



Australian Government

Australian Fisheries Management Authority



**Sub-
Antarctic
Resource
Assessment Group
(SARAG)**

**FINAL MINUTES
SARAG 59**

14 MAY 2019

SUB- ANTARCTIC RESOURCE ASSESSMENT GROUP (SARAG)

CHAIR: Prof John Buckeridge

Date: 14 May 2019

Venue: Australian Antarctic Division, Channel Highway, Kingston

Attendance

Members

Prof John Buckeridge, Chair
Dr Rich Hillary, CSIRO
Dr Philippe Ziegler, AAD
Dr Dirk Welsford, AAD
Mr Malcolm McNeill, Industry Member
Dr Heather Patterson, ABARES
Ms Jo Fisher, AFMA
Ms Sarah Kirkcaldie, Executive Officer, AFMA

Observers

Dr Jemery Day, CSIRO
Mr Trent Timmiss, AFMA
Mr Rhys Arangio, Industry Member
Mr Peter Neville, SouthMAC Chair

Mr Dale Macchette, AAD*
Ms Lihini Weragoda, AAD#
Ms Gill Slocum, AAD#
Mr Josh Van Limbeek, AAD#

*Agenda items 18 only

#Agenda items 9 only

Introduction

Agenda item 1 - Preliminaries

The fifty-ninth meeting of the Sub-Antarctic Resource Assessment Group (SARAG 59) was opened at 9:05 am on 14 May 2019 by the Chair, Professor John Buckeridge.

1.1 Declaration of interests

Professor Buckeridge asked members and observers to state their name and profession and declare any conflict of interest that they may have on specific agenda items.

Professor Buckeridge declared he has no pecuniary interest in the sub-Antarctic fisheries.

Dr Hillary advised that he is employed by CSIRO and is the Principal Investigator of the MITF stock assessment. He also advised that he is a member of AFMA's Southern Bluefin Tuna Management Advisory Committee (SBTMAC) and Tropical Tuna RAG. Dr Hillary advised that he has no pecuniary interests in the sub-Antarctic fisheries.

Mr McNeill advised he is the Managing Director of Australian Longline P/L which holds various fishing rights in, and operates vessels in the sub-Antarctic fisheries and New and Exploratory fisheries under the jurisdiction of CCAMLR. Mr McNeill further advised he is a member on



SouthMAC, Board member of the Coalition of Legal Toothfish Operators (COLTO). Mr McNeill was not aware of any investigation or prosecution action by AFMA against his Company or of any legal action taken by his Company against AFMA.

Dr Welsford advised that he is employed by the Australian Antarctic Division (AAD) and no research grants contribute towards his salary. Dr Welsford advised that AAD get core funding but also seek grants from Fisheries Research and Development Corporation (FRDC) and AFMA. However, members noted that Dr Welsford salary was not connected to the FRDC grants. Dr Welsford further advised he is the Scientific Committee representative to CCAMLR, Chair of the Working Group for Fish Stock Assessments (WG-FSA) and a member on the Torres Strait Scientific Advisory Committee.

Dr Ziegler advised that he is employed by AAD and is the Fishery scientist responsible for HIMIF work including the HIMI stock assessments. Dr Ziegler has no pecuniary interest in the sub-Antarctic and his salary is not connected to any research grants noting that he is a co-investigator on a FRDC project and future FRDC projects. Dr Ziegler informed members that he is also a member SouthMAC.

Ms Fisher advised she is employed by the Australian Fisheries Management Authority (AFMA) as the Manager for sub-Antarctic fisheries at AFMA. Ms Fisher advised she has no pecuniary interests in the sub-Antarctic fisheries.

Ms Kirkcaldie advised she is employed by AFMA as a Senior Management Officer and advised that she is also the Executive Officer for Sub-Antarctic Management Advisory Committee (SouthMAC) and the Southern Bluefin Tuna MAC (SBTMAC). Ms Kirkcaldie advised that she has no pecuniary interests in the sub-Antarctic fisheries.

Dr Patterson advised she is an employee of the Department of Agriculture and Water Resources and is the Editor of the Australian Bureau of Agricultural Resource Economics and Sciences (ABARES) Fishery Status Reports. Dr Patterson noted that she had no pecuniary interest in the sub-Antarctic fisheries.

Mr Arangio advised that he is an observer to SARAG. Mr Arangio is employed by Austral Fisheries P/L that owns Statutory Fishing Rights (SFRs) in the Australian sub-Antarctic fisheries and waters under the jurisdiction of Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). Mr Arangio further advised he is the Executive Officer of COLTO, as well as being a member of SouthMAC and AFMA's Commonwealth Fisheries Marine Mammal Working Group. He was not aware of any investigation or prosecution action by AFMA against his Company or of any legal action taken by his Company against AFMA.

Dr Jemery Day advised that he is employed by CSIRO and works on the MITF stock assessment. Dr Day advised that that he has no pecuniary interest in the sub-Antarctic fisheries.

Mr Trent Timmiss advised he is employed by AFMA as a Senior Manager, Tuna and International fisheries that he is also the member on the Tropical Tuna MAC (TTMAC) and SBTMAC. Mr Timmiss advised that he has no pecuniary interests in the sub-Antarctic fisheries.

Mr Neville declared that he was the Principal of a fisheries consulting business (P.J.Neville & Associates) and Chair Fisheries Research and Development Corporation's (FRDC's)



recreational fishing sub-program. Mr Neville advised that he is the Chair of SouthMAC and has no pecuniary interest in the sub-Antarctic fisheries.

Mr McNeill and Mr Arangio declared their interest under all agenda items. The member and observer left the room. SARAG then discussed whether the members and observer needed to leave the room for any agenda items; it was agreed that, as their input was essential to the agenda items, they should remain in the meeting room for all discussions.

1.2 Apologies and observers

Apologies were received from industry member, Martin Exel. Members noted that Mr Exel had not re-applied for SARAG so this would have been his final meeting as a member. SARAG agreed to write a letter to Mr Exel to thank him for his outstanding contribution to SARAG since it was formed in 1997.

1.3 Agenda

SARAG adopted the agenda with the addition of CCAMLR New and Exploratory fishery applications.

