



Australian Government

Australian Fisheries Management Authority



Species Summaries for the Southern and Eastern Scalefish and Shark Fishery

- * For stock assessments completed in 2013 in preparation for the 2014-15 fishing season



Introduction

These species summaries provide information on quota species assessed by Southern and Eastern Scalefish and Shark Fishery (SESSF) Resource Assessment Groups (RAGs): Great Australian Bight RAG (GABRAG); SharkRAG; ShelfRAG; and SlopeRAG. These assessment summaries apply to stock assessments completed in 2013 in preparation for the 2014-15 fishing season.

The summaries contain basic information on stock status, TACs and catch trends, assessment details and RAG comments. The summaries are designed to be a quick reference, and should be read in conjunction with RAG minutes and the applicable species stock assessments.

A glossary of commonly used terms is available at the end of the document.



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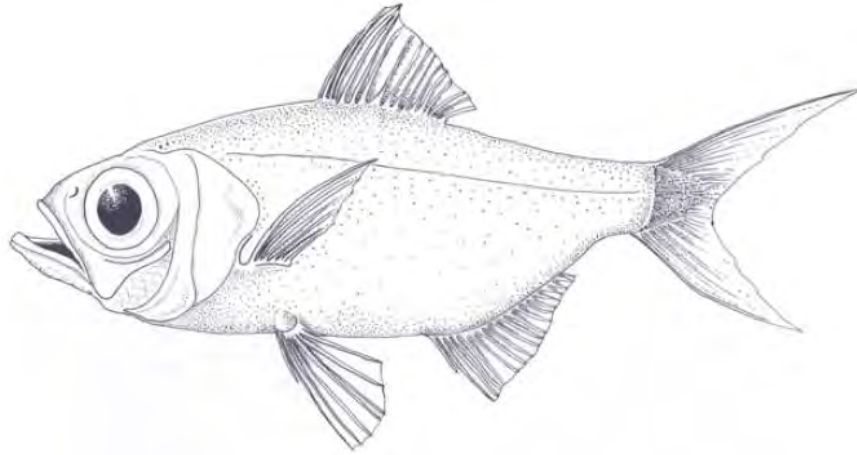
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Alfonsino (*Beryx splendens*)



ABARES (2012): Line drawing – William Murray

Assessed by SlopeRAG in 2013

Stock status summary

Stock structure¹

Little is known about the stock structure of Alfonsino in the SESSF. The RAG noted that this is a straddling stock between the Australian Fishing Zone (AFZ) and the high seas. The East Coast Deepwater Zone (ECDWZ) resource is under quota management and this assessment summary only pertains to the ECDWZ (within the AFZ).

<p>Stock status against reference points and trendⁱⁱ</p>	<p>Tier 3 species use estimates of fishing mortality (F) that will produce a spawning biomass to a given level as reference points.</p> <p>The Tier 3 target reference point for Alfonsino is the level of F that will produce a spawning biomass of 48% of unfished levels.</p> <p>The Tier 3 limit reference point for Alfonsino is the level of F that will produce a spawning biomass of 20% of unfished levels.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">F</td> </tr> <tr> <td>Target</td> <td style="text-align: center;">- 0.149</td> </tr> <tr> <td>(F_{spr48})</td> <td></td> </tr> <tr> <td>Limit (F_{spr20})</td> <td style="text-align: center;">- 0.479</td> </tr> <tr> <td>F_{current}</td> <td style="text-align: center;">- 0.022</td> </tr> </table> <p>Currently F (0.022) is lower than the target (0.479) indicating that fishing mortality is at a level that would lead to spawning biomass being above target.</p> <p>Biomass trend: No information available</p>			F	Target	- 0.149	(F _{spr48})		Limit (F _{spr20})	- 0.479	F _{current}	- 0.022
	F											
Target	- 0.149											
(F _{spr48})												
Limit (F _{spr20})	- 0.479											
F _{current}	- 0.022											
<p>ABARES most recent assessmentⁱⁱⁱ</p>	<p>Biomass: Not overfished Fishing mortality: Not subject to overfishing</p>											
<p>GVP figures^{iv} (2011-12 fishing season)</p>	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th style="width: 50%;">GVP</th> <th style="width: 50%;">% fishery GVP</th> </tr> </thead> <tbody> <tr> <td>Confidential (due to the small number of boats in the fishery)</td> <td>N/A</td> </tr> </tbody> </table>		GVP	% fishery GVP	Confidential (due to the small number of boats in the fishery)	N/A						
GVP	% fishery GVP											
Confidential (due to the small number of boats in the fishery)	N/A											
<p>Recommended Biological Catch 2014-15</p>	<p>1-year: 1,070 tonnes 3-year: 1,070 tonnes</p>											
<p>Overcatch/undercatch</p>	<p>- 10% undercatch - 10% overcatch</p>											
<p>Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u></p>	<p>Very unlikely.</p> <p>Alternative Catch Scenarios: N/A (Tier 3)</p>											



Stock status, RBC,TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 3	Tier 3	Not assessed	Tier 3	Tier 3
Stock Status	No data	Fishing mortality between target and limit	Fishing mortality lower than target	Not assessed	Fishing mortality lower than target	Fishing mortality lower than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC(t)	N/A	82	1160	Rollover	1196	1070
Agreed TAC(t)	500	500	750	750	1125	
Actual TAC after overs/unders (t)	550	549		824	1200	
% TAC caught	3	0	0	11		



Tier Level & Discounts	
Tier Level	Tier 3- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	5 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year MYTAC, calculated from the RBC of 1,070t <input type="checkbox"/> No
Breakout rules for multi-year TAC	The RAG recommended that no further work be done on the Alfonsino assessment in the MYTAC period unless 70% of the TAC is caught.
Have breakout rules been triggered?	N/A

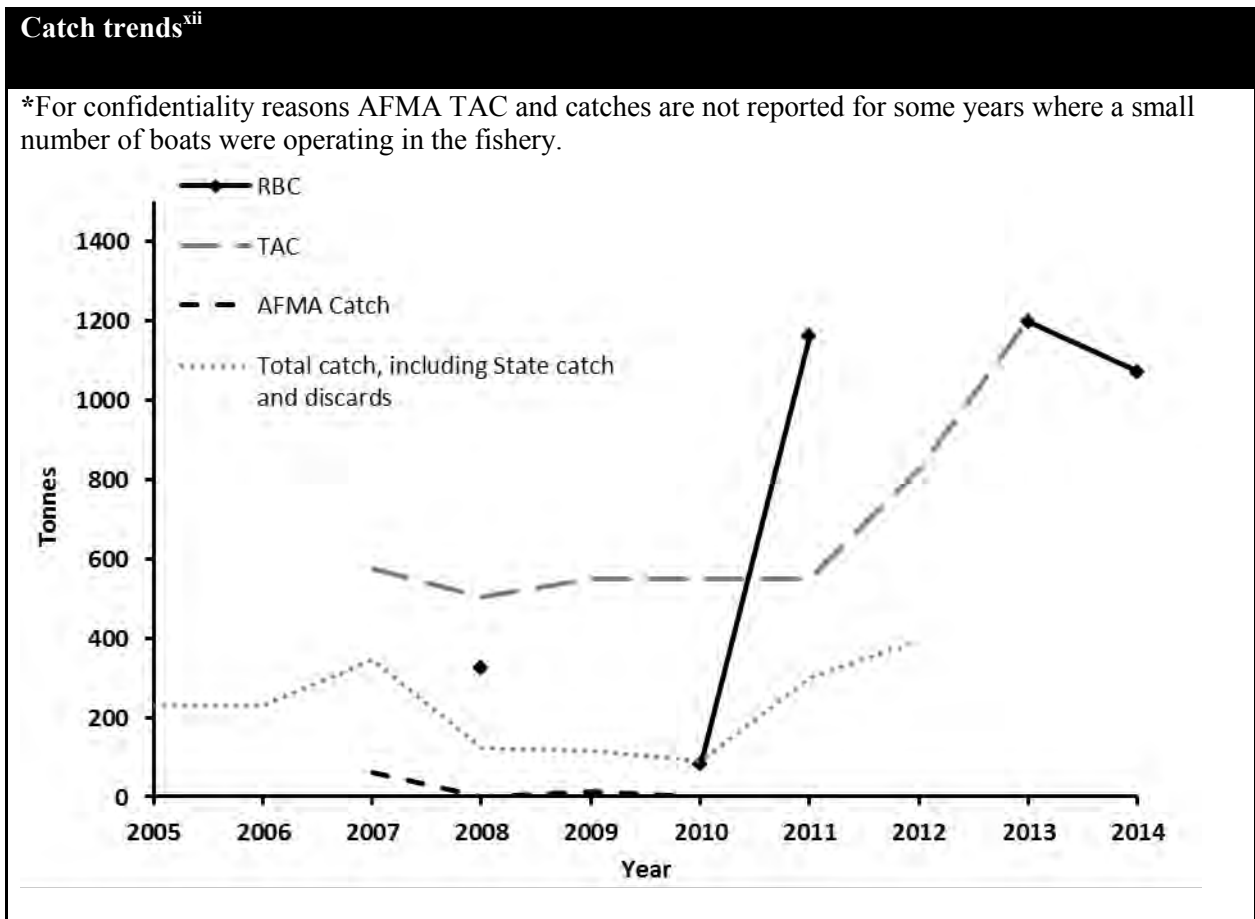
Assessment	
Stock indicator trends^v	<ul style="list-style-type: none"> - The age structure indicates that the stock has not been greatly impacted by fishing - TACs were increasing but catches remain well below the TACs - Nearly all the catch in the AFZ comes from the East Coast Deep Water Trawl Sector (ECDW) and due to low effort catches have been low
RAG comments	- RBC calculations used to set TAC are taken from the AFZ only
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- Nil
Significant changes to data inputs^{vi}	- Calculation of the RBC only uses AFZ data, and so pertains only to the AFZ
Comments on data^{vii}	- Nil



Implications for companion species/TEPs/multi-species fisheries^{viii}	- Nil
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Tier 1 stock projection^{ix}	
Projected biomass (include confidence intervals)^x	N/A – Tier 3

Research		
Research allowance^{xi}	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Bight Redfish (*Centroberyx gerrardi*)



Common names: Nannygai, Redfish, Red Snapper, King Snapper, Golden Snapper.
Assessed by GABRAG in 2013

Stock status summary		
Stock structure	Assessed as a single stock.	
Stock status against reference points and trend	Limit reference is 20% of unfished biomass. Target reference is 41% of unfished biomass. 2011 (last assessment): 90% of unfished biomass. Modelling suggests a slow decline in abundance consistent with the fish-down of a developing fishery. Current biomass is high relative to targets.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$1.7 million	15%
Recommended Biological Catch 2014-15	2 358 tonnes	
Overcatch/undercatch	- 10% undercatch - 10% overcatch	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	RBC recommendation = <10% (Very Unlikely)	
	Alternative Catch Scenarios = N/A	



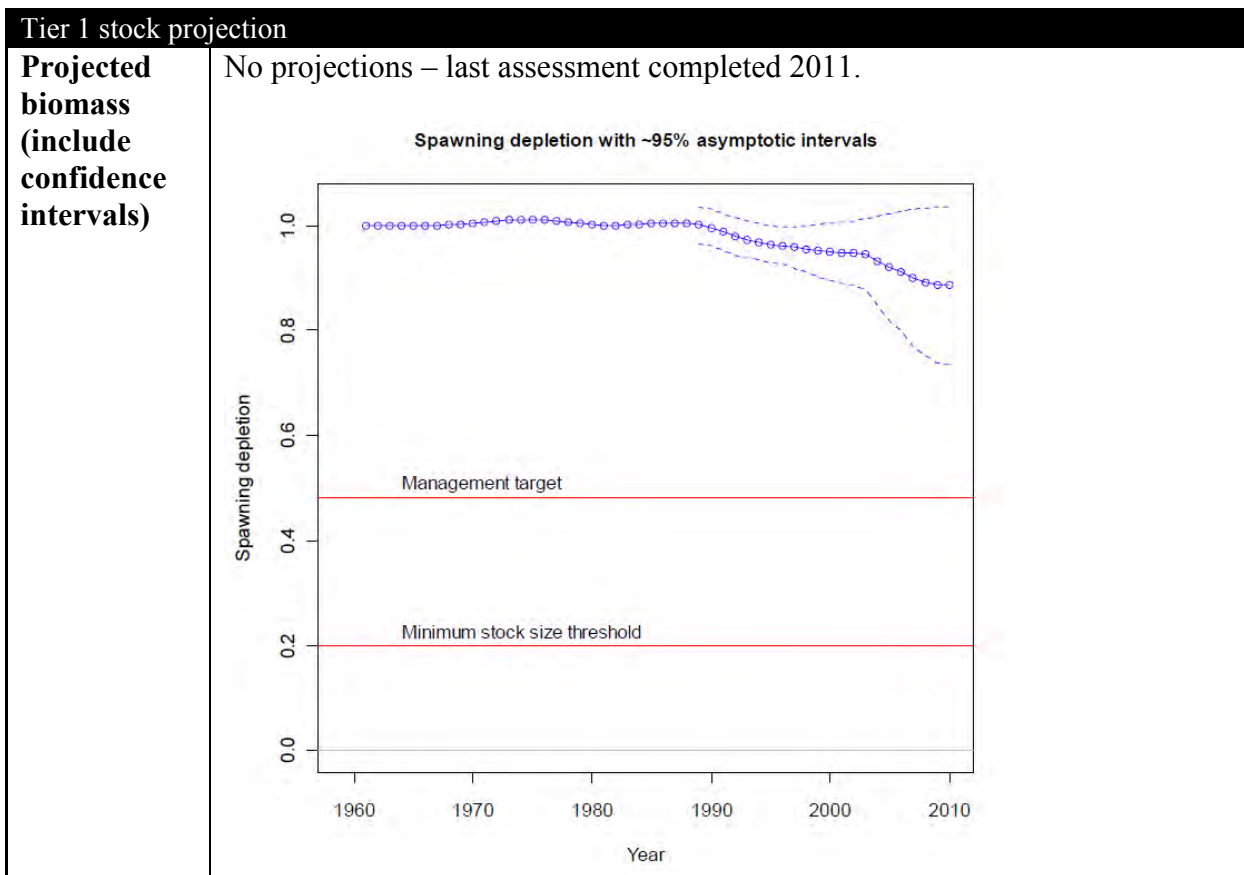


TAC and catch						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Not assessed	Tier 1	Not assessed	Tier 1	Not assessed	Not assessed
Stock Status	Not assessed	77%	Not assessed	90%	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	Not assessed	1653	1556	2358	MYTAC	MYTAC
Agreed TAC	2000	1653	1556	2334	MYTAC	
Actual TAC after overs/unders	2200	1853	1716	2487	2588	
% TAC caught	19%	15%	20%	11%		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0%
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season) 2014-15 will be third year of three year MYTAC <input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a rollover of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) 2 358 t is a RBC based on the last Tier 1 assessment (the long term RBC of 2 358 t is used for MYTAC purposes which is revised using the large change limiting rule to 2 334 t for the default TAC). <input type="checkbox"/> No
Breakout rules for multi-year TAC	If CPUE (or FIS if conducted) increases outside the 95% confidence interval will trigger examination and potential reassessment.
Have breakout rules been triggered?	No. GABRAG reviewed data in both 2012 and 2013 and agreed that Bight Redfish had not breached any breakout rules and recommend continued application of the 2011 assessment.



Assessment:	
Stock indicator trends	Model fits a slow decline in abundance, consistent with the fishdown of a developing fishery. Biomass is high relative to targets.
RAG comments	GABRAG has some concerns over the availability of Bight Redfish, as catches are much lower than the assessment would suggest.
Key model technical assumptions/parameters	Age, length and sex-structured population dynamics model is fitted for Bight Redfish. Last estimated recruitment was set at 1994/95 (as fish do not recruit until 16 years old).
Changes to model structure/assumptions	NA
Significant changes to data inputs	NA
Comments on data	Catch rate index for the trawl fleet suggests a cyclical pattern in availability consistent with industry observations.
Implications for companion species/TEPs/multi-species fisheries	GABRAG has noted concerns regarding the lower catches of Bight Redfish in recent years, with catches being taken as bycatch when targeting Deepwater Flathead.



Research

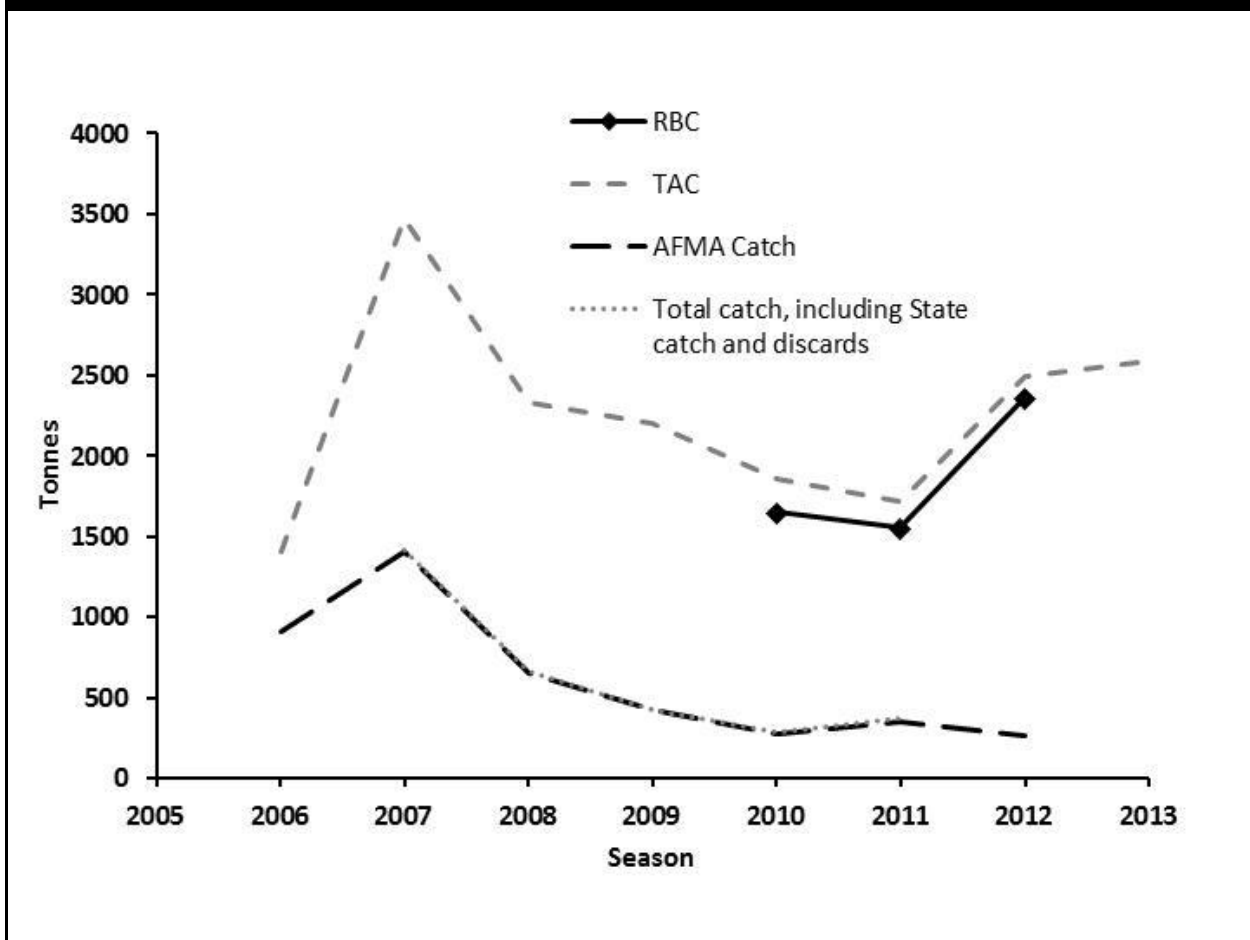
Research allowance

(GABRAG has advised research catch is required for 2014 GAB FIS) – this will be taken from the following season's TAC.

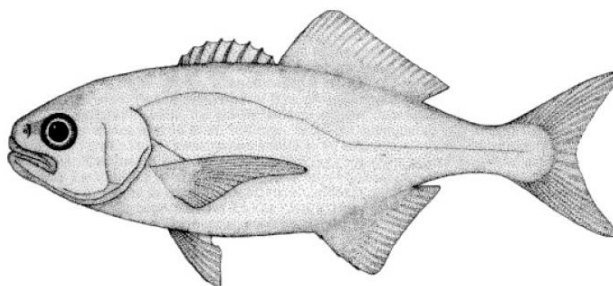
Included in TAC

In addition to TAC

Catch trends



Blue eye Trevalla (*Hyperoglyphe antarctica*)



ABARES (2012): Line drawing - FAO

Assessed by SlopeRAG in 2013

Stock status summary													
Stock structure	<p>The assessment assumes one Australian Blue eye Trevalla stock (incorporating the continental shelf, seamounts and the Cascade Plateau).</p> <p>The Australian stock is considered to be separate from the New Zealand stock(s).</p>												
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <p>Different trends in CPUE were identified for the eastern and western areas of the fishery and the RAG decided that, notwithstanding its assumption of a single SESSF stock, status was best assessed with separate east and west analyses. Advice on the RBC was based on the sum of the RBCs from each area.</p> <table border="1"> <thead> <tr> <th>CPUE</th> <th>East</th> <th>West</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>1.2000</td> <td>1.2000</td> </tr> <tr> <td>Limit</td> <td>0.4800</td> <td>0.3986</td> </tr> <tr> <td>Recent</td> <td>0.5319</td> <td>0.9550</td> </tr> </tbody> </table> <p>CPUE trend: Standardised CPUE has been declining in the eastern area of the fishery since 2007. Standardised CPUE in the western area of the fishery has fluctuated around the management target since the late 1990s.</p>	CPUE	East	West	Target	1.2000	1.2000	Limit	0.4800	0.3986	Recent	0.5319	0.9550
CPUE	East	West											
Target	1.2000	1.2000											
Limit	0.4800	0.3986											
Recent	0.5319	0.9550											
ABARES most recent assessment	<table border="1"> <tr> <td>Biomass: Not overfished</td> <td>Fishing mortality: Not subject to overfishing</td> </tr> </table>	Biomass: Not overfished	Fishing mortality: Not subject to overfishing										
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GVP figures (2011-12 fishing season)	<table border="1"> <thead> <tr> <th>GVP</th> <th>% fishery GVP</th> </tr> </thead> <tbody> <tr> <td>\$3.3 million</td> <td>5.4%</td> </tr> </tbody> </table>	GVP	% fishery GVP	\$3.3 million	5.4%								
GVP	% fishery GVP												
\$3.3 million	5.4%												



Recommended Biological Catch 2014-15	- 269t
Overcatch/undercatch	- 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely.
	Alternative Catch Scenarios: N/A (Tier 4)

TAC and catch						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Rollover	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	Rollover	CPUE between target and limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC(t)	612	536	521	415	N/A TAC rolled over	269
Agreed TAC	560	428	326	387	388	
Actual TAC after overs/unders	604	473	361	385	417	
% TAC caught	65	77	98	86		



Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0%. The RAG recommended that the discount factor not be applied due to protection offered by closures.
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A

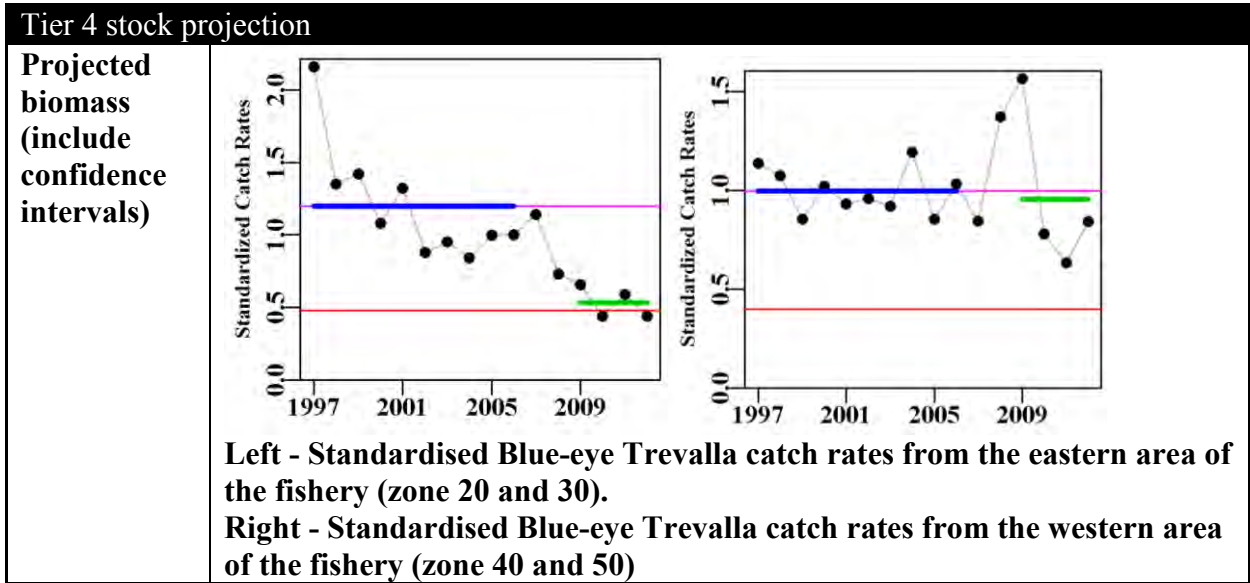
Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - The long term trend in both trawl and line CPUE continues to decline in the eastern part of the fishery. Catch rates in 2013 were the lowest since 1997 and indicate a declining stock.
RAG comments	<ul style="list-style-type: none"> - CSIRO has undertaken further analysis of catch rates on seamounts and the continental shelf. However, they are not used in the assessment because of concerns that it may not reflect abundance (because shifting effort in response to declining catch rates may lead to hyperstability). - Killer whale depredation: recent research in south eastern Australia indicated that killer whales were present for 25% of line sets and for those shots there was a 60% reduction in catch. SlopeRAG recommended that killer whale presence not be included in the Tier 4 assessment as it was unclear whether Killer Whale interaction rates had increased between the reference period and recent catch period. - The New Zealand experience suggests that even with uncertainties in the CPUE index it likely provides a



	<p>useful index of abundance or can indicate general trends.</p> <ul style="list-style-type: none"> - The RAG expressed concern with a number of uncertainties in the T4 and identified the following as additional work:- <ul style="list-style-type: none"> • improvement in standardisations including finer spatial analysis; • investigate seamount CPUE; • continuing collection of Orca interaction data; • further investigate and quantify, if possible, the amount of protection given to BET by seamount closures; • explore alternative methods of assessment, e.g. Tier 5. - The RAG recommended an RBC of 269t for the 2014/15 season, noting that the RBC was relatively precautionary as it does not account for the influence of spatial closures or Killer Whale depredation (both of which could explain reductions in recent CPUE).
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - Key model assumptions are: <ul style="list-style-type: none"> • Single stock • CPUE is proportional to abundance • Best assessment is obtained by simple combination of east and west assessments • Effects of closures, Orcas and the structural adjustment are not accounted for.
Changes to model structure/assumptions	<ul style="list-style-type: none"> - See above.
Significant changes to data inputs	<ul style="list-style-type: none"> - See above.
Comments on data	<ul style="list-style-type: none"> - The potential (but unquantified) impact of closures and Orca depredation make the standardization of CPUE data increasingly difficult. As Tier 4 assessments rely on analysis of CPUE this reduces



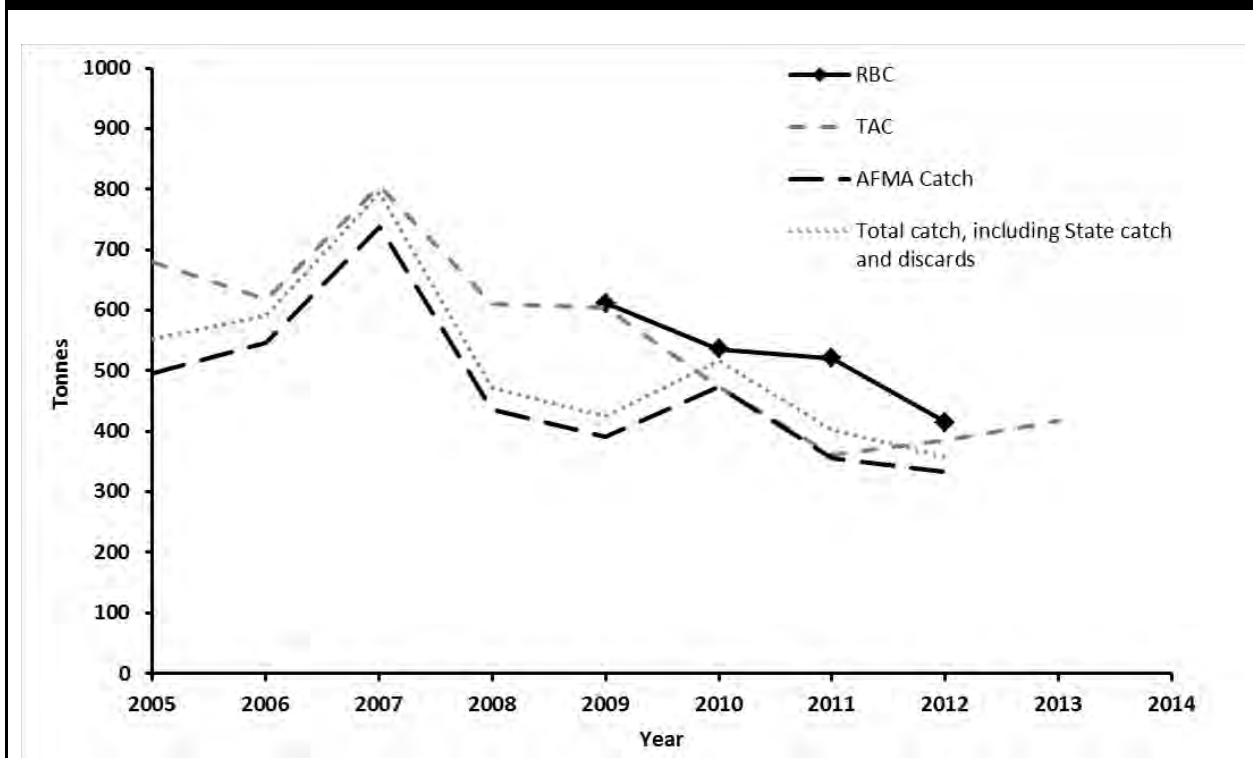
	confidence in the RBC outcomes.
Implications for companion species/TEPs/multi-species fisheries	- Nil.



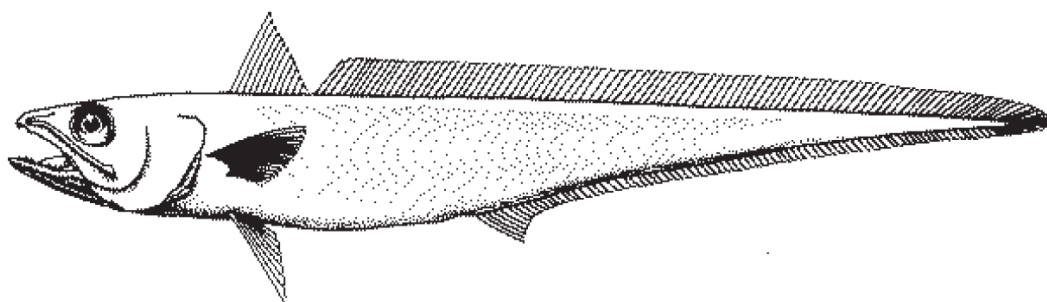
Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Catch trends



Blue Grenadier (*Macrurus novaezelandiae*)



ABARES (2012): Line Drawing – Rosalind Poole

Assessed by SlopeRAG in 2013

Stock status summary		
Stock structure	Blue Grenadier is assessed as a single stock. There are two defined sub-fisheries: the winter spawning fishery off western Tasmania; and the widely spread catches of the non-spawning fishery.	
Stock status against reference points and trend	Limit reference point is 20% of unfished biomass Target reference point 48% of unfished biomass Current: 77% of unfished biomass in 2012 Projected: 94% of unfished biomass in 2014. The trend in stock status is increasing due to increased recruitment.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season), includes Commonwealth Trawl Sector and Scalefish hook sector	GVP	% fishery GVP
	\$11.7 million	19.1%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - One year: 8065t - Three year: 8810t - Five year: 8677t 	

Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 						
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. <10%).</u>	<10% (Very Unlikely)						
	Alternative Catch Scenarios <ul style="list-style-type: none"> • The base case estimates a large 2010 recruitment • If this is not estimated, the model instead estimates a large but slow growing cohort from 2009 • If 2010 recruitment is not estimated, projected RBCs would be lower. See table below. 						
		Base case			No 2010 recruitment		
	Year	Annual	3-Year	5-year	Annual	3-Year	5-year
	2014	7812*	7812*	7812*	6031	6241	6383
	2015	9116	8810	8677	6201	6241	6383
	2016	9249	8810	8677	6490	6241	6383
	2017	8807		8677	6629		6383
	2018	8149		8677	6564		6383
	* large change limiting rule applies.						

Stock status, RBC, TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	MYTAC	Tier 1	Tier 1	MYTAC	Tier 1
Stock Status	51%	MYTAC	87%	77%	MYTAC	94%
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	4750	MYTAC	5821	5713	MYTAC	8065
Agreed TAC	4700	4700	4700	4998	5208	



Actual TAC after overs/unders	4851	5088	5133	5368	5704	
% TAC caught	65	74	80	69		



Tier Level & Discounts		
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au/wp-content/uploads/2010/07/sessf_hsr_2009.pdf	
Discount factor	N/A	
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season)	<input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons). Output from Tier 1 assessment. Retained RBCs <ul style="list-style-type: none"> • 3 year MYTAC = 8810t • 5 year MYTAC = 8677t 	<input type="checkbox"/> No
Breakout rules for multi-year TAC	<ul style="list-style-type: none"> - If the most recent observed value for the standardised non-spawn CPUE falls outside the 95% confidence interval of the value for the standardised non-spawn CPUE predicted by the most recent Tier 1 stock assessment. - if the most recent observed biomass estimate for the acoustic survey falls outside of the 95% confidence interval of the biomass estimate predicted from the assessment model (when survey values are available). - if less than 70% of the TAC is caught (for non-operational reasons). - if the observed age composition is significantly different to that projected. 	
Have breakout rules been triggered?	- No	

Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Model suggests strong 2010 recruitment but data should be monitored to confirm this. - Risk assessment suggests increased catches pose minimal risk under current model structure.
RAG comments	<ul style="list-style-type: none"> - It should be noted that the more optimistic outlook is being driven by the large estimate for the 2010 recruitment and although this is a good sign its size remains uncertain. - Sensitivities run on the model indicate the model is

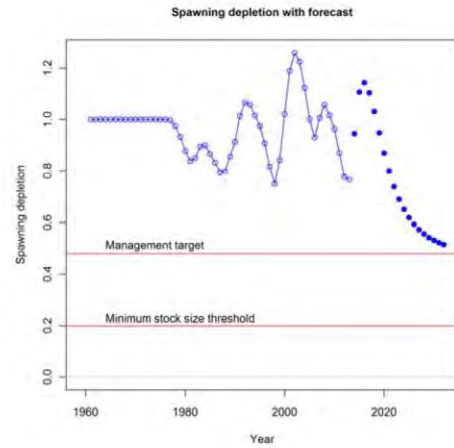
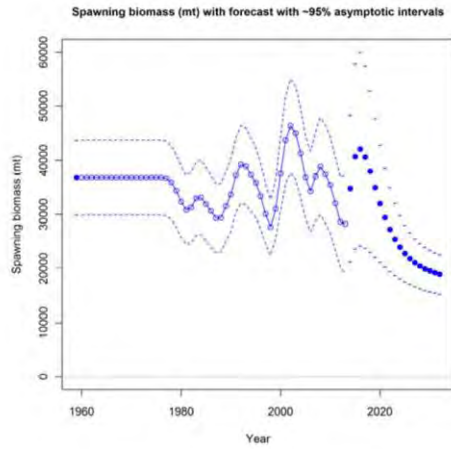


	<p>most sensitive to: inclusion or not of recruitments in 2009 and 2010; data weighting methods; and estimates of total mortality.</p> <ul style="list-style-type: none"> - Projections past five years are uncertain due to the estimates being based on average recruitment, whereas recruitment is highly episodic.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - Discards calculated for ISMP observed discard rates. - 2 sex model, age-structured. - Female M estimated. Male 20% larger. - Steepness is 0.75. - Recruits estimated between 1974 and 2010. - All growth parameters estimated by sex. - Cohort specific growth (estimated for cohorts from 1977 to 2009). - Maturity: 50% female maturity at 63.7 cm. - Proportion of females that spawn 0.84 (Russell and Smith, 2001). - Domed shaped selectivity for non-spawning fleet, logistic for spawning fleet.
Changes to model structure/assumptions	<ul style="list-style-type: none"> - Nil
Significant changes to data inputs	<ul style="list-style-type: none"> - Nil
Comments on data	
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - Nil



Tier 1 stock projection

Projected biomass (include confidence intervals)



Spawning depletion estimates for Blue Grenadier from the 2013 stock assessment. The upper line on the right-hand chart represents the management target, while the lower line represents the limit reference point. Solid dots on the charts are biomass projections beginning from 2014.

