

SPF Scientific Panel draft advice November 2018

The Small Pelagic Fishery (SPF) Scientific Panel met on 26 November in Melbourne. The key items for discussion were:

- Redbait West Daily Egg Production Method survey results
- Annual assessment of SPF stocks and RBCs advice
- Research Priorities for 2020-2021 and upcoming DEPM schedule
- Data and monitoring strategy for the SPF
- Accounting for discards in the TACs

The Panel's draft recommendations / advice on these items is provided below. Further information on each of these items will be presented at the Stakeholder Forum meeting.

Redbait West Daily Egg Production Method survey results

A daily egg production method (DEPM) survey was undertaken during 2017 for the western Redbait stock for the first time. DEPM surveys underpin the SPF Harvest Strategy which is used to set the annual total allowable catches for the fishery. The survey area was from Kangaroo Island to the west coast of Tasmania.

Key outcomes from the survey and points of discussion by the Panel were:

- The survey collected 3,280 live eggs from 113 sites and provided a preliminary DEPM spawning biomass estimate for Redbait West.
- There were no obvious breaks in distribution observed in the survey and no eggs collected in Bass Strait. These results differ from the recent Jack Mackerel survey where a stock separation was observed. From the survey, Redbait West appear to have a more continuous spawning distribution over a larger area.
- The resulting spawning biomass estimates were largely driven by model selection and overall they provided conservative estimates of biomass.
- The most plausible model biomass estimate ranged between 51,765 tonnes and 102,867 tonnes. With no solid reason to reject either estimate and for consistency with the approach taken with other stocks, the median biomass estimate of 66,787 tonnes was used as the basis for the Panel's recommended biological catch level.

The Panel recommended the spawning biomass estimate of 66 787 tonnes be used as the basis for the recommended biological catch (RBC). This tonnage is based on the weight of evidence provided by the DEPM survey.

Annual assessment of SPF stocks and RBCs advice to inform the 2019-20 TAC setting process

The SPF Harvest Strategy applies harvest control rules to the available biomass estimates from DEPM surveys to determine a Recommended Biological Catch (RBC) for each SPF

quota species. Other sources of mortality are then applied to the RBCs to derive the total allowable catch (TAC) recommendations by AFMA Management.

The SPF Harvest Strategy also requires an Annual Fishery Assessment for the RBC processes under Tier 1 and Tier 2. At Tier 3, a review of available catch and effort data is undertaken. These are used to inform the Panel's advice as to whether there is a need to apply lower than maximum harvest rates. The Annual Fishery Assessment must include:

- length–frequency and age information from catches for each stock fished. Guidelines have been developed on the quantity of length–frequency data and otolith information required on an ongoing basis
- updated catch and effort data
- information on changes in spatial and temporal patterns of effort and catch.

The Annual Fishery Assessment also aims to provide evidence suitable for detecting stock depletion, localised depletion or changes in the size and age structure of the catch that cannot be adequately explained by reasons other than a decline in abundance.

A summary of the Panel's advice regarding any key points that arose out of the Annual Fishery Assessment for each stock, along with the RBC advice, is provided in Table 1.

To set the TAC, AFMA deducts other sources of mortality from the RBC.

Table 1: Draft Panel Advice on the annual assessment and 2019-20 recommended biological catches for SPF stocks

Species	Assessment results	Panel Advice	Recommendation for 2019/20
Jack mackerel east	<p>Annual Fishery Assessment.</p> <p>DEPM survey for jack mackerel conducted in 2014.</p> <p>Results published in March 2015 with a best estimate of biomass of 157 805 tonnes.</p>	<p>The Panel was provided with an overview presentation for Jack Mackerel east. There was an increase in catches in 2015/16 to 6,321 t, which has since been decreasing with a total catch of 2,751 t in 2017/18, well below the historical peaks of ~40,000 t in the 1986/87. Trawl effort in 2016/17 and 2017/18 was located off NSW. The 2017/18 catches were 1.74 per cent of the DEPM biomass estimate and 14.5% of the TAC. There is no discernible trend in CPUE.</p> <p>The species is now at the fifth season and Tier 1 and the Panel noted that industry have expressed they would like a new survey to be conducted in January 2019 to keep the species at the Tier 1 level.</p> <p>The Panel's advice for Jack Mackerel East was:</p> <p>The DEPM and associated adult sampling provided robust estimates of key parameters. Results published in March 2015 with a best estimate of biomass of 157 805 tonnes.</p> <p>The annual assessment provided no basis to change the Panel's previous advice for this species. The Panel agreed that the DEPM survey results were appropriate for setting jack mackerel RBCs under the Harvest Strategy for the 2019-20 season.</p>	<p>Fifth season at Tier 1</p> <p>RBC</p> <p>= 157 805 x 12%</p> <p>= 18 937 tonnes</p>
Jack mackerel west	<p>Annual Fishery Assessment.</p> <p>DEPM survey for jack mackerel conducted in 2017</p> <p>Results provide a best estimate of</p>	<p>The Panel was provided with an overview presentation for Jack Mackerel west. The Panel noted that there is continued low effort in the western area with 2017/18 catch <1 t despite the increase in catches to 634 t in 2015/16 and 686 t in 2016/17 (the previous peak was 365 t). A majority of the recent fishing effort was around Kangaroo Island.</p> <p>The CPUE is low but is reflective of the very low effort in the area. There is no discernible trend in CPUE.</p> <p>The Panel agreed that due to this variability in the data and sporadic fishing effort in the fishery over recent years that there is no reason for concern with the stock.</p> <p>The Panel reiterated its previous advice that:</p>	<p>Second season at Tier 1</p> <p>RBC</p> <p>= 34 978 x 12%</p> <p>= 4 197 tonnes</p>