Agenda item 2 – Adoption of minutes from SARAG 58

Members noted that the draft minutes from SARAG 58 held on 29 August 2018 were circulated for comment on 20 September 2018. Comments were received from Mr Martin Exel and Mr Arangio. Members noted that the minutes from the SARAG 58 meeting are now finalised.

Agenda item 3 – Actions arising from SARAG 58

Item	Action arising	Status
1	Tags - AAD agreed to investigate if tags from the trawl fishery could be used in the stock assessment (SARAG 58 Actions arising 57).	At SARAG 57 and 58 AAD informed members that they had not fully investigated whether tags from the trawl fishery could be used in the stock assessment. AAD provided a verbal update to SARAG 59 noting that there had been no progression of this action arising (Action arising 1).
2	Macquarie Island longline season extension – AFMA to extend the MITF longline season by a week at the end of the season (SARAG 58 Actions arising 57).	Members noted that this item was discussed under Agenda item 7.



3	MITF stock assessment – CSIRO to present new MITF stock assessment at SARAG 59 and it will include catch and tag data for 2018 and ageing work up to and including 2017 (SARAG 58 Agenda item 6).	Members noted that this item was discussed under Agenda item 6.
4	Toothfish stock assessment – AAD to enquire with team developing CASAL 2 to fix tag loss issues as part of revisions (SARAG 58 Agenda item 10).	AAD noted that they are currently discussing this issue with New Zealand scientists who are developing CASAL 2 and that it will include revised tag loss functions within this redevelopment. Members noted that New Zealand is losing a senior stock assessment Scientist and this will slow down the process of introducing CASAL 2.
5	HIMI season extension trial – AFMA and AAD to review the data collected during the HIMI season extension trials and develop criteria to enable a long-term management regime of three longline fishing periods (pre-season, core season and post-season) (SARAG 58 Agenda item 10).	Members noted that this item was discussed under Agenda item 12.
6	Management history of sub-Antarctic fisheries – AFMA to update the management history and provide to members. (SARAG 58 Agenda item 20).	SARAG noted that this action arising was completed and the document was updated and distributed to members on 14 September 2018.
7	Observer duties – AFMA to update the longline observer duties (SARAG 58 Agenda item 21).	SARAG noted that this action arising was completed. AFMA will continue to update the observer duties as required.

Agenda item 4 – Correspondence

SARAG noted the following correspondence which had been received out-of-session since the last meeting in August 2018:

- An email dated 20 November 2018 from Sarah Kirkcaldie informing members that RAG membership are due to expire in June 2019 and informing members of the process;
- An email dated 12 March 2019 from Sarah Kirkcaldie requesting that the date of the May 2019 meeting is changed to Tuesday 14 May 2019;
- An email dated 14 March 2019 from Sarah Kirkcaldie stating that the meeting dates have been moved to Tuesday 14 May 2019;



- An email dated 25 March 2019 from Sarah Kirkcaldie attaching a call for SARAG members; and
- An email dated 10 April 2019 from Sarah Kirkcaldie seeking comments from members on the draft agenda for the May 2019.

Agenda item 5 - Fishing operations update

Mr McNeill and Mr Arangio provided SARAG with verbal updates on fishing operations in the Heard Island and McDonald islands Fishery (HIMIF), Macquarie Island Toothfish Fishery (MITF) and CCAMLR Exploratory fisheries.

Mr McNeill stated that Australian Longline Pty Ltd (ALPL) had two successful trips to HIMIF in the 2017/18 season and caught all of their quota. ALPL then leased quota from Austral fisheries Pty Ltd and caught that as well. Members noted that the MITF 2018/19 season started slow with low catch rates in the first trip which unloaded into Hobart. However, the second trip had very high catch rates and ALPL caught all of the quota in the MITF and no fishing occurred during the season extension.

Mr McNeill noted that one vessel fished in the CCAMLR statistical 88.1 in the 2018/19 Exploratory fishing season but the area closed quickly and the vessel moved in to area 88.2.

SARAG noted that the 2018/19 HIMIF season had started slowly; however there had been an increase in both the number of whale sightings and depredation on the lines. Mr McNeill explained that in the 2019/20 MITF season the vessel had to return to port twice (for a sick crew member and then an issue with the rudder) resulting in the vessel being out of the fishery for 14 days. Members noted that the vessel had just started fishing again and that catch rates were good and that DNA samples would be collected during this trip.

Mr Arangio noted that Austral fisheries 2017/18 HIMIF season had not been as successful as ALPL and they had about 380 tonnes of uncaught quota at the end of the season. Members noted that the company had three vessels fishing until the end of the season on 30 November 2018 and then the fishing vessel *Atlas Cove* began trawling for Mackerel icefish in the new season on 1 December 2018. Members noted that while all the icefish quota has been caught for the season, catch rates were lower, averaging 9t/day, compared to recent years around 25t/day. The *Atlas Cove* returned to Port before returning to HIMI to conduct the RSTS and then began longlining on 1 April 2019 with the other two Austral fisheries vessels (*Isla Eden* and *Corinthian Bay*). Mr Arangio noted that catch rates were stable compared to the last couple of years and that there had been a lot of whale sightings. Members noted that the whales appeared to be more aggressive this season and were relentless in following vessels and depredation.

Mr Arangio further noted that in previous seasons Austral would get on average 6-7 kg Toothfish but now getting 5-6 kgs fish.

SARAG also noted the update provided by the AFMA observer section.

Deployments

Since SARAG 58, eleven fishing voyages have been completed in the Southern Ocean Fisheries: two Exploratory Fisheries voyages, one Macquarie Island Toothfish Fishery (MITF) voyage, and eight Heard Island and McDonald Islands Fishery (HIMI).



Tagging

Since SARAG 58:

- 2672 toothfish have been tagged at HIMI (584 recaptured);
- 44 toothfish have been tagged at Macquarie Island (5 recaptured); and
- 738 have been tagged in the Exploratory Fisheries (15 recaptured).

1049 skate were also tagged at HIMI (40 recaptured).

Observer feedback

Observers have indicated that crew are generally friendly and co-operative in regard to observer requirements, with no issues with tagging or general assistance. Any company/ voyage specific feedback from an observer is provided directly to the company by the Technical Co-ordinator. A few repairs were undertaken in observer cabins to address WH&S concerns.

