore, there is a sustainably managed orange roughy stock (Cascade Plateau). This stock is known to be currently large and capable of supporting a significant and sustainable fishery while meeting the fishery management reference points. This fishery management success alone is sufficient to conclude that the risk of extinction of the species as a whole in the Australian EEZ is effectively zero, or at least not significantly increased by fishing. And this conclusion is further supported by the existence of further stocks in the EEZ that have been lightly fished under fishery management arrangements that follow the successful and conservative approach used to achieve a sustainable outcome on the Cascade Plateau.

Overall the orange roughy fishery has resulted in some overfished stocks but these are now fully protected from overfishing and all experience and scientific evidence predicts their recovery. So even for these stocks the cause of the population reduction has already been removed by management, which is a consideration in the application of Criterion 1 in the guidelines. Furthermore, cautious fishery management approaches have now been developed and applied. These have already resulted in a sustainable fishery at a high population level for one stock and can be expected to deliver the same outcome for additional stocks in the EEZ. From this it is concluded that the orange roughy species and breeding stocks are not “facing a very high risk of extinction in the wild” and so do not meet the intent of endangered species listing under the EPBC Act.

References & Further Reading

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