Research

Research allowance

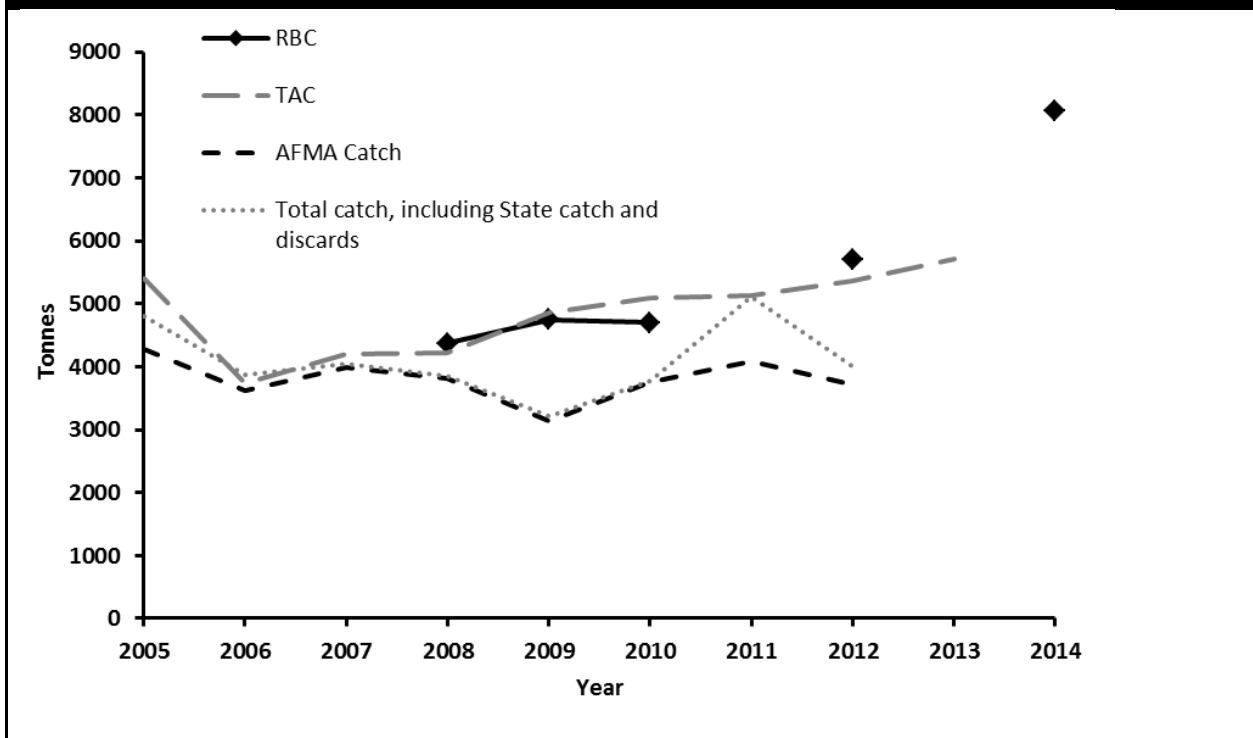
0tonnes

Included in TAC

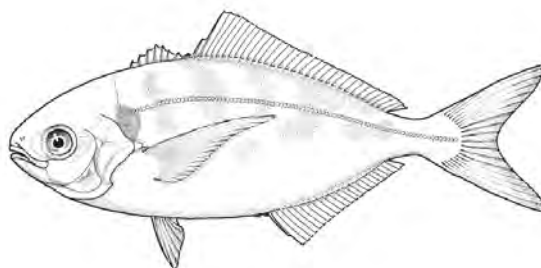
In addition to TAC



Catch trends



Blue Warehou (*Seriolella brama*)



ABARES (2012): Line Drawing – Rosalind Poole

Common names: Black trevally, sea bream, snotgall, snotgall trevally, snotty trevala, snottynose trevala, Tasmanian trevally, trevally

Assessed by Shelf RAG in 2013

Stock status summary													
Stock structure	There is good evidence that there are two stocks of Blue Warehou, east and west of the Bass Strait, but a single TAC is applied to these.												
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 Target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1"> <thead> <tr> <th>CPUE</th> <th>East</th> <th>West</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>2.0717</td> <td>1.9249</td> </tr> <tr> <td>Limit</td> <td>0.8287</td> <td>0.7699</td> </tr> <tr> <td>Recent</td> <td>0.1861</td> <td>0.2681</td> </tr> </tbody> </table> <p>Stock status: Currently Blue Warehou is expected to be below the limit reference point and is subject to a rebuilding strategy. The last agreed Tier 1 assessment in 2005/06 found the eastern stock to be depleted below the limit reference point. In contrast, the western stock was thought to be above the limit reference point and close to the biomass maximum sustainable yield (B₄₀) level. However, the assessment predicted that the western stock will have dropped below the limit reference point by 2007 if the landed catches remained high and if recruitment was average.</p> <p>Biomass trend: The standardised CPUE for both stocks</p>	CPUE	East	West	Target	2.0717	1.9249	Limit	0.8287	0.7699	Recent	0.1861	0.2681
CPUE	East	West											
Target	2.0717	1.9249											
Limit	0.8287	0.7699											
Recent	0.1861	0.2681											



	continue to be low and declining in 2012, however, the use of CPUE as an index of abundance is no longer considered reliable.	
ABARES most recent assessment	Biomass: Overfished	Fishing mortality: Uncertain
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.4 million	0.7%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 0t - RBCs for both eastern and western stocks remain at zero as standardised catch rates are below the limit reference points. - Blue Warehouse is managed under the Blue Warehouse Stock Rebuilding Strategy. - An incidental catch TAC of 118t is recommended by ShelfRAG. 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 0% undercatch - 0% overcatch 	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i>	N/A – Already considered to be below the limit reference point.	
	Alternative Catch Scenarios = N/A – Already considered to be below the limit reference point.	

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	E: CPUE less than limit	E: CPUE less than limit	E: CPUE less than limit	E: CPUE less than limit	E: CPUE less than limit	E: CPUE less than limit
	W: CPUE less than limit	W: CPUE less than limit	W: CPUE less than limit	W: CPUE less than limit	W: CPUE less than limit	W: CPUE less than limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15



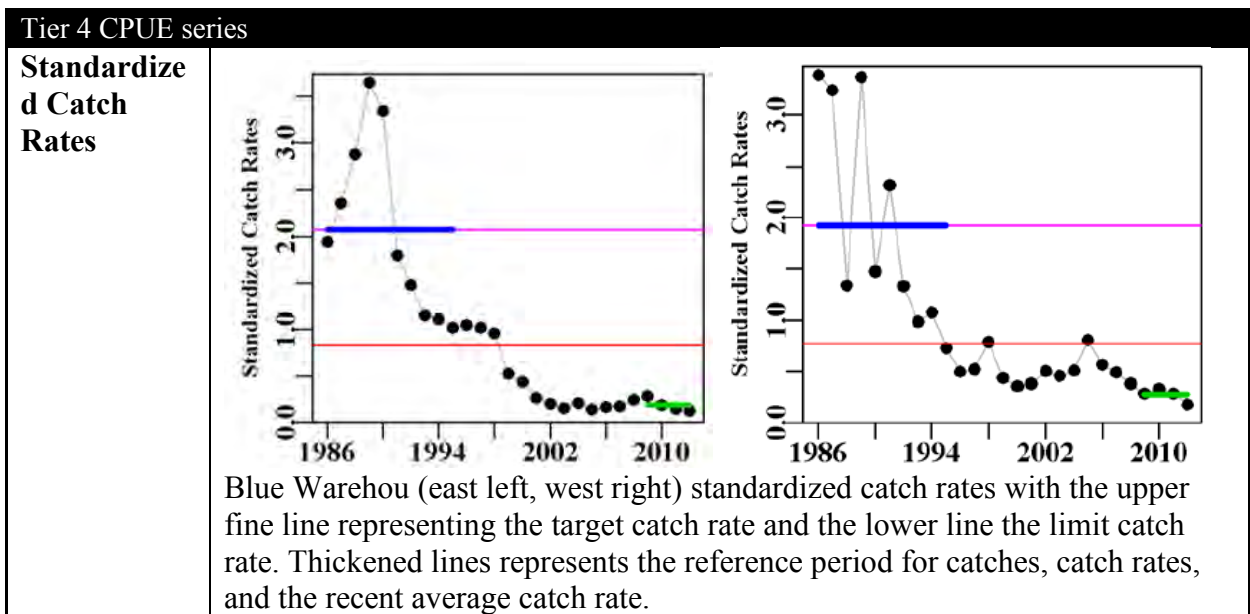
RBC (t)	0	0	0	0	0	0
Agreed TAC	183	183	133	118	118	
Actual TAC (t) after overs/unders	214	195	133	118	118	
% TAC caught	57	71	73	41		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au/wp-content/uploads/2010/07/sessf_hsr_2009.pdf
Discount factor	N/A (incidental catch TAC)
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A

Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - The RAG noted again its concern that CPUE is not a good index of abundance while there is an incidental catch TAC in place and industry is actively avoiding the species. An alternative primary index of abundance needs to be developed as a high priority for use in future stock assessments.
RAG comments	<ul style="list-style-type: none"> - The 2012 companion species analysis showed there were low levels of targeting of Blue Warehou. The RAG noted that the total catch was approximately half of last year's catch, down to 50.8t in 2012, and due to this it was agreed the companion analysis is likely to have become extremely sensitive to the results of individual shots and may be unreliable. - The RAG accepted that total mortality has reduced to well below the incidental catch TAC, and agreed to recommend maintaining the 118t incidental catch TAC. The RAG agreed that reducing the TAC further would be unlikely to reduce fishing mortality but could lead to unreported discarding.



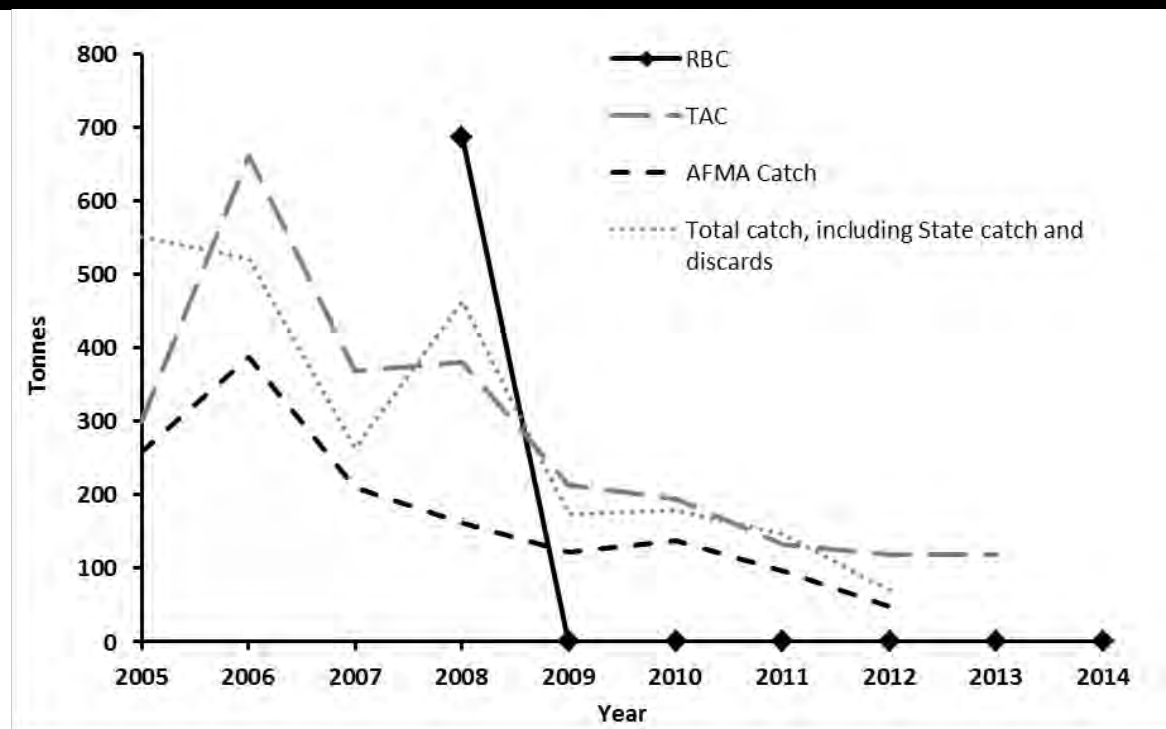
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	- N/A



Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



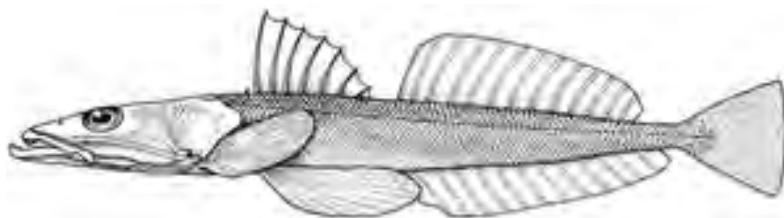
Catch trends



* Data shown in the catch trends graph above is for both the eastern and western stocks combined.



Deepwater Flathead (*Neoplatycephalus conatus*)



Obsolete common names: deep sea flathead, trawl flathead.

Assessed by GABRAG in 2013

Stock status summary		
Stock structure	Assessed as a single stock.	
Stock status against reference points and trend	Reference point is 20% of unfished biomass. Target is 43% of unfished biomass. 2013: 45% of unfished biomass The 2013 assessment indicates recent increases in stock size driven by favourable recruitments.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$6.7 million	58%
Recommended Biological Catch 2014-15	One year: 1146 tonnes. Three year: of 1146t in 2014-15 and 1122t in 2015-16 and 2016-17.	
Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. $P < 10\%$).</i>	RBC recommendation = <10% (Very Unlikely)	
	Alternative Catch Scenarios = N/A	

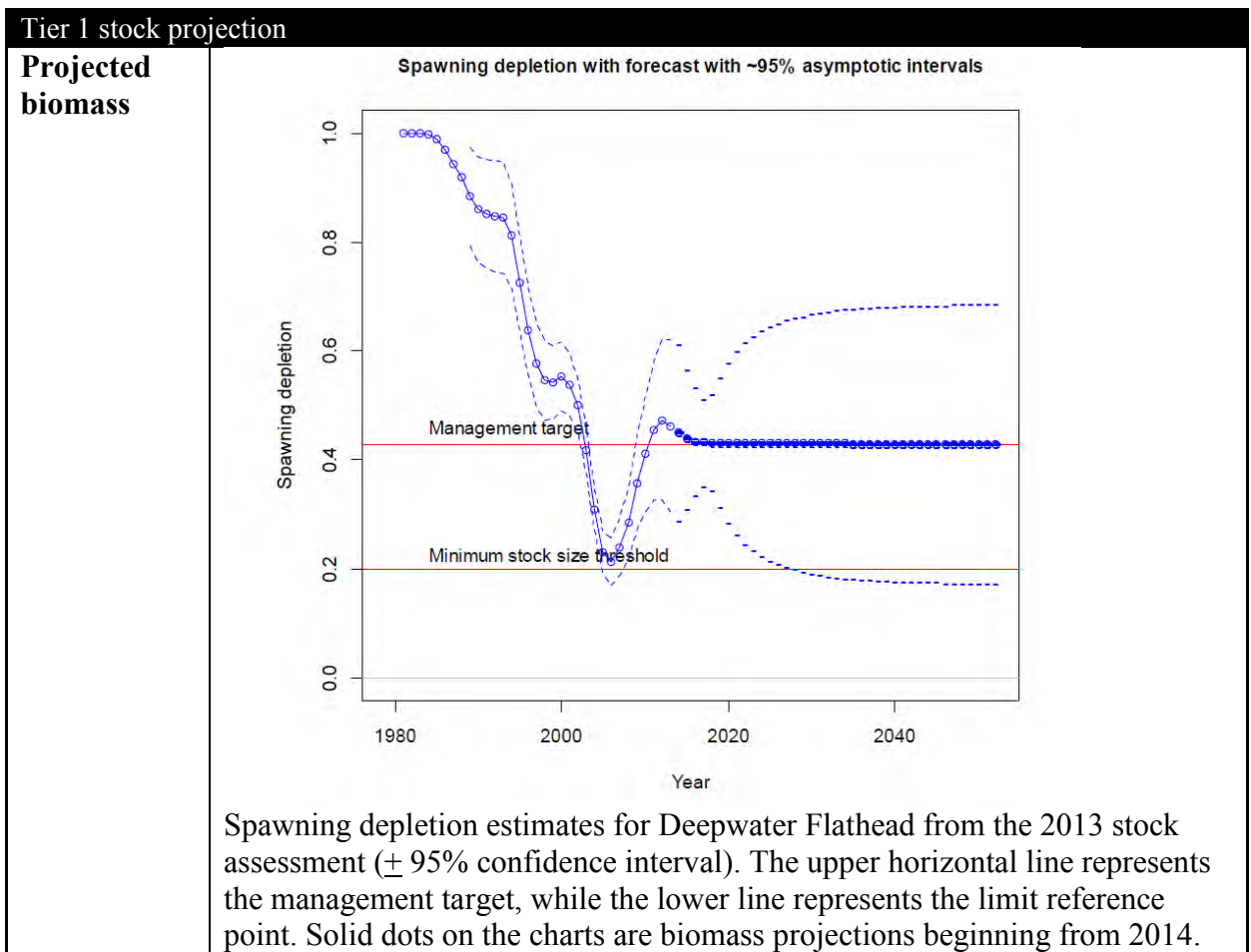


TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
Stock Status (% of unfished biomass)	56%	49%	62%	33%	39%	45%
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	1205	857	1463	1733	979	1146
Agreed TAC	1300	1100	1650	1560	1150	
Actual TAC after overs/unders	1519	1240	1650	1723	1301	
% TAC caught	57	67	62	55		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) RAG did consider a three year MYTAC would be appropriate with the following RBCs: - 2014/15: 1146t - 2015/16: 1122t - 2016/17: 1112t <input type="checkbox"/> No
Breakout rules for multi-year TAC	If CPUE (or FIS if conducted) increases outside the 95% CI will trigger examination and potential reassessment.
Have breakout rules been triggered?	N/A



Assessment	
Stock indicator trends	Tier 1 assessment in 2013 shows the stock declined lower than the target in about 2004-05, to near or below the lower limit 2006-07, followed by a steep recovery to above the target currently. The recent increase was likely driven by favourable recruitment events.
RAG comments	GABRAG have stated that Deepwater Flathead availability is cyclical in nature and this may be reflected in CPUE series and Fisheries Independent Survey findings.
Key model technical assumptions/parameters	Two sex model used (as females have substantially larger size). Assessment comes from a single trawl fleet.
Changes to model structure/assumptions	NA
Significant changes to data inputs	NA
Comments on data	NA
Implications for companion species/TEPs/multi-species fisheries	NA



Research

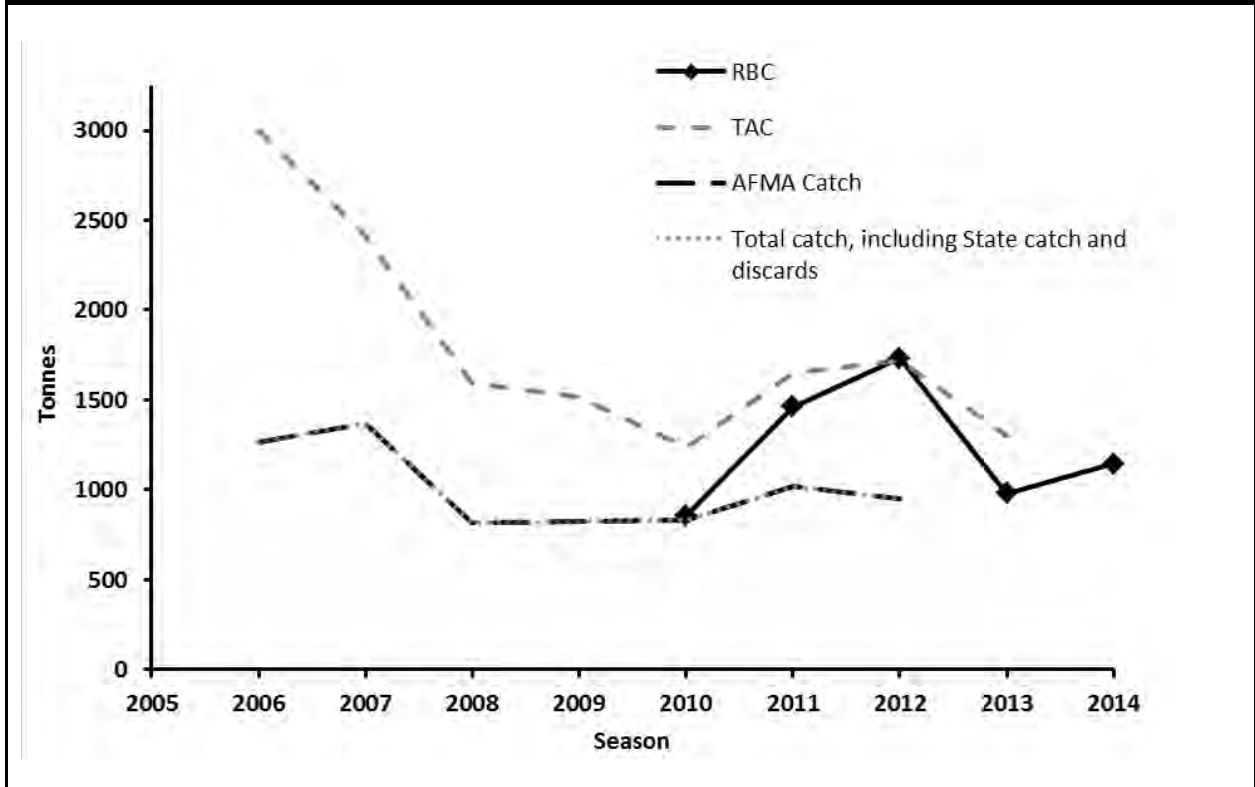
Research allowance

20 t

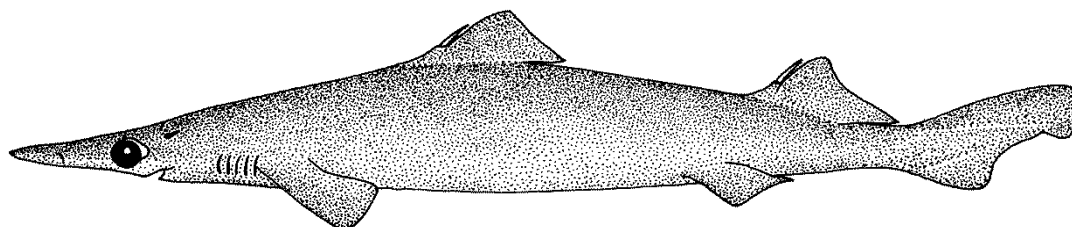
Included in TAC

In addition to TAC

Catch trends



Deepwater Shark Basket - East



The Deepwater Shark Basket quota includes multiple species of deepwater sharks: Brier shark (*Deania calcea*), Platypus shark (*Deania quadrispinosa*), Plunket's shark (*Centroscyrnus plunketi*), Roughskin Shark (*Centroscyrnus and Deania spp*), Pearl shark (*D.calcea and D.quadrispinosa*), Black shark (*Centroscyrnus spp*), Lantern shark (*Etmopterus spp*), Dogfish Family *Squalidae* and other sharks.

Assessed by SlopeRAG in 2013

Stock status summary									
Stock structure	<p>Little is known about the stock structure of deepwater sharks. They are benthic-pelagic species that have been sampled in oceanic environments over the abyssal plains and are distributed widely across ocean basins and along the middle and lower continental shelves.</p> <p>The eastern management area extends from NSW around the Tasmanian east coast and up the Tasmanian west coast to 42° S (approximately Strahan), including to the centre of Bass Strait to 146° 22'E.</p>								
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" data-bbox="735 1570 1302 1727"> <thead> <tr> <th>CPUE</th> <th></th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.9993</td> </tr> <tr> <td>Limit</td> <td>0.3997</td> </tr> <tr> <td>Recent</td> <td>0.6173</td> </tr> </tbody> </table> <p>CPUE trend: Standardised CPUE has been slowly declining since 2009, and is between the target and limit reference points.</p>	CPUE		Target	0.9993	Limit	0.3997	Recent	0.6173
CPUE									
Target	0.9993								
Limit	0.3997								
Recent	0.6173								

ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	n/a	n/a
Recommended Biological Catch 2014-15	1 year: 78 tonnes 3 year: 47 tonnes (last 3 years CPUE used – Tier 4)	
Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely (P<10%).	
	Alternative Catch Scenarios = Not available	

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Not assessed (catches <10t)	Tier 4
Stock Status	CPUE between target and limit	CPUE above target	CPUE between target and limit	CPUE between target and limit	Not assessed	CPUE between target and limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC(t)	90	85	85	90	N/A	78
Agreed TAC(t)	75	85	85	80	85	
Actual TAC after overs/unders(t)	80	92	93	88	92	
% TAC caught	47	32	28	30		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au



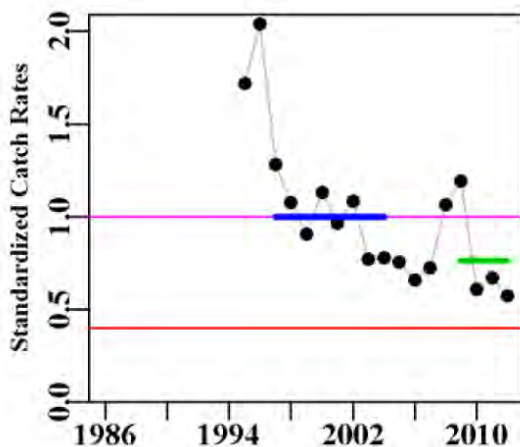
Discount factor	0 %	
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season)	<input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> The RAG recommended a 3 year MYTAC to be calculated by using an average of the last three years of the standardised catch rate in the Tier 4 assessment 3 year MYTAC of 47t per year 	<input type="checkbox"/> No
Breakout rules for multi-year TAC	A breakout rule to review the MYTAC is triggered if catches in the second and third years of the MYTAC are lower than the average catch of the last three years.	
Have breakout rules been triggered?	- N/A	

Assessment	
Stock indicator trends	- The CPUE trend in the eastern zone is slowly declining and is currently between the target and limit reference points.
RAG comments	- A large proportion of the catch was previously taken in waters >700m and most of these areas are now closed.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> Assessed as a separate east and west stock. Basket of species (see stock structure), hence a key assumption is that the combined species CPUE at least broadly reflects the trends in CPUE for all the contributing species.
Changes to model structure/assumptions	- The catch rates used in the analysis are based on log-transformed catches rather than log transformed catch/effort. This was a RAG decision relating to how sharks were fished.
Significant changes to data inputs	- Nil
Comments on data	- Nil
Implications for companion species/TEPs/multi-species fisheries	- Nil



Tier 4 CPUE series

Standardized Catch Rates



Deepwater Shark (east) standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate

Research

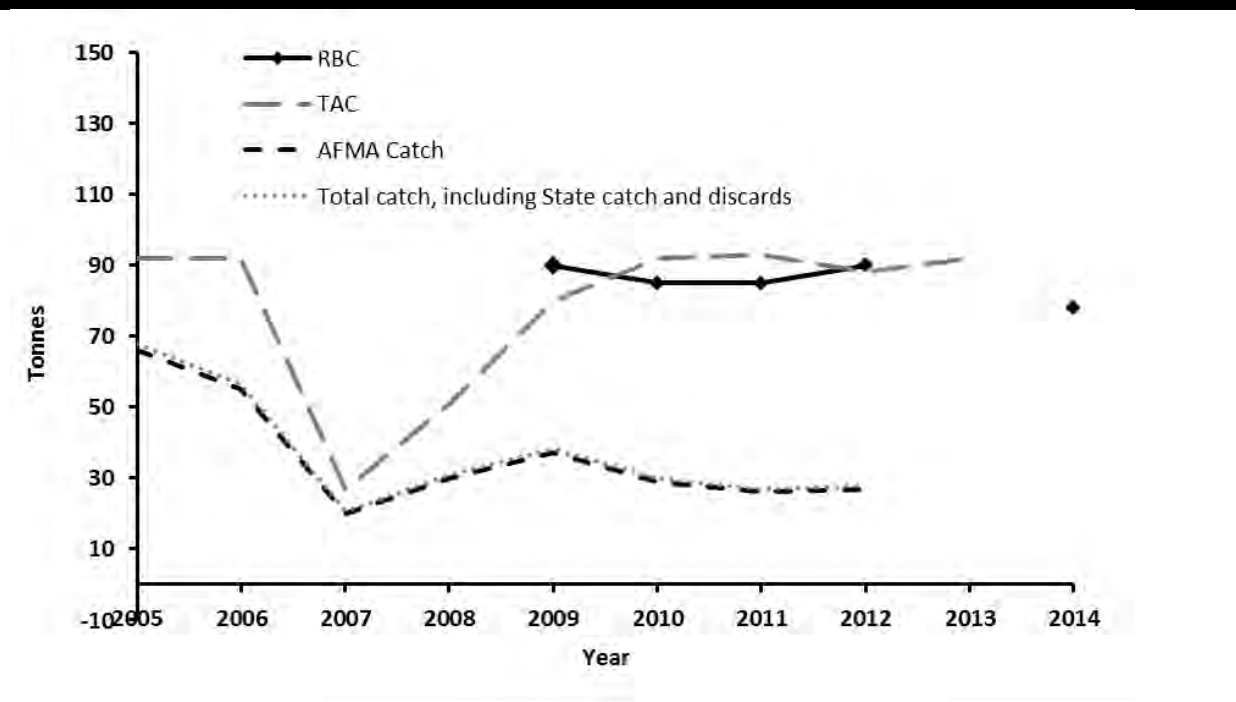
Research allowance

0 tonnes

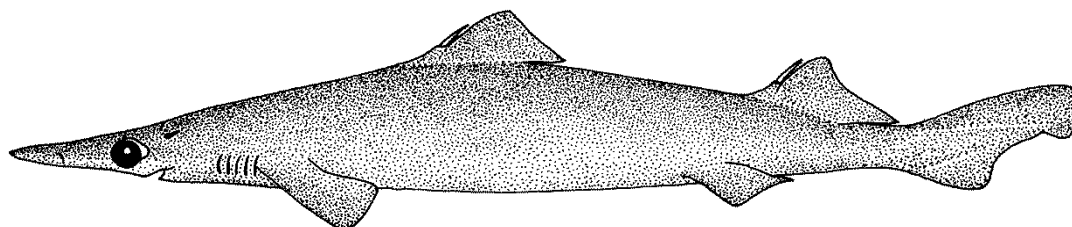
Included in TAC

In addition to TAC

Catch trends



Deepwater Shark Basket - West



The Deepwater Shark Basket quota includes multiple species of deepwater sharks: Brier shark (*Deania calcea*), Platypus shark (*Deania quadrispinosa*), Plunket's shark (*Centroscymnus plunketi*), Roughskin Shark (*Centroscymnus* and *Deania* spp), Pearl shark (*D.calcea* and *D.quadrispinosa*), Black shark (*Centroscymnus* spp), Lantern shark (*Etmopterus* spp), Dogfish Family *squalidae* and other sharks.

Assessed by SlopeRAG in 2013

Stock status summary										
Stock structure	Little is known about the stock structure of deepwater sharks. They are benthic-pelagic species that have been sampled in oceanic environments over the abyssal plains and are distributed widely across ocean basins and along the middle and lower continental shelves. The western management area extends from the Tasmanian west coast Latitude 42° S (approximately Strahan), around to Western Australia.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" data-bbox="609 1328 1174 1469"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.5169</td> </tr> <tr> <td>Limit</td> <td>0.2068</td> </tr> <tr> <td>Recent</td> <td>0.8634</td> </tr> </tbody> </table> <p>CPUE trend: Standardised CPUE is well above target but has been declining over the last four years.</p>		CPUE		Target	0.5169	Limit	0.2068	Recent	0.8634
CPUE										
Target	0.5169									
Limit	0.2068									
Recent	0.8634									
ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	n/a	n/a								
Recommended Biological Catch 2014-15	1 year: 300 tonnes 3 year: 263 tonnes (using last 3 years CPUE)									
Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 									



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely
	Alternative Catch Scenarios: N/A (Tier 4)

Stock status, RBC, TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Not assessed (catches <10t)	Tier 4
Stock Status	CPUE higher than target	CPUE higher than target	CPUE higher than target	CPUE higher than target	Not assessed	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC(t)	121	155	364	374	Not assessed	300
Agreed TAC(t)	63	95	143	141	215	
Actual TAC after overs/unders (t)	66	100	152	147	234	
% TAC caught	60	43	33	37		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) Three year MYTAC: The RAG recommended two options for calculating a MYTAC. i. a three MYTAC to be calculated by using an average of the last three years of the standardised catch rate in the Tier 4 assessment (263t); or ii. set a long term MYTAC (> 3 years) at <input type="checkbox"/> No



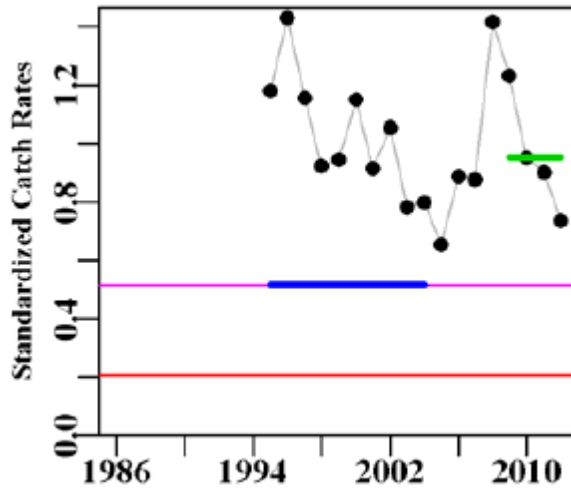
	C(Targ), 124t, and not review the TAC until catches reach this level	
Breakout rules for multi-year TAC	A breakout rule to review the MYTAC is triggered if catches in the second and third years of the MYTAC are lower than the average catch of the last three years.	
Have breakout rules been triggered?	- N/A	

Assessment		
Stock indicator trends	<ul style="list-style-type: none"> - Catches of WDS are low - The four year average of standardised CPUE in the western zone is currently a lot higher than the target reference point. - Target catch is 124t 	
RAG comments	-	
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - Assessed as a separate east and west stock - Basket of species (see stock structure) hence a key assumption is that the combined species CPUE at least broadly reflects the trends in CPUE for all the contributing species 	
Changes to model structure/assumptions	- Nil	
Significant changes to data inputs	- Given the apparently unusual catch rates in 2008 and 2009 on both the east and west coasts it was decided to leave those years out of the estimation of a three-year RBC and use, instead, the last three years of standardized CPUE and put that average through the usual Tier4 control rule.	
Comments on data	- Nil	
Implications for companion species/TEPs/multi-species fisheries	- Nil	



Tier 4 CPUE series

Standardized Catch Rates



Deepwater Shark Basket (west) standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.

Research

Research allowance

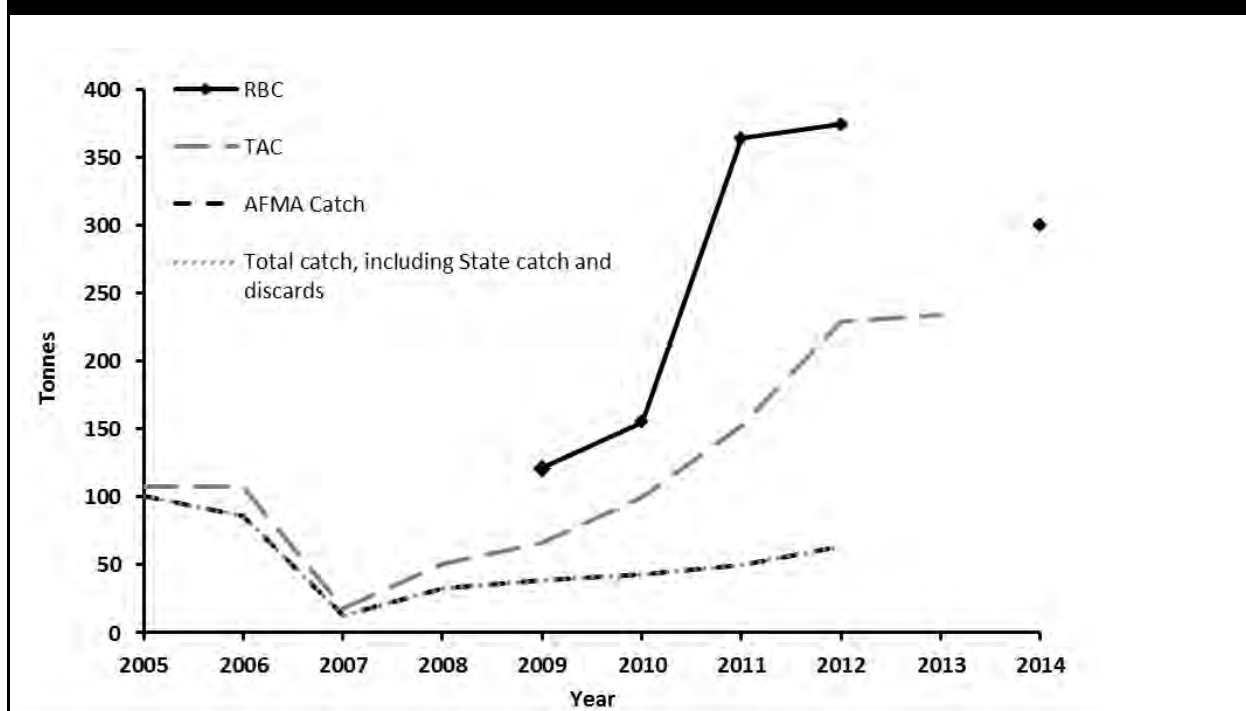
0 tonnes

Included in TAC

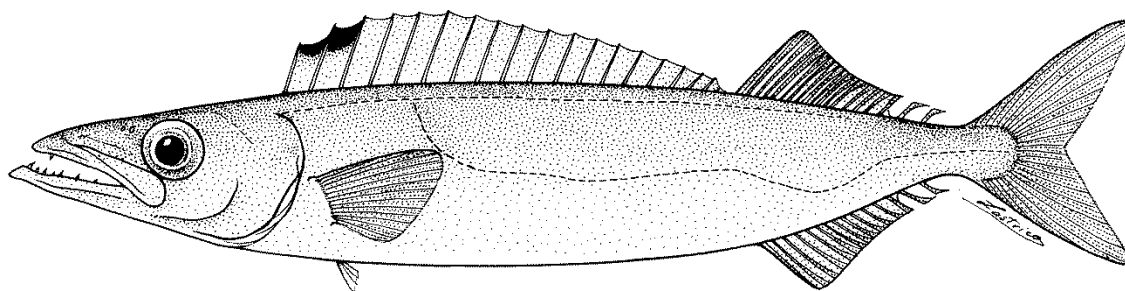
In addition to TAC



Catch trends



Eastern Gemfish (*Rexea solandri*)



Common names: Gemfish, Silver Gemfish and King Couta.

Assessed by Shelf RAG in 2013

Stock status summary

Stock structure

Genetic analysis recognised two separate stocks with a boundary at the western end of Bass Strait (Paxton and Colgan 1993).

The current assessment is based solely on Eastern Gemfish, caught south and east of the 43° latitude off western Tasmania.

Stock status against reference points and trend	<p>Limit reference point is 20% of unfished biomass Target reference point is 48% of unfished biomass</p> <p>Stock status: The last updated assessment in 2010 (updated from 2008), assessed Eastern Gemfish to be at 16% of its unfished biomass, and hence to be below the limit reference point.</p> <p>Biomass trend: When last assessed, the stock was estimated to have started rebuilding.</p>	
ABARES most recent assessment	Biomass: Overfished	Fishing mortality: Subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.2 million	0.3%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 0 tonnes (under a bycatch TAC). - Incidental total allowable catch of 100 tonnes. 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 0% undercatch - 0% overcatch 	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. $P < 10\%$).</i>	RBC recommendation = N/A, already considered to be below the limit reference point.	
	Alternative Catch Scenarios = N/A	

Stock status, RBC, TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	Not assessed	Not assessed	Not assessed
Stock Status	17	15	16	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	0	0	0	0	0	0
Agreed TAC	100	100	100	100	100	100
Actual TAC after overs/unders	104	106	100	100	100	100



% TAC caught	81%	83%	77%	63%		
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Tier Level & Discounts	
Tier Level	Tier 1 (last full assessment in 2009) - for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <input type="checkbox"/> No <ul style="list-style-type: none"> • 3 year = 100 tonnes (incidental bycatch only)
Breakout rules for multi-year TAC	<ul style="list-style-type: none"> - Observed standardised CPUE falls outside of 95% confidence interval of that predicted by the Tier 1 assessment - Catch and discards exceed 100t.
Have breakout rules been triggered?	<ul style="list-style-type: none"> - N/A

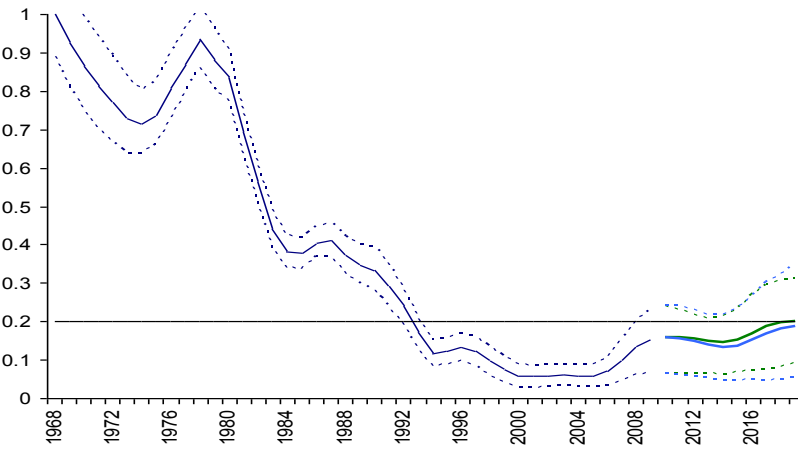


Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Landed catches remains well below the incidental catch TAC and have been declining.
RAG comments	<ul style="list-style-type: none"> - There was no formal assessment of Eastern Gemfish during 2013. Projections from the most recent assessment, updated during 2010, indicate that with average recruitment the stock would recover within 13 years which is within the rebuilding timeframe specified in the HSP - CSIRO is undertaking a review of Eastern Gemfish to establish whether a “productivity shift” may have occurred that is hindering the recovery of the stock. - The companion species analysis shows around 10t was targeted for 2012 in the east, consistent with the low targeting amounts also for 2010 and 2011. - Discard rates reduced in 2012 to 30% from >50% previously. It was noted that this is the first time the discards are much lower than the total catch. - The RAG agreed that continuing with the 100t incidental catch TAC was appropriate, recommending it as a MYTAC over 3 years. The RAG agreed to review the indicators and targeting analysis each year to monitor mortality levels.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - N/A
Changes to model structure/assumptions	<ul style="list-style-type: none"> - N/A
Significant changes to data inputs	<ul style="list-style-type: none"> - N/A
Comments on data	<ul style="list-style-type: none"> - N/A
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - Historically there was a companion species relationship between Mirror Dory and Eastern Gemfish which is likely to have changed due to avoidance of fishing the areas and depths that these species inhabit during the Eastern Gemfish spawning season.