Species	Assessment results	Panel Advice	Recommendation for 2019/20
	<p>biomass of 34 978 tonnes.</p>	<p>A DEPM survey for jack mackerel conducted in 2017 provided a best estimate of biomass of 34 978 tonnes (which is the 31, 069 plus the Bass Strait estimate) which was considered to be conservative given that the stock extends west of Kangaroo Island and a large amount of spawning activity was detected in Bass Strait which was not extensively sampled (and therefore the biomass estimate is an underestimate).</p> <p>On the basis of the information provided, the Panel agreed that the DEPM survey results were appropriate for setting jack mackerel RBCs under the Harvest Strategy for the 2019/20 season.</p> <p>The Tier 1 exploitation for this stock is 12%.</p> <p>Considering the limited information on jack mackerel to the west of Kangaroo Island and the spatial separation of the two key spawning areas (Kangaroo Island and western Bass Strait) which may be evidence of a stock structuring, the Panel recommended that, until more is known about the biomass and / or stock structure of jack mackerel west, the catch taken to the west of the Bonney coast should be restricted to 20 per cent of the RBC. This is equivalent to the proportion of the total spawning area found during the DEPM survey that was represented by this area.</p>	
Blue mackerel east	<p>Annual Fishery Assessment.</p> <p>DEPM survey conducted for blue mackerel in 2014.</p> <p>Estimated biomass 83 300 tonnes</p>	<p>The Panel was provided with an overview presentation for blue mackerel east. The catches peaked in 2017/18 at 3,119 t (previous peak of 2,368 t in 2015/16). The 2017/18 catches were 3.74% of the DEPM biomass estimate and 24.9% of the TAC with effort in 2016/17 and 2017/18 concentrated off NSW.</p> <p>The Panel noted that it remains difficult to draw conclusions from the length frequency and ageing data due to the variability in effort and fleets which would result in different sizes of fish being caught each year. There is no discernible trend in CPUE.</p> <p>Samples collected by the fishing vessel operating between 2015 and 2016 have been analysed and did not provide any further clarity around adult parameters consequently uncertainty around the adult parameters used in the calculation of biomass estimate remain. The Panel noted that the more precautionary exploitation rate adopted in the</p>	<p>Fourth season at Tier 1</p> <p>RBC = 83 300 x 15% = 12 495 tonnes</p>