Internet access

Internet access via WIFI has been implemented for observers on all Southern Oceans vessels. There have been teething problems identified on some of the newly equipped vessels. Observers have experienced intermittent access, trouble with uploading/downloading emails which may be due to the internet bandwidth (speed and reception), type of modem installed and how many people are trying to access it at the same time. AFMA are working with Industry to try to resolve issues to ensure observers have adequate access to communication technology, providing reliable independent and secure communications between observer and professional and private support services and family.

Requests for sample and data collection by the Observers

Sampling Antarctic Toothfish tissue at HIMI has ceased.

AFMA has been asked for a small number of whole blobfish from Macquarie by CSIRO/MNHN. The standing request for Macquarie skates continues.

Some test deployments of prototype lice traps were carried out on the *Antarctic Chieftain* in East Antarctica.

Whale listener

The whale listener mooring that was deployed last season in the HIMIF was recovered by *Atlas* Cove with the AFMA Observer operating the acoustic release equipment. It has been downloaded and sperm whale calls were recorded, however they have not been analysed yet.

Vessel re-fits

The AFMA Observer section and AAD have been working with ALPL and Austral Fisheries to identify workstation needs and consider WH&S issues during the outfit of new vessels. Both AFMA and AAD greatly value the opportunity to engage early in vessel design, to ensure that observer requirements can be met in a way that is as cost-effective and practical as possible.

New Observers

Henry Wilson (AN21) and Ben Kelly (CB14) are currently deployed on their first Southern Oceans voyage. At this stage they both are keen to undertake more voyages next season.



Thank you to crew from both companies for providing support and co-operation to ensure their first voyage is good introduction to Southern Ocean deployments.

AFMA is looking to train up to four new observers to add to the pool of observers ready to be deployed in Southern Oceans. Anytime a new observer or DCO is deployed, AFMA works with Capfish to pair new observers with experienced observers.

For more information please contact Justine Johnston on 02 6225 5415, Justine.Johnston@afma.gov.au

Macquarie Island Toothfish Fishery

Agenda item 6 – Macquarie Island stock assessment

6a) Macquarie Island Patagonian Toothfish 2019 stock Assessment

SARAG discussed the CSIRO prepared report “Preliminary stock assessment of the Macquarie Island fishery for Patagonian toothfish (*Dissosostichus eleginoides*) using data up to and including August 2018 using Stock Synthesis”. The assessment uses a spatial model that fits to data from the entire Macquarie Island toothfish Fishery, and assumes a single reproductive stock, but takes into account spatial structuring of the population within the region. Members noted that the delineation between north and south was a very clear line at 54 25° South. Dr Day stated that in the last two years when the northern catches have been low the TAC was under caught. However, in 2018 the catch in north was bigger and TAC was closer to being caught.

SARAG noted that the new data include in this assessment includes:

- catch 2017 - 18
- length frequencies 2017-18
- tag recaptures
- age at length 2017 only

Members noted that the outcomes from the assessment were very similar to those in 2017. The base case current female spawning biomass estimate was 70% of unfished at the start of 2019 (69% in 2017).

SARAG noted that a bridging analysis was conducted that showed that estimates of growth, selectivity plots, recruitment and length frequencies for trawl (up to 2008) were all very similar to the last assessment.

Dr Day stated that the an issue with the stock assessment this year appears to be the recruits to the northern area. SARAG noted that the difference between north and south is growing with spawning depletion estimated to be 32% in south (previously 48%) but is 77% in north. Members noted that this would not be an issue if fish from the north were migrating to the south. Dr Day noted that historically three-quarters of the catch has come from the south. Dr Day noted that depletion has stabilised in the south. Members noted that CSIRO do not believe that the data indicates the Fishery is two stocks. Dr Day noted that factors that could be affecting the



results include that if the vessel finds a good area they can take 20% of TAC in a short period of time and fish would all be similar size and also the impact of the Marine Protected Area.

SARAG also noted that the MCMC is having difficulty converging (it has currently been running for 28 days and is only three-quarter of the way through) and CSIRO believe the model structure may be the problem, and that this issue is expected to worsen in coming years as more parameters (eg tagging data) are estimated in the model as the number of years of data increases. Members noted that stock synthesis 2 (SS2) software is no longer a supported software version and expressed concerns with using a model that isn't actively supported.

Members noted that AAD agreed to prepare a map outlining the boundaries of the three MITF fishing areas: the Northern Macquarie Ridge, the Southern Macquarie Ridge and the Aurora Trough. AAD agreed to provide the map with draft boundaries at the next meeting of SARAG.

6b)

Tag shedding

Dr Hillary presented the paper titled "Estimates of tag shedding in the Macquarie Island Toothfish tagging program". Members noted that when the current stock synthesis model was being constructed there was little indication of high levels of tag shedding. As a result, subsequent assessments have assumed effectively zero tag shedding (or mortality). The current data set is now bigger (both in terms of time-at-liberty and overall numbers) and when developing a new model, it was important to provide estimates to use.

Members noted that there were a number of different data sets that could be used to address the issue of tag shedding. Dr Hillary explained that only the recaptures that had a PIT tag were used and the re-released fish were not used. Members noted that just under 1300 recaptures were used in the analysis with the time-at-liberty ranging from 0.5 to 17.5 years. Dr Hillary explained that even for 10 years-at-liberty (longer than the maximum recapture time-frame in the revised assessment), the probability of retaining at least one tag, given double-tagging at release, is around 92-93%. Members noted that the more complex model is not significantly better and it does not significantly improve the fit given by the basic model.

The data confirmed that tag shedding is very low in MITF and unlikely to be a major cause of bias in abundance, but that the low level of tag shedding estimated from the basic model would be used in developing the new stock assessment model.

Update growth estimates in MITF

Dr Hillary presented the paper titled "Estimates of growth parameters for input to the revised stock assessment model". Members noted that this paper details the estimation of the key growth parameters used as inputs to the revised assessment for the reference case.

Dr Hillary explained that he used a conditional age-at-length statistical framework to estimate the key growth parameters and distribution for both sexes and data from 1996 to 2017 was included.