Tier 1 stock projection

Projected biomass (include confidence intervals)



Eastern Gemfish base-case time-trajectories of spawning biomass depletion. Projections under 0t catch (green) and 100 t catch (blue) (0.05 and 0.95 percentile). Note: total catches (including discards) are often in excess of the current 100t bycatch TAC, which means the above trajectories are optimistic (from Little and Rowling 2011).

Research

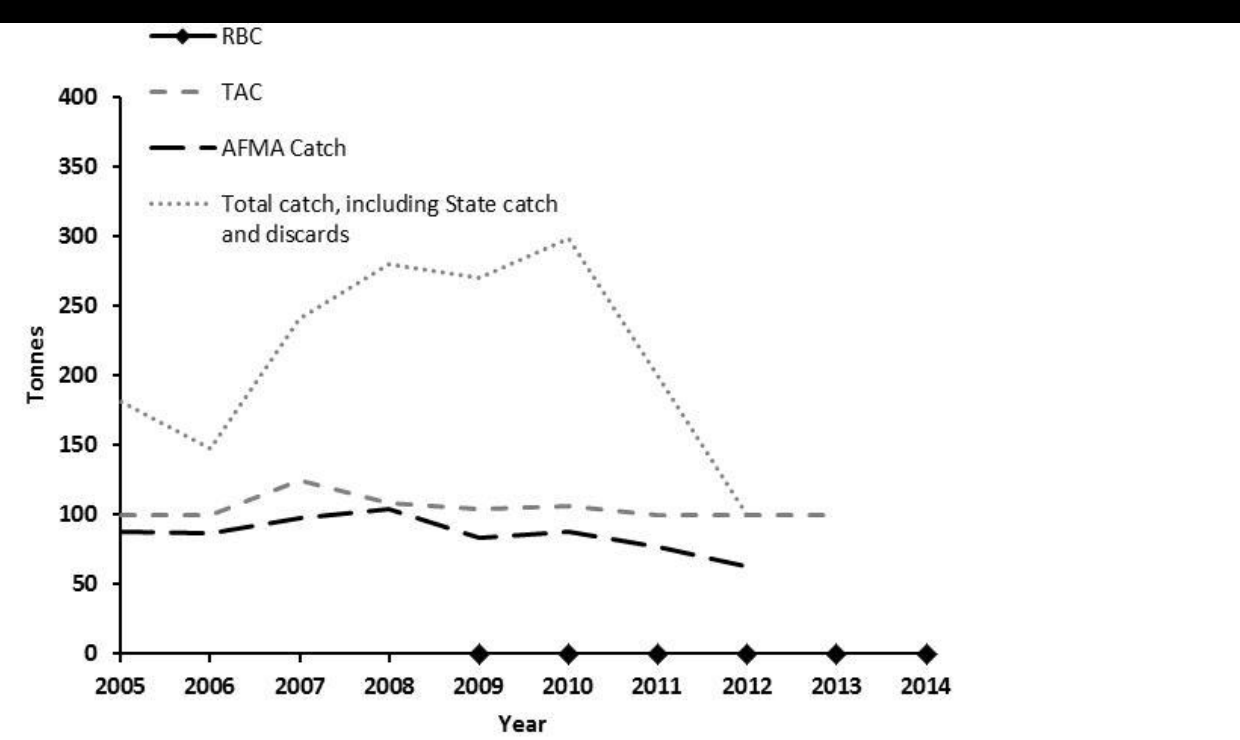
Research allowance

0 tonnes

Included in TAC

In addition to TAC

Catch trends



Elephantfish (*Callorhinchus milii*)



(Ken Graham © DPI Fisheries, 1984)

Assessed by SharkRAG in 2013

Stock status summary										
Stock structure	Little is known about stock structure from an assessment and management perspective. Their biology suggests some potential for regional management of stocks. However, it is currently assessed as a single stock.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <p>Stock status: In the 2013 Tier 4 assessment the recent average standardized CPUE-based proxy for biomass was above the target reference point.</p> <table border="1" data-bbox="735 1406 1302 1563"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.9750</td> </tr> <tr> <td>Limit</td> <td>0.3901</td> </tr> <tr> <td>Recent</td> <td>1.0257</td> </tr> </tbody> </table>			CPUE	Target	0.9750	Limit	0.3901	Recent	1.0257
	CPUE									
Target	0.9750									
Limit	0.3901									
Recent	1.0257									
ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Uncertain								
GVP figures (2011-12 fishing season)	GVP \$0.05 million	% fishery GVP 0.2%								
Recommended Biological Catch 2014-15	116t									
Overcatch/undercatch	10% undercatch 10% overcatch									



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	RBC recommendation = <10% (very unlikely)
	Alternative Catch Scenarios N.A. Tier 4 assessment

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE above target	CPUE above target	CPUE above target	CPUE above target	CPUE above target	CPUE above target
Fishing season	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	94	94	122.8	136	136	116
Agreed TAC	94	65	89	89	109	
Actual TAC after overs/unders	100.08	70.65	91.97	96.16	116.15	
% TAC caught	80%	85%	72%	77%		

Tier Level & Discounts	
Tier Level	Tier 4
Discount factor	No discount factor recommended because the large closures in Victoria and SA provide additional precaution.
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No



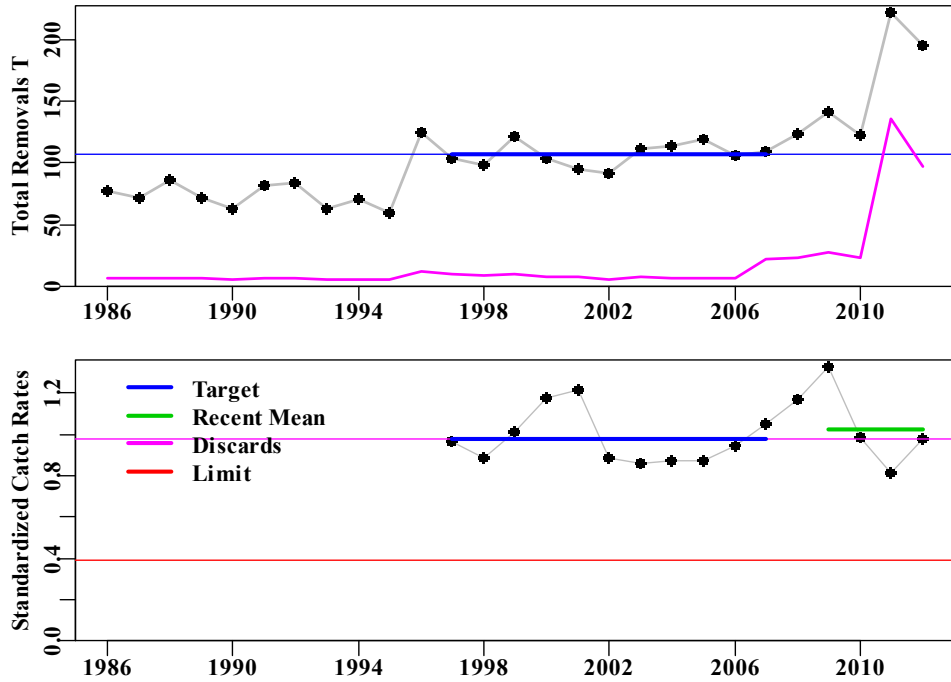
Breakout rules for multi-year TAC	- NA
Have breakout rules been triggered?	- NA

Assessment	
Stock indicator trends	NA
RAG comments	<p>SharkRAG considered the effect of discards in the assessment and noted that estimates of discards were improving over time but there was not currently a sufficient time series to include discards in the assessment.</p> <p>As a results Shark RAG selected the tier 4 analysis without discards included.</p> <p>SharkRAG has expressed concerns that changes in fishing behavior such as intentional avoidance cannot be accounted for in the Tier 4 assessment, and can ultimately drive RBC/TACs downwards.</p> <p>There was some uncertainty about how reliable the tier 4 assessment is as an index of abundance for Elephantfish. However, SharkRAG 2013 did not have concerns about the current status of the stock based on the available catch and effort information.</p>
Key model technical assumptions/parameters	NA
Changes to model structure/assumptions	In 2013 SESSF RAG proposed that the target reference point could be reduced to 40% of unfished spawning biomass for species that did not represent a major part of the value of the fishery and that were not targeted.
Significant changes to data inputs	NA
Comments on data	NA
Implications for companion species/TEPs/multi-species fisheries	NA



Tier 1 stock projection

Projected biomass (include confidence intervals)



Top panel is the total removals with the fine line illustrating the target catch. Bottom panel represents the standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates (1996 – 2007), and the recent average catch rate (last four years).

Research

Research allowance

NA

Included in TAC

In addition to TAC



Catch trends

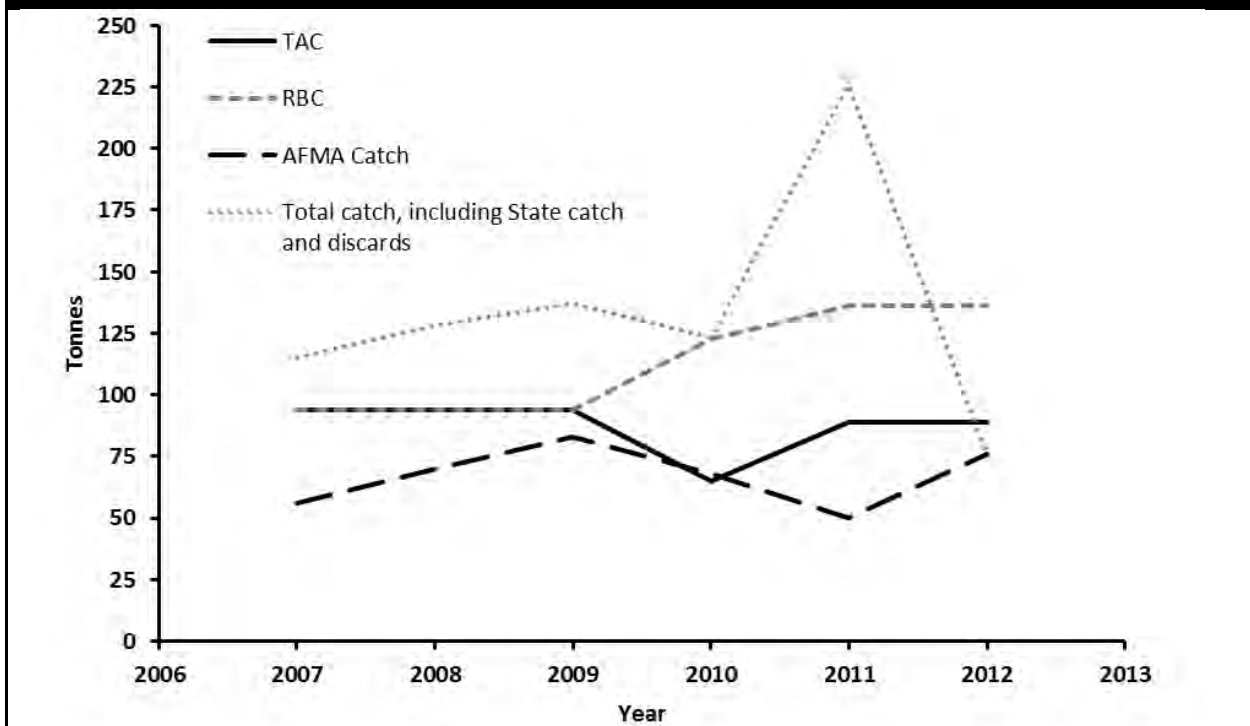


Figure 2. Elephantfish TAC, RBC, AFMA catch and total catch are detailed above. The spike in total catch for 2011 can be attributed to the high level of discards recorded for that year which is incorporated into the total catch.

Gummy Shark (*Mustelus antarcticus*)



(Fisheries Research & Development Corporation, 2012)

Assessed by SharkRAG in 2013

Stock status summary		
Stock structure	Gummy Shark is endemic to southern Australia and harvested by the SESSF from a single genetic stock extending from Bunbury in Western Australia to Jervis Bay in NSW. This single genetic stock is assessed as four separate sub-stocks within the four broad regions on the continental shelf of Bass Strait (BS), Tasmania (Tas), South Australia (SA), and Western Australia (WA). These sub stocks are considered to be discrete reproductive stocks with tagging data showing there is low movement between them.	
Stock status against reference points and trend	<p>Limit reference point is 20% of unfished biomass (pup production is used as a proxy for breeding biomass)</p> <p>Target reference point is 48% of unfished biomass (pup production is used as a proxy for breeding biomass)</p> <p>The 2013 assessment estimates that the stock is above the target reference point for all sub-stocks.</p>	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$14.63 million	61.4%



<p>Recommended Biological Catch 2014-15</p>	<p>Based on the 2013 stock assessment, Shark RAG supported an RBC of 2010 tonnes for the entire fishery. Noting larger hook catch reduces the RBC. The RBC of 2010 tonnes is based on the scenario of 75% hook catch in SA which reflects current and expected fishing activity.</p> <p>However, the RAG noted caution as:</p> <ul style="list-style-type: none"> the RBC from the 2013 assessment is above historical catches for the fishery Commonwealth only catch has never been sustained above 1900 tonnes and catches at this level have historically driven down catch rates. <p>It is important to maintain long term distribution of catches in the 3 areas of fishery in order to maintain catch rates. The concern is decreasing catch rates will mean higher levels of effort are required to land the TAC which is likely to increase the fishery's impact on incidental species and issues with localized depletion of Gummy Shark.</p> <p>Therefore the RAG supported maintaining the status quo of a Commonwealth TAC of 1836 tonnes.</p>																																																					
<p>Overcatch/undercatch</p>	<p>10% undercatch 10% overcatch</p>																																																					
<p>Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a "very unlikely" score in this section (i.e. P<10%).</i></p>	<p>RBC recommendation = <10% (very unlikely)</p> <p>Alternative Catch Scenarios</p> <p>Alternative scenarios for hook caught v gillnet caught. Recommended Biological Catches (RBCs; tonnes) for Bass Strait "BS", South Australian SA and Tasmanian TS populations. Calculations were done assuming that 0%, 10%, 25%, 75%, or 100% of the catch is taken by line gear Line (%). Totals are presented for situations where line gear is used in all regions ALL, or in South Australia alone SA only. RBCs are shown for 2014 "2014 RBCs" and for populations that are stable at 48% of pristine "Long term RBCs"</p> <table border="1" data-bbox="571 1500 1348 1904"> <thead> <tr> <th colspan="6">2014 RBCs</th> </tr> <tr> <th rowspan="2">Line (%)</th> <th colspan="3">Population</th> <th colspan="2">Total</th> </tr> <tr> <th>BS</th> <th>SA</th> <th>TS</th> <th>All</th> <th>SA only</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1234</td> <td>745</td> <td>253</td> <td>2232</td> <td>2232</td> </tr> <tr> <td>10</td> <td>1080</td> <td>617</td> <td>242</td> <td>1939</td> <td>2104</td> </tr> <tr> <td>25</td> <td>1049</td> <td>599</td> <td>233</td> <td>1881</td> <td>2086</td> </tr> <tr> <td>50</td> <td>1013</td> <td>582</td> <td>225</td> <td>1820</td> <td>2069</td> </tr> <tr> <td>75</td> <td>988</td> <td>567</td> <td>219</td> <td>1774</td> <td>2054</td> </tr> <tr> <td>100</td> <td>972</td> <td>557</td> <td>215</td> <td>1744</td> <td>2044</td> </tr> </tbody> </table>	2014 RBCs						Line (%)	Population			Total		BS	SA	TS	All	SA only	0	1234	745	253	2232	2232	10	1080	617	242	1939	2104	25	1049	599	233	1881	2086	50	1013	582	225	1820	2069	75	988	567	219	1774	2054	100	972	557	215	1744	2044
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TAC and catch trends						
Assessment year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
Stock Status	>B _{TARG}	>B _{TARG}	>B _{TARG}	>B _{TARG}	>B _{TARG}	N/A
Fishing season	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	1800	1800	1836	1836	1836	2010
Agreed TAC*	1717	1717	1717	1717	1836	
Actual TAC after overs/unders	1771.42	1826.50	1846.55	1862.15	1963.67	
% TAC caught	91%	85%	79%	79%		

*Note that Commonwealth TAC is set based on the RBC minus state allocation. Details of the state allocation are outlined in the MOU between the Commonwealth and the State of Victoria and South Australia. The total state allocation for Gummy Shark is 4.6% of the global catch limit (or RBC) and is apportioned for catch in South Australian internal waters (2.9%) and catch in Victorian Bays and Inlets (1.7%).

Tier Level & Discounts	
Tier Level	Tier 1
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <input type="checkbox"/> No <ul style="list-style-type: none"> • 1 year = 1836 • 3 year = 1836 • 5 year = NA



Breakout rules for multi-year TAC	<p>SharkRAG recommended indicators for multi-year TACs of:</p> <ul style="list-style-type: none"> - if standardised CPUE moves outside the 50-percentile range (catch rates impact on economics and bycatch) in Bass Strait - catches fall below 1200 tonnes (providing an indication of recruitment) - length frequencies from the line catch changes significantly from the model parameters.
Have breakout rules been triggered?	- NA

Assessment	
Stock indicator trends	n/a as assessed as a Tier 1 species
RAG comments	<p>SharkRAG 2, 2013 noted that there are no sustainability concerns with the RBC set for the 2014/15 season.</p> <p>The RAG noted that careful consideration of catch rates in Bass Strait is important along with the impacts of changing the size composition of sharks caught with longlines.</p>
Key model technical assumptions/parameters	<p>Because of the close relationship between the number of shark pups and both the number and length of mature females, SharkRAG uses pup production as a proxy for spawning biomass.</p> <p>The model relies on gillnet caught shark that are primarily from four age classes of sub adults. Trends in adult biomass are poorly informed by the data. The model results are highly sensitive to the assumption made regarding density dependence. Density dependence is the way that modeled stock compensates for a fish down in the stock. i.e. how the productivity of the stock responds to changing abundance.</p> <p>Density dependence affects the mortality rate of sharks aged 0-30 years, as a function of 1+ biomass.</p> <p>It is assumed that larger / older sharks are less available to capture than younger sharks (this is in addition to gear selectivity constraints). This is applied to gillnet and line gear. While there is evidence supporting this assumption for gillnets, there as yet no evidence for longline.</p> <p>A non-linear relationship between CPUE and available biomass is implemented though the assumption that “gear competition” applies.</p>
Changes to model structure/assumptions	<p>There were no significant changes to the model used in 2013 compared to the last assessment in 2010.</p> <p>The model no longer considers tag return data after 2005.</p>

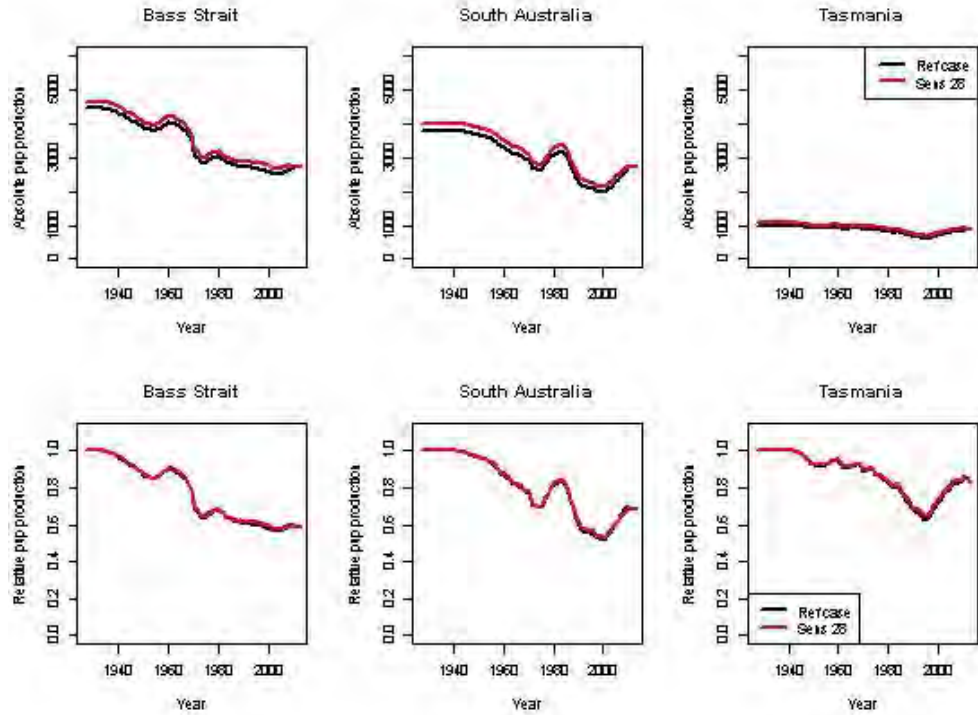


	Forward projections now incorporate the assumption that the South Australian catch will be 75% hook caught with the remainder of the fishery close to 100% gillnet caught.
Significant changes to data inputs	<p>The following data was added to the 2013 model:</p> <ul style="list-style-type: none"> • Reliable Observer data is now available including length frequency data from Tasmania. • CPUE data up to 2012 was included for Bass Strait and Tasmania. • CPUE data from SA after 2009 was not included due influence of fishery closures.
Comments on data	<p>Recent large closures in South Australia are thought to have reduced the nominal and standardized CPUE in that state causing a break in the index of abundance.</p> <p>The RAG emphasizes the importance of collecting length frequency data for all longline caught Gummy Shark across the fishery.</p>
Implications for companion species/TEPs/multi-species fisheries	<p>Australian sea lion bycatch in waters off South Australia is managed using trigger limits that close spatial zones for 18 months. The Coorong region in South Australia is currently closed to gillnet fishing to mitigate dolphin interactions.</p> <p>School Shark landings are subject to a 20% rule for gillnet operators that limited catches by individual operators to 20% of their Gummy Shark catch to reduce deliberate targeting. It has been recommended by the RAG that 20% rule be applied to all shark caught by longline inside 183m.</p>



Tier 1 stock projection

Projected biomass



Pup production in thousands of pups (top panel) and pup production relative to 1927 (bottom panel) for the three gummy shark regions and two scenarios (Reference case and sensitivity 28).

Research

Research allowance

NA

Included in TAC

In addition to TAC



Catch trends

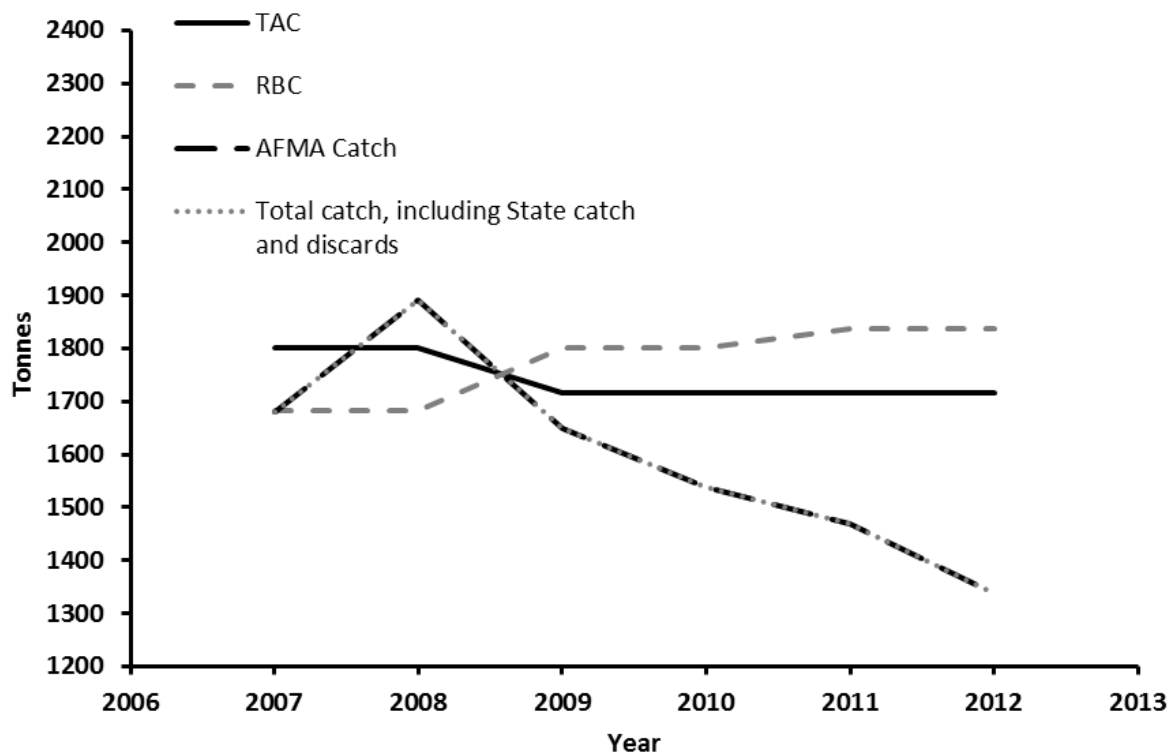


Figure 2. Gummy Shark TAC, RBC, AFMA catch and total catch are detailed above. Due to the lack of data in relation to State and recreational catch, the total catch is equal to the AFMA catch. The recent downward trend in catch can be attributed to large gillnet closures implemented across South Australia to mitigate ASL and dolphin interactions.



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
Stock Status~	E: 19% W: 68%	E: 24% W: 70%	E: 26% W: 69%	E: 35% W: 67%	E: 38% W: 66%	E: 40% W: 68%
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	380	510	557	640	655	692
Agreed TAC*	450	450	450	565	568	
Actual TAC after overs/unders*	493	492	484	601	624	
% TAC caught*	75%	73%	81%	58%		

* Combined east and west.

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	N/A
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 2 year: 624t (combined east and west) <input type="checkbox"/> No



Breakout rules for multi-year TAC	The RAG determined that if a MYTAC is adopted the following breakout rules are appropriate, which if triggered, the RAG would recommend a new assessment as a priority: <ul style="list-style-type: none"> • Observed standardized CPUE falls outside the 95% confidence intervals • Catch exceeds the individual east and west RBCs.
Have breakout rules been triggered?	N/A

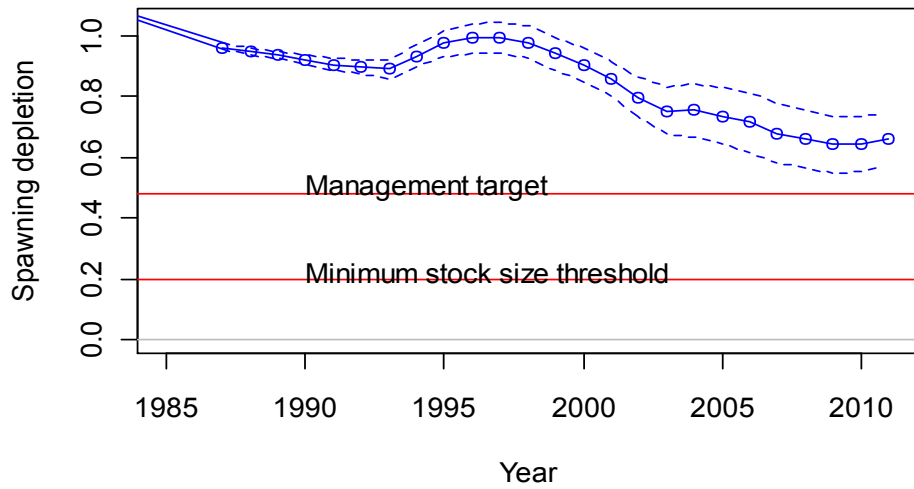
Assessment	
Stock indicator trends	CPUE is flat, catches are well under the estimated RBC and the size/age composition data shows no signs of any problems
RAG comments	<ul style="list-style-type: none"> - Suitable for a two year MYTAC, however the RAG was not comfortable providing an option for an RBC for a longer period because an assessment has not being conducted since 2011. - The RAG noted that Jackass Morwong has been significantly under caught in recent years, and the RBC continues to increase. Despite this the RAG held some reservation as to whether the stock is rebuilding. - Dr Wayte explained that genetic studies conducted by CSIRO have not found evidence of separate stocks. - Much of the historical Jackass Morwong fishing grounds in the west have been closed, particularly in the Port MacDonnell dogfish closure.
Key model technical assumptions/parameters	N/A
Changes to model structure/assumptions	N/A
Significant changes to data inputs	N/A
Comments on data	The RAG emphasised their ongoing concern with the limited data from the western stock. The RAG noted that the western assessment is uncertain because of this and there is a need for increased data.
Implications for companion species/TEPs/multi-species fisheries	N/A



Tier 1 stock projection

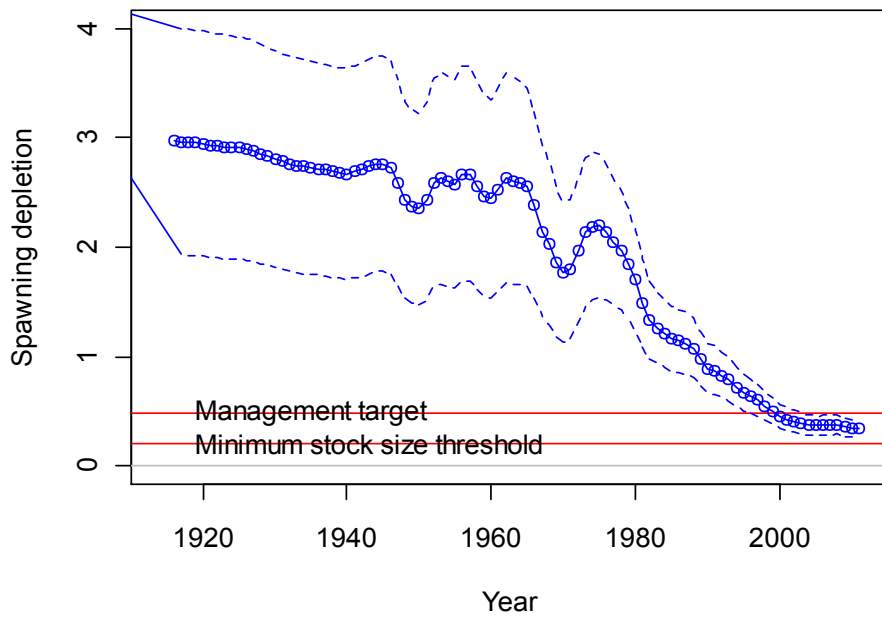
Projected biomass (include confidence intervals)

Spawning depletion with ~95% asymptotic intervals



Jackass Morwong time-trajectory of spawning biomass depletion of the western stock corresponding to the base-case estimates.

Spawning depletion with ~95% asymptotic intervals



Jackass Morwong time-trajectory of spawning biomass depletion of the eastern stock corresponding to the base-case estimates.



Research

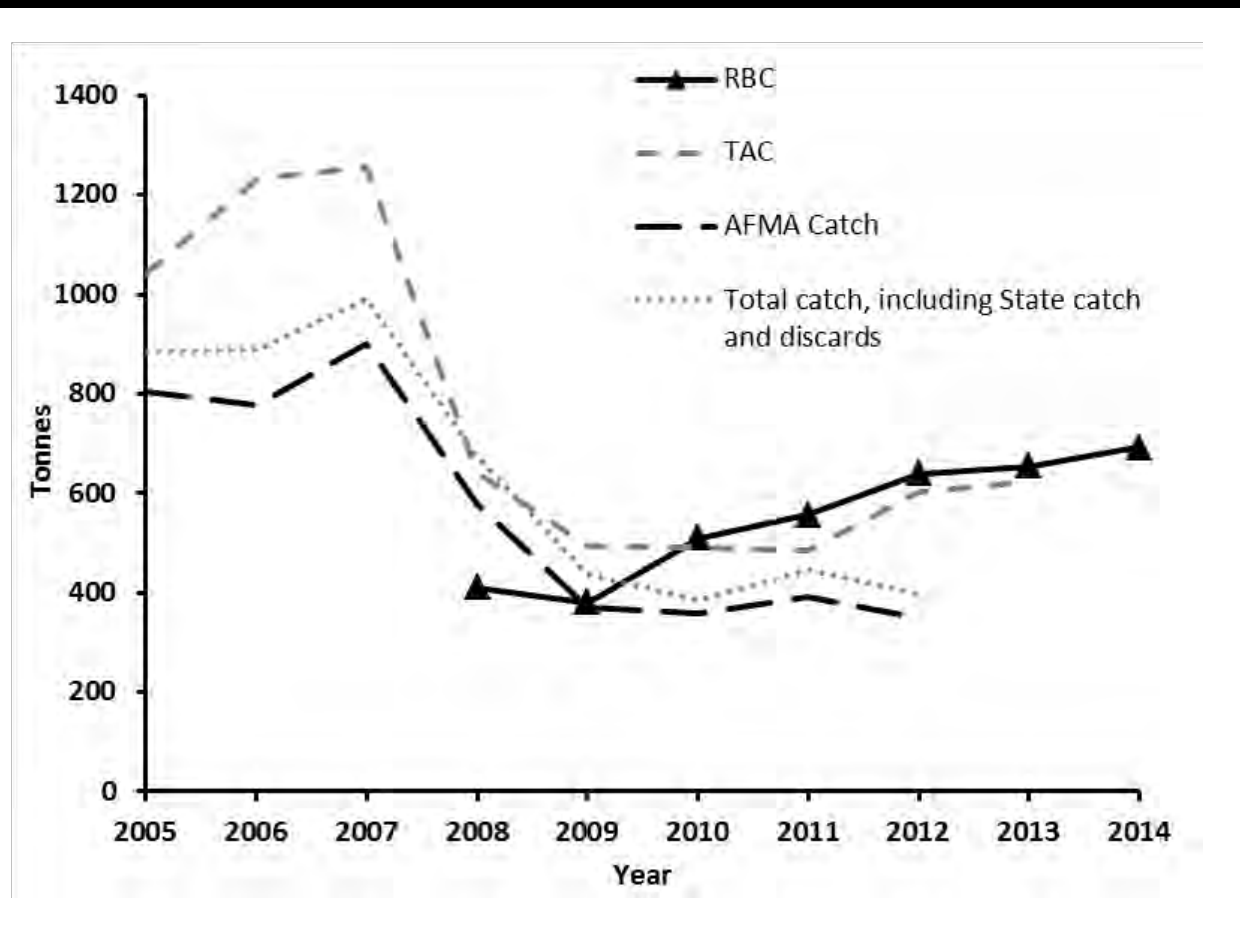
Research allowance

0 tonnes

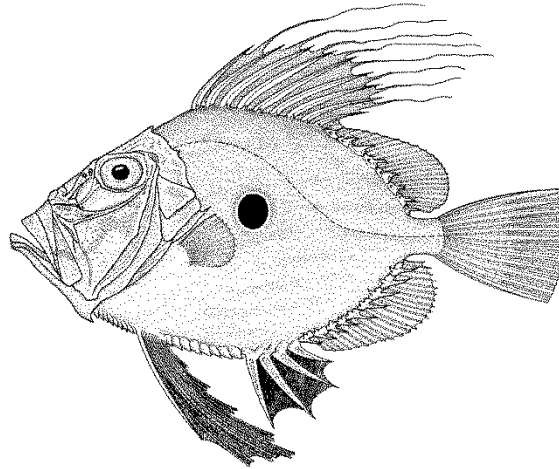
Included in TAC

In addition to TAC

Catch trends



John Dory (*Zeus faber*)



Common names: Doorkeeper's Fish, Keparu, Kuparu, St. Peter's Fish.