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		<p>harvest strategy than the original MSE work suggested could be applied, accounts for the uncertainties in the DEPM biomass estimate.</p> <p>The annual assessment provided no basis to change the Panel's previous advice for this species. The Panel confirmed that the uncertainty associated with the adult parameters used in the DEPM remain however the DEPM survey biomass estimate of 83 300 tonnes is appropriate to be used as the basis for providing RBC advice.</p> <p>The current exploitation rate of 15 per cent is considered to be precautionary (as shown by the MSE testing by Smith et al 2015) and accounts for uncertainties in the assessment.</p>	
Blue mackerel west	<p>Annual Fishery Assessment.</p> <p>Estimated biomass 86 500 tonnes</p>	<p>The Panel was provided with an overview presentation for blue mackerel west. Recent catches of this species have been very low with 2017/18 catch <1 t (previous peaks were ~2,000 t in 2006 and 2008). The Panel noted that the size structures for this species with much larger fish in the west that don't appear in the east.</p> <p>There are no discernible trends in the CPUE data (given very low effort).</p> <p>The Panel noted that the most recent DEPM survey for this stock had been undertaken in 2005 and 2006. The Panel confirmed its previous support of the SPFRAG approach which adopted a biomass estimate for blue mackerel of 86 500 tonne based on the results of the two surveys that covered most of the western spawning area.</p>	<p>Third season at Tier 3</p> <p>RBC = 86 500 x 3.75% = 3 243 tonnes</p>
Australian sardines east	<p>DEPM survey conducted in 2015.</p> <p>Estimated biomass 49 575 tonnes</p>	<p>The Panel was provided with an overview presentation for Australian sardine east. Catches of this species peaked at 7,392 tonnes in 2016-17 due to a significant increase in Victorian State catches (previous peak of 4,690 tonnes in 2007-08). For 2017/18, total catch is 429 t (excludes Victorian catch data). Excluding the increase in 2016/17, catches were relatively stable at around 1,300 t from 2012-13 and 2015-16. The 2017-18 SPF catches were 0.86% of the DEPM biomass estimate and 4.33% of the TAC. There were no discernible trends in the CPUE data.</p> <p>The Panel noted that Victorian catches have not been provided due to confidentially concerns and the issue of data sharing is becoming a concern in multiple jurisdictions for a number of jointly managed stocks. However, this is not relevant to the RBC / TAC</p>	<p>Fourth season at Tier 1</p> <p>RBC =49 575 x 20% = 9 915 tonnes</p>

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		<p>setting process for the Commonwealth given the stock boundary corresponding broadly with the NSW / Victorian border.</p> <p>The Panel noted that two DEPM surveys have been undertaken for this species, a southern area survey (biomass estimate 10,962) was undertaken at the same time as the recent jack mackerel survey (Ward <i>et al.</i> 2015a) and a northern area survey (biomass estimate 49,575) was conducted at the same time as the blue mackerel east survey (Ward <i>et al.</i> 2015b). It was noted that the southern estimate is likely an underestimate.</p> <p>The annual assessment provided no basis to change the Panel's previous advice for this species. The Panel confirmed its previous recommendation to use the biomass estimate from the northern survey to determine a RBC for the northern area and that only the NSW State catches should be taken off the RBC when setting the TAC.</p> <p>This recommendation was based on recent research (Izzo et al. 2017, Ward et al. in prep, and Sexton et al. submitted to Fisheries Oceanography) that provides indications of stock structuring, with a north stock and south eastern stock (with the stock split occurring around the NSW/Victorian border).</p>	
Redbait east	<p>DEPMs conducted in 2005 and 2006</p> <p>Estimated biomass 68 886 tonnes</p>	<p>The Panel was provided with an overview presentation for redbait east. The catches in recent years continue to be low compared to the peak catches of ~7700 t in 2003/04, although catches increased from negligible levels to 217 tonnes in 2015/16 and 101 tonnes in 2016/17, however 2017/18 catches are again low at 10 tonnes. The 2017/18 SPF catches were 0.02% of the agreed DEPM biomass estimate and 0.3% of the TAC.</p> <p>There were no discernible trends in the CPUE data, with highly variable fishing effort and catches for this species and very low catches over the last 5 years. The length frequency data shows large fish however there are low sample numbers. With very low catches there is no basis to change the Panel's previous advice.</p> <p>The Panel noted the most recent biomass estimates from DEPMs in October 2005 and October 2006 of 86 990 tonnes and 50 782 tonnes, respectively. The annual assessment provided no basis to change the Panel's previous advice for this species. The Panel confirmed that the approach used by SPFRAG of adopting the average of these DEPM estimates (68 886 tonnes) should be continued, and the</p>	<p>Eighth season at Tier 2</p> <p>RBC = 68 886 x 5% = 3 444 tonnes</p>

Species	Assessment results	Panel Advice	Recommendation for 2019/20
		Harvest Strategy Tier 2 harvest rate for redbait of 5 per cent be used as the basis for RBC advice.	
Redbait west	<p>Annual Fishery Assessment.</p> <p>DEPM survey conducted in 2017</p> <p>Estimated biomass of 66 787 tonnes</p>	<p>The Panel was provided with an overview presentation for redbait west. The Panel noted that limited fishing for this stock has occurred over the last few years with no catch in 2017/18. In recent years, catches increased to 1,157 in 2015/16 and 1,140 t in 2016-17 (from previous peaks of ~3,000 t in 2005-2007).</p> <p>The CPUE is variable due to the intermittent fishing effort for this species making trends difficult to discern from the data. The Panel agreed that due to this variability in the data and extremely low fishing effort in the fishery over recent years that there is no reason for concern with the stock.</p> <p>A new DEPM survey for this stock was completed in 2017 with the Panel recommending a spawning biomass estimate of 66,787 tonnes be used for the recommended biological catch (RBC) based on the weight of evidence provided by the survey.</p> <p>With the new survey results accepted by the Panel, this species moves into Tier 1 under the Harvest Strategy with an exploitation rate of 10%</p>	<p>First season at Tier 1</p> <p>RBC = 66 787 x 10% = 6, 678 tonnes</p>