Members noted that males seem to grow faster initially, but to a smaller length and as a result, size-at-age (and weight) of females is greater than males from about age 5 onwards. The key



mean length parameters are all very accurately estimated and variability in mean length-at-age is very well estimated and similar for both sexes.

SARAG noted that given the accuracy of the estimates it would be appropriate to use these estimates as fixed inputs to the revised stock assessment model, though sensitivity analyses that estimates growth parameters should be undertaken in a revised stock assessment.

Proposed revised stock assessment for MITF

Dr Hillary's final paper presented to SARAG 59 was titled "Proposed new assessment structure for Macquarie Island Toothfish using data up to and including 2018".

Members noted that the reason for moving from the stock synthesis (SS) to a custom-designed model was because the SS2 software was unsupported and was a modification of a previous version of SS. Members further noted that another reason a new model was required was because a systematic overhaul was required to deal with how the tagging data are included in the assessment.

SARAG noted that the four primary data inputs to the model are catch biomass, length frequency, conditional age-at-length and tagging data and that these are the same as the current assessment.

The model was run, similar to the current SS assessment, as a two-region model with a Northern and Southern region.

Members noted that the structure of the tagging data is the major difference between the previous assessment, and the revised assessment. The new model is specifically designed to incorporate tagging data, whereas tagging data is incorporated as an add-on to the SS2 model. Tagging design work previously discussed showed that a reformulation of the likelihood of the tagging model into the so-called "spatial Brownie model" would consistently improve estimates of migration rates whilst attaining the same precision in spatial abundance.

SARAG noted that another key difference is how the data weighting is included and instead of a tuning-type approach, CSIRO used a more flexible likelihood function (for the length and tagging data).

The model uses updated MCMC algorithms to run the model and this takes hours rather than the days/months for the SS2 model. Members noted that the new model is more flexible and will future proof the assessment.

Dr Hillary agreed to do a formal comparison of the old and revised model and present it at the next SARAG meeting (**Action arising 2**). SARAG agreed that the recommended biological catch (RBC) should be calculated using the new model and it was important to choose to use the revised model prior to considering the RBCs produced by each model. SARAG requested that if it is possible to calculate the RBC using the old stock synthesis model could that be included in the comparison document.

Industry questioned whether the Marine Stewardship Council (MSC) needed to be advised about the move to a new stock assessment model. The AFMA observer noted that SARAG



needed to carefully document and justify why the Fishery is using a revised model to retain MSC certification.

Agenda item 7 – Extension of Macquarie Island season

Members noted that SARAG 57 considered and supported the request from Industry to extend the MITF longline season by one week. Following SARAG 57, SouthMAC and the AFMA Commission also supported the one-week extension to the 2018 longline season. The AFMA member noted that subsequently the MITF statutory fishing rights conditions were amended to extend the 2018/19 season to 7 September 2018 but due to good catch rates early in the season the extension was not required.

SARAG noted that the one-week extension has been applied again to the 2019/20 MITF longline season and the longline season dates are 15 April to 7 September 2019. Members noted that the observer report for the 2019 trip will be used by AAD and AFMA to assess whether bird observations are higher in the first week in September compared to the last week in August. This will be referenced with number of hooks set in each week and whether any birds have been caught.

Industry queried that, given the vessel had unexpectedly returned to port twice already this season, that consideration be made for an additional week to the extension period so that the longline season extends to 14 September 2019. AAD stated that as long as risk to birds is managed, there are unlikely to be any impediments to 1-14 September extension being a longer term arrangement, although it was noted that some bird populations around Macquarie Island are small, so there is a need to minimise risk.

SARAG agreed that industry should write to AFMA requesting an additional week at the end of the 2019 longline season (**Action arising 3**).

Heard Island and McDonald Islands Toothfish Fishery

Agenda item 8 – William’s Ridge SIOFA update

SARAG noted that at the SIOFA’s Scientific Committee meeting in Japan in late March 2019, discussions included recent toothfish catches from William’s Ridge and Del Cano Rise. SARAG noted that Spanish fishing boats went to William’s Ridge last year for first time and went there again early this year. Members noted that the area hadn’t been fished since illegal, unreported and unregulated fishing was prevalent in the area.

AAD advised that they had presented a paper to the Scientific Committee of SIOFA showing the scientific evidence that the William’s Ridge catches had come from the same population as the HIMIF. AAD noted that discussions were difficult and that Australia argued that fishing should stop until management measure are in place. SARAG noted that the SIOFA Scientific Committee recommended that the SIOFA Meeting of Parties urgently consider adopting temporary measures to regulate toothfish fishing on William’s Ridge at levels commensurate with fishing activities reported in 2016, which is effectively zero.

Members noted that since Scientific Committee meeting the EU has back-tracked on the recommendation and the Australian government and France/EU are currently in discussions to



come up with proposal that is acceptable to all parties. SARAG noted that the SIOFA Meeting of Parties will convene in July to further discuss this issue.

SARAG noted with concern recent developments in SIOFA and supported the outcomes from Scientific Committee meeting. Members noted that SARAG's role is to consider to how to include catches in stock assessment. SARAG thanked Dr Ziegler for representing AAD at the meeting and Mr Rhys Arangio who represented Industry. On behalf of industry, Mr Arangio thanked AAD, AFMA and the Department of Agriculture and Water Resources and especially Dr Ziegler for achieving the various agreements and recommendations.

Agenda item 9 – Patagonian Toothfish stock assessment

SARAG welcomed AAD observers (Lihini Weragoda, Gill Slocum and Josh Van Limbeek) to the meeting.

AAD presented the paper titled “Draft integrated stock assessment for the Heard Island and McDonald Islands Patagonian Toothfish (*Dissostichus eleginoides*) fishery in Division 58.5.2”.

Compared to the 2017 assessment this assessment takes into account:

- new fishery observations up to the end of 2018 including new ageing data from the RSTS and commercial fishery from 2017-2018
- inclusion of mortality from longline gear loss;
- updated growth parameters;
- updated length-weight relationship; and
- updated maturity parameters.