Assessed by Shelf RAG in 2013

Stock status summary										
Stock structure	For management purposes, a single stock is assumed for the SESSF.									
Stock status against reference points and trend	<p>Tier 3 species use estimates of fishing mortality (F) that will produce a spawning biomass at a given level as reference points.</p> <p>The Tier 3 target reference point for John Dory is the level of F that will produce a spawning biomass of 40% of unfished levels.</p> <p>The Tier 3 limit reference point for John Dory is the level of F that will produce a spawning biomass of 20% of unfished levels.</p> <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">F</td> </tr> <tr> <td>Target (F_{spr40})</td> <td style="text-align: center;">0.159</td> </tr> <tr> <td>Limit (F_{spr20})</td> <td style="text-align: center;">0.287</td> </tr> <tr> <td>F_{cur}</td> <td style="text-align: center;">0.064</td> </tr> </table> <p>Stock status: Currently F (0.064) is below the target (0.159) indicating that fishing mortality is at a level that would lead to spawning biomass being above target.</p> <p>Trend: Catches and fishing mortality rates are expected to remain low.</p>			F	Target (F_{spr40})	0.159	Limit (F_{spr20})	0.287	F_{cur}	0.064
	F									
Target (F_{spr40})	0.159									
Limit (F_{spr20})	0.287									
F_{cur}	0.064									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	\$0.6 million	1.0%								
Recommended Biological Catch 2014-15	N/A - continue 221t MYTAC (final year of a three year MYTAC)									



Overcatch/undercatch	- 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

TAC and catch trends						
Assessment Year	2009	2010	2011	2012	2013	2014
Tier /rollover /MYTAC	Tier 3	Tier 3	Tier 3	Tier 3	Tier 3	Tier 3
Stock Status	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC (t)	233	284	265	MYTAC	MYTAC	MYTAC
Agreed TAC	190	190	221	221	221	221
Actual TAC after overs/unders	205	207	237	243	243	
% TAC caught	44%	28%	37%	32%		

Tier Level & Discounts	
Tier Level	Tier 3- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 % - Due to the bycatch nature of this species, the long time series of consistent catches, the conservative TAC recommendation and other stable indicators, the RAG agreed that the application of the default 5% Tier 3 discount factor was not required.
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season) <input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> 1 year: continue 221t MYTAC (currently in its second year of a 3 year MYTAC) <input type="checkbox"/> No



roll-over of catch))		
Breakout rules for multi-year TAC	<ul style="list-style-type: none"> - the catch rate for last year is outside the 95% confidence interval of the average standardised catch rate since 2007 inclusive - the average standardised catch rate for the last four years is below the limit reference point. 	
Have breakout rules been triggered?	<ul style="list-style-type: none"> - No 	

Assessment		
Stock indicator trends	<ul style="list-style-type: none"> - Recent Tier 3 assessments indicate low fishing mortality rates, well below the natural mortality rate, which is consistent with the recent low levels of catch relative to historical levels. - Standardized CPUE remains above the Tier 4 limit reference point. 	
RAG comments	<ul style="list-style-type: none"> - The RAG noted that the indicators show no concern and the Tier 3 assessment fits well. - The RAG noted John Dory has not triggered the breakout rule, and was confident in recommending the continuation of the MYTAC at 221t, noting that this is well below the 1 year RBC of 321t. 	
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - N/A 	
Changes to model structure/assumptions	<ul style="list-style-type: none"> - N/A 	
Significant changes to data inputs	<ul style="list-style-type: none"> - New age composition data were available that allowed a revised Tier 3 assessment. 	
Comments on data	<ul style="list-style-type: none"> - N/A 	
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - N/A 	

Biomass projection	
	N/A – Tier 3



Research

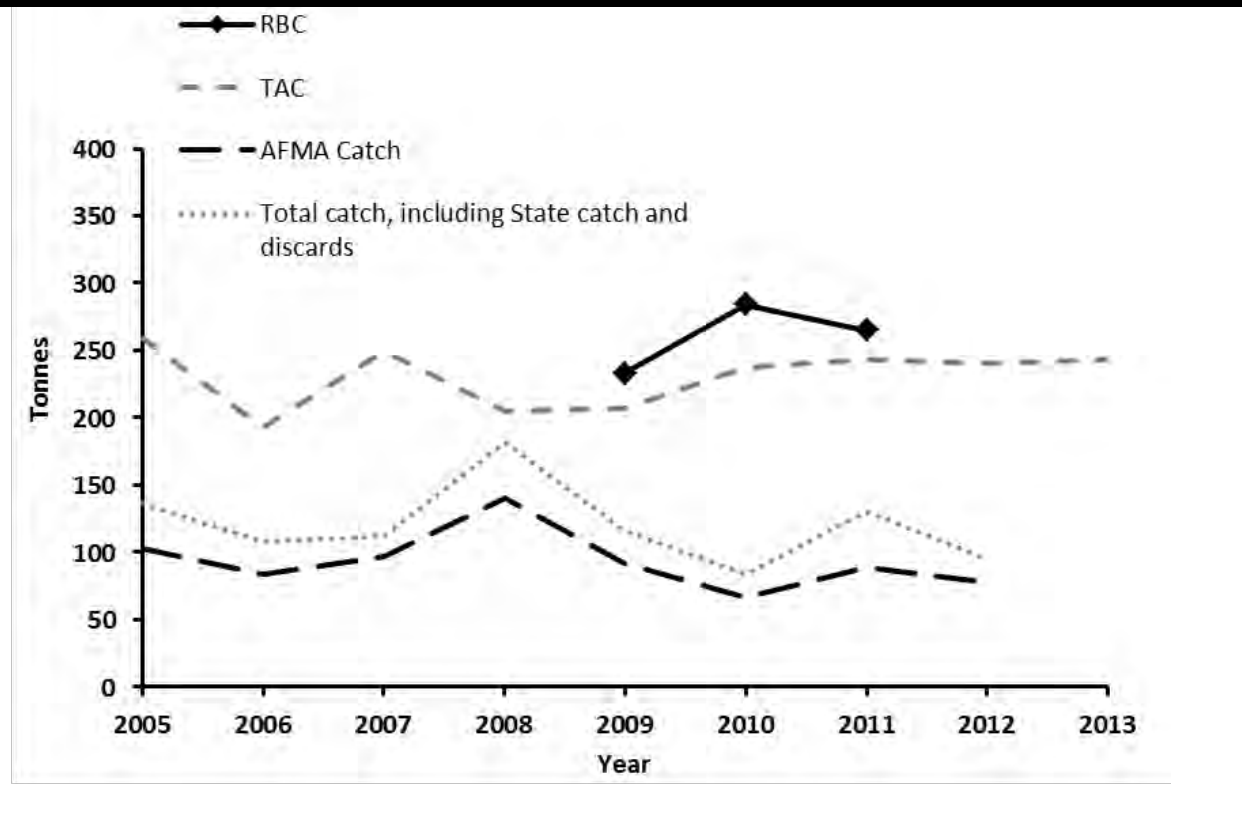
Research allowance

0 tonnes

Included in TAC

In addition to TAC

Catch trends



Mirror Dory (*Zenopsis nebulosus*)



Assessed by Shelf RAG in 2013

Stock status summary										
Stock structure	A single stock is currently assumed for assessment purposes.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" data-bbox="699 1249 1332 1397"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.9618</td> </tr> <tr> <td>Limit</td> <td>0.3847</td> </tr> <tr> <td>Recent</td> <td>1.0811</td> </tr> </tbody> </table> <p>Biomass: Recent CPUE-based proxy for biomass is above the limit and target reference points.</p> <p>Trend: Standardised CPUE and catch levels have been variable with no concerning trends.</p>		CPUE		Target	0.9618	Limit	0.3847	Recent	1.0811
CPUE										
Target	0.9618									
Limit	0.3847									
Recent	1.0811									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	\$1.2 million	2.0%								
Recommended Biological Catch 2014-15	- 680 tonnes									
Overcatch/undercatch	<p>- 10% undercatch</p> <p>- 10% overcatch</p>									



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

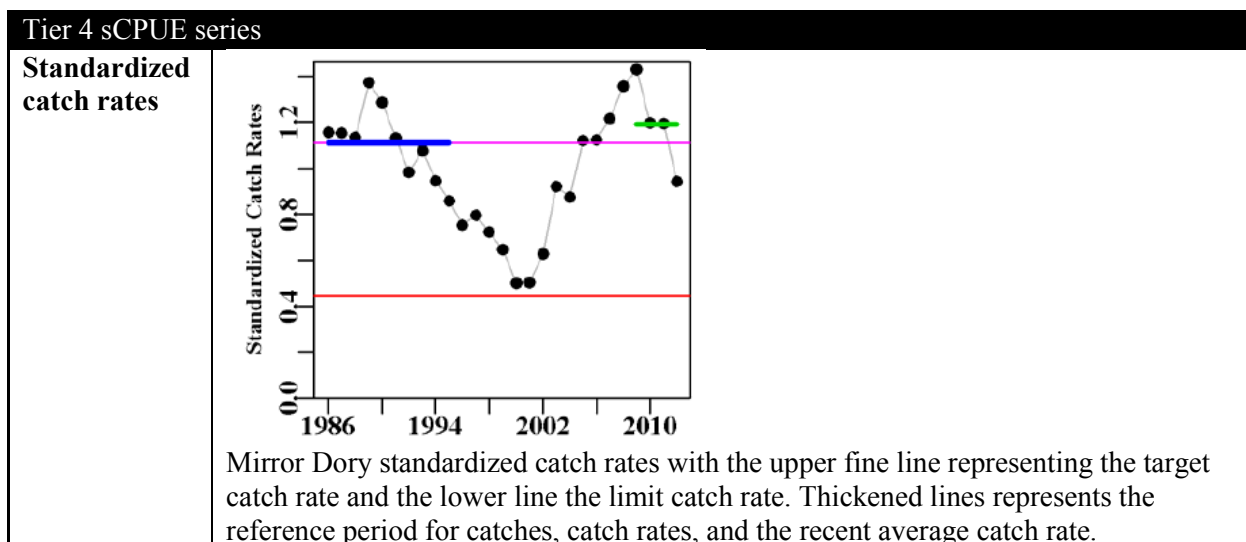
TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 3	Tier 3	Tier 3	Tier 3	Tier 3	Tier 4
Stock Status	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	Fishing mortality less than target	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	906	1196	906	7349	2794	680
Agreed TAC	718	718	718	1077	1616	
Actual TAC after overs/unders	761	768	767	1135	1717	
% TAC caught	68%	80%	68%	33%		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au/
Discount factor	15 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No



Breakout rules for multi-year TAC	N/A
Have breakout rules been triggered?	N/A

Assessment	
Stock indicator trends	N/A
RAG comments	<ul style="list-style-type: none"> - The RAG agreed that the previous Tier 3 assessment (length based) was not robust due to unrepresentative length data and the previous RBC was probably too high. The RAG also agreed that the new age based Tier 3 is not robust either due to insufficient and unrepresentative age data. - The RAG suggested that Mirror Dory were not a suitable candidate for a MYTAC due to their high variability and the lack of a stable assessment to rely on.
Key model technical assumptions/parameters	N/A
Changes to model structure/assumptions	N/A
Significant changes to data inputs	N/A
Comments on data	N/A
Implications for companion species/TEPs/multi-species fisheries	The RAG suggested in 2012 there may have been a companion species relationship between Mirror Dory and Eastern Gemfish but speculated that this is likely to have changed due to avoidance of Eastern Gemfish during their spawning run.



Research

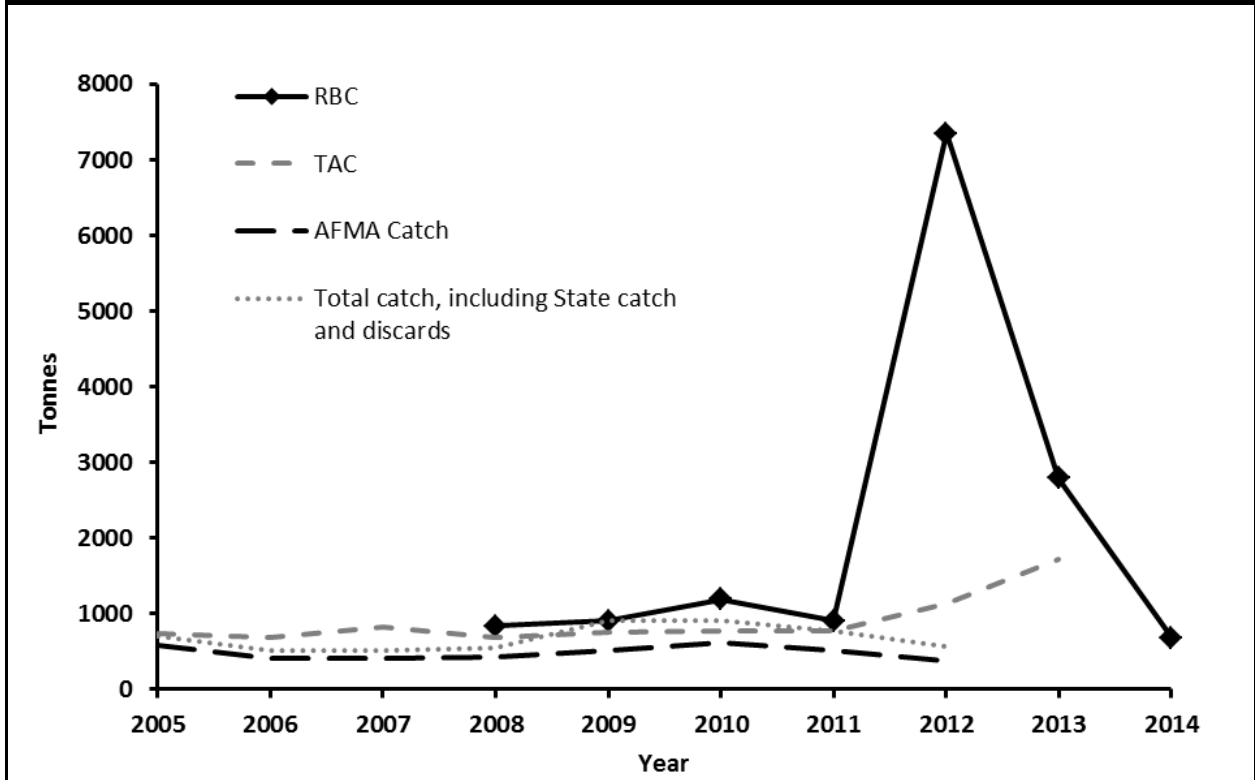
Research allowance

0 tonnes

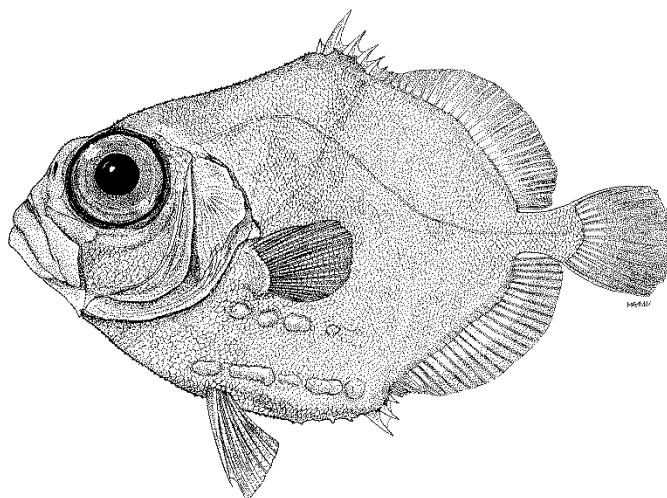
Included in TAC

In addition to TAC

Catch trends



Mixed Oreo, basket (Warty, Spiky, Rough and Black Oreo Dory)



Assessed by SlopeRAG in 2013

Stock status summary										
Stock structure	<p>Little is known about the stock structure of the Oreo species in this basket quota.</p> <p>They are benthic-pelagic species that are caught mainly below 600m. For assessment and management purposes they are treated as a single unit of stock through the SESSF.</p>									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" data-bbox="730 1413 1299 1559"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.4640</td> </tr> <tr> <td>Limit</td> <td>0.1856</td> </tr> <tr> <td>Recent</td> <td>0.4076</td> </tr> </tbody> </table> <p>CPUE trend: Standardised CPUE is slightly above the target reference point and has been relatively flat over the past decade</p>		CPUE		Target	0.4640	Limit	0.1856	Recent	0.4076
CPUE										
Target	0.4640									
Limit	0.1856									
Recent	0.4076									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	<\$0.1 million	<0.2%								
Recommended Biological Catch 2014-15	<p>1 year: 128 tonnes</p> <p>3 year: 128 tonnes</p>									



Overcatch/undercatch	10% undercatch 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely
	Alternative Catch Scenarios = N/A (Tier 4)

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	393	200	113	120	132	128
Agreed TAC	188	188	113	111	132	
Actual TAC after overs/unders	202	205	129	120	140	
% TAC caught	43	44	76	87		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year = 128t RBC <input type="checkbox"/> No



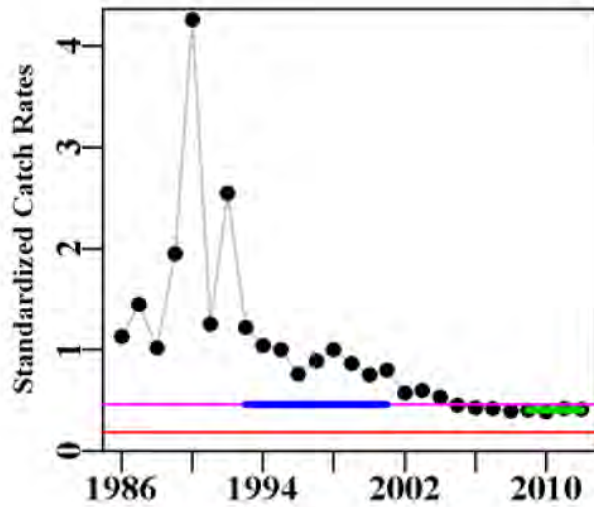
Breakout rules for multi-year TAC	Breakout rules for Mixed Oreo:- <ul style="list-style-type: none"> - if the catch is less than 70% of the TAC; or - if there is a greater than 50% change in the trawl CPUE.
Have breakout rules been triggered?	- N/A

Assessment	
Stock indicator trends	- Catch rates have been relatively stable since 2006 and are marginally below F_{48} .
RAG comments	<ul style="list-style-type: none"> - The RAG advised that mixed Oreos were a potential candidate for a lower target reference point and there was little biological risk to the stock in lowering the target to B40. The RAG noted that although mixed Oreos were targeted they are a low economic driver in the fishery and that a high proportion of the quota was caught and there was low quota latency. - The majority of mixed Oreo catches are Spikey Oreo - Noting that the stock is at approximately 40% B0 and closures provide protection the RAG considered these species to be suitable for a three year MYTAC (using the RBC of 128t for TAC calculations), a level that should still allow rebuilding
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	- Nil



Tier 4 CPUE series

Standardized Catch Rates



Mixed Oreo Basket standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.

Research

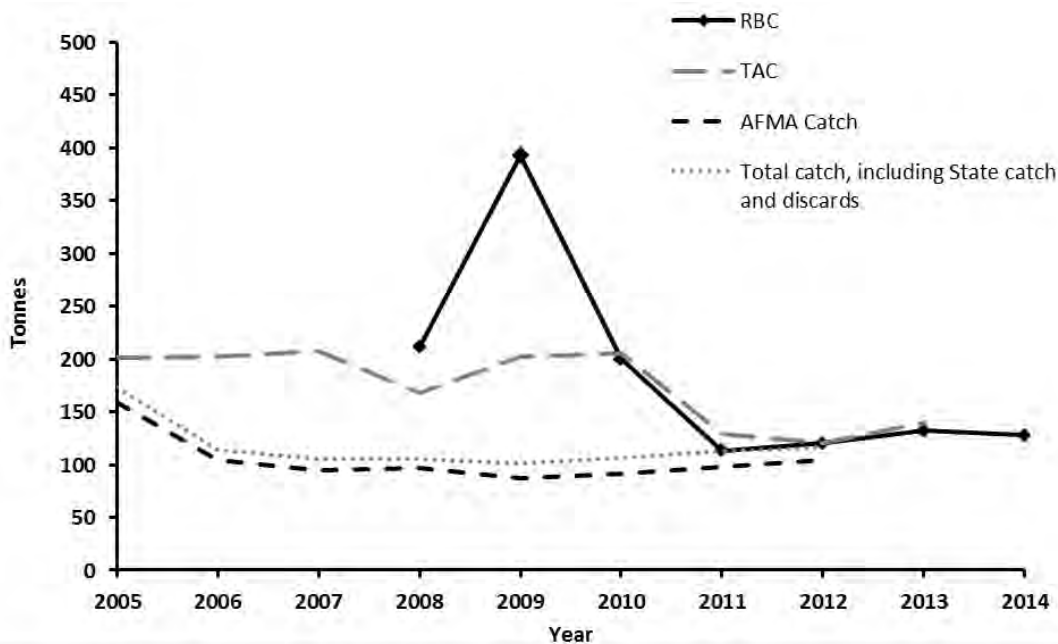
Research allowance

0 tonnes

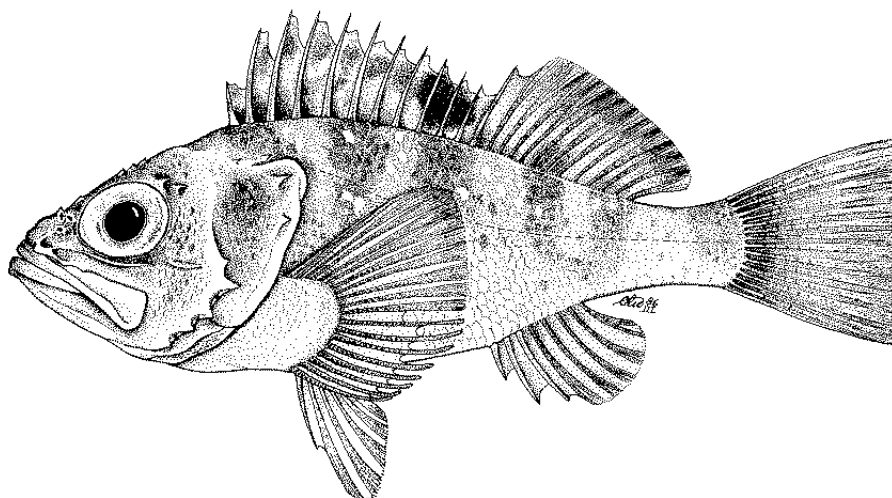
Included in TAC

In addition to TAC

Catch trends



Inshore Ocean Perch (*Helicolenus percoides*)



Common names: Ocean Perch, Reef Ocean Perch, Coral Cod.
Assessed by Shelf RAG in 2013

Stock status summary										
Stock structure	A single TAC is set for the two distinct species: the inshore species (<i>H. percoides</i>), and the offshore species (<i>H. barathri</i>), however both are assessed separately.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 40% of unfished levels.</p> <p>The limit reference point is 40% of the CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <table border="1" data-bbox="671 1350 1362 1503"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>1.2663</td> </tr> <tr> <td>Limit</td> <td>0.5065</td> </tr> <tr> <td>Recent</td> <td>1.7690</td> </tr> </tbody> </table> <p>Stock status: In the 2012 Tier 4 assessment the recent average standardized CPUE proxy for biomass is above the 40% target reference point.</p> <p>Trend: CPUE has been variable, particularly in the last 7 years.</p>		CPUE		Target	1.2663	Limit	0.5065	Recent	1.7690
CPUE										
Target	1.2663									
Limit	0.5065									
Recent	1.7690									
ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Uncertain								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	\$0.8 million	1.3%								
Recommended Biological Catch 2014-15	1-year = 234 tonnes 3-year = 102 tonnes (the Tier 4 target catch level)									



Overcatch/undercatch	- 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	25	26	39	95	126	234
Agreed TAC*	400	300	300	230	195	
Actual TAC after overs/unders*	446	334	322	249	210	
% TAC caught*	43%	66%	71%	80%		

* combined TAC for Inshore and Offshore Ocean Perch.

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au/
Discount factor	15 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year = 102 (target catch level) <input type="checkbox"/> No



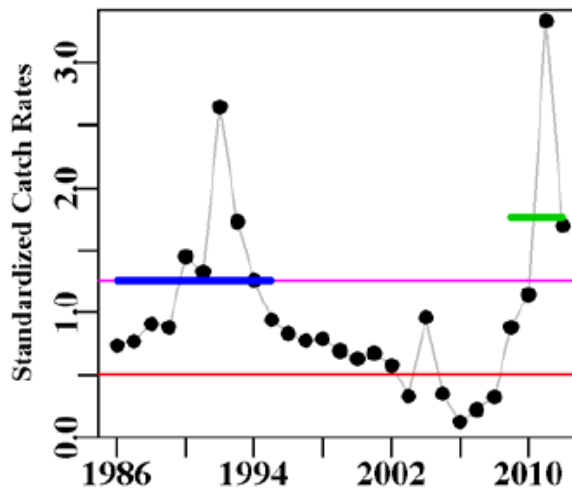
is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))		
Breakout rules for multi-year TAC	The RAG did not consider breakout rules for Ocean Perch.	
Have breakout rules been triggered?	N/A	

Assessment	
Stock indicator trends	N/A
RAG comments	<ul style="list-style-type: none"> - The RAG determined a three year RBC at the Tier 4 target catch level of 102 tonnes suitable. - Discards are very high (>80%) with some members stating concerns that inshore Ocean Perch is a bycatch species, and shouldn't be under quota. - The RAG agreed Ocean Perch (inshore and offshore) are an obvious candidate for separate TACs; however it was noted that it would not be easy to administer as the species are separated by depth rather than by geographical distribution.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - The assessment includes discards. - The target reference point is 40% of unfished biomass.
Changes to model structure/assumptions	N/A
Significant changes to data inputs	N/A
Comments on data	N/A
Implications for companion species/TEPs/multi-species fisheries	N/A



Tier 4 CPUE series

Standardized Catch Rates



Inshore Ocean Perch standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.

Research

Research allowance

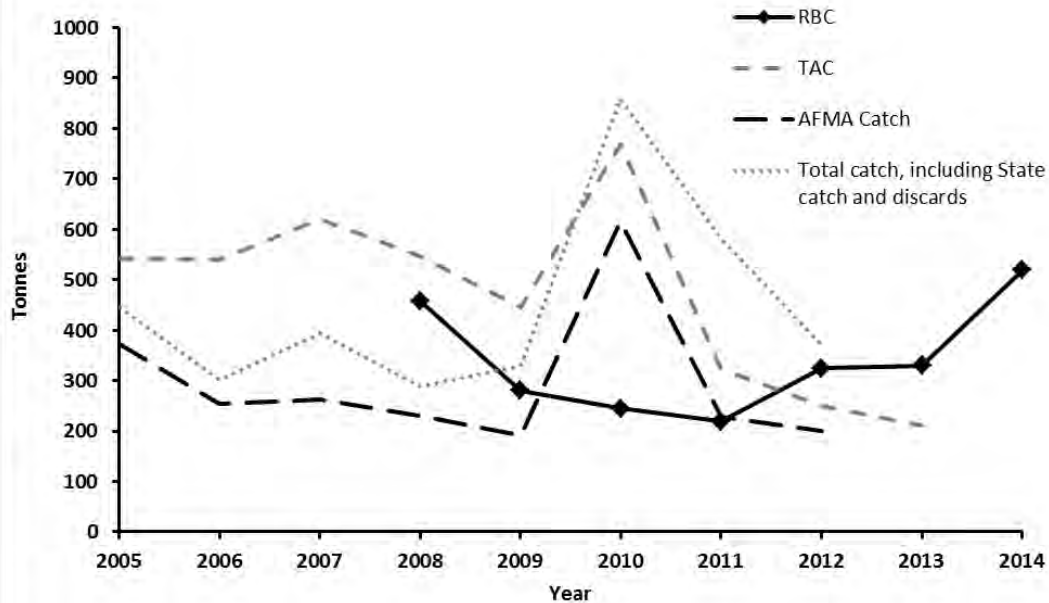
0 tonnes

Included in TAC

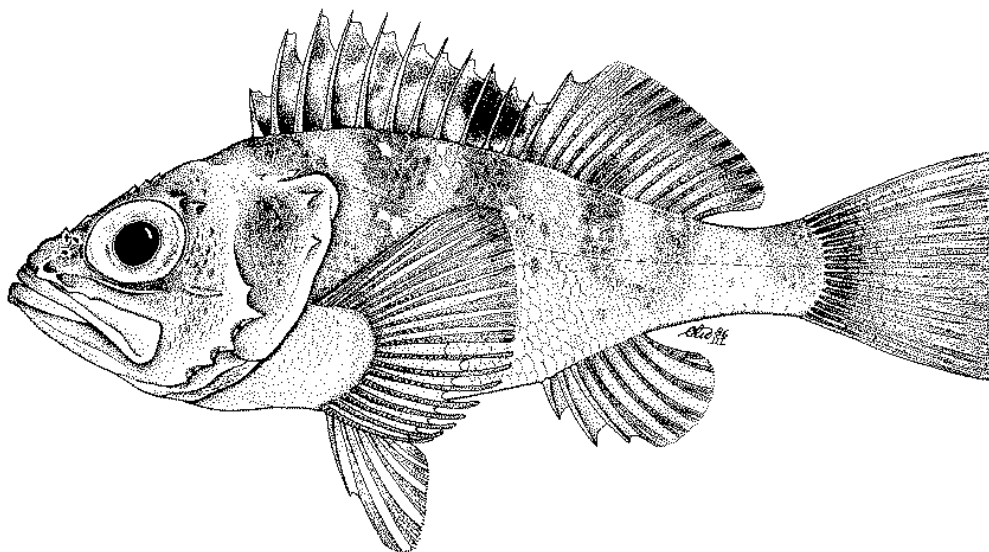
In addition to TAC

Catch trends

* Inshore and Offshore Ocean Perch are assessed separately, but managed under a single TAC and quota SFR. The below figure is Inshore and Offshore combined.



Offshore Ocean Perch (*Helicolenus barathri*)



Common names: Ocean Perch, Bigeye Ocean Perch, Coral Cod.
Assessed by Shelf RAG in 2013

Stock status summary									
Stock structure	A single TAC is set for the two distinct species: the inshore species (<i>H. percooides</i>), and the offshore species (<i>H. barathri</i>), however both are assessed separately.								
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 40% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.9419</td> </tr> <tr> <td>Limit</td> <td>0.4521</td> </tr> <tr> <td>Recent</td> <td>0.9449</td> </tr> </tbody> </table> <p>Stock status: In the 2012 Tier 4 assessment the recent average standardized CPUE proxy for biomass is at the target reference point.</p> <p>Trend: CPUE has been relatively stable since the mid 1990's but catch has been gradually declining back to levels of the Tier 4 reference period.</p>	CPUE		Target	0.9419	Limit	0.4521	Recent	0.9449
CPUE									
Target	0.9419								
Limit	0.4521								
Recent	0.9449								
ABARES most recent assessment	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">Biomass: Uncertain</td> <td style="width: 50%;">Fishing mortality: Uncertain</td> </tr> </table>	Biomass: Uncertain	Fishing mortality: Uncertain						
Biomass: Uncertain	Fishing mortality: Uncertain								
Recommended Biological Catch 2014-15	<p>1-year: 285 tonnes</p> <p>3-year: 283 tonnes (the Tier 4 target catch level)</p>								



Overcatch/undercatch	- 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	219	193	215	196	276	285
Agreed TAC*	400	300	300	230	195	
Actual TAC after overs/unders*	446	334	322	249	210	
% TAC caught*	43%	66%	71%	80%		

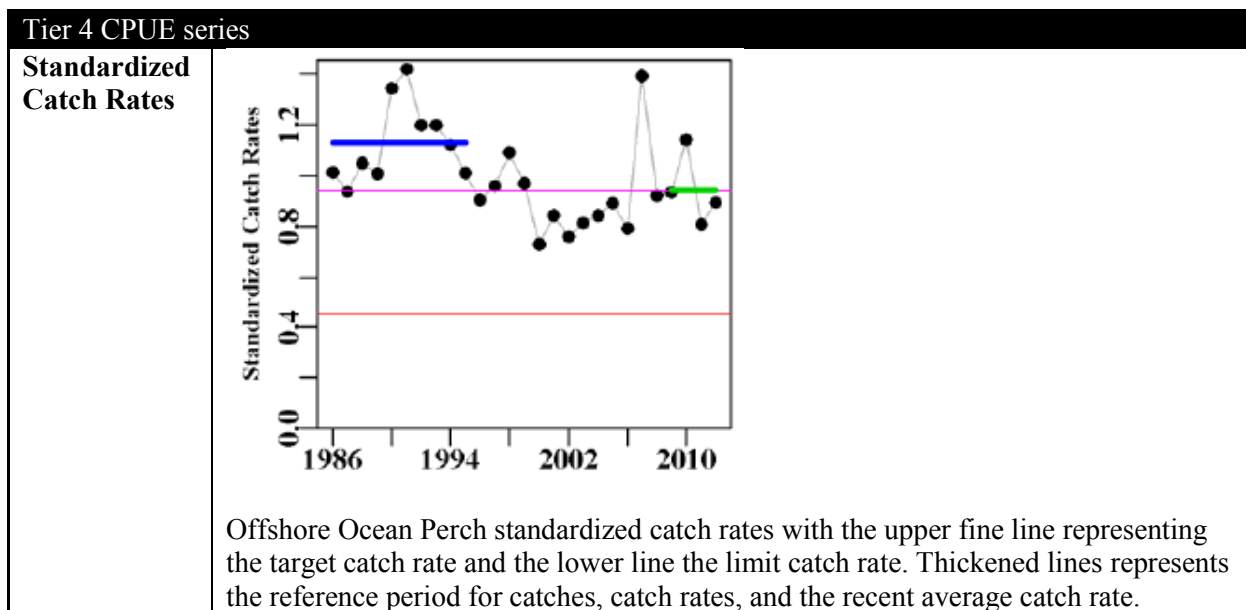
* combined TAC for Inshore and Offshore Ocean Perch.

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	15 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year = 283t (target catch level) <input type="checkbox"/> No



model output) or TAC (e.g. a roll-over of catch))		
Breakout rules for multi-year TAC	The RAG did not consider breakout rules.	
Have breakout rules been triggered?	N/A	

Assessment	
Stock indicator trends	N/A
RAG comments	<ul style="list-style-type: none"> - The RAG determined a three year RBC at the Tier 4 target catch level of 283 tonnes suitable. - The RAG agreed Ocean Perch (inshore and offshore) are an obvious candidate for separate TACs; however it was noted that it would not be easy to administer as the species are separated by depth rather than by geographical distribution.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - The target reference point is 40% of unfished biomass.
Changes to model structure/assumptions	<ul style="list-style-type: none"> - The assessment includes discards.
Significant changes to data inputs	N/A
Comments on data	N/A
Implications for companion species/TEPs/multi-species fisheries	N/A



Research

Research allowance

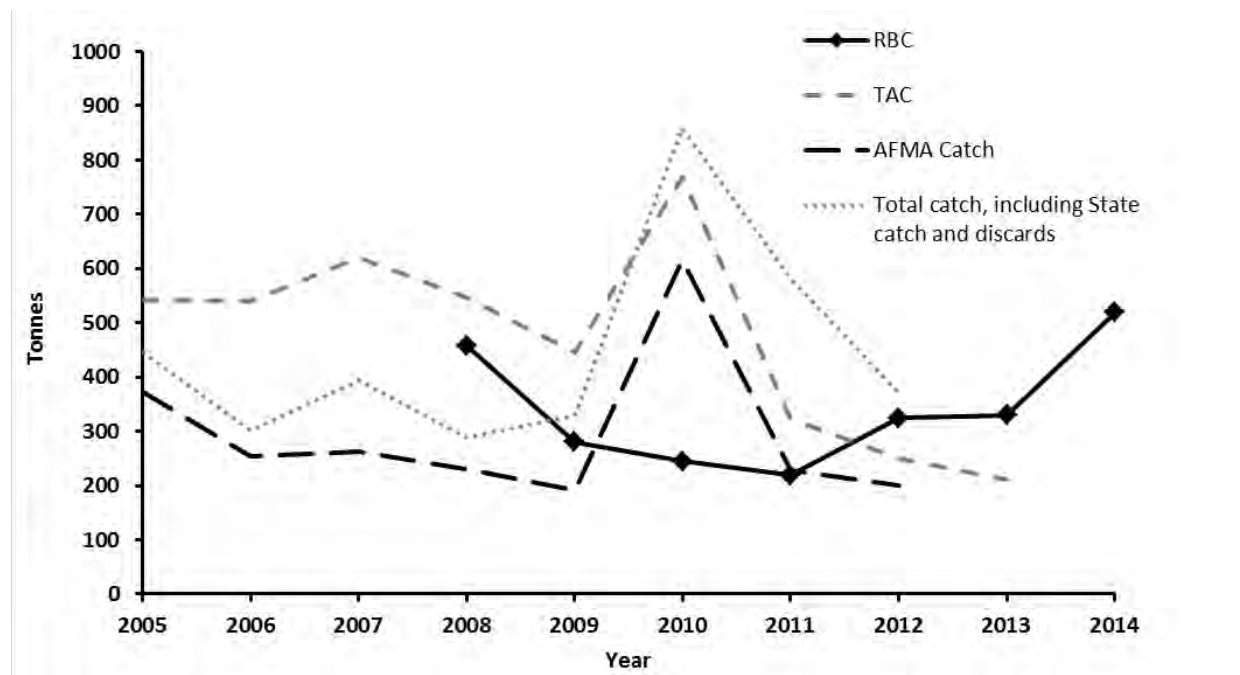
0 tonnes

Included in TAC

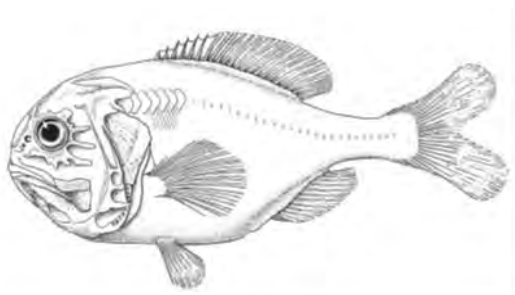
In addition to TAC

Catch trends

* Inshore and Offshore Ocean Perch are assessed separately, but managed under a single TAC and quota SFR.



Orange Roughy (*Hoplostethus atlanticus*) - Southern zone



ABARES (2012): Line Drawing – Rosalind Poole

Assessed by SlopeRAG in 2013

Stock status summary		
Stock structure	Based on the existing data and fishery dynamics multiple regional stocks of Orange Roughy are assumed and the fishery is managed and assessed as a number of discrete regional stocks. Recent genetic studies indicate little genetic diversity between all SE Australian stocks, however they may be demographically separate.	
Stock status against reference points and trend	<p>Limit reference point is 20% of unfished biomass. Target reference point is 48% of unfished biomass.</p> <p>Stock status: unresolved but likely to be less than the limit reference point. The most recent accepted assessment (2000) concluded that the stock was less than the limit reference point. Orange Roughy southern is managed under a conservation program.</p> <p>Biomass trend: The 2004 and 2006 updates of abundance indices and observations of possible spawning aggregations (from acoustic surveys) indicated that rebuilding may be occurring. Catches are extremely low therefore overfishing is unlikely to be occurring. The current TAC poses no impediment to stock recovery.</p>	
ABARES most recent assessment	Biomass: Overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.1 million	0.2%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 0 tonnes. No targeted fishing. - Incidental catch TAC of 35 tonnes. 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 0% undercatch - 0% overcatch 	
Probability of recommended	N/A	



biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Alternative Catch Scenarios: not assessed
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TAC and catch						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Stock Status	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	0	0	0	0	0	0
Agreed TAC	35	35	35	35	35	
Actual TAC after overs/unders	37	38	35	35	35	
% TAC caught	46	42	48	52		

Tier Level & Discounts	
Tier Level	Tier 2 in 2000, not assessed since.
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A



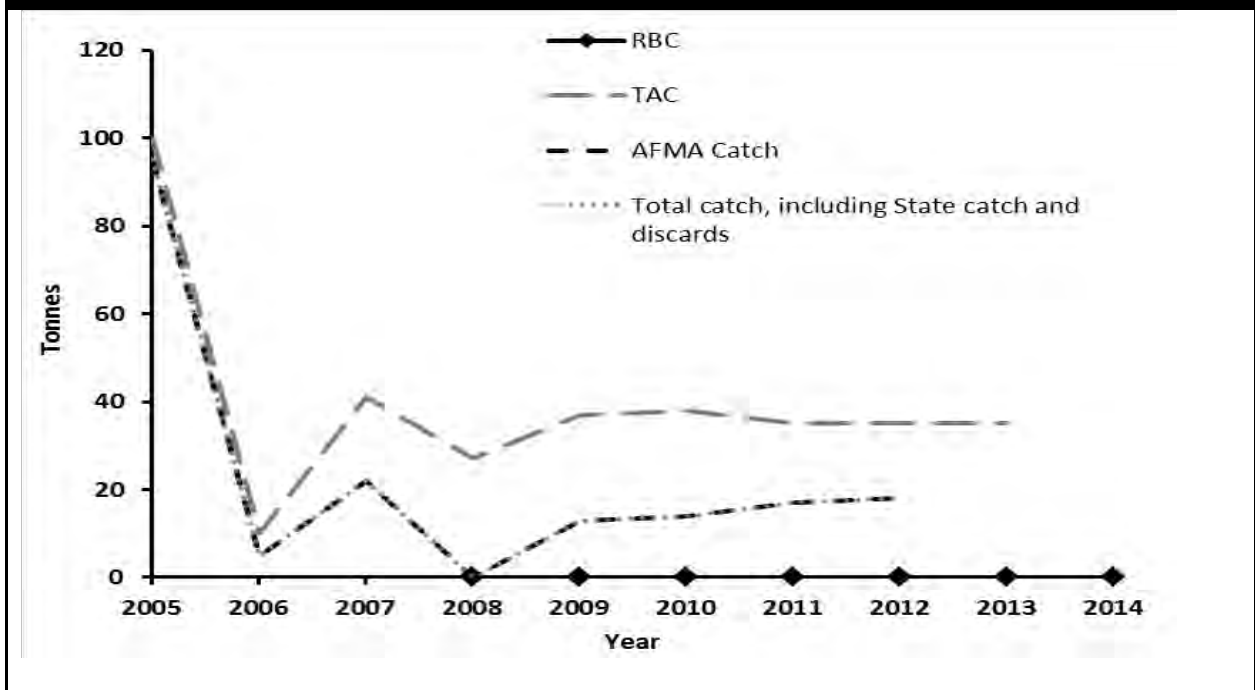
Assessment	
Stock indicator trends	- Due to incidental catch TAC with no targeted fishing, CPUE is not a reliable index of abundance.
RAG comments	- The RAG has previously agreed that, despite the absence of an agreed assessment model, the data show there is little targeting or bycatch of Orange Roughy. As such the incidental catch TAC is applicable and does not impede recovery of the stock
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	- N/A

Tier 1 stock projection	
Projected biomass (include confidence intervals)	No biomass projection as there is no assessment.