Research Priorities for 2020-2021

As part of the AFMA annual research cycle, MACs and RAGs are required to review the relevant fishery five year strategic research plans to identify the annual research needs. The process to develop the 2020-21 research priorities for the SPF has commenced with advice from the Panel to be considered by the South East Management Advisory Committee in 2019 before consideration by the AFMA Research Committee.

- The Panel agreed to maintain the current order of DEPM surveys noting that the Harvest Strategy framework allows the level of investment in research and assessment to be varied to match commercial interest in exploiting the resource while generating the information required to manage each stock. The schedule is:
 - Jack mackerel east 2018-19
 - Blue mackerel east 2019-20
 - Blue mackerel west 2020-21
- The Panel agreed to retain the annual monitoring and assessment of the fishery as a priority for 2020-21 noting that the project could be simplified in light of the revised sampling requirements and abbreviated report.
- The Panel added an additional research priority to improve the level of information regarding the distribution of small pelagic species to the west of Kangaroo Island, in the western quota zone. This project would use a method such as DNA barcoding to identify all species present in a large number of samples collected through other research projects. This project will provide valuable information on species distribution in a cost effective manner which can then be used to design more targeted DEPM surveys of stocks in this area. This project replaced the previous priority which had a similar objective of improving the level of understanding about stocks west of Kangaroo Island but with more conventional methods of sorting and identifying eggs.

Data and monitoring strategy for the SPF

The Panel discussed data and monitoring requirements in the fishery acknowledging that it underpins the evidence based decision making in the fishery. The Panel noted that throughout 2019, AFMA will be developing a data and monitoring strategy for the fishery, incorporating the work on sampling requirements and monitoring in the fishery to date.

In discussing data collection and monitoring, the Panel recommended:

- For commercial species, 30 samples of 20 fish for length estimates and 5 aged fish across all species are collected to support the annual fishery assessment in the fishery. It was agreed this level of sampling would provide confidence in estimating length and age parameters of SPF species. Sample collection should be spread throughout the year and can potentially be collected by industry given no processing of samples is required.

- For small bycatch species (as opposed to large bycatch outlined below) on board observer coverage between 5 – 10 per cent of effort would provide confidence in monitoring bycatch species caught in the fishery.
- For Protected species, marine mammals and large bycatch monitoring be reduced from 100 to 10 per cent review of Electronic Monitoring footage. This recommendation was based on the outcomes of footage review in the SPF to date, as well as evidence from both AFMA-managed fisheries and international work that this level of review is sufficient to achieve accurate reporting in logbooks.
- As risk to seabird interactions in the fishery is low (due to very little discarding of catch and the use of bird mitigation devices), that the deployment of mitigation be audited by Electronic Monitoring.

Accounting for discards in the TACs

The SPF Harvest Strategy outlines that to set the TAC, all significant known sources of mortality for each stock is subtracted from the RBC. The Panel discussed the development of an agreed method of calculating discards, to be applied to the SPF RBCs from 2019-20 onwards.

The Panel noted that:

- discards in the SPF are currently very low (generally less than 5 per cent of total catch). Only when discards become larger than the uncaught TAC do they become of concern.
- Generally discards are related to total catch so if discards are to be accounted for, a rate based approach, rather than an absolute tonnage deduction, is more appropriate. This is also consistent with the approach adopted in other fisheries.
- In light of its previous advice regarding how to estimate discards (by calculating a rate based on retained and discarded catch from the previous three seasons and applying that to the RBC), the Panel acknowledged the issue that arose when trying to apply this approach without accounting for the differences between the different methods in the fishery and the abrupt changes in the fleet.
- Consequently, the **Panel recommended that the discard rate should be calculated by vessel type to account for the differences in mid-water trawl and purse seine operations. In applying the discard rate, if there is to be no fishing expected by a sector in the upcoming season, the discard rate for the respective sector not be applied.**