Members noted that the 2019 assessment addresses recommendations from WG-FSA-17 on revising the maturity function and the CCAMLR Independent Stock Assessment Review included;

- The 2019 assessment assumes that the total catch in 2019 is taken. It also includes the SIOFA catch on William's Ridge (339 tonnes in 2018 and an assumed 300 tonnes in 2019);
- As recommended at SARAG 58, the 2019 assessment includes mortality from longline gear loss. The mortality is estimated from hooks lost or retrieved after at least 5 days of setting and only includes gear loss events with over 100 hooks lost. The number of hooks lost is multiplied with geometric mean of catch per hook for that year. Industry sought clarification on when gear is deemed lost (ie how many hours/days) and AFMA and AAD agreed to provide clarification (**Action arising 4**);
- Growth was re-estimated which accounts for size selectivity and length (L infinity 1504mm whereas it was estimated as 2116mm in 2015);
- Re-estimation of length-weight. Members noted that the catch was slightly lighter for length than previously estimated; and



- Re-estimation of maturity. Members noted that in 2017 the maturity based on macroscopic stages 2+ but this was criticized by the Working Group on Fish Stock Assessments at CCAMLR. In 2019 the maturity is based on histological samples. Members noted that it was a difficult model fit and the 'average' was chosen which resulted in an older maturity-at-age. AAD explained that the data does not fit well regardless of model. Histological samples are from one trip, which were not actually collected for this purpose. Toxic chemicals are involved in the collection of these samples and therefore it is difficult to do.

SARAG noted that the updated assessment model leads to a smaller estimate of the virgin spawning stock biomass B_0 than that obtained in 2017, with an MCMC estimate of 59 616 tonnes (95% CI: 55 054 - 64 542 tonnes). Estimated SSB status at the end of 2019 was 0.53 (95% CI: 0.50-0.56). The smaller biomass meant that the catch limit that satisfies the CCAMLR decision rules decreased from 3525 tonnes to 2770 tonnes. Members expressed concern that over the course of the projection period the median SSB status reaches a minimum of 37% before increasing to the target level at the end of the 35-year projection period, a pattern that is largely driven by below-average year class strength since 1998. Members noted that the stock assessment model estimated that Year Class Strength (YCS) was above average in the late 1980s and at or below average since the mid-1990s. AAD stated that the driver for this YCS trend and whether it is likely to continue into the future is unclear, i.e. whether below-average YCS should be assumed for in the expected future recruitment pattern. This YCS trend, together with the effects of the fishery having moved from trawl to longline, strongly determines the shape of the projections where the stock status drops further for some years before recovering during the 35-year projection period.

AAD stated that the lower biomass estimates were mainly driven by the re-estimated maturity function. This maturity function was estimated from histological samples from fish which had been collected in 2011 as part of a project to evaluate the spawning dynamics at HIMI. The maturity-at-age data were noisy with a large age range where about 50% of fish were mature. This pattern caused problems for fitting a suitable model, and the model chosen was a compromise between fitting to the maturity of younger and older fish. The re-estimated maturity-at-age function predicted that fish were mature at an older age, leading to a smaller spawning biomass estimate by the stock assessment model. Members recommended that as the maturity data set was small and potentially not representative of the entire fished stock, that more research is required to improve the estimation of maturity-at-age. SARAG agreed that the Yates et al (2017) gonad staging data was the more reliable data as it had been peer reviewed and agreed to use this data and assume no fish were mature until age 5.

Members noted that AAD had undertaken a bridging analysis and a retrospective analysis which involved a step-wise deleting of data. Members noted that the retrospective analysis gives information if data from particular years is different from the rest. AAD stated that the data appears consistent between the years.

SARAG noted that AAD will take the new maturity function to CCAMLR working group on Fish Stock Assessment meeting in June and then input into stock assessment which will then be presented to SARAG at the August meeting.

Industry expressed concern regarding the previous decision to do a stock assessment every two years given the current situation and questioned if a stock assessment needs to be done next year. AAD noted that the re-estimation of maturity will take two years and it was agreed that the timing of the next stock assessment would be discussed at the next meeting.



SARAG thanked Dr Philippe Ziegler for presented the preliminary stock assessment for Patagonian Toothfish in the HIMIF.

Agenda item 10 – Skate and Ray bycatch

SARAG noted that as at 20 April 2019, 56.50 tonnes, or 47.09%, of the 120 tonne skate bycatch limit had been caught. Members noted that the majority of the skate bycatch is caught when trawling for icefish which had now ceased for the 2018/19 season. Industry noted that in previous seasons when icefish catch rates have been low like the current season the skate bycatch has been high. Industry stated that they do not believe they will reach the skate bycatch limit in the 2018/19 season.

SARAG noted that the skates caught when trawling (shallow water skates) are different to the skates caught when longlining (deeper water skates) for Patagonian Toothfish. Members discussed the potential of running an assessment for skates similar to one conducted for the two morphs of grenadier. AAD noted that this work is planned for the second half of the year but noted that they believe CCAMLR will be against any increase in bycatch limits. Members noted that two years ago there was an attempt to increase Macrourids bycatch but it was not accepted by CCAMLR (in East Antarctic). Members noted that skates have been tagged but there are not many returns.

SARAG agreed that AAD will prepare work on a skate stock assessment and present it at the next SARAG meeting (**Action arising 5**).

Agenda item 11 – Trawl gear modification trial to reduce skate bycatch

SARAG noted that Industry are concerned that when fishing, particularly trawling, for Mackerel icefish they catch a lot of skates. Whilst in the last few years this has not been a problem, industry is concerned that if the icefish quota increases in future years, the skate bycatch limit could be reached before the end of the season. Industry have been discussing the issue with their skippers and looking at trawl rigs to reduce bycatch of skates. Industry presented a design to SARAG which is 30% lighter than current gear but has smaller bobbins and smaller disc than is currently allowed under the HIMIF Regulations which specifies a minimum size. Industry explained that they only want to modify the trawl gear when fishing for icefish not when doing the RSTS. Dr Welsford noted that the bottom fishing impact study that AAD undertook assumed that anything in front of trawl was impacted regardless of bobbin size. Members did not express any concerns with using a lighter rig for fishing for Mackerel Icefish and AAD suggested that a trial could compare the two set ups.

The AFMA observer proposed to take the net and bobbin size requirements out of the HIMIF Regulations (*Fisheries Management (Heard Island and McDonald Islands Fishery) Regulations 2002*) as part of the current Regulation amendment process, noting that it takes 18 months – 2 years to amend Regulations. SARAG noted that AFMA will place requirements regarding gear in the Statutory Fishing Right conditions which are easier to amend quickly.