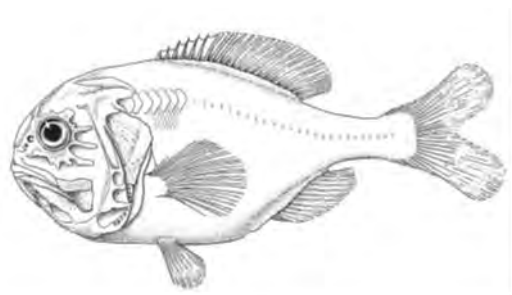
Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Catch trends



Orange Roughy (*Hoplostethus atlanticus*) - Western zone



ABARES (2012): Line Drawing – Rosalind Poole

Assessed by SlopeRAG in 2013

Stock status summary		
Stock structure	Based on the existing data and fishery dynamics multiple regional stocks of Orange Roughy are assumed and the fishery is managed and assessed as a number of discrete regional stocks. Recent genetic studies indicate little genetic diversity between all SE Australian stocks, however they may be demographically separate.	
Stock status against reference points and trend	<p>Limit reference point is 20% of unfished biomass. Target reference point is 48% of unfished biomass.</p> <p>Stock status: The most recent assessment of western stock was in 2002 and estimated a biomass <30% of 1985 biomass and likely to be less than the limit reference point. Orange Roughy southern is managed under a conservation program.</p> <p>Biomass trend: The biology of Orange Roughy means that rebuilding of this stock could take many years.</p>	
ABARES most recent assessment	Biomass: Overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.2 million	0.3%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 0 tonnes. No targeted fishing. - Incidental bycatch TAC of 60 tonnes. 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 0% undercatch - 0% overcatch 	
Probability of recommended	N/A	



biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Alternative Catch Scenarios = not assessed
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TAC and catch						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Stock Status	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	0	0	0	0	0	0
Agreed TAC	60	60	60	60	60	
Actual TAC after overs/unders	65	66	60	60	60	
% TAC caught	39	42	56	44		

Tier Level & Discounts	
Tier Level	Tier 2 in 2002. Not assessed since.
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A



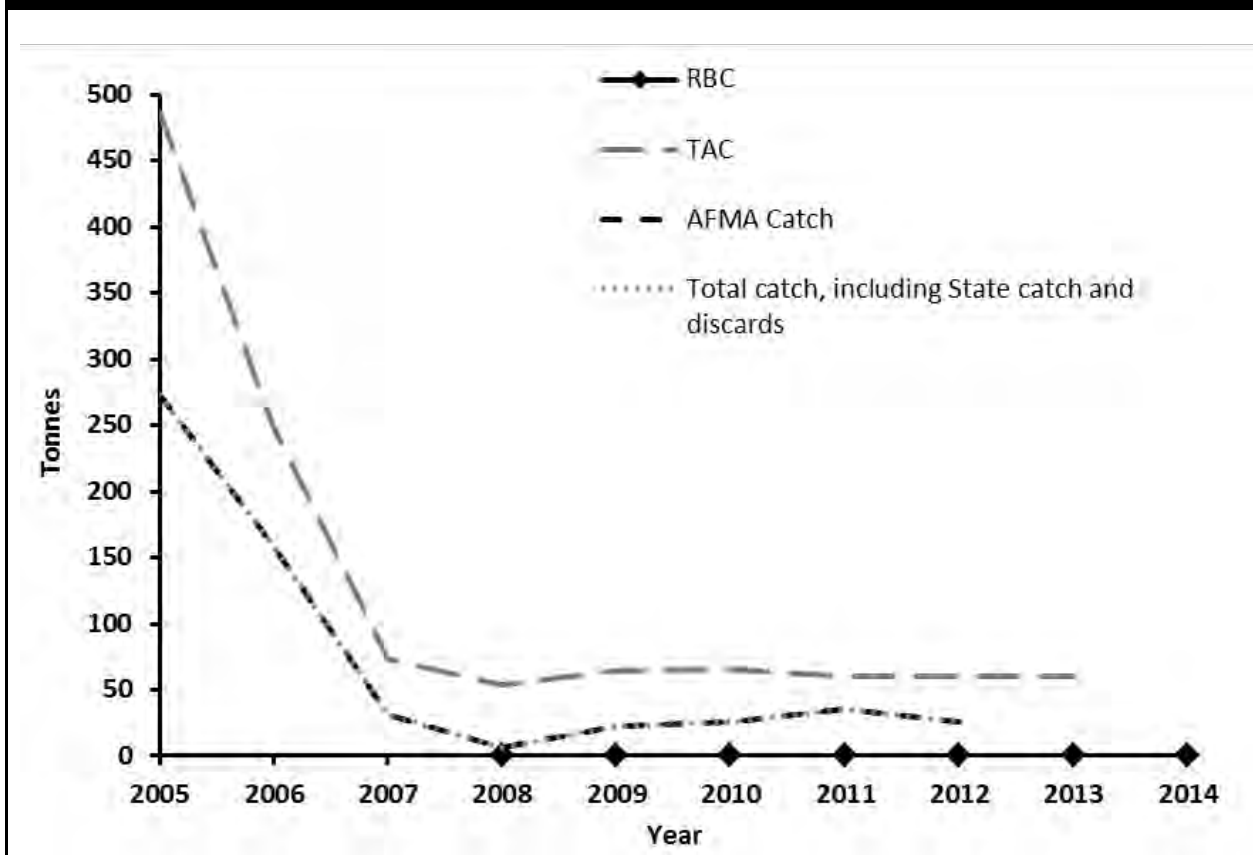
Assessment	
Stock indicator trends	- Due to incidental catch TAC with no targeted fishing, CPUE is not a reliable index of abundance.
RAG comments	- The RAG has previously agreed that, despite the absence of an agreed assessment model, the data show there is little targeting or bycatch of Orange Roughy. As such the incidental catch TAC is applicable and does not impede recovery of the stock
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	- N/A

Tier 1 stock projection	
Projected biomass (include confidence intervals)	No biomass projections as there is no assessment.

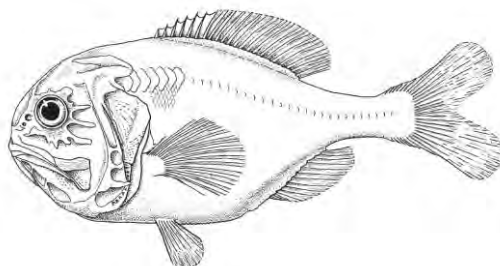
Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Catch trends



Orange Roughy (*Hoplostethus atlanticus*) - Eastern zone



ABARES (2012): Line Drawing – Rosalind Poole

Discussed by SlopeRAG in 2013

Stock status summary		
Stock structure	Based on the existing data and fishery dynamics, multiple regional stocks of Orange Roughy are assumed and the fishery is managed and assessed as a number of discrete regional stocks. Recent genetic studies indicate little genetic diversity between all SE Australian stocks. However, they may be demographically separate.	
Stock status against reference points and trend	<p>Limit reference point is 20% of unfished biomass. Target reference point is 48% of unfished biomass.</p> <p>Stock status: The most recent assessment (2006) suggests that the stock is below the limit reference point. Please see “RAG comments” for further details regarding later assessments.</p> <p>Orange Roughy eastern is managed under a conservation program.</p> <p>Biomass trend. Catches are extremely low therefore overfishing is unlikely to be occurring. The current TAC poses no impediment to stock recovery. Preliminary results from acoustic surveys indicate increasing population.</p>	
ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.9 million	1.5%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 0 tonnes. No targeted fishing. - Incidental bycatch TAC of 25 tonnes. 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 0% undercatch - 0% overcatch 	
Probability of recommended	N/A	



biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Alternative Catch Scenarios = not assessed. A Tier 1 assessment is recommended for 2014.
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TAC and catch						
Assessment Year	2009	2010	2011	2012	2013	2014
Tier /rollover /MYTAC	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Stock Status	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	0	0	0	0	0	0
Agreed TAC	25	25	25	25	25	
Actual TAC after overs/unders	27	27	25	25	25	
% TAC caught	31	2	100	12		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No, SlopeRAG recommended a Tier 1 assessment in 2014.
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A



Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Due to incidental catch TAC with no targeted fishing, CPUE is not a reliable index of abundance. - Acoustic survey results undertaken in 1999, 2006, 2010, 2012 and 2013 at St. Helen's Hill and St. Patrick's Head indicate an increasing population
RAG comments	<ul style="list-style-type: none"> - Because it takes about 28 years for Orange Roughy to reach maturity the impact of intensive fishing (which has occurred in the last 27 years) on recruitment levels has yet to be observed and levels of recruitment seen will continue to reflect an unfished biomass. - Research (Kloser and Ryan 2012) suggests an increase in Orange Roughy fecundity which may mean the impact of fishing on recruitment may be less. - SlopeRAG recommended that a workshop on Orange Roughy assessment and a Tier 1 assessment be undertaken in 2014. - The RAG did not support continuing the acoustic survey until the current work had been finalised and consideration had been given to using the data. - The main uncertainty with the 2011 assessment model for the eastern stock, as far as it had been progressed, was the difference between the base-case model's estimates of female spawning biomass in 2011 (less than 8,000 t, meaning a total spawning biomass of < 15,000 t) and the acoustic survey estimate of the spawning biomass (taking into account the estimated proportion spawning) of over 48,000 t.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - No accepted base case. To be developed at a workshop proposed to be held in May 2014
Changes to model structure/assumptions	<ul style="list-style-type: none"> - See above
Significant changes to data inputs	<ul style="list-style-type: none"> - See above
Comments on data	<ul style="list-style-type: none"> - See above
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - N/A



Tier 1 stock projection

Projected biomass (include confidence intervals)

No biomass projections as there is no accepted base case. However preliminary results from AOS indicate the stock is rebuilding at 700 – 1400 t per year.

Research

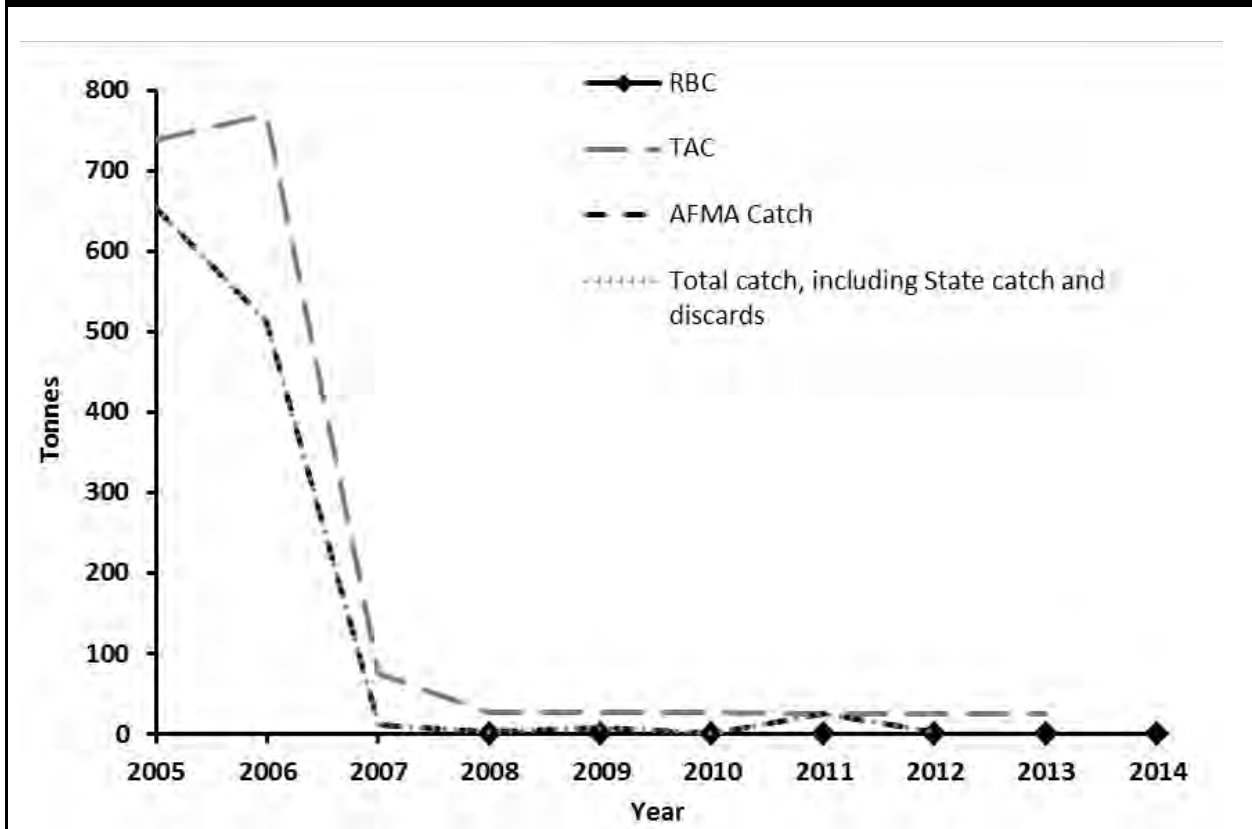
Research allowance

0 tonnes

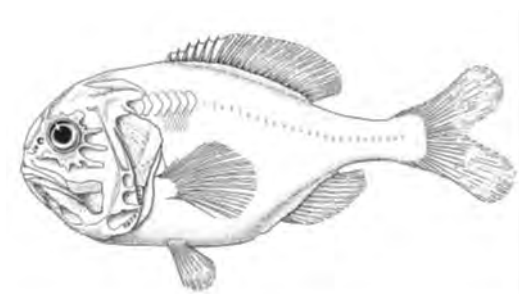
Included in TAC

In addition to TAC

Catch trends



Orange Roughy (*Hoplostethus atlanticus*) - Cascade Plateau



ABARES (2012): Line Drawing – Rosalind Poole

Discussed by SlopeRAG in 2013

Stock status summary		
Stock structure	The stock structure of Orange Roughy in the Australian Fishing Zone remains unresolved. Based on the existing data fishery dynamics multiple regional stocks of Orange Roughy are assumed. The Cascade Plateau, however, holds Orange Roughy with distinct morphometrics, parasite populations, size and age composition, and which also have a distinct spawning time from other adjacent stocks. For assessment and management purposes they are regarded as a separate stock.	
Stock status against reference points and trend	Limit reference point = 20% of unfished biomass Target reference point = 60% of unfished biomass Stock status: The last stock update of the stock assessment (2009) estimated the stock to be at 64% of unfished biomass which is above the target reference point. Biomass trend: Catches have remained below the RBC for the past 5 years so the stock is expected to be rebuilding.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	<\$0.1 million	<0.2%
Recommended Biological Catch 2014-15	- Due to low fishing effort and therefore little data, there was no update to previously calculated RBCs.	
Overcatch/undercatch	- 10% undercatch - 10% overcatch	



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	RBC recommendation: There is a low risk to the stock as, even if the TAC is taken next year, it would still equate to a low average catch over the recent past.
	Alternative Catch Scenarios = see above.

Stock status, RBC, TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Not assessed (Tier 2 – 2006)	Tier 2 updated to include only 2003/2004 biomass data	Not assessed	Not assessed	Not assessed	Not assessed
Stock Status	Not assessed	64%	Not assessed	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	N/A	315	N/A	N/A	N/A	N/A
Agreed TAC	500	500	500	500	500	
Actual TAC after overs/unders	544	528	545	543	550	
% TAC caught	86	29	1	1		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No



multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))		
Breakout rules for multi-year TAC	-	N/A
Have breakout rules been triggered?	-	N/A

Assessment	
Stock indicator trends	- Not available. Low levels of fishing has resulted in insufficient data being available to update the assessment
RAG comments	<ul style="list-style-type: none"> - The first quantitative stock assessment of the Cascade Plateau Orange Roughy population was produced in 2004 (Wayte, 2004). The 2004 assessment used catch records, biological data collected over the previous 6 years, and the 2003 acoustic biomass estimate. - The 2004 stock assessment estimated the Orange Roughy biomass at Cascade Plateau to be between 7,000 and 18,700 t and the long term sustainable catch to be 300-400 t. - In 2006, the assessment was again updated, using the acoustic biomass estimate from the 2005 winter spawning aggregation which was about three times larger than previous estimates. The 2006 assessment estimated the stock to be about 20,000 t and the current biomass as 72-73% of the unfished biomass (B₀) approximately 20% higher than the target reference point and 12% higher than the target under the Conservation Program. - In 2008 a DeepRAG member expressed concerns that the 2005 biomass estimate was biologically unfeasible. In 2009 the 2005 acoustic data were reanalyzed and as a result biomass estimates were downgraded. Using these data the assessment suggested that maintaining the TAC at 500t in 2010 would result in a depletion of 34% at the start of 2011. - There was low levels of fishing on the Cascade Plateau (<1% of TAC caught) during 2011 and 2012. - An update to the assessment was due for 2012 but this was deferred due to the lack of new data and a higher priority being assigned to other species. - The RAG has noted that recent low levels of fishing catch and effort reduces the information available for updating the assessment and may make it difficult for it to provide



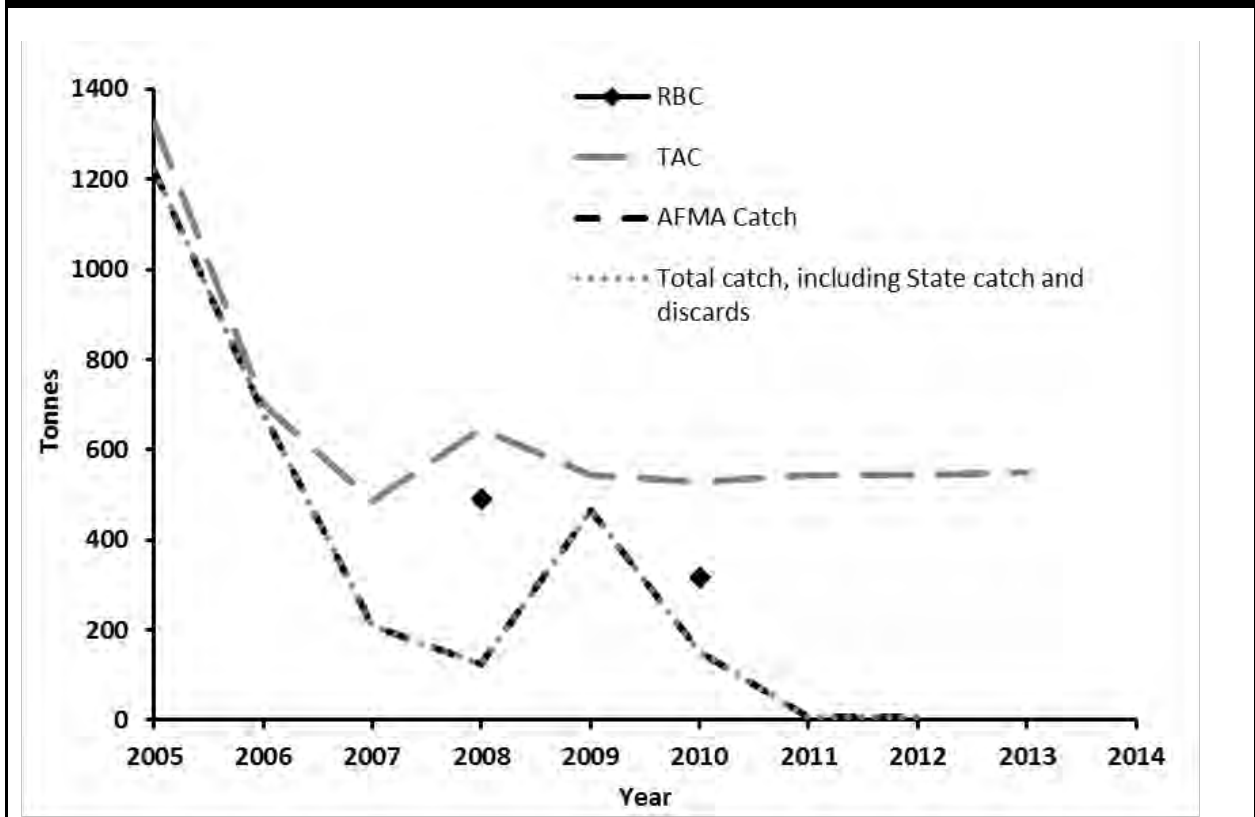
	<p>useful guidance in the future. Until new data are obtained, and in particular a new survey is conducted, the RAG would not be in a position to update the assessment.</p> <ul style="list-style-type: none"> - Negligible levels of fishing over recent years constitute a low risk to stocks even if the TAC were to be taken over the next few years.
Key model technical assumptions/parameters	-
Changes to model structure/assumptions	-
Significant changes to data inputs	- Low levels of fishing has resulted in insufficient data being available to update the assessment
Comments on data	- Low levels of fishing has resulted in insufficient data being available to update the assessment
Implications for companion species/TEPs/multi-species fisheries	- Nil.

Tier 1 stock projection	
Projected biomass (include confidence intervals)	N/A

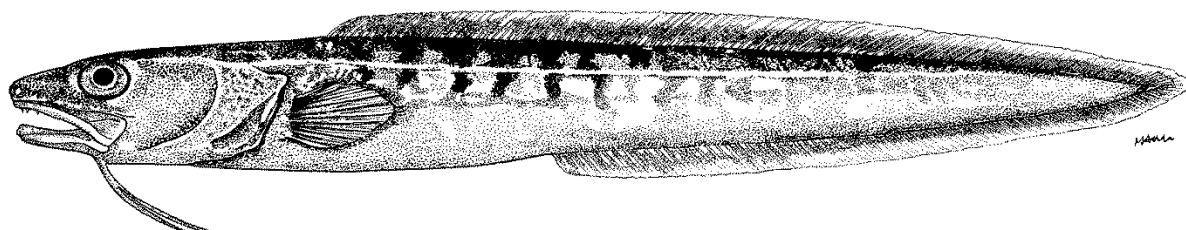
Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Catch trends



Pink Ling (*Genypterus blacodes*)



Common names: Pink Cusk-Eel, Ling, Australian rockling, New Zealand ling, kingclip, northern ling

Assessed by SlopeRAG in 2013

Stock status summary		
Stock structure	<p>In light of increasing evidence that there are two stocks of Pink Ling, they are assessed as separate stocks (east and west of Longitude 147° East).</p> <p>Genetic variation between eastern and western Pink Ling has not been found, however, there are differences in size and age structure, growth and catch rates between the eastern and western zones. These differences suggest there is little mixing of Pink Ling between the zones, and that fishing in one area will have limited impact on fish in the other area.</p>	
Stock status against reference points and trend	<p>Limit reference is 20% of unfished biomass. Target reference is 48% of unfished biomass.</p> <p>2013 (east): 25% of unfished biomass. 2013 (west): 58% of unfished biomass.</p> <p>East – biomass trend recently increasing. West – biomass steady above management target.</p>	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Uncertain
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$6.6 million	10.8%
Recommended Biological Catch 2014-15	<p>East: (1 year): 122 tonnes (0 – 550t 95% Confidence Interval) East: (3 year): 122 tonnes (The alternative catch scenario table below presents risks/probability of alternative catches)</p> <p>West (1 year): 807 tonnes (430 – 1710t 95% Confidence Interval) West (3 year): 661 tonnes (set at long-term RBC target)</p>	
Overcatch/ undercatch	<p>10% undercatch 10% overcatch</p>	



Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. $P < 10\%$).</u>	RBC recommendation: 1-year RBC (east and west) is very unlikely to fall below the limit reference point (MSE tested)						
	Alternative Catch Scenarios – eastern stock at constant catch						
	Annual catch (t)	B_{2015}/B_0	B_{2020}/B_0	$P(B_{2015} > B_{2013})$	$P(B_{2020} > B_{2013})$	$P(B_{2015} < 0.2)$	$P(B_{2020} < 0.2)$
	0	0.33	0.56	1.00	1.00	0.01	0.00
	250	0.30	0.44	0.98	0.99	0.04	0.00
	300	0.30	0.42	0.96	0.99	0.05	0.01
	350	0.29	0.39	0.93	0.97	0.07	0.02
	400	0.28	0.37	0.88	0.93	0.09	0.04
	450	0.28	0.35	0.82	0.90	0.11	0.07
500	0.27	0.32	0.75	0.82	0.14	0.11	

B_{2015} means the biomass estimate in 2015.

B_0 means unfished biomass.

P means probability.

0.2 means 20% of unfished biomass, the limit reference point.

Rebuild year means at least a 50% probability of being at or above the target reference point of 48% of the unfished biomass.

N.B. Uses Markov Chain Monte Carlo stochastic projections to determine performance indicators.

TAC and catch trends							
Assessment Year		2008	2009	2010	2011	2012	2013
Assessment Tier (or rollover/MYT AC)	East	Tier 1	Tier 1	Tier 1	No agreed assessment	Tier 1	Tier 1
	West	Tier 1	Tier 1	Tier 1		Tier 1	Tier 1
Stock Status	East	28%	36%	35%	No agreed assessment	26%	25%
	West	33%	49%	45%		43%	58%
Fishing Year		2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	East	757	656	531	No agreed assessment	223	122 t
	West		813	844		490	807 t
Agreed TAC	East	800	1200	1200	996	834	
	West						
Actual TAC after overs/unders	East	853	1208	1275	1022	844	
	West						
% TAC caught	East	92	87	96	97		
	West						

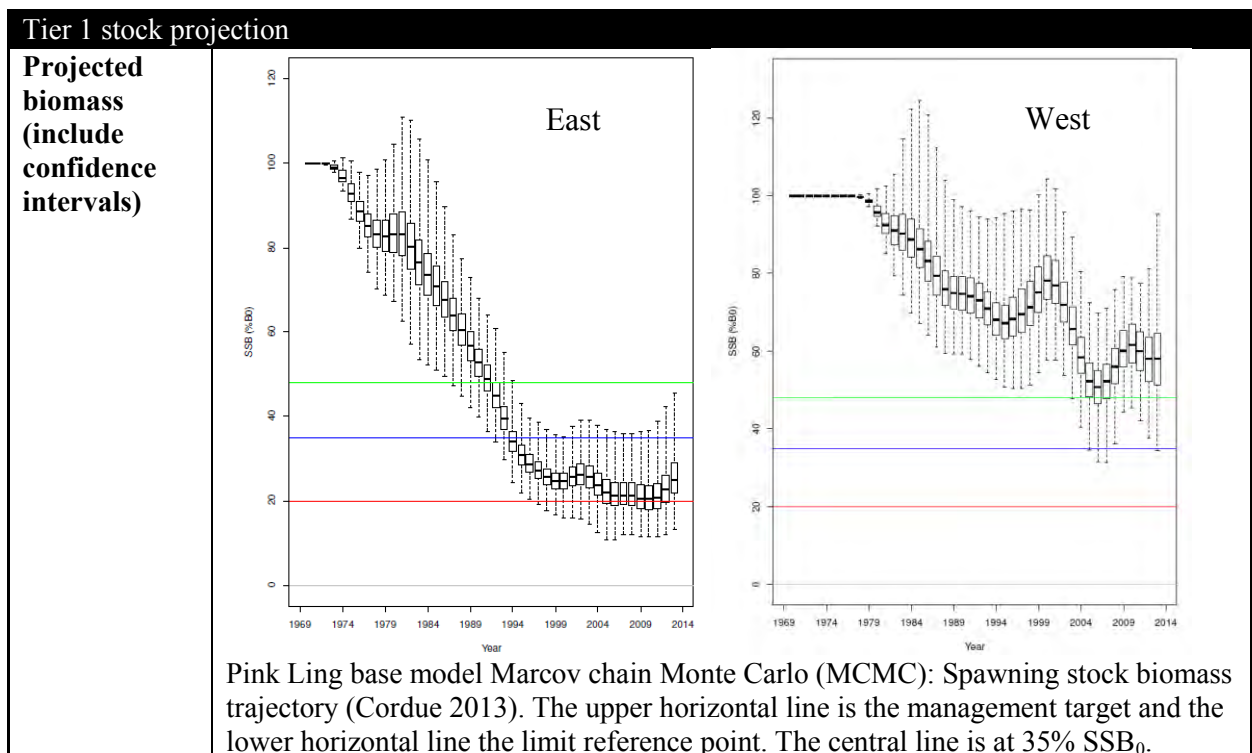


Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	N/A
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (RAG provides options for a 3 year MYTAC (see page 1), and explicitly recommends that a stock assessment not be conducted in 2014) <ul style="list-style-type: none"> • 1 year = 122 tonnes (east) 807 tonnes (west) • 3 year = 122 tonnes (east) 661 tonnes (west) • Alternatively see catch table above <input type="checkbox"/> No
Breakout rules for multi-year TAC	-
Have breakout rules been triggered?	- N/A (not currently on a MYTAC)

Assessment	
Stock indicator trends	- N/A (Tier 1)
RAG comments	<ul style="list-style-type: none"> - RBC recommendations are provided using the Harvest Control Rules provided for in the SESSF Harvest Strategy Framework 2009. - An additional table is provided outlining constant catch scenarios calculated using the agreed base-case model.
Key model technical assumptions/parameters	- Assessed using CASAL based stock assessment model. See Cordue (2013) for technical assumptions and parameters.
Changes to model structure/assumptions	<p>Changes to the last accepted assessment that were implemented included:</p> <ul style="list-style-type: none"> • time-blocked CPUE indices (using 3 linking vessels) were used for eastern trawl, with separate fishing selectivities for each of the three time blocks; • a shift to estimating mid-year mature female biomass as the basis for stock status (rather than the start of year biomass); • omission of non-trawl CPUE data as not reflective of stock abundance; length frequencies were stratified by depth and zone for trawl data and not stratified for non-trawl; unsexed



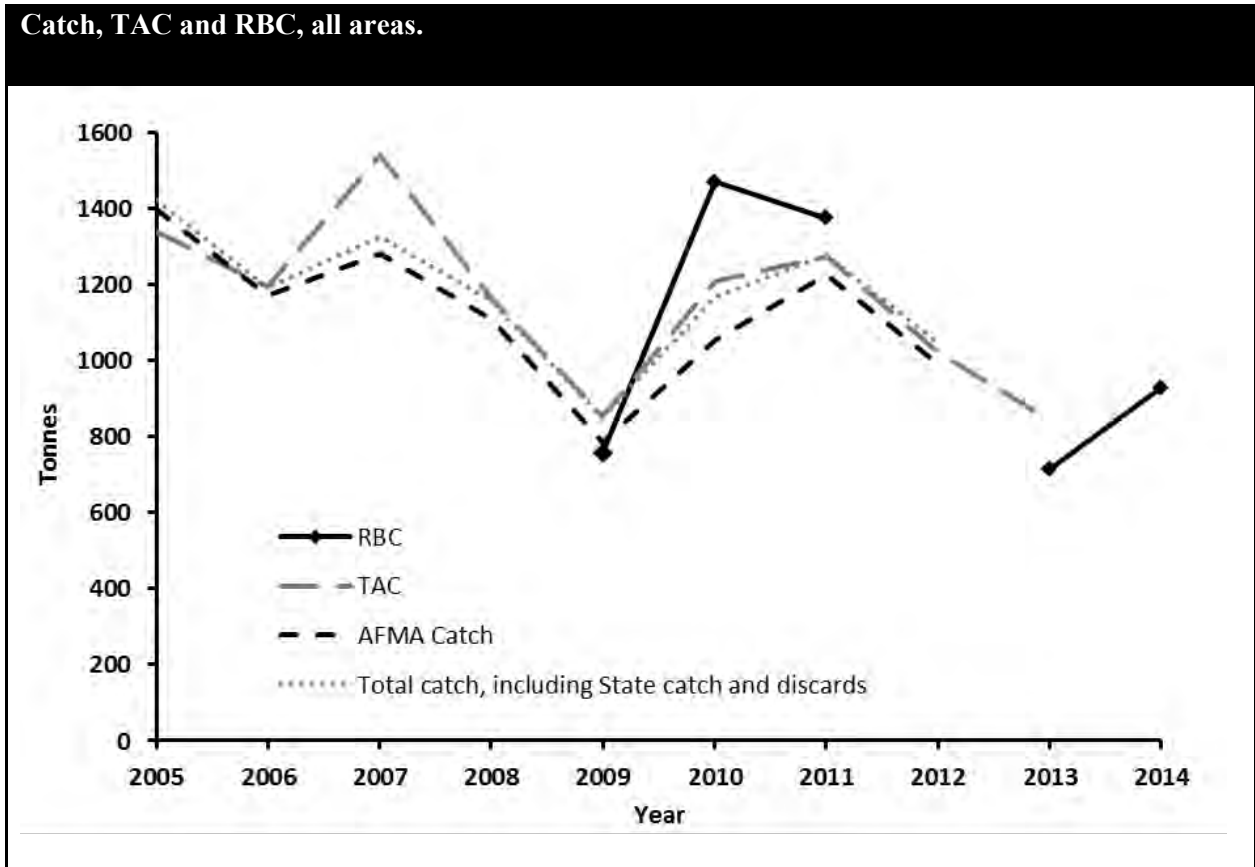
	<p>zone 20 length frequencies were converted to age frequencies;</p> <ul style="list-style-type: none"> sexed age length data were stratified by zone (trawl zones 10 & 20) and not stratified for non-trawl (20 & 30); and MCMC projections were used as the basis of RBC advice. <p>Data remained aggregated into single areas in each zone.</p> <p>First year of accepted model (CASAL). Stock synthesis model used in previous years was updated and presented for comparison.</p>
Significant changes to data inputs	<ul style="list-style-type: none"> A new index of abundance was used for the first time in 2013: The new time-series included time-blocking of vessel effects and 'linked vessel effects' to address potential changes in ling catchability over time (see Cordue, 2013 for details). Length-frequency data were initially weighted by numbers of landings/operations, unlike previous assessments, where data were initially weighted by numbers of fished measured.
Comments on data	<ul style="list-style-type: none"> The above data changes (plus others not mentioned here) should be reviewed for future assessments.
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> Multi-species fishery issue – Pink Ling is caught in close association with the following species: Line:Blue-eye Trevalla; Trawl:Blue Grenadier



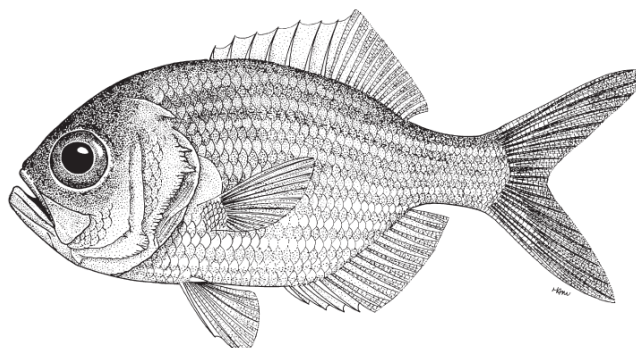
Research



Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Redfish (*Centroberyx affinis*)



ABARES (2012)

Common names: Nannygai, Red Snapper, King Snapper, Golden Snapper.

Assessed by Shelf RAG in 2013

Stock status summary									
Stock structure	<p>No formal stock discrimination studies have been done in Australia. Tagging studies suggested a single unit stock of Redfish off NSW. However, recent studies of mean length at age suggest differences in growth rates between the 'northern' and 'southern' sectors of the fishery off eastern Australia.</p> <p>Recent assessments of the Redfish stock have therefore also considered that the fishery exploits two separate populations, with the boundary between these 'stocks' being 36°S (just north of Montague Island).</p>								
Stock status against reference points and trend	<p>Redfish is assessed as a Tier 3 species. However, since 2011 the RAG has also taken into account Tier 4 results due to concerns about declining CPUE.</p> <p>Tier 3 species use estimates of fishing mortality (F) that will reduce spawning biomass to a given level as reference points.</p> <p>The Tier 3 target reference point for Redfish is the level of F that will produce a spawning biomass of 40% of unfished levels.</p> <p>The Tier 3 limit reference point for Redfish is the level of F that will produce a spawning biomass of 20% of unfished levels.</p> <table data-bbox="630 1747 933 1881"> <thead> <tr> <th></th> <th>F</th> </tr> </thead> <tbody> <tr> <td>Target (F_{spr40})</td> <td>- 0.098</td> </tr> <tr> <td>Limit (F_{spr20})</td> <td>- 0.213</td> </tr> <tr> <td>$F_{current}$</td> <td>- 0.045</td> </tr> </tbody> </table> <p>Biomass trend: No information available</p>		F	Target (F_{spr40})	- 0.098	Limit (F_{spr20})	- 0.213	$F_{current}$	- 0.045
	F								
Target (F_{spr40})	- 0.098								
Limit (F_{spr20})	- 0.213								
$F_{current}$	- 0.045								

	<p>Status: Current stock status is uncertain because of conflicting Tier 3 and Tier 4 assessments which, respectively, show no signs of concern and a biomass below the Limit Reference Point and declining.</p> <p>Trend: Catches and estimated fishing mortality levels remain low but the CPUE-based proxy for biomass shows an ongoing decline.</p>	
ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.3 million	0.5%
Recommended Biological Catch 2014-15	0 tonnes	
Overcatch/undercatch	10% undercatch 10% overcatch	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely (<10%)	
	Alternative Catch Scenarios: N/A	

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 3	Tier 3	Tier 3	Tier 3 Tier 4	Tier 3 Tier 4	Tier 3 Tier 4
Stock Status	Fishing mortality between target and limit	Fishing mortality between target and limit	Fishing mortality less than target	Tier 3 - Fishing mortality less than target Tier 4 – CPUE lower than limit	Tier 3 - Fishing mortality less than target Tier 4 – CPUE lower than limit	Tier 3 - Fishing mortality less than target Tier 4 – CPUE lower than limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	788	700	1985	Tier 3 – 1569 Tier 4 - 0	Tier 3 – 2932 Tier 4 - 0	Tier 3 – 3791 Tier 4 - 0



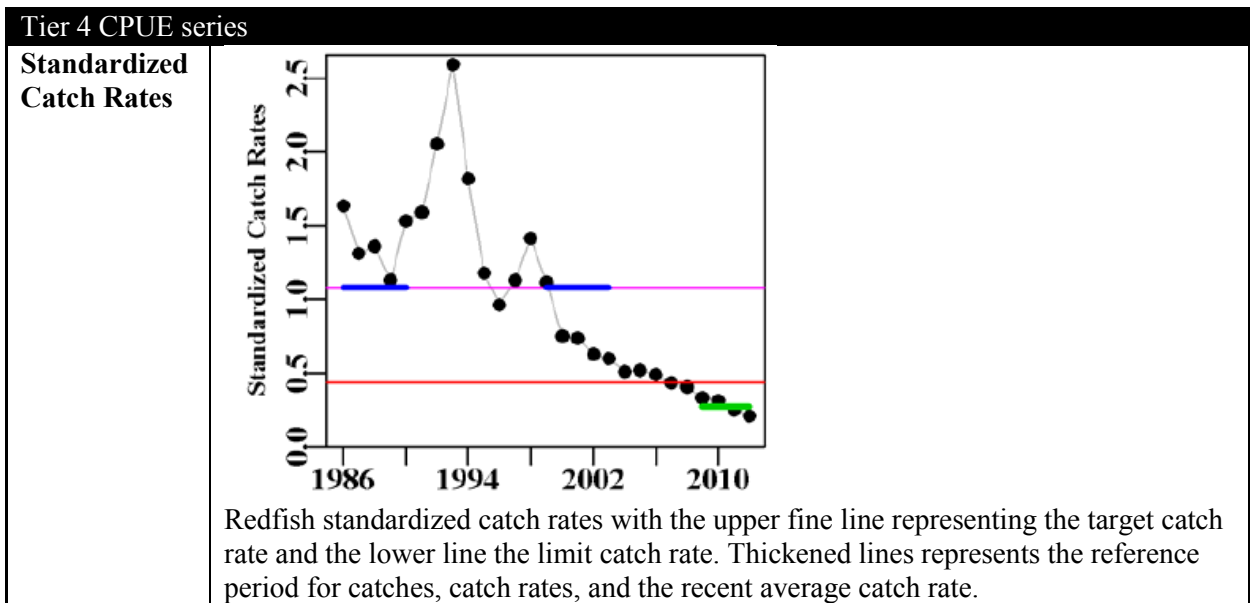
Agreed TAC	678	551	276	276	276	
Actual TAC after overs/unders	756	611	330	299	303	
% TAC caught	23	24	28	22		

Tier Level & Discounts	
Tier Level	Tier 3- while considered a Tier 3 species, the Tier 4 assessment was adopted for 2014-15 on a precautionary basis and a Tier 1 assessment has been recommended for 2014. For details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 % (50% limiting rule will apply)
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	- N/A
Have breakout rules been triggered?	- N/A

Assessment	
Stock indicator trends	- Redfish is assessed as a Tier 3 species. However, there were large differences between the Tier 3 (showing the stock is close to the target) and Tier 4 (0 tonnes RBC) assessments. So, despite good age and length frequency data, the Tier 3 assessment was not accepted and the RAG used the Tier 4 assessment to recommend an RBC as a precautionary measure.
RAG comments	<ul style="list-style-type: none"> - The RAG noted the Tier 4 shows the stock to be below B_{LIM} and results in an RBC of 0t. - The RAG noted that the available data was likely sufficient for a Tier 1 assessment, and it was becoming increasingly urgent that one be attempted. - Pending the outcome of a Tier 1, ShelfRAG recommended a precautionary approach using the Tier 4 RBC of 0 tonnes. However, the RAG noted that the CPUE was likely to be affected by abundance and availability and that their advice was in the context that a Tier 1 assessment be undertaken in 2014 to attempt to reconcile differences in the data.



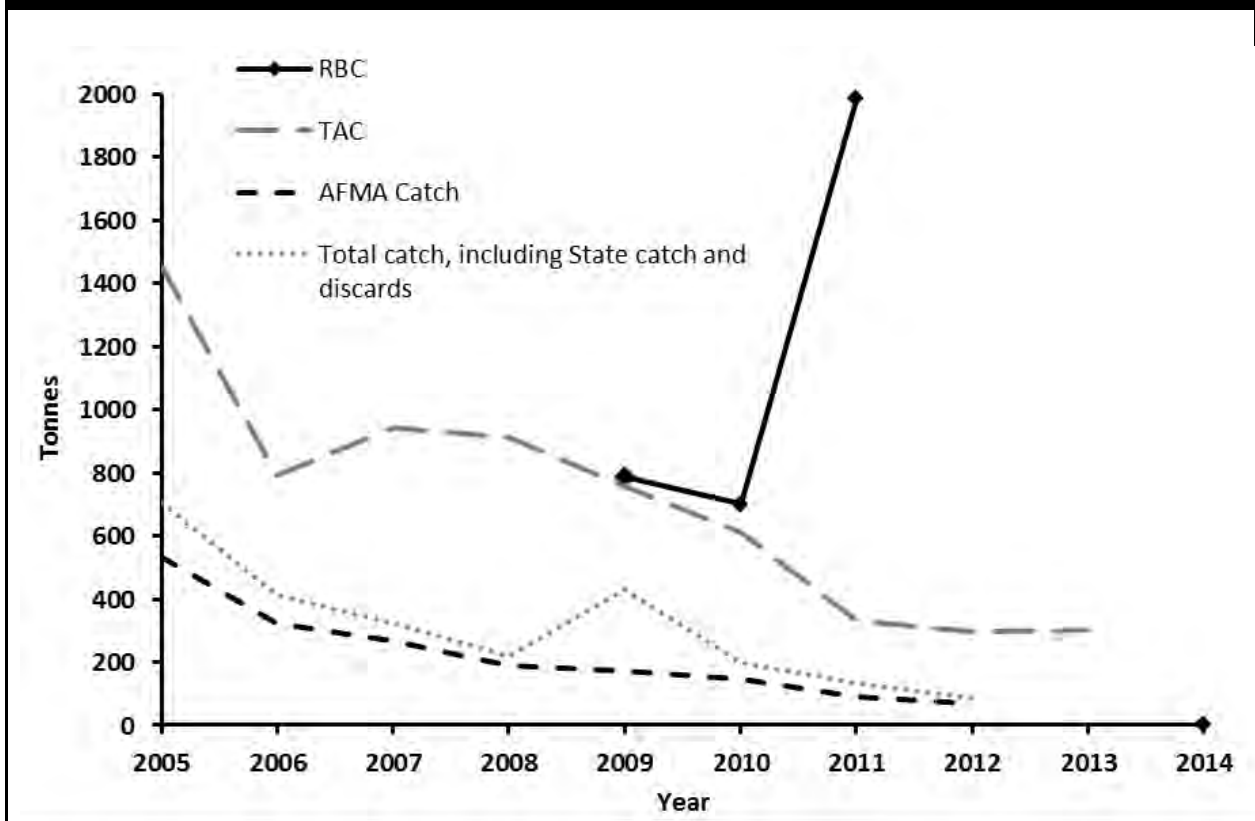
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	
Implications for companion species/TEPs/multi-species fisheries	- N/A



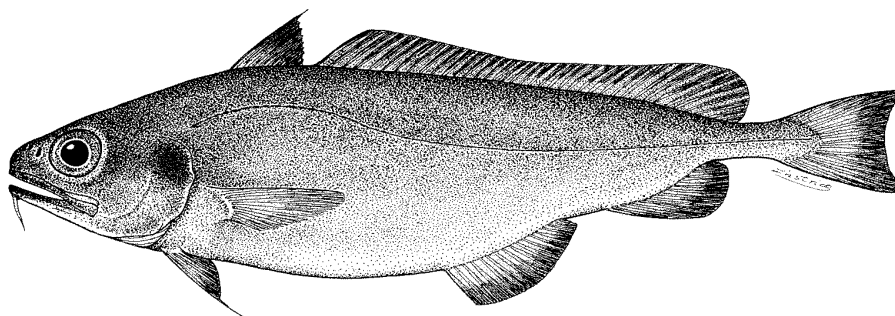
Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Catch trends



Ribaldo (*Mora mora*)



Assessed by SlopeRAG in 2013

Stock status summary										
Stock structure	One stock of Ribaldo is assumed for the SSSF.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point for Ribaldo is the level of CPUE assumed to produce a spawning biomass of 40% of unfished levels.</p> <p>The limit reference point is 40% of the CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <table border="1" data-bbox="609 1115 1174 1256"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.3416</td> </tr> <tr> <td>Limit</td> <td>0.1640</td> </tr> <tr> <td>Recent</td> <td>0.5319</td> </tr> </tbody> </table> <p>CPUE trend: Standardised CPUE has been relatively flat since the early 2000's and remains above the target reference point.</p>			CPUE	Target	0.3416	Limit	0.1640	Recent	0.5319
	CPUE									
Target	0.3416									
Limit	0.1640									
Recent	0.5319									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	\$0.3 million	0.5%								
Recommended Biological Catch 2014-15	1 year: 355 tonnes 3 year: 355 tonnes									
Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 									
Probability of recommended	Very unlikely.									



biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Alternative Catch Scenarios: N/A
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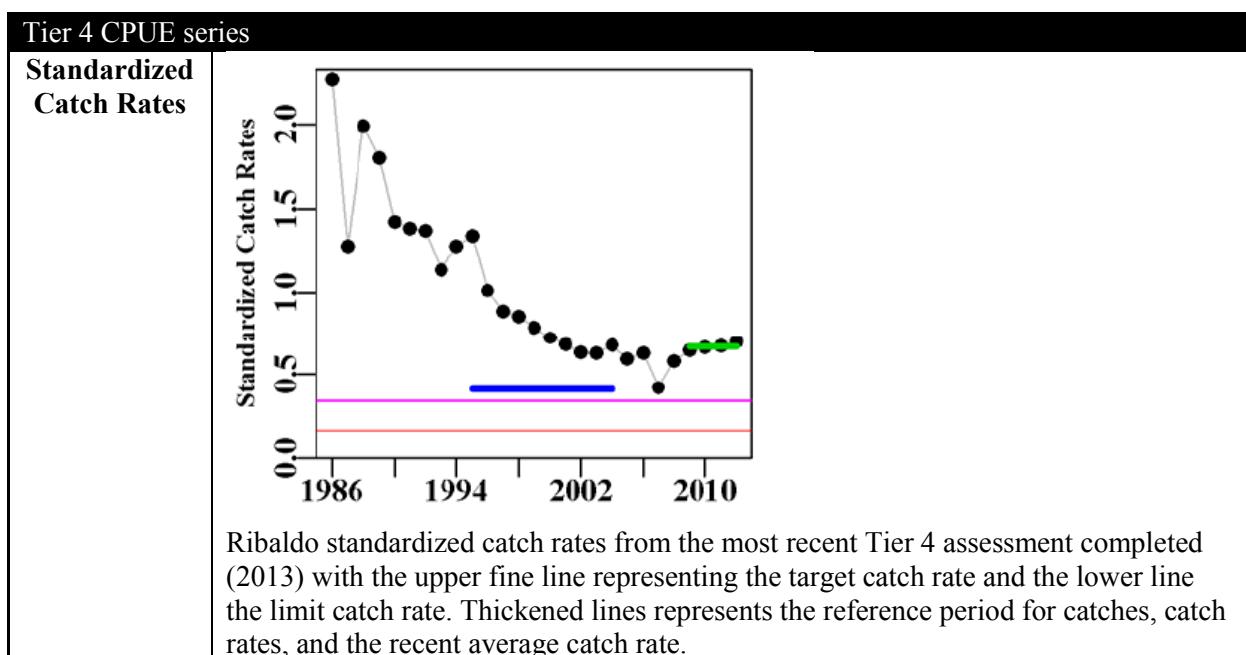
TAC and catch						
Assessment Year	2009	2010	2011	2012	2013	2014
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE higher than target	CPUE higher than target	CPUE higher than target	CPUE higher than target	CPUE higher than target	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	209	160	202	197	232	355
Agreed TAC	165	131	168	167	168	
Actual TAC after overs/unders	178	144	177	180	182	
% TAC caught	65	71	65	63		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0% because deepwater closures are considered to provide a level of precaution that is at least equivalent to the default 15% discount factor for a Tier 4 species.
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year: 355t RBC <input type="checkbox"/> No



Breakout rules for multi-year TAC	<p>The following breakout rules will apply to the Ribaldo MYTAC:</p> <ul style="list-style-type: none"> - if the catch is less than 70% of the TAC; or - if there is a greater than 50% change in the trawl CPUE. <p>The RAG agreed to monitor the proportion of the catch taken by trawl and hook method for significant changes.</p>
Have breakout rules been triggered?	N/A

Assessment	
Stock indicator trends	Trawl and non-trawl CPUE are flat and well above the Tier 4 target catch levels.
RAG comments	N/A
Key model technical assumptions/parameters	
Changes to model structure/assumptions	- Nil
Significant changes to data inputs	- Nil
Comments on data	Trawl data is used in the assessment; however an analysis of auto longline data was undertaken this year because catches by this method over the last four years exceeded the trawl catch. The auto longline catch rate is flat and there is nothing in these data that are contrary to the trawl data.
Implications for companion species/TEPs/multi-species fisheries	- Nil



Research

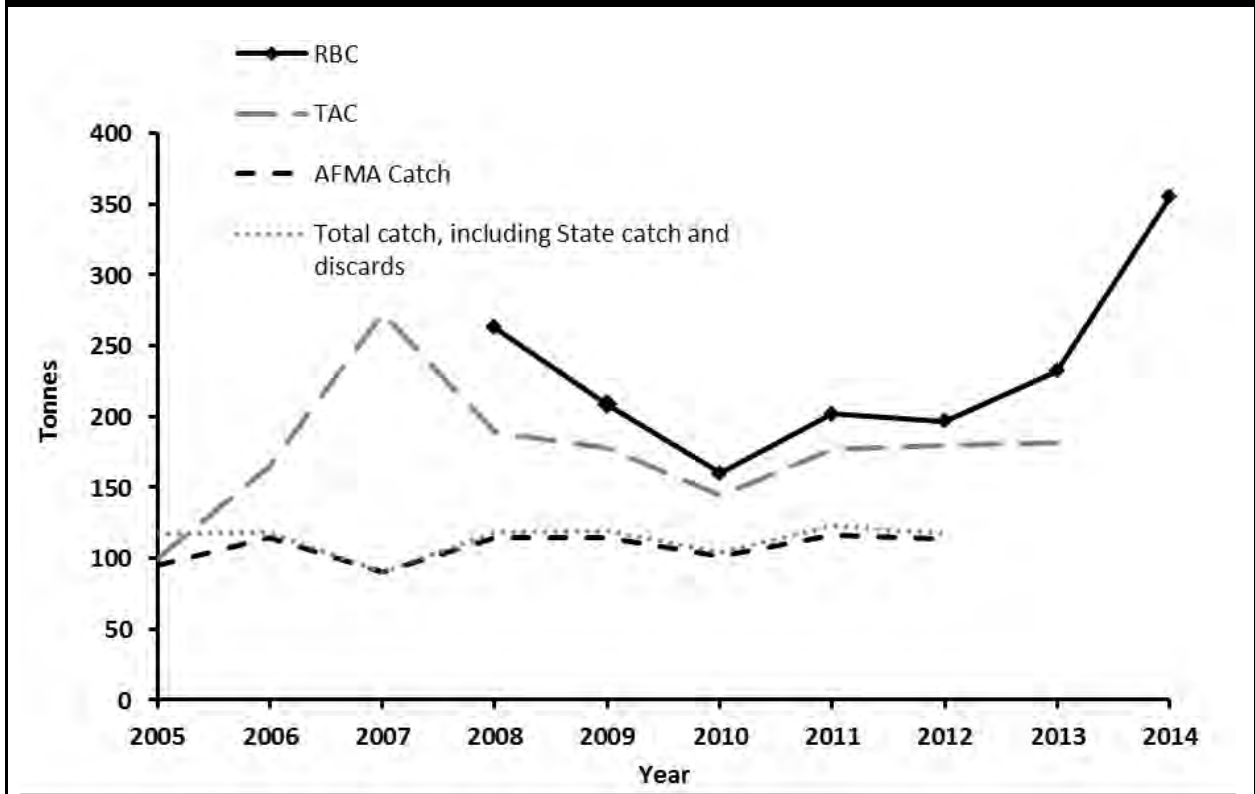
Research allowance

0 tonnes

Included in TAC

In addition to TAC

Catch trends



Royal Red Prawn (*Haliporoides sibogae*)



Assessed by Shelf RAG in 2013

Stock status summary									
Stock structure	Little is known of the stock structure in Australia, but they are assumed to comprise a common stock off eastern Australia which straddles the Barrenjoey Point SESSF management line.								
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>1.0615</td> </tr> <tr> <td>Limit</td> <td>0.4246</td> </tr> <tr> <td>Recent</td> <td>1.0443</td> </tr> </tbody> </table> <p>Stock status: The recent average standardised CPUE-based proxy for biomass is close to the target reference point.</p> <p>Trend: CPUE has fluctuated around target levels. Catches have been below the RBC in recent years, due to reported market constraints.</p>	CPUE		Target	1.0615	Limit	0.4246	Recent	1.0443
CPUE									
Target	1.0615								
Limit	0.4246								
Recent	1.0443								
ABARES most recent assessment	<table border="1" style="width: 100%;"> <tr> <td style="background-color: #92d050;">Biomass: Not overfished</td> <td style="background-color: #92d050;">Fishing mortality: Not subject to overfishing</td> </tr> </table>	Biomass: Not overfished	Fishing mortality: Not subject to overfishing						
Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	<table border="1" style="width: 100%;"> <thead> <tr> <th style="background-color: #92d050;">GVP</th> <th style="background-color: #92d050;">% fishery GVP</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">\$0.4 million</td> <td style="text-align: center;">0.7%</td> </tr> </tbody> </table>	GVP	% fishery GVP	\$0.4 million	0.7%				
GVP	% fishery GVP								
\$0.4 million	0.7%								
Recommended Biological Catch 2014-15	393 tonnes for season 2014-15, 2015-16, 2016-17.								
Overcatch/undercatch	10% undercatch 10% overcatch								
Probability of recommended	Very unlikely (P<10%)								



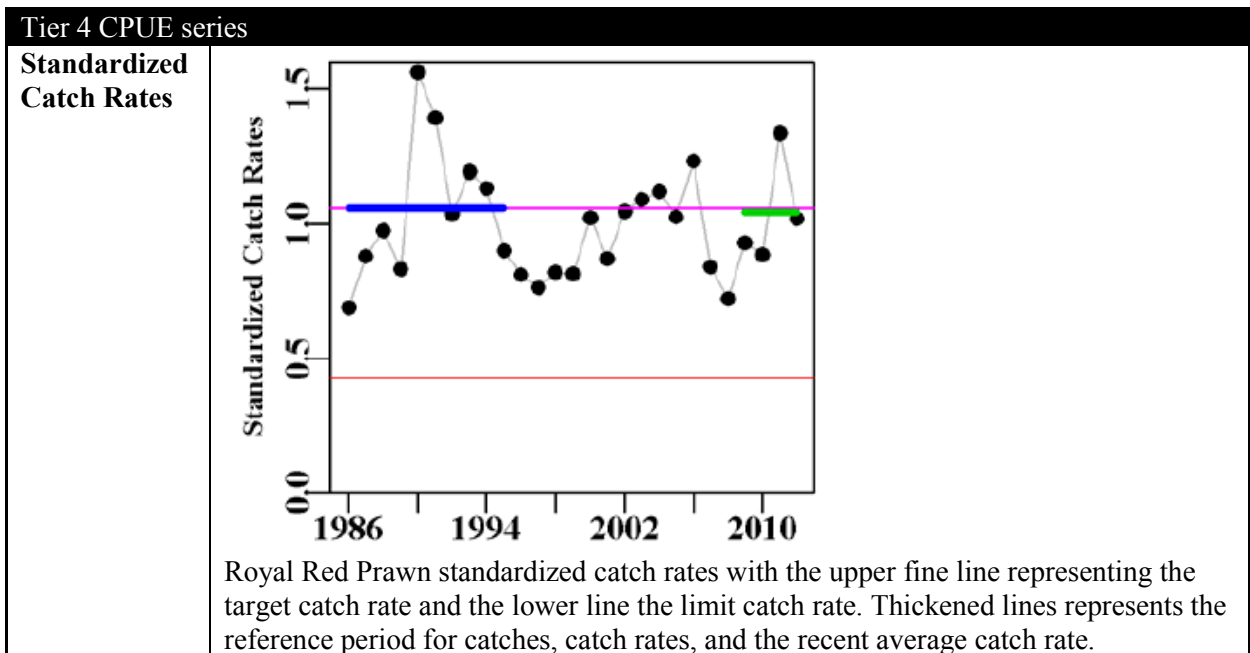
<p>biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u></p>	<p>Alternative Catch Scenarios = N/A</p>
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Stock status, RBC,TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE higher than target	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	466	336	351	276	352	393
Agreed TAC	400	400	303	303	303	
Actual TAC after overs/unders	431	432	339	330	313	
% TAC caught	20	26	39	56%		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 % (The RAG decided a discount factor does not apply as per previous decisions)
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 1 year = 393 tonne RBC • 3 year = 393 tonne RBC <input type="checkbox"/> No
Breakout rules for multi-year TAC	- The observed standardized CPUE changes by 50% or more.
Have breakout rules been triggered?	- N/A



Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Standardised CPUE has displayed a cyclical trend around the mean and generally increased from 1997 – 2005 - The population size structure has been relatively stable.
RAG comments	<ul style="list-style-type: none"> - Market requirements may compromise the validity of the assessment method if it reduces catch rates. - The RAG recommended a research catch allowance of 37.5 tonnes for the Gulper Shark Grid Exclusion Device project to offset costs of research trips and experimenting with new gear.
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- N/A
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - The Royal Red Prawn fishing grounds off Sydney occur in areas of core habitat for Harrison’s and Southern dogfish and much of the fishing grounds have been closed under the Upper Slope Dogfish Management Strategy. Industry has proposed to trial a Grid Exclusion Device in Royal Red Prawn nets to exclude Dogfish.



Research

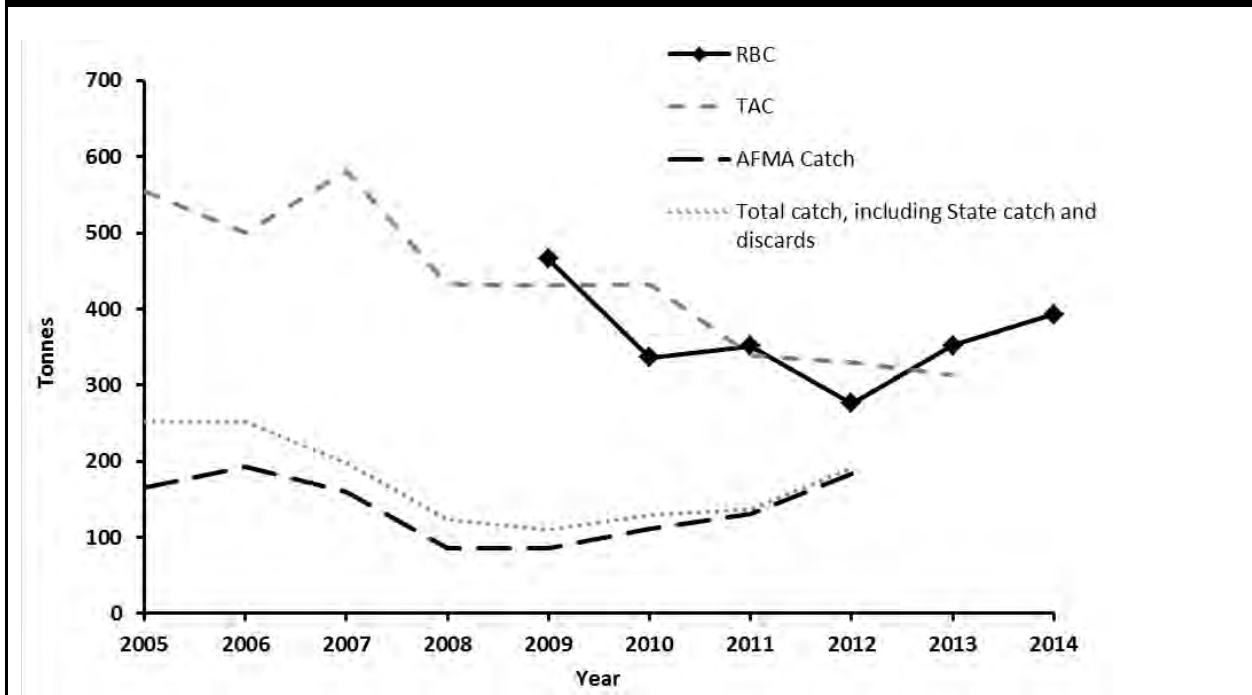
Research allowance

37.5 tonnes

Included in TAC

In addition to TAC

Catch trends



Sawshark (*Pristiophorus* spp.)



(CSIRO National Fish Collection, 2009)

Assessed by SharkRAG in 2013

Stock status summary									
<p>Stock structure</p>	<p>Three endemic species of sawsharks occur off southern Australia, but their distributions have not been described precisely. Common Sawshark (<i>Pristiophorus cirratus</i>) is reported to range from Jurien Bay in WA to Eden in NSW, including Tasmania, to depths of 310 m. Southern Sawshark (<i>P. nudipinnis</i>) is reported to range from the western region of the Great Australian Bight to eastern Gippsland in Victoria, including Tasmania, to depths of 70 m. The Eastern Sawshark (<i>Pristiophorus</i> sp. A) is reported to range from approximately Lakes Entrance in Victoria to Coffs Harbour in NSW at depths of 100–630 m (Last and Stevens 1994).</p> <p>Little is known of stock structure or movement rates.</p> <p>For assessment purposes, all sawsharks south of the Victoria–NSW border are assumed to be Common Sawshark and Southern Sawshark, whereas those north of this border are assumed to be Eastern Sawshark.</p>								
<p>Stock status against reference points and trend</p>	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <table border="1" data-bbox="724 1749 1289 1890"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.8740</td> </tr> <tr> <td>Limit</td> <td>0.3497</td> </tr> <tr> <td>Recent</td> <td>1.0050</td> </tr> </tbody> </table>		CPUE	Target	0.8740	Limit	0.3497	Recent	1.0050
	CPUE								
Target	0.8740								
Limit	0.3497								
Recent	1.0050								



ABARES most recent assessment	Biomass: Uncertain	Fishing mortality: Uncertain
GVP figures (2011-12 fishing season)	GVP GHAT	% fishery GVP
	\$0.32 million	1.4%
Recommended Biological Catch 2014-15	459 t	
Overcatch/undercatch	10% undercatch 10% overcatch	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	RBC recommendation = <10% (very unlikely)	
	Alternative Catch Scenarios NA – tier 4 species.	

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE above target reference period
Fishing season	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	312	369.61	339.74	268.18	367.54	459
Agreed TAC	312	255	226	226	339	
Actual TAC after overs/unders	334.95	281.06	241.28	242.87	354.48	
% TAC caught	63%	84%	83%	81%		

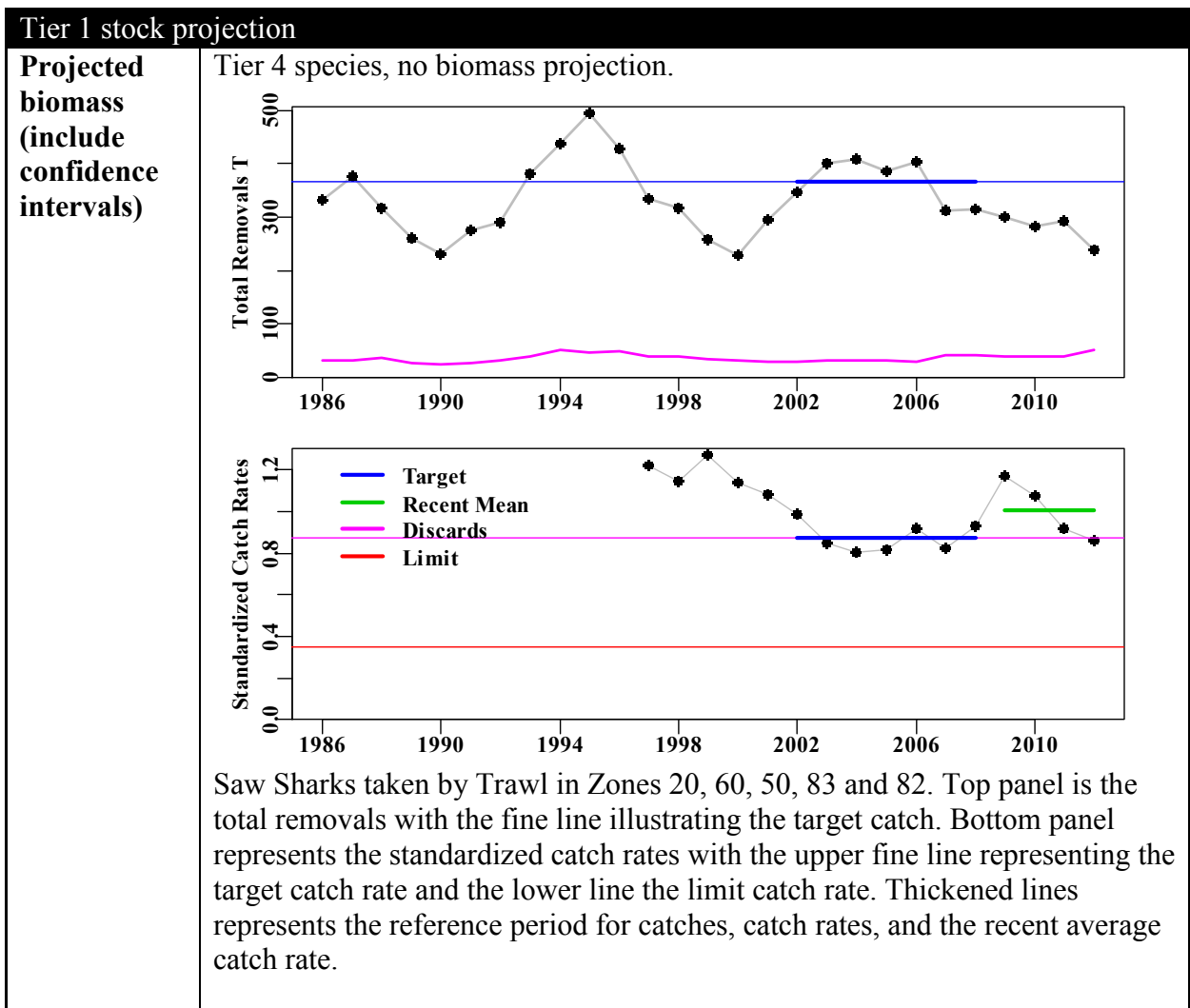


Tier Level & Discounts		
Tier Level	Tier 4	
Discount factor	No discount factor because the large closures in Victoria and SA provide additional precaution. Significant discarding exists. Discounting the RBC will increase discarding further.	
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season)	<input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons)	<input checked="" type="checkbox"/> No
Breakout rules for multi-year TAC	-	
Have breakout rules been triggered?	-	

Assessment	
Stock indicator trends	NA
RAG comments	<p>In 2013, SharkRAG considered updated Tier 4 assessments using both gillnet and trawl catch rates. SharkRAG considered that the trawl catch rates provided a better measure of abundance for the stock because gillnetters actively avoided the species. However, the RAG is concerned that the CPUE trend may be affected by discarding and the current assessment does not include discards.</p> <p>SharkRAG considered that:</p> <ul style="list-style-type: none"> • the AFMA observer program should provide improved data on discarding • next year trawl catch rates should be used for the Tier 4 and discards should be included in the assessment • SESSFRAG consider whether a B40 target should be used for this species as it is not considered by the RAG to be a key economic driver.
Key model technical assumptions/parameters	Standardized catch rates for trawl caught saw shark behave differently to those from the gillnet fishery. Trawl catches are



	<p>above the reference period and provide a much higher RBC than gillnet catch.</p> <p>SharkRAG selected trawl data rather than gillnet because it was more reflective of stock abundance and there has been a change in targeting behavior within the gillnet sector.</p> <p>Changes were due to a lack in quota availability and low market value not a decline in stock abundance.</p>
Changes to model structure/assumptions	As above SharkRAG elected to move to trawl data.
Significant changes to data inputs	In 2013 Shark RAG supported changing from Gillnet to trawl data as the key input to the assessment.
Comments on data	SharkRAG expects to include discard data in the next assessment
Implications for companion species/TEPs/multi-species fisheries	



Research

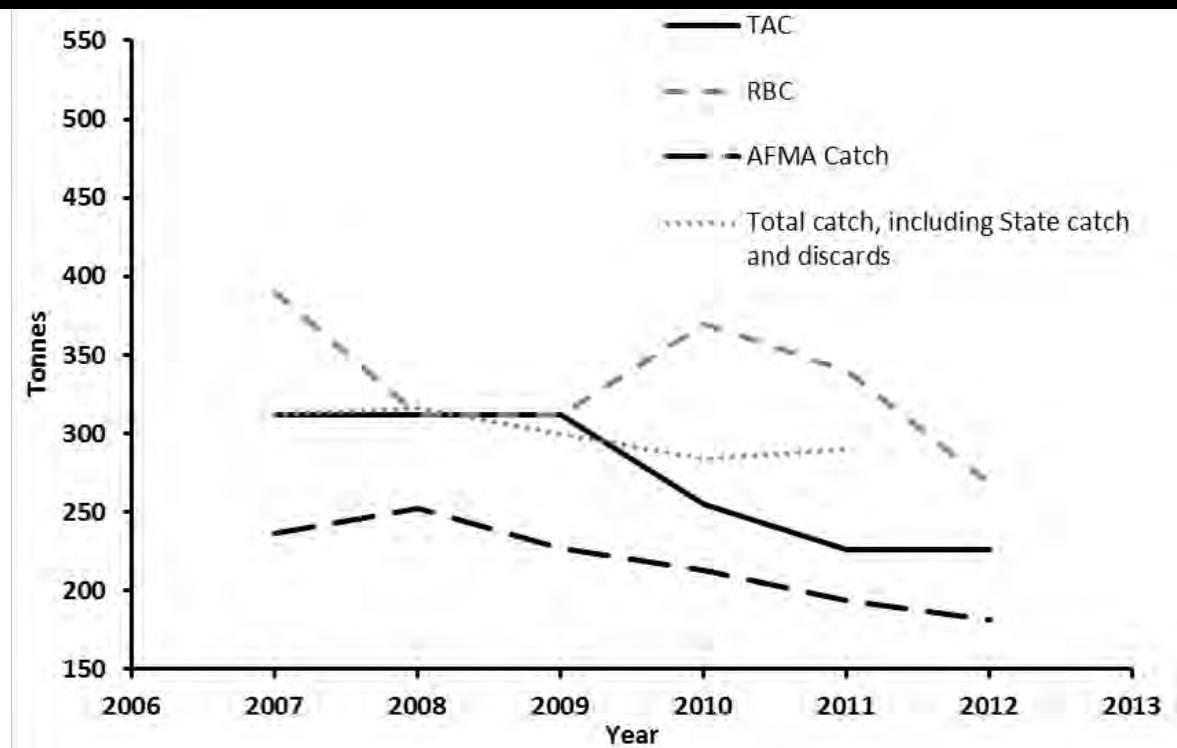
Research allowance

0 tonnes

Included in TAC

In addition to TAC

Catch trends



Sawshark TAC, RBC, AFMA catch and total catch are detailed above for the years 2007 to 2012.



School Shark (*Galeorhinus galeus*)



(Fisheries Research & Development Corporation, 2012)

Assessed by SharkRAG in 2013

Stock status summary		
Stock structure	<p>The assessment model assumes that there is one well mixed stock.</p> <p>Tagging and genetic data shows some evidence for one well mixed stock. However, earlier data suggests there could be an east/west divide in stocks. This is supported by research documenting a collapse in the eastern part of the fishery around Tasmania and Bass Strait. After this collapse a fishery subsequently established in the west suggesting a reproductively isolated stock.</p>	
Stock status against reference points and trend	<p>Limit reference point is 20% of the unfished biomass (pup production is used as a proxy for breeding biomass)</p> <p>Target reference point is 48% of the unfished biomass (pup production is used as a proxy for breeding biomass)</p> <p>The stock is currently assessed at below the limit reference point. Note that the RAG considers that the weight of evidence supports that the stock is rebuilding and not subject to overfishing within the rebuilding time of three generation times.</p>	
ABARES most recent assessment	Biomass: Overfished	Fishing mortality: Subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$1.48 million	6.2%
Recommended Biological Catch 2014-15	<p>0t. No targeted fishing as stock is $< B_{LIM}$</p> <p>Commonwealth TAC recommendation is 215t. This TAC is set at the lowest level to cover unavoidable bycatch whilst still supporting rebuilding of the stock.</p>	



Overcatch/undercatch	0% undercatch 0% overcatch																																																																																																														
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference under proposed management	RBC recommendation = NA as currently assessed at below the limit reference point.																																																																																																														
<u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	<p>Alternative Catch Scenarios Table 1. Number of years after 2008 when the school shark stock is predicted to achieve limit (B₂₀, B₂₅) or target reference points (B₄₀, B₅₀) under future catches ranging between 0 and 275t.</p> <table border="1"> <thead> <tr> <th></th> <th>0t</th> <th>100t</th> <th>125t</th> <th>150t</th> <th>175t</th> <th>200t</th> <th>225t</th> <th>250t</th> <th>275t</th> </tr> </thead> <tbody> <tr> <td colspan="10"><i>2009 Base Case – 2011 proportions</i></td> </tr> <tr> <td>B₂₀</td> <td>23</td> <td>30</td> <td>32</td> <td>36</td> <td>40</td> <td>47</td> <td>58</td> <td>80</td> <td>-</td> </tr> <tr> <td>B₂₅</td> <td>30</td> <td>38</td> <td>42</td> <td>46</td> <td>51</td> <td>59</td> <td>71</td> <td>95</td> <td>-</td> </tr> <tr> <td>B₄₀</td> <td>45</td> <td>57</td> <td>62</td> <td>67</td> <td>74</td> <td>83</td> <td>97</td> <td>124</td> <td>-</td> </tr> <tr> <td>B₅₀</td> <td>50</td> <td>62</td> <td>67</td> <td>73</td> <td>80</td> <td>89</td> <td>104</td> <td>132</td> <td>-</td> </tr> <tr> <td colspan="10"><i>2009 Base Case – 2008 proportions</i></td> </tr> <tr> <td>B₂₀</td> <td>23</td> <td>30</td> <td>33</td> <td>37</td> <td>42</td> <td>50</td> <td>64</td> <td>99</td> <td>-</td> </tr> <tr> <td>B₂₅</td> <td>30</td> <td>39</td> <td>42</td> <td>47</td> <td>53</td> <td>63</td> <td>78</td> <td>117</td> <td>-</td> </tr> <tr> <td>B₄₀</td> <td>45</td> <td>58</td> <td>63</td> <td>69</td> <td>76</td> <td>87</td> <td>105</td> <td>150</td> <td>-</td> </tr> <tr> <td>B₅₀</td> <td>50</td> <td>63</td> <td>68</td> <td>74</td> <td>82</td> <td>93</td> <td>111</td> <td>159</td> <td>-</td> </tr> </tbody> </table>		0t	100t	125t	150t	175t	200t	225t	250t	275t	<i>2009 Base Case – 2011 proportions</i>										B ₂₀	23	30	32	36	40	47	58	80	-	B ₂₅	30	38	42	46	51	59	71	95	-	B ₄₀	45	57	62	67	74	83	97	124	-	B ₅₀	50	62	67	73	80	89	104	132	-	<i>2009 Base Case – 2008 proportions</i>										B ₂₀	23	30	33	37	42	50	64	99	-	B ₂₅	30	39	42	47	53	63	78	117	-	B ₄₀	45	58	63	69	76	87	105	150	-	B ₅₀	50	63	68	74	82	93	111	159	-
	0t	100t	125t	150t	175t	200t	225t	250t	275t																																																																																																						
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B ₄₀	45	57	62	67	74	83	97	124	-																																																																																																						
B ₅₀	50	62	67	73	80	89	104	132	-																																																																																																						
<i>2009 Base Case – 2008 proportions</i>																																																																																																															
B ₂₀	23	30	33	37	42	50	64	99	-																																																																																																						
B ₂₅	30	39	42	47	53	63	78	117	-																																																																																																						
B ₄₀	45	58	63	69	76	87	105	150	-																																																																																																						
B ₅₀	50	63	68	74	82	93	111	159	-																																																																																																						

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1	Tier 1
Stock Status	<B _{LIM}	<B _{LIM}	<B _{LIM}	<B _{LIM}	<B _{LIM}	<B _{LIM}
Fishing season	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	0	0	0	0	0	0
Agreed TAC	240	216	176	150	215	
Actual TAC after overs/unders	240	216	176	150	215	
% TAC caught	81%	100%	92%	85%		

Tier Level & Discounts	
Tier Level	Tier 1
Discount factor	0 %



Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season)	<input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 1 year = 215 • 3 year = 215 • 5 year = NA 	<input type="checkbox"/> No
Breakout rules for multi-year TAC	The RAG recommended indicators to review the incidental TAC: <ul style="list-style-type: none"> - if reported Commonwealth catch and ISMP discards reach 215 tonnes or fall below 120 tonnes - a School Shark alternative index of abundance becomes available. 	
Have breakout rules been triggered?	NA	

Assessment	
Stock indicator trends	<p>CPUE is not considered a reliable index of abundance as School Shark are actively avoided by fishers.</p> <p>Work is underway to develop alternative and independent measures of abundance for the stock.</p>
RAG comments	<p>SharkRAG's assessments (since 1991) have consistently estimated that the School Shark population is below 20% of pristine levels (the SESSF HSP limit reference point).</p> <p>For the 2013/14 season SharkRAG recommended School Shark catches by restricted to a level that covers unavoidable bycatch and discards.</p> <p>Shark RAG considers the best estimate of unavoidable bycatch including discards is 215 tonnes. This is based on landed catch from 2011 and ISMP estimates of discards of 9%. In December 2013 Shark RAG recommended limiting catch at 215 tonnes per year for the next three years subject to breakout rules.</p> <p>SharkRAG expressed concern over the potentially high catch of School Shark by South Australian state fisheries. South</p>



	<p>Australian catch reports currently aggregate catch of all species in the family Triakidae and in 2011-12 reported 161 tonnes of aggregated catch.</p> <p>SharkRAG strongly recommends that species specific catches are reported and efforts should be implemented to ensure state catch of School Shark is minimized.</p>
Key model technical assumptions/parameters	<p>The assessment model assumes that there is one well mixed stock.</p> <p>The patterns of movement used in the model are partially estimated but strongly influenced by theory.</p>
Changes to model structure/assumptions	<p>The stocks intrinsic rate of productivity was amended for the 2012 re-run of the 2009 stock assessment. The new runs of the model yielded higher estimates of productivity that are considered by CSIRO to be more appropriate for this species.</p>
Significant changes to data inputs	N/A
Comments on data	<p>There are concerns in relation to CPUE data used in the model due to avoidance behavior. As a result, concern remains about the ability of the school shark assessment to reliably estimate the state of the stock. Work is underway to provide details of the most suitable method for determining an alternative index of abundance. The results will be peer reviewed by an external scientific expert.</p>
Implications for companion species/TEPs/multi-species fisheries	<p>Australian sealion bycatch in waters off South Australia is managed using trigger limits that close spatial zones for 18 months. The Coorong region in South Australia is currently closed to gillnet fishing to mitigate dolphin interactions.</p> <p>School Shark landings are subject to a 20% rule for gillnet operators that limited catches by individual operators to 20% of their Gummy Shark catch to reduce deliberate targeting.</p>



Tier 1 stock projection

Projected biomass (include confidence intervals)

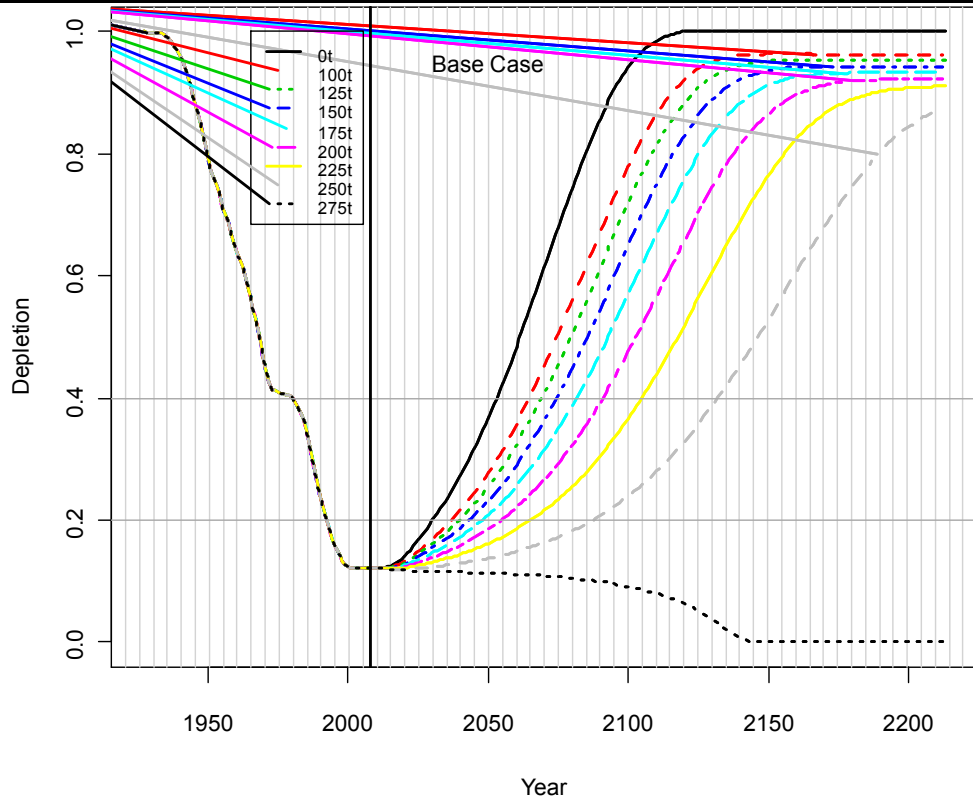


Figure 1. Projected future depletion from 2012 stock assessment re-run (pup production divided by pristine pup production) for the school shark stock for the Tier 1 2009 base case assessment model. Projections are shown for 9 future catch scenarios. Catches between 2008 (marked by a vertical line) and 2011 are the actual catches taken by the fishery.