SARAG supported Austral fisheries running gear trials for 12 months either through SFR conditions or a scientific permit. SARAG supported implementation of new gear requirements if the trial proves that the new gear specifications reduce bycatch.

Agenda item 12 – Results of season extension trial

SARAG noted that in the HIMIF there is currently a core longline season, season extensions and then trial season extensions which were endorsed at CCAMLR XXXIV. At SARAG 58 members noted that the required number of hook sets for the HIMI Fishery season extension trials had been reached:

- a cumulative total of at least 500,000 hooks had been set during daylight between 1 and 14 April; and
- a cumulative total of at least 500,000 hooks had been set (during day and/or night) in the periods 1 to 14 November and 15 to 30 November.

AAD presented a paper summarising the results of the final analysis of the HIMIF longline season and found that the core (1 May – 14 September) and post extension (14 September – 31 October) had the same risk and the pre-season extension (1-14 April) and trial extensions (1-30 November) had similar, yet higher risks which was around 10-15 times higher risk than the core season, but similar to the existing 15-30 April approved extension period. Industry expressed concern that stating 10-15 times higher risk appeared negative when the risk was still very low. SARAG noted that trial has been a success. SARAG agreed that the trial periods should be incorporated in to the season extensions noting that this will require no changes to CCAMLR conservation measures.

It was proposed that the core season would extend from 1 May to 14 September. The season extension periods would apply from 1 – 30 April and 15 September – 30 November and a three-seabird limit would apply to all extension periods. AAD further agreed to amend the paper to compare the risks of the new season extension periods to the already agreed 15-30 April extension period.

SARAG noted that this issue would be discussed at SouthMAC on 15 May and that the final paper would then be submitted to CCAMLR's working group on fish stock assessments.

Agenda item 13 – New vessel access season extension trial

The AFMA member stated that Industry have two new vessels coming into the HIMIF during the 2019/20 season, one vessel owned by Australian Longline P/L and one vessel owned by Austral Fisheries. Members noted that both companies have indicated that the new vessels will want to fish the longline season extensions. SARAG noted that under current arrangements the new vessels will not be able to access the season extension periods as they will not have had the opportunity to '*demonstrate full compliance with CCAMLR Conservation Measure 25-02 in the previous season*'.

Noting the three-bird limit in place for the season extension periods, and that both companies have a strong track record in sub-Antarctic Fisheries, SARAG agreed that there are no



additional risks with new vessels fishing in the season extensions given the current mitigation measures. SARAG supported the new vessels being provided with access to the season extension periods. SARAG noted that Australia would need to seek CCAMLR agreement to this approach. SARAG further noted that the Australian Longline P/L vessel will be using a moonpool and this should meet the current bird excluder device requirements.

SARAG noted that this issue will also be considered by SouthMAC and the CCAMLR Consultative Forum (CCF) prior to the Australian Government preparing advice for consideration by CCAMLR at its 2019 meetings.

Agenda item 14 – Offal dumping trial

Austral Fisheries explained that currently SFR conditions placed on Australian vessels prevent the dumping or discarding of offal in the Fishery. Industry explained that the Austral vessels cannot retain offal for a whole trip and therefore must steam outside the Exclusive Economic Zone (EEZ) to dump offal, generally once or twice per trip. Members noted that depending on where the vessels are fishing, under current requirements, this could involve 1-2 days of steaming. Industry presented a map that proposed four boxes within the Australian EEZ, away from fishing grounds in deep water, as areas to dump offal. Industry explained that the offal would not be dumped when shooting or hauling, and only when steaming. SARAG noted that the offal is always macerated and dumped below the water line. Industry also suggested an alternative proposal where the perimeter for offal dumping would be brought in and offal could be dumped in the deeper water rather than having boxes. Industry noted that they had spoken to French and Alaskan industries about whales and offal; on the basis of this, they concluded that dumping of offal does not attract whales. Industry had been provided with similar advice from Dr Paul Tixier who is leading the current HIMIF whale project (refer Agenda Item 20).

SARAG supported the proposal to dump offal off fishing grounds in deeper water. Industry agreed to draw the perimeter line and AAD will plot up with fishing effort and provide the results to AFMA for finalising (**Action arising 6**).

Agenda item 15 – Trotline/drop line gear trial

Austral Fisheries stated that they have an interest in trialling trotlines and droplines in the HIMI Fishery, as a way to minimising gear loss on rougher grounds. Members noted that currently CCAMLR Conservation Measure 41-08 states that the fishery in Statistical Division 58.5.2 (ie the HIMI Fishery) shall be conducted by vessels using trawl, pots or longlines only. The HIMI Fishery SFR conditions also state that permit the holders can only use longline fishing methods, trawl methods and pot fishing methods and no other fishing methods are permitted.

Austral Fisheries indicated that trotline gear is used in other CCAMLR fisheries but droplines are not currently used. AAD noted that the use of trotlines is poorly documented in CCAMLR and recommended industry look at the CCAMLR gear library.

AFMA noted that as droplines and trotline are currently not permitted under the HIMI SFR conditions it would involve an amendment. Industry would need to do a proposal to go to CCAMLR Consultative Forum that considered risks to seabirds as well as sink rates. If



approved the proposal would then be sent to the AFMA Commission. SARAG noted that Industry would submit a proposal if they want to take this further.

CCAMLR & Exploratory Fisheries

CCAMLR New and exploratory applications

SARAG noted that Australian Longline Pty Ltd have submitted applications to fish in CCAMLR exploratory areas 88.1, 88.2, 58.4.1 and 58.4.2. The applications have been supported by the CCAMLR Consultative Forum and AAD are now developing research plans and notifications which will be submitted to CCAMLR by the 1 June 2019 deadline.

Agenda item 16 – Papers to WG-EMM and WG-SAM

SARAG noted that AAD have indicated that the following papers will be submitted to:

Working Group on Ecosystem Monitoring and Management (24 June - 5 July 2019):

- Using the krill risk assessment to allocate catches at SSMU scale;
- Tools to access biophysical datasets for use in spatial management in the Southern Ocean;
- Components of a revised krill management procedure; and
- Revised target strength models for Antarctic Krill, and updated algorithms for estimating krill biomass using the swarms method.