Research

Research allowance

NA

Included in TAC

In addition to TAC



Catch trends

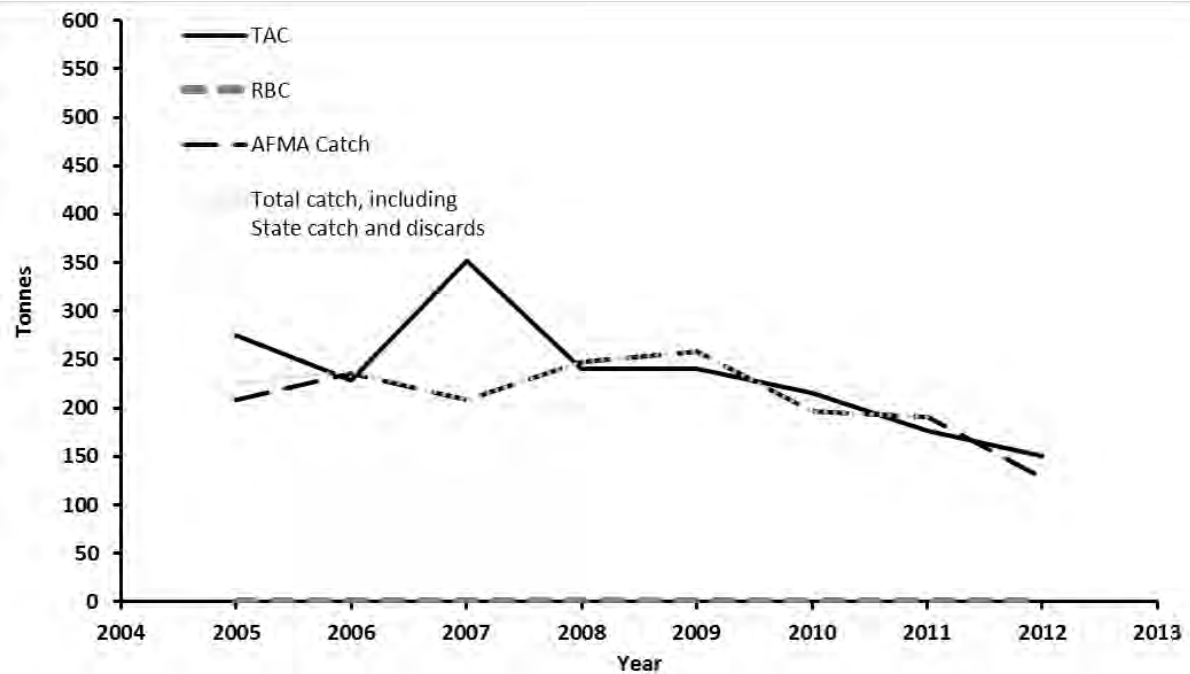
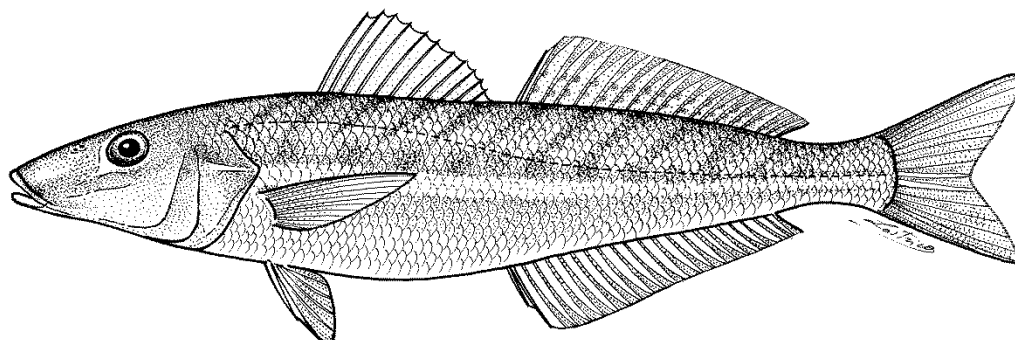


Figure 2. School Shark TAC, RBC, AFMA catch and total catch are detailed above. Note the RBC is 0 due to the stock being below B_{LIM} . Due to the lack of data in relation to State and recreational catch, the total catch is equal to the AFMA catch. The recent downward trend in catch can be attributed to large gillnet closures implemented across South Australia to mitigate ASL and dolphin interactions.

School Whiting (*Sillago flindersi*)



Common names: Red spot whiting, spotted whiting, silver whiting, trawl whiting.
Assessed by Shelf RAG in 2013

Stock status summary		
Stock structure	Early genetic studies suggested two stocks with the division between 'northern' and 'southern' stocks in the Sydney – Jervis Bay area. However, the evidence for two stocks is weak and current SESSF management and stock assessment assumes a single stock.	
Stock status against reference points and trend	Limit reference 20% of unfished biomass Target 48% of unfished biomass Stock status: The last full assessment of eastern school whiting was in 2009. It estimated that the spawning stock biomass would be 50 per cent of the unfished biomass in 2010. Trend: The most recent assessment estimated the stock to have been fluctuating around target levels since 2005 in response to variations in recruitment.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.9 million	1.5%
Recommended Biological Catch 2014-15	- Continuation of long term RBC of 1660t	
Overcatch/undercatch	- 10% undercatch - 10% overcatch	
Probability of recommended	Very unlikely (P<10%)	

<p>biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i></p>	<p>Alternative Catch Scenarios = Monte Carlo Markov Chain (MCMC) projections in 2011 suggest that with fixed catches of either 1600t or 1700t per year the stock is unlikely to fall below the limit reference point in the next ten years. However these projections are based on potentially optimistic assumptions about recent recruitment levels (2006-2008).</p>
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TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Not assessed – fixed catch scenarios tested	Not assessed	Not assessed	Not assessed
Stock Status	82%	49%		Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	3785	1723	1660	Long-term RBC	Long-term RBC	Long-term RBC
Agreed TAC	1125	844	641	640	809	
Actual TAC after overs/unders	1192	952	719	695	865	
% TAC caught	38%	38%	50%	69%		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (Due to large variability in recruitment, in 2010 a long-term RBC was set at 1660 tonnes. State catches and discards are taken from this RBC each year to arrive at a recommended TAC. <input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input type="checkbox"/> Yes (recommended for future seasons) <input checked="" type="checkbox"/> No

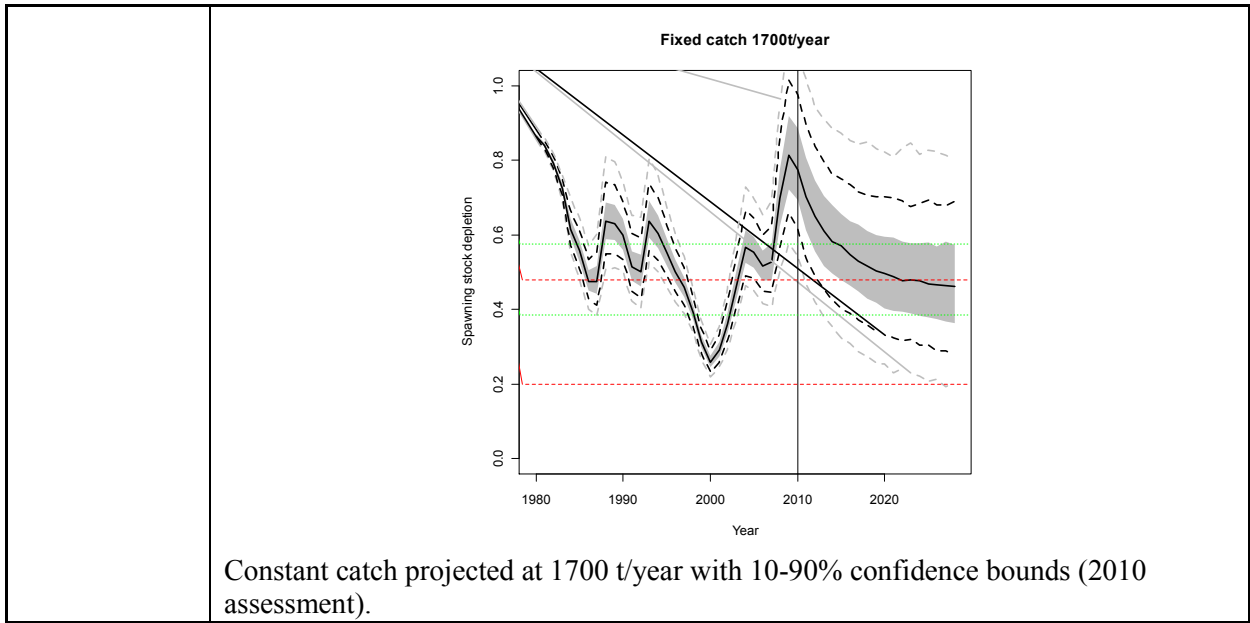


Breakout rules for multi-year TAC	-
Have breakout rules been triggered?	-

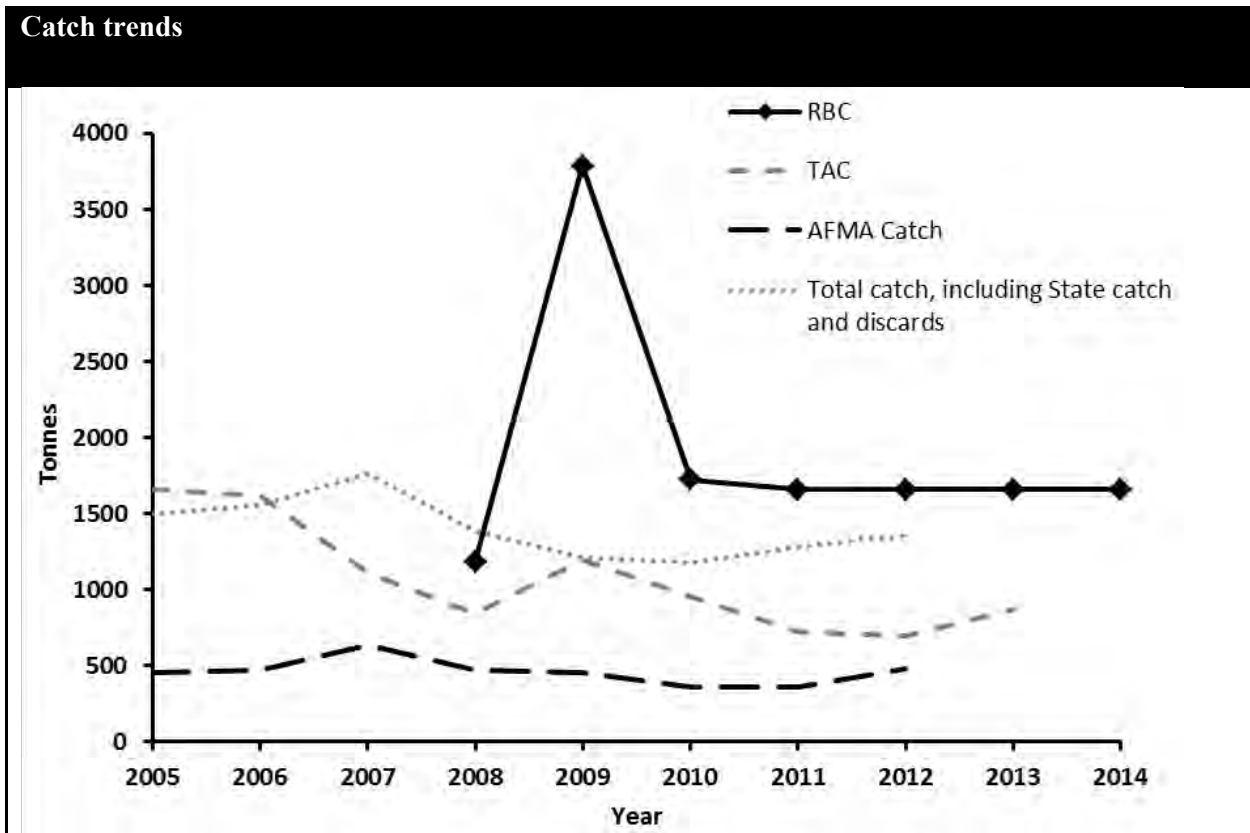
Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Landings are constant even though the TAC has fluctuated, and the TAC is under caught due to market constraints, not availability. - Standardized catch rates have remained above the limit reference point and just below the target reference point.
RAG comments	<ul style="list-style-type: none"> - Given there was no formal assessment during 2013, the RAG considered various stock indicators and concluded there was none that warranted changing the current fixed catch harvest strategy. - Given that there were no concerns with the stock falling below B_{lim}, the RAG agreed to retain the RBC at 1660t, in line with the long-term RBC. - The RAG stated that a more spatially explicit assessment model should be developed for School Whiting as a priority.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - MCMC projections in 2011 showed that at a fixed catch of 1600t per year, the probability of falling below the limit reference point is less than 2.5% for all projections through to 2028.
Changes to model structure/assumptions	<ul style="list-style-type: none"> - N/A (no formal assessment conducted since 2009)
Significant changes to data inputs	<ul style="list-style-type: none"> - N/A
Comments on data	<ul style="list-style-type: none"> - N/A
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - N/A

Tier 1 stock projection	
Projected biomass (include confidence intervals)	

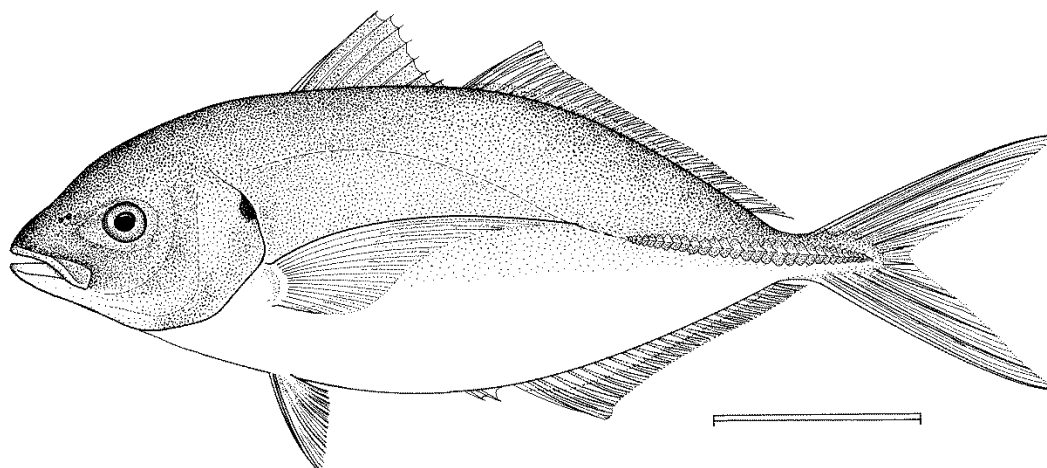




Research		
Research allowance	0 tonnes	
	<input type="checkbox"/> Included in TAC	<input type="checkbox"/> In addition to TAC



Silver Trevally (*Pseudocaranx dentex*)



Assessed by Shelf RAG in 2013

Stock status summary										
Stock structure	Preliminary research suggests that the Silver Trevally off south-eastern Australia represent a single stock.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <p>Stock status: In the 2012 Tier 4 assessment the recent average standardized CPUE-based proxy for biomass was above the target reference point.</p> <table border="1" data-bbox="608 1397 1174 1541"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.8527</td> </tr> <tr> <td>Limit</td> <td>0.3411</td> </tr> <tr> <td>Recent</td> <td>0.8956</td> </tr> </tbody> </table> <p>Trend: CPUE has recently fluctuated around target levels after more than 10 years lying between the limit and target levels. Catches are below the RBC.</p>			CPUE	Target	0.8527	Limit	0.3411	Recent	0.8956
	CPUE									
Target	0.8527									
Limit	0.3411									
Recent	0.8956									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	\$0.7 million	1.1%								
Recommended Biological Catch 2014-15	1 year = 858 tonnes 3 year = 791 tonnes (the Tier 4 target catch level)									



Overcatch/undercatch	- 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	Very unlikely (P<10%)
	Alternative Catch Scenarios = N/A

TAC and catch						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4	Tier 4
Stock Status	CPUE between target and limit	CPUE between target and limit	CPUE between target and limit	CPUE higher than target	CPUE higher than target	CPUE higher than target
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	624	650	754	897	980	3 year: 791
Agreed TAC	360	360	540	677	781	
Actual TAC after overs/unders	388	390	564	726	847	
% TAC caught	40%	54%	30%	16%		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0%
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 3 year: 791t <input type="checkbox"/> No



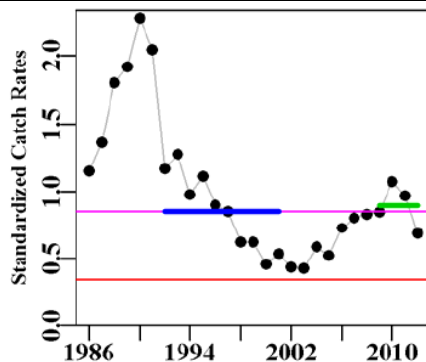
is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))		
Breakout rules for multi-year TAC	<p>The RAG agreed, if a MYTAC was adopted, the following breakout rules would be appropriate:</p> <ul style="list-style-type: none"> • total catch (including state catch and discards) increasing over 500t; or • a significant decline in CPUE (The RAG could not objectively identify an appropriate percentage at this stage). 	
Have breakout rules been triggered?	N/A	

Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - The size composition of the landed catch shows a trend towards larger fish, but onboard measurements of the retained catch show little change. There is no information on the age composition of the catch in the CTS.
RAG comments	<ul style="list-style-type: none"> - The RAG determined that Silver Trevally would be suitable for a three year RBC at the Tier 4 target catch level, rather than at the 1 year RBC, as the recent catch history has been fluctuating around the Tier 4 target catch level, and the most recent CPUE was below the Tier 4 target catch level. - The RAG discussed the use of a discount factor, and agreed that consistent with previous years, a discount factor is not required due to protection from the Batemans Bay Marine Protected Area (MPA). - Silver Trevally are being caught well below the size for optimum biological yield.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - The assessment includes historical catches from inside the MPA, but CPUE from outside only (assumes some level of mixing inside and outside the MPA) - The recreational catch is significant, but as there are no data on trends in the recreational catch the assessment assumes that recent catches are similar to those during the reference period.
Changes to model structure/assumptions	N/A
Significant changes to data inputs	N/A
Comments on data	N/A
Implications for companion species/TEPs/multi-species fisheries	N/A



Tier 4 CPUE series

Standardized Catch Rates



Silver Trevally standardized catch rates with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate.

Research

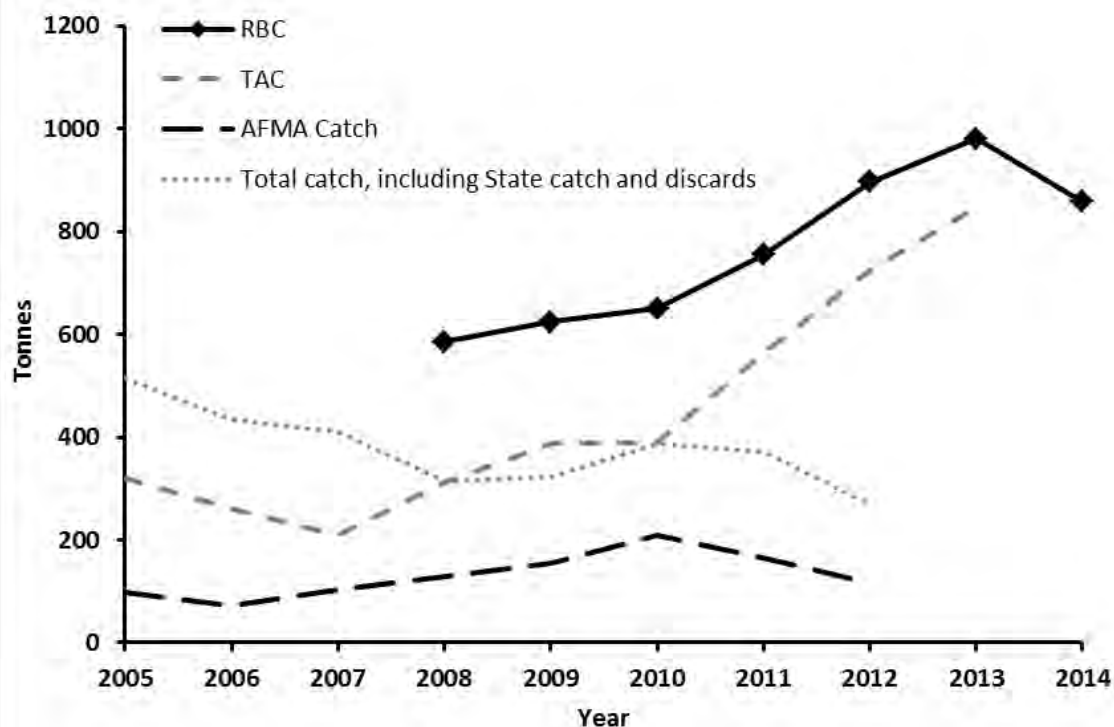
Research allowance

0 tonnes

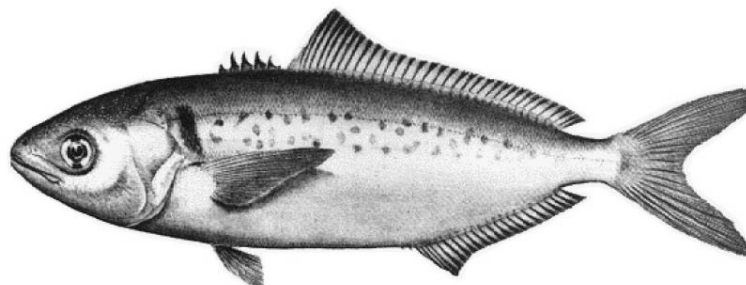
Included in TAC

In addition to TAC

Catch trends



Silver Warehou (*Seriolella punctata*)



ABARES (2012): Line drawing – FAO

Discussed by SlopeRAG in 2013

Stock status summary		
Stock structure	Considered to be a single stock in the SESSF.	
Stock status against reference points and trend	Limit Reference is 20% of unfished biomass Target is 48% of unfished biomass Stock status: In 2012 the stock was assessed as being close to the target at 47% of the unfished biomass at the start of 2013. Biomass trend: The biomass trend from the assessment is that the biomass has been increasing for the last 3 years, but standardised CPUE has been on a gradual declining trend since 2005.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$2.0 million	3.3%
Recommended Biological Catch 2014-15	- N/A. Silver Warehou are in the second year of a three year 2329t MYTAC	
Overcatch/undercatch	10% undercatch 10% overcatch	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	RBC recommendation = very unlikely Alternative Catch Scenarios = Projections based on the estimated recent recruitment levels for 2002-2005 (below average recruitment) indicated that catches up to the RBC would deplete the stock rather than allow rebuilding.	



Stock status, RBC,TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Not assessed	Not assessed	Tier 1	Not assessed
Stock Status	54%	44%	Not assessed	Not assessed	47%	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	2488	2660	MYTAC	MYTAC	2544	MYTAC
Agreed TAC	3000	2566	2566	2541	2329	2329
Actual TAC after overs/unders	3249	2829	2784	2789	2579	
% TAC caught	38	44	38	26		

Tier Level & Discounts		
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au	
Discount factor	N/A	
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season). 2014-15 will be the second year of a three year MYTAC	<input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons)	<input type="checkbox"/> No
Breakout rules for multi-year TAC	<ul style="list-style-type: none"> - If the most recent observed value for the standardised CPUE falls outside of the 95% confidence interval of the value for the CPUE predicted by the most recent Tier 1 stock assessment; or - If discards exceed 20% of the TAC; or - If age composition of the Silver Warehouse stock is significantly different from that predicted by the model; or - If the proportion of the TAC caught differs by more than 20% from the average over the last three years. 	
Have breakout rules been triggered?	<ul style="list-style-type: none"> - Yes. - During 2012, the first break out rule was triggered with catch rates falling outside predicted levels. In response a new Tier 1 assessment was completed with no significant changes to the stock identified. - The first break out rule was again triggered in 2013. The RAG recommended not redoing a Tier 1 stock assessment 	



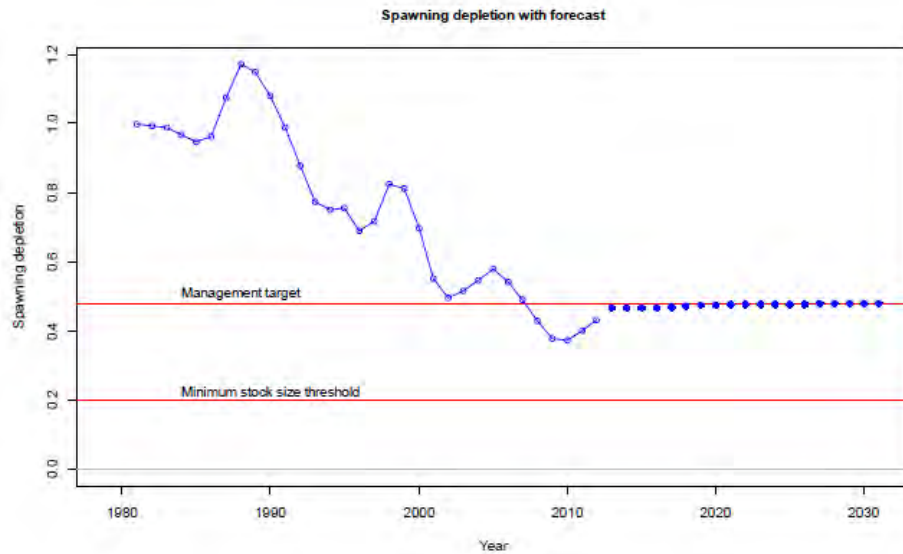
	<p>and flagged that there are potential concerns with the stock and that the assessment (especially the level of future recruitment) was possibly over optimistic, Re-doing the current form of the assessment would not help resolve the issues. Risks were also reduced by the fact that $< \frac{1}{2}$ the TAC is being caught in recent years and this is not likely to change in the short term.</p> <ul style="list-style-type: none"> - The RAG recommended that the multi-year TAC continue but that it would be beneficial to review the assessment when resources were available to do so.
--	--

Assessment	
Stock indicator trends	<ul style="list-style-type: none"> - Standardised CPUE has continued to decline and is at historically low levels, but there are no major changes in other indicators (size composition, age composition, area of the fishery, or depth distribution of the catch).
RAG comments	<ul style="list-style-type: none"> - Age and length frequency data suggest there is a potential recruitment coming through - The RAG confirmed the continuation of the second year of the Silver Warehou MYTAC.
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - Stock Synthesis 3 software used for this Tier 1 assessment - Single sex and single fleet are used in the assessment - Single stock within the area of the fishery - Unfished biomass with corresponding age structure is assumed to be at the start of 1979 - M is assumed to be constant with age and time-invariant. Base case value for M is 0.30 yr⁻¹ - Beverton-Holt type recruitment is assumed with a steepness of 0.75 - Growth is assumed to be time invariant
Changes to model structure/assumptions	<ul style="list-style-type: none"> - MYTAC, no assessment update
Significant changes to data inputs	<ul style="list-style-type: none"> - MYTAC, no assessment update
Comments on data	<ul style="list-style-type: none"> - N/A
Implications for companion species/TEPs/multi-species fisheries	<ul style="list-style-type: none"> - Nil



Tier 1 stock projection

Projected biomass



Spawning depletion with projections based on catches matching the harvest strategy rule (from the 2012 stock assessment).

Research

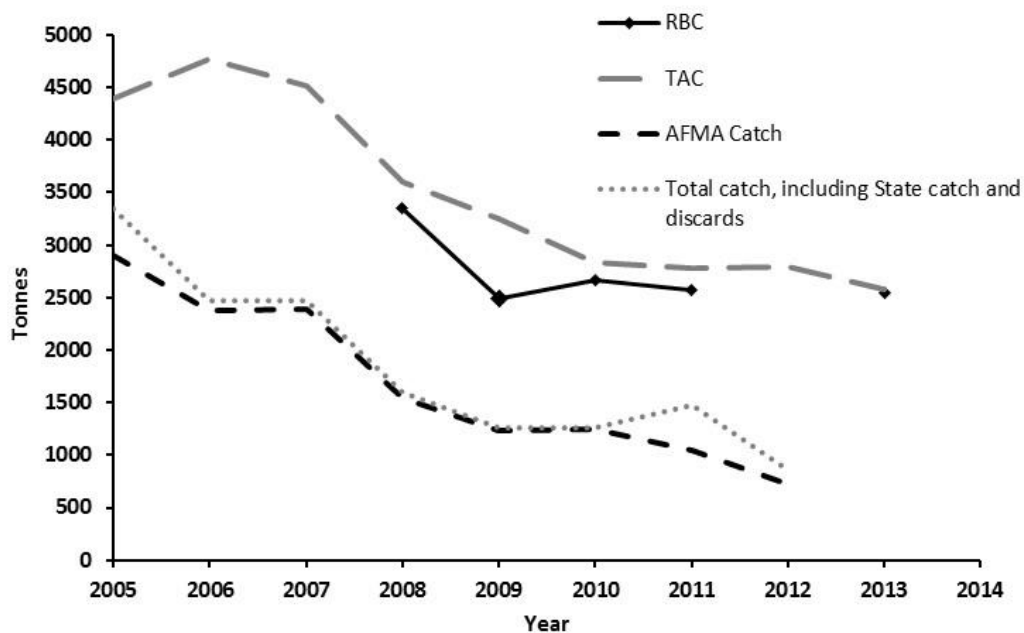
Research allowance

0 tonnes

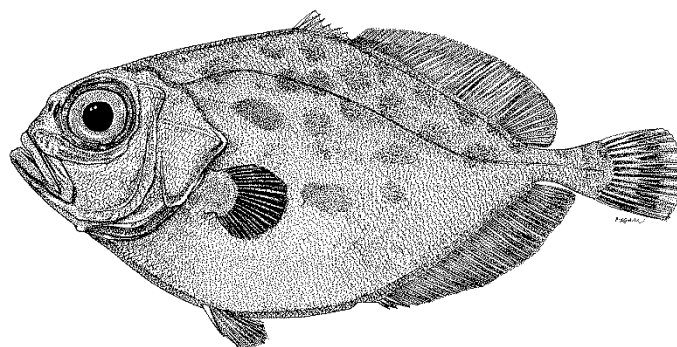
Included in TAC

In addition to TAC

Catch trends



Smooth Oreo (*Pseudocyttus maculatus*) – Non-Cascade Plateau



Assessed by SlopeRAG in 2013

Stock status summary										
Stock structure	Little is known about the stock structure of Smooth Oreo. 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.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <p>Stock status: The most recent assessment (a Tier 4 assessment in 2010 using data up to 2009) concluded that the CPUE-based biomass proxy was above the target reference point. Catches since 2006 have been so small that it was not valid to update the Tier 4 analysis.</p> <table border="1" data-bbox="730 1518 1299 1659"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.5127</td> </tr> <tr> <td>Limit</td> <td>0.2051</td> </tr> <tr> <td>Recent</td> <td>0.8440</td> </tr> </tbody> </table> <p>Biomass trend: When last assessed, the CPUE was variable but with a slight positive trend. Low catch and effort levels since 2009 have precluded any updates.</p>			CPUE	Target	0.5127	Limit	0.2051	Recent	0.8440
	CPUE									
Target	0.5127									
Limit	0.2051									
Recent	0.8440									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	<\$0.1 million	<0.2%								



Recommended Biological Catch 2014-15	N/A. MYTAC – The RAG recommended a continuing MYTAC of 23t until catches reach 10t.
Overcatch/undercatch	10% undercatch 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. $P < 10\%$).</i>	RBC recommendation = N/A
	Alternative Catch Scenarios = N/A

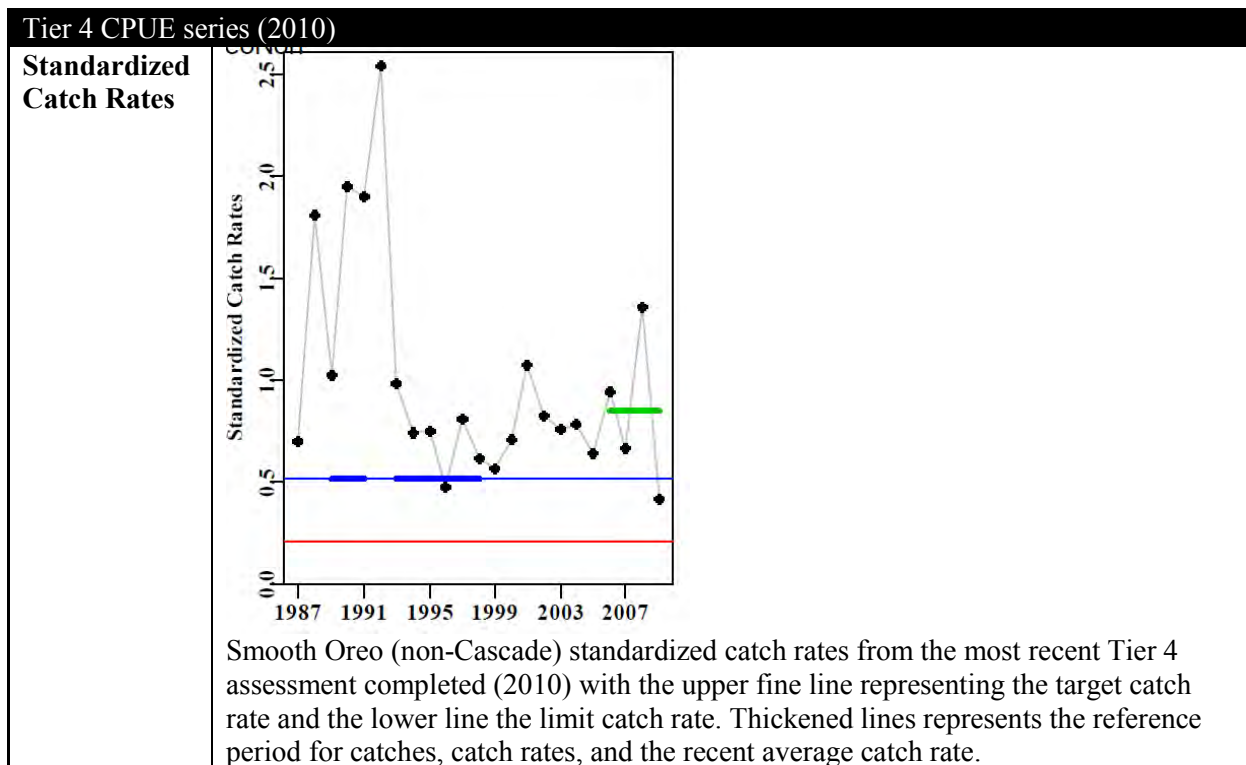
Stock status, RBC, TAC and percentage of TAC caught						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Not assessed	Not assessed	Not assessed
Stock Status	CPUE between target and limit	CPUE higher than target	CPUE higher than target	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	35	106	50	Not assessed	Not assessed	
Agreed TAC	30	45	45	23	23	
Actual TAC after overs/unders	34	48	49	27	24	
% TAC caught	2	0	3	3		

Tier Level & Discounts	
Tier Level	Tier 4
Discount factor	0 %. The discount factor was not applied due to the protection given to stocks by the deepwater trawl closure.
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • MYTAC of 23t until catches reach 10t <input type="checkbox"/> No



model output) or TAC (e.g. a roll-over of catch))		
Breakout rules for multi-year TAC	- RAG to review data if catches reach 10t	
Have breakout rules been triggered?	- No	

Assessment		
Stock indicator trends	- Unknown due to low effort and catches	
RAG comments	<ul style="list-style-type: none"> - The level of catches did not justify recalculating an RBC from a Tier 4 assessment. Instead the RAG recommended maintaining a 23t TAC until catches reach 10t. - The RAG considered that low catch in recent times would have little effect on the stock and would not inform the CPUE data. 	
Key model technical assumptions/parameters	- N/A	
Changes to model structure/assumptions	- N/A	
Significant changes to data inputs	- N/A	
Comments on data		
Implications for companion species/TEPs/multi-species fisheries	- Nil	



Research

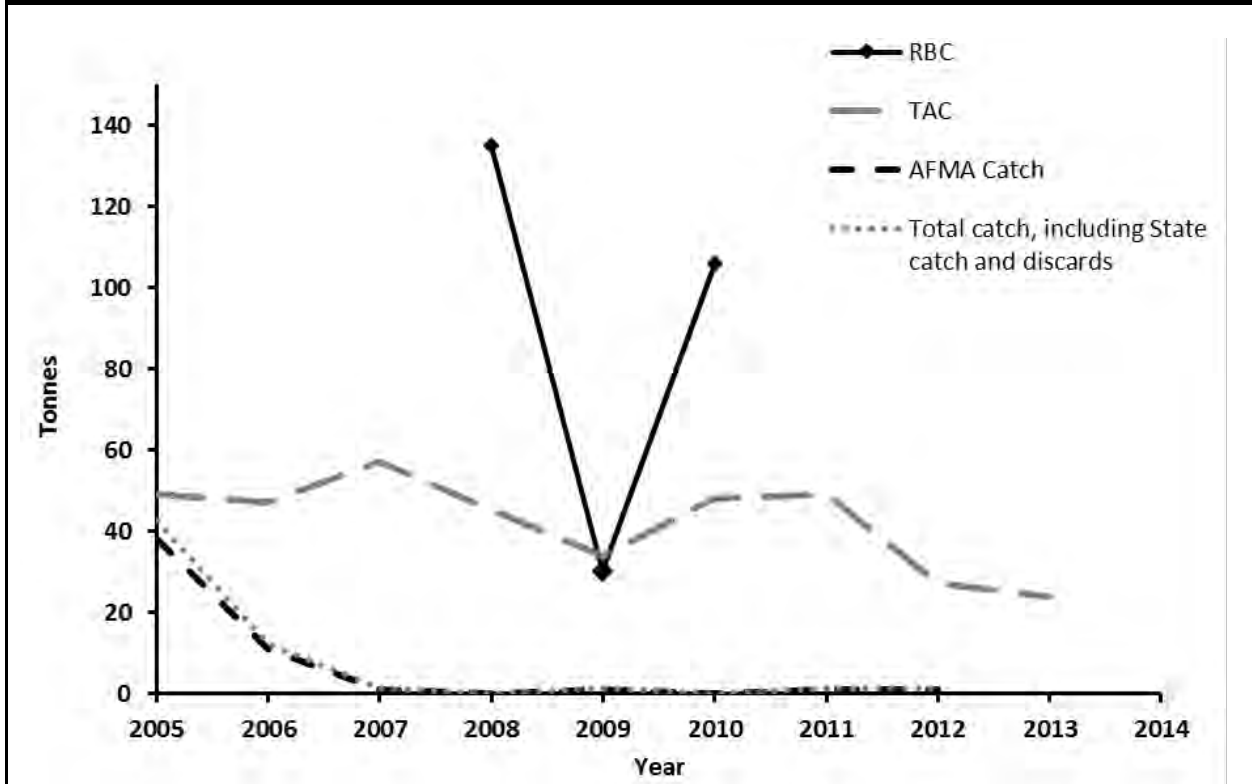
Research allowance

0 tonnes

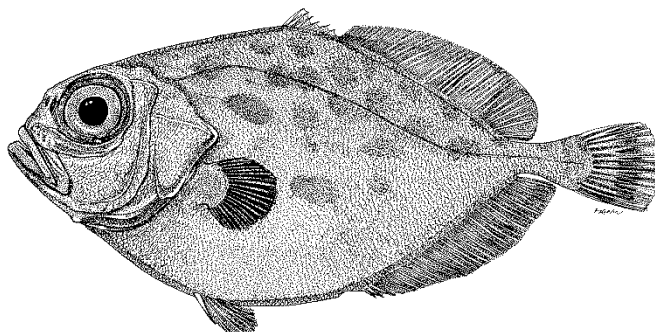
Included in TAC

In addition to TAC

Catch trends



Smooth Oreo Cascade (*Pseudocyttus maculatus*)



Assessed by SlopeRAG in 2013

Stock status summary										
Stock structure	Stock structure of Smooth Oreo is unknown. For assessment and management purposes the Cascade Plateau is regarded as a separate stock.									
Stock status against reference points and trend	<p>Tier 4 species use CPUE targets as a proxy of biomass targets.</p> <p>The Tier 4 target reference point is the level of CPUE assumed to produce a spawning biomass of 48% of unfished levels.</p> <p>The limit reference point is 40% of the target reference point.</p> <p>Stock status: The most recent assessment (a Tier 4 assessment in 2010 using data up to 2009) concluded that the CPUE-based biomass proxy was above the target reference point. Low catch and effort levels since 2009 have precluded any updates to the Tier 4 assessment.</p> <table border="1" data-bbox="730 1397 1299 1541"> <thead> <tr> <th></th> <th>CPUE</th> </tr> </thead> <tbody> <tr> <td>Target</td> <td>0.4989</td> </tr> <tr> <td>Limit</td> <td>0.1996</td> </tr> <tr> <td>Recent</td> <td>1.3575</td> </tr> </tbody> </table> <p>Biomass trend: When last assessed, CPUE had been extremely variable and the fluctuations were considered to be not indicative of changes in stock status.</p>			CPUE	Target	0.4989	Limit	0.1996	Recent	1.3575
	CPUE									
Target	0.4989									
Limit	0.1996									
Recent	1.3575									
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing								
GVP figures (2011-12 fishing season)	GVP	% fishery GVP								
	N/A	N/A								
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - Catches of Smooth Oreos are now so low on the Cascade Plateau that the catch rate and Tier 4 analyses are unlikely to be valid. 									



Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. $P < 10\%$).</u>	RBC recommendation = See above. MYTAC 150t
	Alternative Catch Scenarios = N/A

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Not assessed	Not assessed	Not assessed
Stock Status	CPUE higher than target	CPUE higher than target	CPUE higher than target	Not assessed	Not assessed	Not assessed
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC	126	247	771	Not estimated	Not estimated	Not estimated
Agreed TAC	100	150	150	150	150	
Actual TAC after overs/unders	108	160	165	165	165	
% TAC caught	0	2	0	0		

Tier Level & Discounts	
Tier Level	Tier 4- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	0 %. The RAG agreed that the discount factor not be applied due to low fishing effort on the Cascade Plateau.
Is a multi-year TAC in place?	<input checked="" type="checkbox"/> Yes (in place this season) <input type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 150t until catches reach at least 10t <input type="checkbox"/> No



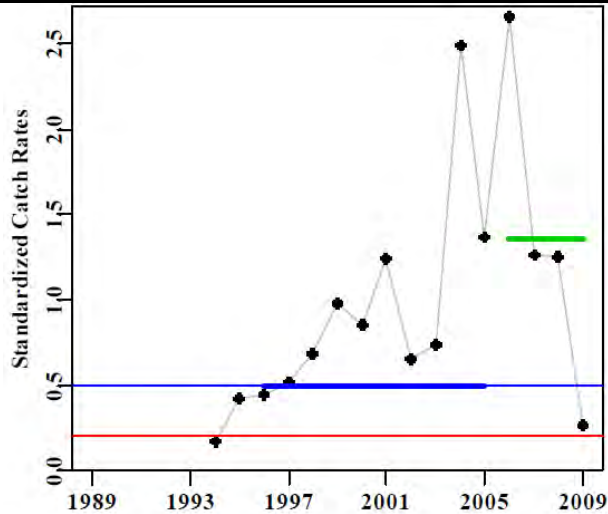
Breakout rules for multi-year TAC	- The RAG will review the assessment when catches reach 10t
Have breakout rules been triggered?	- No.

Assessment	
Stock indicator trends	- Nil
RAG comments	- The RAG recommended that the Tier 4 assessment be suspended until catches reach at least 10t
Key model technical assumptions/parameters	<ul style="list-style-type: none"> - Reference period taken as 1996-2005. - The discard rate estimated in 2007 of 12.3% is assumed to be representative of all years.
Changes to model structure/assumptions	<ul style="list-style-type: none"> - 2011: the Tier 4 assessment was not adopted because of low catches. - 2009: A revised Tier 4 assessment was undertaken using standardised CPUE data (Haddon and Wayte 2009). The reference period was again taken as 1996-2005 and on this basis the Tier 4 analysis derived a catch target of 197 t, a maximum catch of 247 t. - 2008: revised Tier 4 assessment used the reference period 1996-2005 as the Cascade Plateau was only fished sporadically prior to the development of the Orange Roughy fishery. Catch target of 83 tonnes, with a maximum catch of 126 tonnes. - 2006: RBC was first estimated on the basis of the former Tier 4 methodology.
Significant changes to data inputs	-
Comments on data	- This is a data poor species due to low levels of fishing activity on the Cascade Plateau.
Implications for companion species/TEPs/multi-species fisheries	- Nil



Tier 4 CPUE series (2010)

Standardized Catch Rates



Smooth Ore (Cascade) standardized catch rates from the most recent Tier 4 assessment completed (2010) with the upper fine line representing the target catch rate and the lower line the limit catch rate. Thickened lines represents the reference period for catches, catch rates, and the recent average catch rate

Research

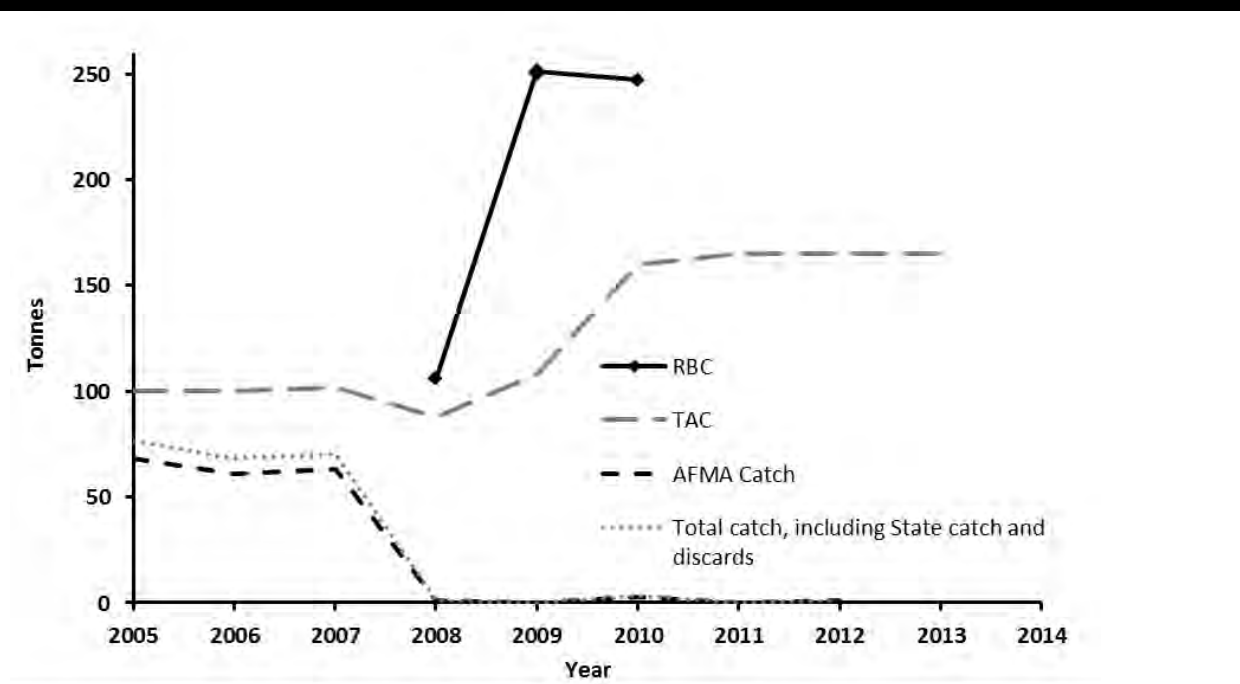
Research allowance

0 tonnes

Included in TAC

In addition to TAC

Catch trends



Tiger Flathead (*Neoplatycephalus richardsoni*)



Common names: Deep sea flathead, flathead, king flathead, spiky flathead, trawl flathead.
Assessed by Shelf RAG in 2013

Stock status summary		
Stock structure	For management purposes a single continuous stock has been assumed throughout all zones of the SESSF.	
Stock status against reference points and trend	<p>Limit Reference Point is 20% of unfished female spawning biomass Target reference point is 40% of unfished female spawning biomass.</p> <p>Stock status: The 2013 assessment estimated current spawning stock biomass as 50% of unexploited stock biomass.</p> <p>Trend: The biomass has fluctuated around the target reference point since 1985.</p>	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$14.6 million	23.9%
Recommended Biological Catch 2014-15	1 year: 3 428t 3 year: 3 334t 5 year: 3 252t	
Overcatch/undercatch	- 10% undercatch - 10% overcatch	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <i>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</i>	Very unlikely (P<10%)	
	Alternative Catch Scenarios The RAG agreed that most sensitivities did not greatly change the current spawning depletion estimates apart from the assumed value for mortality, but that the sensitivity values of mortality used in the sensitivity were very broad and probably implausible. The RAG further noted there is a large change when removing the estimated recruitment for 2008-09 (spawning depletion estimates at 40%) but agreed the recruitments are probably well estimated.	

TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 1	Tier 1	Tier 1	MYTAC	MYTAC	Tier 1
Stock Status	N/A	N/A	44%	Not assessed	Not assessed	50%
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC (t)	2663	2779	3097	Not assessed	Not assessed	1 year: 3428t 3 year: 3334t 5 year: 3252t
Agreed TAC	2850	2750	2750	2741	2750	
Actual TAC after overs/unders	2960	2866	2930	2837	2835	
% TAC caught	89%	87%	96%	95%		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	N/A
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes (recommended for future seasons) <ul style="list-style-type: none"> • 1 year = 3428t • 3 year = 3334t • 5 year = 3252t <input type="checkbox"/> No
Breakout rules for multi-year TAC	The RAG suggested that if a MYTAC is adopted the following breakout rules would be appropriate: <ul style="list-style-type: none"> - Observed standardized CPUE falls outside the 95% confidence intervals projected from the assessment. - Observed total mortality differs from the projected mortality by +/-20%.
Have breakout rules been triggered?	- N/A

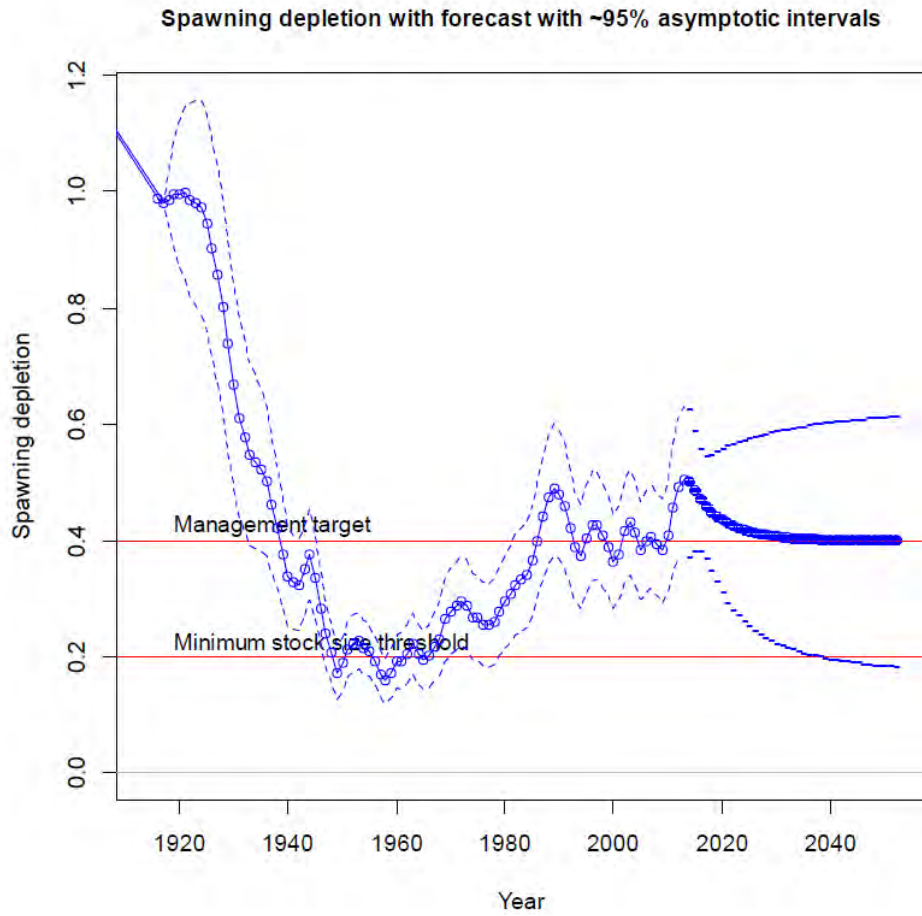


Assessment	
Stock indicator trends	- N/A
RAG comments	<ul style="list-style-type: none"> - Either a 1, 3 or 5 year TAC is appropriate for this assessment. - The RAG's assumption is that a stock assessment will be completed at the end of whichever TAC period is chosen. - The RAG agreed to recommend a change of the inflection point for Tiger Flathead to B_{35}, rather than B_{40}, with the Harvest Control Rules as follows: <ul style="list-style-type: none"> ○ $B_{Lim} = B_{20}$ ○ Inflection Point = B_{35} ○ $B_{Targ} = B_{40}$
Key model technical assumptions/parameters	- N/A
Changes to model structure/assumptions	- N/A
Significant changes to data inputs	- This is the first Tiger Flathead assessment to incorporate the results from the winter Fishery Independent Surveys
Comments on data	- N/A
Implications for companion species/TEPs/multi-species fisheries	- N/A



Tier 1 stock projection

Projected biomass (include confidence intervals)



Time-trajectory of spawning biomass depletion (with 95% confidence intervals) corresponding to the MPD estimates for the base-case analysis for Tiger Flathead. The first solid blue dot is 2014 depletion, and subsequent solid dots are forecast depletion under the 20:35:40 harvest control rule assuming average recruitment.

Research

Research allowance

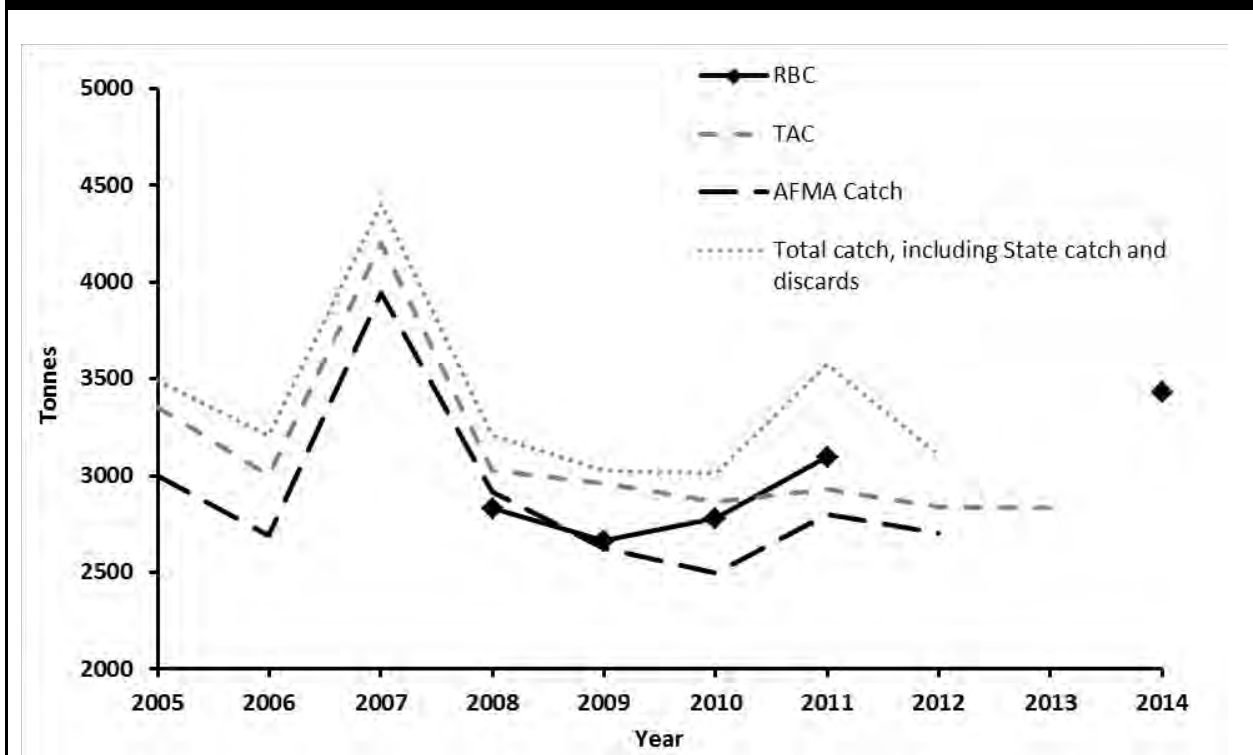
0 tonnes

Included in TAC

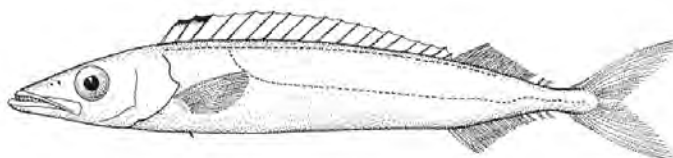
In addition to TAC



Catch trends



Western Gemfish (*Rexea solandri*)



ABARES (2012): Line Drawing – Shane Weidland

Obsolete common names: Hake, Common gemfish, Deepsea Kingfish, King barracouta, King couta, Silver Gemfish, Southern Kingfish

Assessed by GABRAG in 2013

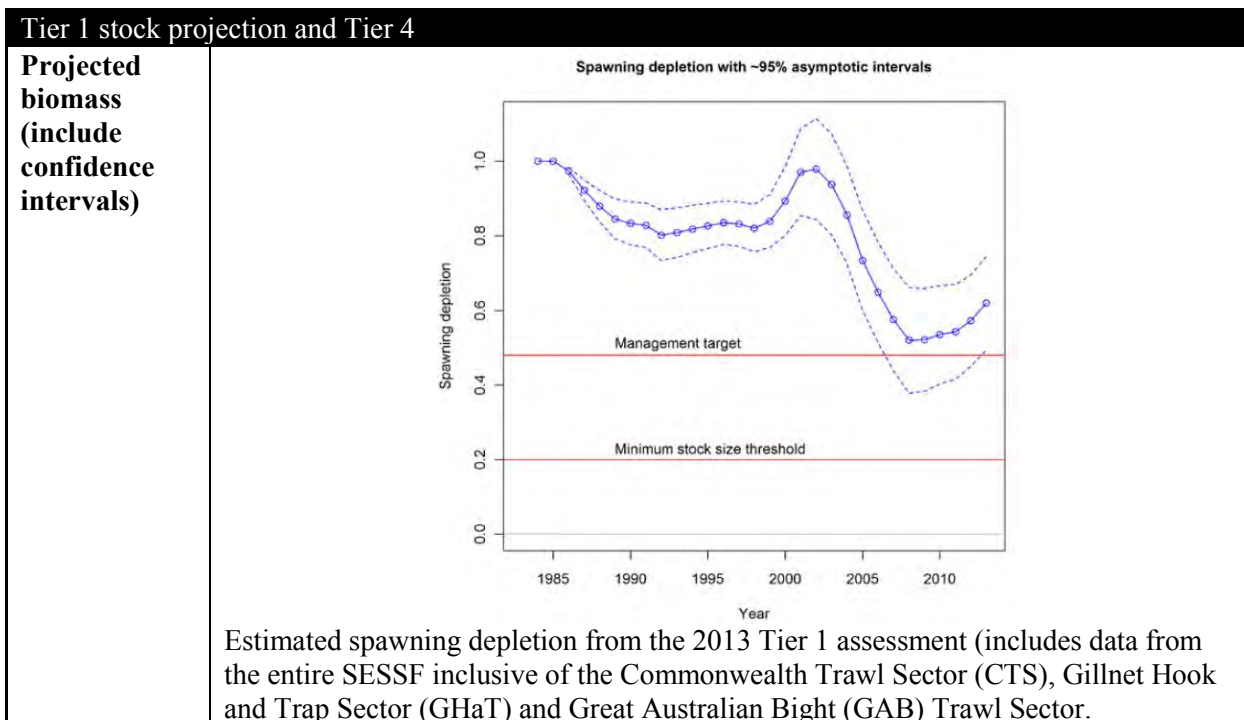
Stock status summary		
Stock structure	There are considered to be two stocks of <i>R. solandri</i> in Australia, an eastern and a western stock bordered by a boundary in the south west of Tasmania (west of 146°42'E, north of 42°00'S) .	
Stock status against reference points and trend	Limit reference 20% of unfished biomass Target reference 48% of unfished biomass Spawning stock biomass is estimated to be above the target reference point of 48% of unfished biomass.	
ABARES most recent assessment	Biomass: Not overfished	Fishing mortality: Not subject to overfishing
GVP figures (2011-12 fishing season)	GVP	% fishery GVP
	\$0.2 million	0.3%
Recommended Biological Catch 2014-15	<ul style="list-style-type: none"> - 1 year: 346 tonnes (Tier 4 – from the eastern part of the fishery that is fished by the Commonwealth Trawl Sector (CTS) (Zones 40 and 50)) - 3 year: 247 tonnes (Tier 4) 	
Overcatch/undercatch	<ul style="list-style-type: none"> - 10% undercatch - 10% overcatch 	
Probability of recommended biological catch (RBC) (or other levels of catch) causing a decline below limit reference <u>under proposed management</u> <u>Species that follow a HS rule that has been MSE tested will have a “very unlikely” score in this section (i.e. P<10%).</u>	<10% (very unlikely)	
	Alternative Catch Scenarios = N/A – Already considered to be below the limit reference point.	

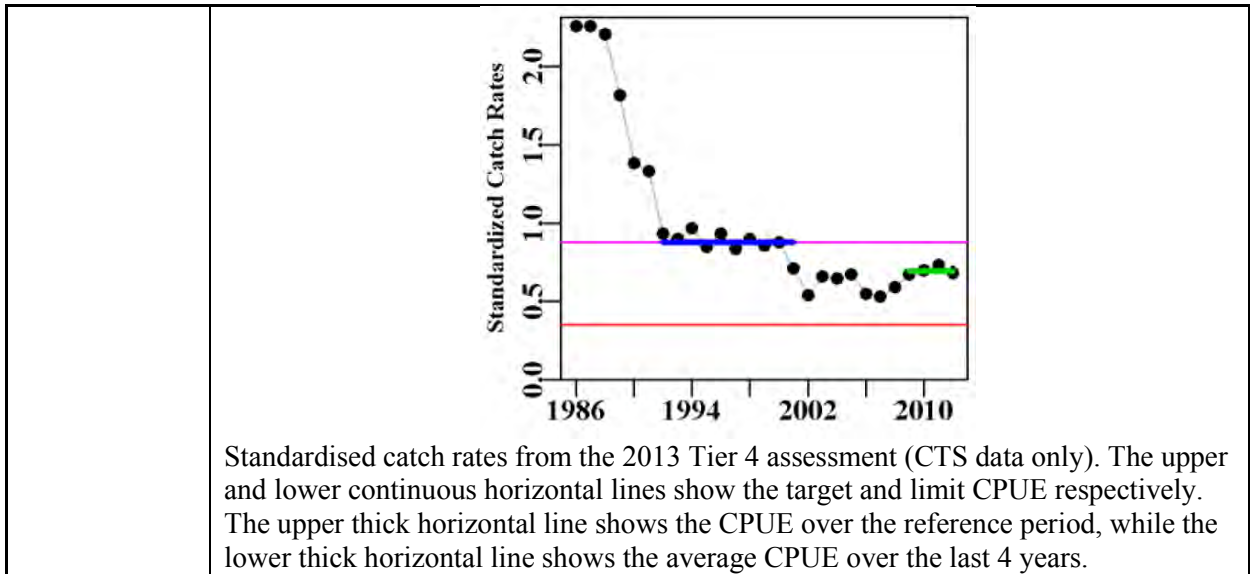
TAC and catch trends						
Assessment Year	2008	2009	2010	2011	2012	2013
Tier /rollover /MYTAC	Tier 4	Tier 4	Tier 4	Tier 1	Rollover of 2011 assessment	Tier 1 (Tier 4 used to set CTS TAC)
Stock Status	CPUE between the target and limit	CPUE between the target and limit	CPUE between the target and limit	78%	Rollover of 2011 assessment	Tier 1 - 74% Tier 4 - CPUE between the target and limit
Fishing Year	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
RBC (t)	120	102	93	613	613	676 (T1) 346 (T4)
Agreed TAC	125	109	94	141	199	
Actual TAC after overs/unders	135	118	86	147	211	
% TAC caught	50%	100%	80%	37%		

Tier Level & Discounts	
Tier Level	Tier 1- for details of Tiers and the Harvest Strategy, see: http://www.afma.gov.au
Discount factor	
Is a multi-year TAC in place?	<input type="checkbox"/> Yes (in place this season) <input checked="" type="checkbox"/> No
Is a multi-year TAC recommended? (please provide a clear indication on whether the multi-year recommendation is a RBC (e.g. based on Tier 1 model output) or TAC (e.g. a roll-over of catch))	<input checked="" type="checkbox"/> Yes • 3 year: 247t (RBC) <input type="checkbox"/> No
Breakout rules for multi-year TAC	
Have breakout rules been triggered?	NA



Assessment	
Stock indicator trends	The Tier 1 assessment indicates that the spawning stock biomass is estimated to have declined as a result of the relatively large catches between 2004-07, but is still above the 48% management target.
RAG comments	GABRAG has concerns about details of the Tier 1 assessment, particularly how a potential spawning/non-spawning component to the fishery may affect CPUE indices (especially if active targeting of potential spawning aggregations in the early part of the fishery has largely ceased). The RAG has expressed need to explore stock structure further.
Key model technical assumptions/parameters	Two sex models using separately aged otoliths from male and females (females grow faster than males). The last year of recruitment in model is 2009.
Changes to model structure/assumptions	N/A
Significant changes to data inputs	Significant change to weighting of one length frequency sample from 1997 has led to an increased revised biomass estimate.
Comments on data	
Implications for companion species/TEPs/multi-species fisheries	N/A

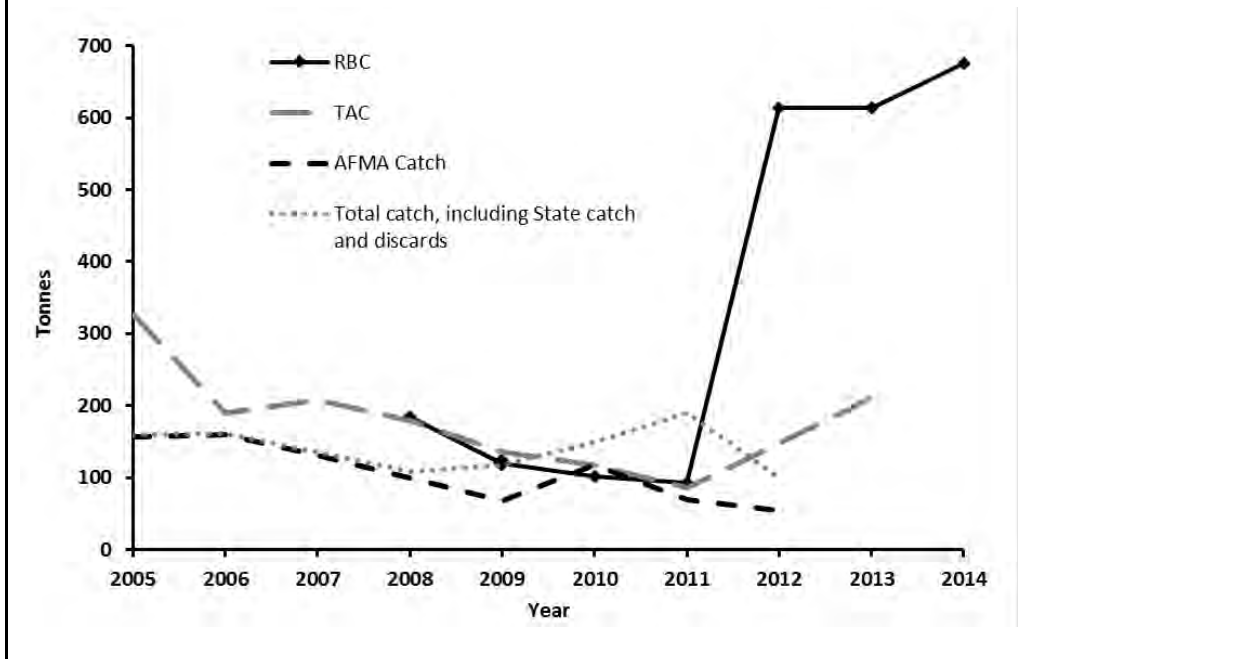




Research		
Research allowance		5 tonnes (to support sample collection for FRDC)
	<input type="checkbox"/> Included in TAC	<input checked="" type="checkbox"/> In addition to TAC

Catch trends

- The large increase in reported RBC is a result of the RBC after 2011 being based on a Tier 1 assessment using data from the entire SESSF, rather than being based entirely on the Tier 4 using CTS data.



Glossary

biological reference points – quantitative values, often stated in terms of fishing mortality or stock size, that summarise either a desired state for the stock (a target) or a state of the stock that should be avoided (a threshold).

biomass – the total weight of all the fish in a stock or a component of a stock.

B_{LIM} (biomass limit reference point) – The point beyond which the risk to the stock is regarded as unacceptably high.

B_{MEY} (biomass at maximum economic yield) – Average biomass corresponding to maximum economic yield.

B_{MSY} (biomass at maximum sustainable yield) – Average biomass corresponding to maximum sustainable yield.

B_{TARG} (target biomass) – The desired biomass of the stock.

B_0 (mean equilibrium unfished biomass) – Average biomass level if fishing had not occurred.

catch-per-unit effort (CPUE) – the number or biomass of fish caught as by a unit of fishing effort. Often used as a measure of fish abundance.

C_{TARG} (Catch target) – The target catch level.

CE_{LIM} (CPUE limit reference point) – the point below which CPUE is too low and can indicate stock depletion.

CE_{TARG} (CPUE target) – The target CPUE rate.

confidence interval – also called the confidence bound, a range of values within which the true value most likely lies.

F (fishing mortality) – The instantaneous rate of fish deaths due to fishing a designated component of the fish stock. F reference points may be applied to entire stocks or segments of the stocks and should match the scale of management unit. Instantaneous fishing mortality rates of 0.1, 0.2 and 0.5 are equivalent to 10 per cent, 18 per cent and 39 per cent of deaths of a stock due to fishing.

F_{LIM} (fishing mortality limit reference point) – The point above which the removal rate from the stock is too high.

F_{MEY} (fishing mortality at maximum economic yield) – The fishing mortality rate that corresponds to maximum economic yield.

F_{MSY} (fishing mortality maximum sustainable yield) – The fishing mortality rate that achieves maximum sustainable yield.

F_{TARG} (fishing mortality target) – The target fishing mortality rate.

index of abundance – numerical value used to demonstrate the trend in relative abundance over time.

Markov Chain Monte Carlo (MCMC) – an approach to estimate uncertainty in a statistical model by beginning with a final model and shifting its associated parameter values slightly to recalculate the model's goodness of fit thousands or millions of times.



Maximum economic yield (MEY) – The sustainable catch level for a commercial fishery that allows net economic returns to be maximised. For most practical discount rates and fishing costs, MEY implies that the equilibrium stock of fish is larger than that associated with maximum sustainable yield (MSY). In this sense, MEY is more environmentally conservative than MSY and should, in principle, help protect the fishery from unfavourable environmental impacts that could diminish the fish population.

Maximum sustainable yield (MSY) – The maximum average annual catch that can be removed from a stock over an indefinite period under prevailing environmental conditions. MSY defined in this way makes no allowance for environmental variability, and studies have demonstrated that fishing at the level of MSY is often not sustainable.

Mortality – Deaths from all causes (usually expressed as a rate or as the proportion of the stock dying each year).

Overfished – A fish stock with a biomass below the biomass limit reference point. 'Not overfished' implies that the stock is not below the threshold.

Overfishing, subject to – A stock that is experiencing too much fishing, and the removal rate from the stock is unsustainable. Also:

- Fishing mortality (F) exceeds the limit reference point (F_{LIM}). When stock levels are at or above B_{MSY} , F_{MSY} will be the default level for F_{LIM} .
- Fishing mortality in excess of F_{LIM} will not be defined as overfishing if a formal 'fish down' or similar strategy is in place for a stock and the stock remains above the target level (B_{TARG}).
- When the stock is less than B_{MSY} but greater than B_{LIM} , F_{LIM} will decrease in proportion to the level of biomass relative to B_{MSY} .
- At these stock levels, fishing mortality in excess of the target reference point (F_{TARG}) but less than F_{LIM} may also be defined as overfishing, depending on the harvest strategy in place and/or recent trends in biomass levels.
- Any fishing mortality will be defined as overfishing if the stock level is below B_{LIM} , unless fishing mortality is below the level that will allow the stock to recover within a period of 10 years plus one mean generation times the mean generation time, whichever is less.

spawning stock biomass (SB) – the total weight of all adult (reproductively mature) individuals in a population. Also called spawning biomass.

SB_{MSY} – Spawning or 'adult' equilibrium biomass at maximum sustainable yield.

stock assessment – an evaluation of the past, present and future status of the stock that includes a range of life history characteristics for a species, such as the geographical boundaries of the population and the stock; information on age, growth, natural mortality, sexual maturity and reproduction, feeding habits and habitat preferences; and the fisheries pressures affecting the species.



Guide to completing species assessment forms

This template is prepared to present RAG considerations to inform the AFMA Commission in setting Total Allowable Catches.

Who should complete this form?

RAGs should work together to complete this form as a group. One form should be completed for each species or basket quota species.

How to complete this form

Instructions on what to include in each section are provided in the form itself. Greater clarification has been provided for particular items and can be accessed by following the endnotes provided. RAGs should delete the endnotes in the form prior to submitting it to the Commission.

ⁱ Briefly summarise the current assumptions regarding stock structure and distribution.

ⁱⁱ Report the most likely stock status against reference points using the base case for the assessment. Trend should be in terms of stock size and fishing intensity.

ⁱⁱⁱ Provide assessments of biomass and fishing mortality using the most recent Fishery Status Reports by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES). Complete this section by:

1. using the dropdown lists to select an assessment option
2. insert status with cell colour. Note if species is under a rebuilding strategy.

^{iv} Taken from most recent ABARES report.

^v Potentially useful indicators might include:

- change in distribution of catch or effort by method
- non standardised CPUE
- standardised CPUE
- size, age composition and recruitment (if available)

Write 'NA' if not required.

^{vi} Use dot points to list the main data inputs for the assessment. In particular, note any *significant* changes to the inputs. For example, simple updates to catch and effort do not need to be noted.

^{vii} Include main data outputs (eg model calculated discards or productivity) and any data not used.

^{viii} Provide any RAG recommendations on companion or other species that will be affected, or will influence, the ability of a TAC to meet an RBC for this species.

^{ix} This section can only be completed for Tier 1 species as stock projections are not completed for Tier 3 and Tier 4 species. Delete this section if not required.



^x This section should be used to report any available information on likely future trends in biomass or related variables under the current (or a range of) catch levels over a period of approximately 3-5 years following the year of the last assessment.

^{xi} Research allowance is allocated when there is a specific research proposal available for the RAG to consider. In most cases the Research Allowance will come off the RBC during TAC calculations. Write '0' tonnes if a research allowance has not been allocated.

^{xii} This chart should allow readers of the Species Summary to rapidly see catches, RBC and TAC over the recent past (5-10 years).