Working Group on Statistics, assessments and Modelling (17-21 June 2019):

- Work to support HIMI Stock Assessment: maturity function, YCS trends and SSB Projections below target level, other WG-FSA/Assessment Review issues;
- Exploratory fisheries: Standardisation of catch rates and population parameters;
- East Antarctic Research fishing: Progress report - Standardised report;
- Update of the research plan for 58.4.1 and 58.4.2;
- Revised maturation; and
- And mortality from gear loss.

Agenda item 17 – Papers to WG-FSA, SC & Commission 2019

Members noted that AAD have indicated that the following papers will be submitted to the **Working Group on Fish Stock Assessment:**



- HIMI Report on the 2018 Random Stratified Trawl Survey;
- HIMI Updated Mackerel icefish assessment;
- HIMI Toothfish Stock assessment 2019;
- HIMI seabird bycatch analysis;
- East Antarctic: Ageing and growth; and
- Antarctic Toothfish stock connectivity.

AAD also indicated that the following papers will be going to the **Scientific Committee**:

- Establishing a mentoring program for SC-CAMLR.

SARAG noted that this year the focus at CCAMLR will be the 2019 HIMIF stock assessment. AAD agreed to provide further details at the August SARAG meeting.

Agenda item 18 – Update on East Antarctic genetics project

Mr Dale Maschette from AAD presented that outcomes from the project titled ‘Antarctic Toothfish Stock Connectivity’. Members noted that the aim of the project is to use high throughput sequencing to look at genetic connectivity of Antarctic Toothfish within the Southern Ocean.

SARAG noted that it is the largest tissue sample ever done with over 4000 tissue samples collected. Mr Maschette noted that over half of the samples were from Australian Longline Pty Ltd and 547 samples were successfully analysed. Members noted that fin clips work better for DNA collection compared to muscle samples.

Members noted that there are eight geographic locations and Antarctic Toothfish has limited genetic diversity, therefore results were not very informative, but could guide future research.

SARAG noted the recommendations from the project included:

Given potential stock linkages areas outside of CCAMLR should consider a framework similar to the CCAMLR decision rules to ensure sustainability;

Spawning models should be updated to account for all the new information obtained since 2012;

Inability to define stock boundaries from genetics alone limits the ability for close-kin mark recapture; and

For this species genetics are not a silver bullet and likely will need to be combined with something like stable isotopes for assigning IUU catch back to location.

Mr Maschette noted that he is currently waiting for comments back from FRDC for the final report and will then run more samples to fill the Amundsen Sea gaps. The next steps are to align to Patagonian Toothfish genome, then publish as a journal article and present the results to CCAMLR.



SARAG thanked Mr Dale Maschette for providing an update to SARAG

Research

Agenda item 19 – Replicate longline survey

SARAG noted that AAD have started progressing the project to conduct a replicate longline survey, however, AAD will need to do proper power analysis first. Members noted that this project was high on the work program and it is anticipated that it will be undertaken in 2020.

Agenda item 20 – Whale depredation research

SARAG noted the update Industry provided from Dr Paul Tixier on the project titled “Developing global solutions to marine mammals – fisheries interactions”. Members were provided with a summary on data collected to date (2017-2018) from Toothfish longliners at HIMI. Members noted that so far, a total of eight individual whales have been identified, including four new individuals and four individuals that had been previously photographed in the Kerguelen EEZ

Members noted that Dr Tixier is currently analysing the soundtrap devices that have been deployed from vessels to assess whether the four vessels sound different and whether that is a factor that could influence different interaction rates. The soundtraps data is currently being analysed with three primary aims:

- Identifying aspects of vessels’ acoustic signatures that can reduce their detectability underwater;
- Determining how skippers can lower the level of underwater they are making to reduce their probability of being detected by sperm whales; and
- Developing a tool for the automatic detection of sperm whales that could be used by skippers before setting their lines.

SARAG noted that *Atlas Cove* and the *Isla Eden* tend to attract whales more than the other two vessels. Members noted that the project is just over the half way point and Dr Tixier is working with broader Toothfish Fisheries through COLTO. Members noted that Dr Tixier has summarised and sent papers to members of the Australian Research Council project and the executive Officer will provide the papers to SARAG (**Actions arising 7**). Members noted that Dr Tixier is planning a meeting later this year to present what has happened and what is coming up.

Agenda item 21 – Recent research

- a. Electronic monitoring trial (grenadier)

SARAG noted that Austral have begun a pilot trial using two GoPro cameras to determine whether CSIRO’s machine learning algorithm can make sense of their hauling station configuration to accurately count toothfish, skate and grenadier, and then potentially separate skate and grenadier into their separate morph groups. This project also has the potential to



learn length-weight relationships which ultimately would give industry a count, and an accurate weight, which could free up the observer from having to do this and reallocate their time into other priority areas. Members noted that the trial is on the *Atlas Cove* and they are recording vision in the hauling station to figure out the best camera angle/position. Members noted that CSIRO will judge whether there is merit in scaling this up to a full project after the first trip for the *Atlas Cove*.

b. Close kin genetics trial (MITF)

SARAG noted that CSIRO have put together a proposal to look at whether close kin genetics can be used for Patagonian Toothfish. CSIRO are using the population at MITF as it is a smaller population and there is only one boat fishing. CSIRO noted that they need samples from about 3,000 juveniles and 100 adults and scientists would expect about 50 matches. Members noted that they are having trouble getting enough tissue and considering using fin clipping instead. CSIRO thanked industry for the co-operation in getting this project started and agreed to provide an update at the next SARAG meeting (**Action arising 8**).

c. Impact of environmental variability on Toothfish fishery

Stuart Corney & Nicole Hill (Utas)

SARAG noted that this is a FRDC-supported project investigating the impacts of environmental variability on the Patagonian toothfish fishery. The project team met for the first time in March to plan and begin work on the project. This initial meeting discussed recent work by Zimeng Su, an honours student at Utas who has been exploring marine heatwaves on the Kerguelen Plateau. Zimeng's work will feed into the project and will provide a good starting point by improving our understanding of the frequency of marine heatwaves on the plateau, and an increased understanding of drivers of extreme heat both at the surface and sub-surface.

SARAG noted that the first major deliverable is a workshop planned for August this year. This workshop will involve industry, managers and scientists and will refine the conceptual model that was developed in 2017 into a network model that we can use to test hypotheses about how environmental variability affects catch rates.

d. Any other research

eDNA
(CSIRO – Lev Bodrossy)

Industry noted that there may be potential for a project of this type and explained that there is a growing expertise in the field of eDNA which brings forth potential solutions with regards to Southern Ocean fisheries. Industry noted that they are speaking to several agencies currently working on eDNA, including AAD, CSIRO, AIMS and Curtin University. SARAG noted that eDNA and its potential to help with long term monitoring of change in the HIMI/MITF Marine Reserves and quantifying/mapping lice at HIMI.



Environment

Agenda item 22 – Environmental interactions and gear loss

SARAG noted that during the 2017/18 HIMI Fishery fishing season 16,415,948 hooks were set and there were eight seal, two seabird and one porbeagle shark interactions with fishing gear resulting in deaths:

- on 22 April 2018 a grey petrel was hooked and drowned while longline gear was being set on the vessel *Corinthian Bay*;
- on 25 May 2018 a porbeagle shark was discovered dead in trawl gear;
- on 6 June 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Isla Eden*;
- on 29 June 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Antarctic Chieftain*;
- on 5 July 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Corinthian Bay*;
- on 26 July 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Atlas Cove*; and
- on 23 August 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Antarctic Chieftain*;
- on 31 October 2018 a Southern Elephant Seal was found tangled and drowned in longline gear on the vessel *Isla Eden*;
- on 8 November 2018 a white-chinned petrel was hooked and drowned while longline gear was being set on the vessel *Corinthian Bay*;
- on 15 November 2018 a Southern Elephant Seal was found hooked, tangled and drowned in longline gear on the vessel *Isla Eden*; and
- on 19 November 2018 a Southern Elephant Seal was found hooked, tangled and drowned in longline gear on the vessel *Isla Eden*.

SARAG noted that during the 2018/19 MITF season 2,026,880 hooks were set with no seal or bird interactions with fishing gear that resulted in a death. There were 10 Porbeagle sharks killed as a result of interactions with fishing gear.

SARAG noted that there was a decrease in the amount of gear lost in the HIMI Fishery in 2018 compared to 2017 and the amount of gear recovered was similar to the previous season. Gear loss in the MITF decreased in the 2018/19 season compared to the previous season and in 2018/19 Exploratory fisheries had a significant increase in gear lost when compared to the previous season.



Other

Agenda item 23 – Other business

No other business was raised at SARAG 59.

Agenda item 24 – Next meeting

It is proposed to hold the next face-to-face SARAG meeting on Thursday 22 or Friday 23 August 2019. The key items for discussion will be new stock assessment for MITF stock assessment and the HIMIF stock assessments. Members noted that the industry consultation meeting and meetings with researchers would be held the day before SARAG 60.

The meeting closed at 5 pm on Tuesday 14 May 2019.



Sub-Antarctic Resource Assessment Group (SARAG) Meeting 59

Final Agenda

Tuesday 14 May 2019

9.00am – 5:00pm

Mawson Conference Room 2

Australian Antarctic Division – Channel Highway, Kingston

Introduction

- | | | | |
|-----|--|-------|-----------------|
| 1. | Preliminaries | | |
| 1.1 | Declaration of interests | Chair | For Discussion |
| 1.2 | Apologies | AFMA | For Information |
| 1.3 | Adoption of Agenda | Chair | For Decision |
| 2. | Minutes from SARAG 58 | AFMA | For Information |
| 3. | Action Arising | AFMA | For Discussion |
| 4. | Correspondence | AFMA | For Discussion |
| 5. | Update on fishing operations
(HIMI, MITF, Exploratory, observers) | All | For Information |

Macquarie Island Toothfish Fishery

- | | | | |
|----|--------------------------------------|-------|-----------------|
| 6. | Macquarie Island stock assessments | CSIRO | For Discussion |
| a) | Current stock assessment model | | |
| b) | New stock assessment model | | |
| 7. | Extension of Macquarie Island season | AFMA | For Information |

Heard Island and McDonald Islands Fishery

- | | | | |
|-----|---|----------|--------------------|
| 8. | William's Ridge SIOFA update | AAD | For Information |
| 9. | Patagonian Toothfish stock assessment | AAD | For Discussion |
| 10. | Skate and ray bycatch | AFMA | For Information |
| 11. | Trawl gear modification trial to reduce skate bycatch | Austral | For Discussion |
| 12. | Results of season extension trial | AFMA/AAD | For Recommendation |
| 13. | New vessel access to season extensions | AFMA | For Recommendation |



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|-----|-------------------------------|---------|----------------|
| 14. | Offal dumping trial | Austral | For Discussion |
| 15. | Trotline/Drop line gear trial | Austral | For Discussion |

CCAMLR & Exploratory Fisheries

- | | | | |
|-----|---|------|-----------------|
| | CCAMLR new and exploratory applications | AFMA | For Information |
| 16. | Papers to WG-EMM & WG-SAM | AAD | For Discussion |
| 17. | Papers to WG-FSA, SC & Commission | AAD | For Discussion |
| 18. | Update on East Antarctic genetics project | AAD | For Information |

Research

- | | | | |
|-----|---|--------------|------------------|
| 19. | Replicate longline survey | AAD/Industry | For Discussion* |
| 20. | Whale depredation research | Austral | For Information |
| 21. | Recent research | | |
| | e. Electronic monitoring trial (grenadier) | CSIRO | For Information |
| | f. Close kin genetics trial (MITF) | CSIRO | For Information* |
| | g. Impact of environmental variability on Toothfish fishery | All | For Discussion |
| | h. Any other research | All | For Discussion |

Environment

- | | | | |
|-----|--|------|-----------------|
| 22. | Environmental interactions and gear loss | AFMA | For Information |
|-----|--|------|-----------------|

Other

- | | | | |
|-----|----------------|-------|----------------|
| 23. | Other Business | Chair | For Discussion |
| 24. | Next Meeting | Chair | For Discussion |

* Verbal update, no agenda paper provided

Attachment A

