



Australian Government

Australian Fisheries Management Authority

Seventy fourth meeting of the Sub-Antarctic Resource Assessment Group (SARAG)

**FINAL MINUTES
SARAG 74**

27-28 MAY 2026

SUB- ANTARCTIC RESOURCE ASSESSMENT GROUP (SARAG)

CHAIR: Bruce Wallner

DATE: 27-28 May 2026

VENUE: The Old Woolstore Apartment Hotel, Hobart, Tasmania

ATTENDANCE

Members

Philippe Ziegler, AAD
Cara Masere, AAD
Rich Hillary, CSIRO
Tim Ward, IMAS (Agenda items 1-8)
Brad Milic, Industry (ALF Pty Ltd)
Rhys Arangio, Industry (Austral Fisheries)
Elissa Mastroianni, AFMA

Executive Officer

Rachel Downes, AFMA

Invited Participants

Heather Patterson, ABARES (online)
Pia Bessell-Browne, CSIRO
Dale Maschette, IMAS/AAD
Sam Thalmann, NRE Tasmania (Agenda item 8)
Colette Appert, AAD/IMAS (Agenda item 10.2)
Julia Blanchard, UTAS/IMAS/ACEAS (Agenda item 10.4)
Kieran Murphy, UTAS/IMAS/ACEAS (Agenda item 10.4)
Denisse Fierro Arcos, UTAS/IMAS/ACEAS (Agenda item 10.4)

Observers

Selina Stoute, AFMA
David Smith, Invited Observer
Sally Carney, AAD
Ryan Leadbetter, AAD
Rohan Currey, ABARES
Rhonda Bartley, AAD (Agenda items 1-6)
Henry Oak, AFMA (Agenda item 8)
Justine Johnson, AFMA (Agenda item 8)
Malcom McNeill, ALF

Agenda Item 1: Preliminaries

1. Welcome and Apologies

1. The seventy-fourth meeting of the Sub-Antarctic Resource Assessment Group (SARAG 74) was opened at 1:30pm on 27 May 2026 by the Chair, Bruce Wallner.
2. The Chair welcomed members, invited participants and observers to the meeting. The Chair acknowledged the Muwinina people as the Traditional Owners and custodians of the land SARAG 74 met on, including their ongoing connections to Land and Sea Country and paid respects to their Elders past, present and emerging.
3. Members **NOTED** that the meeting was being recorded for the purpose of developing the meeting minutes.
4. The members **NOTED** that there were no apologies for the meeting.

2. Declarations of Interest

5. The Chair reminded members and observers of the procedure for declaring and managing conflicts of interest as outlined in the *Fisheries Administration Act 1991* and AFMA [Fisheries Administration Paper No. 12](#), including that all members must declare any actual or perceived conflicts of interest (not limited to pecuniary gain) in the fishery at the commencement of the meeting and as soon as they become evident during the discussion of relevant agenda items.
6. SARAG **NOTED** declarations of interest from members, invited participants and observers at the start of the meeting (detailed at **Attachment A**).
7. The Chair noted that industry has a strong interest in Agenda items 8 and 9. SARAG **AGREED** that industry would retire from the meeting for any recommendations made under these Agenda Items.

3. Adoption of Agenda

8. The agenda (**Attachment B**) was adopted without change.

Agenda Item 2: Actions Arising

9. SARAG **NOTED** there are several ongoing actions arising which are more akin to management priorities or projects, rather than action items. SARAG **AGREED** to establish a 'list of priorities' for the SARAG, that will be considered at each meeting going forward, as detailed in **Attachment C**.
10. SARAG **NOTED** the written update on the status of actions arising from previous SARAG meetings at **Attachment C**.

Agenda Item 3: Member Updates

3.1 AFMA update

11. SARAG **NOTED** the written update as provided by AFMA (**Attachment D**).

3.2 Industry member updates

12. SARAG **NOTED** the following verbal updates from industry members:

Australian Longline Fishing Pty Ltd

- The Antarctic Aurora has fished in East Antarctica (Division 58.4.2). Catch rates in Box 1 were as expected, but Box 2 was frozen over and unfishable.
- The Antarctic Aurora started longlining at HIMI in the longline season extension. The vessel incidentally caught seven white-chinned petrels in their first day of fishing, four upon setting and three found while hauling the remaining lines in the water to cease fishing. Having been excluded from the season extension, the vessel held position at HIMI until the opening of the core season on 1 May.
- One sperm whale has been observed several times however no depredation has occurred.
- Exclusion from the season extensions means catch rates will need to remain high to catch all the quota in the substantially shorter season.
- The Antarctic Discovery has been fishing at MITF. Catch rates have been good and consistent. Due to tidal movement, the vessel has moved to different fishing grounds on the inside of the ridge and has noticed a decrease in fish size with different fishing grounds. The skipper is focusing on setting more lines in the northern area.

Austral Fisheries Pty Ltd

- The Austral Odyssey has taken its first trip. The vessel began fishing at Williams Ridge in SIOFA before entering the HIMIF for the start of the longline season extension on 1 April. The vessel incidentally caught three white-chinned petrels and was excluded from the longline extension season. The vessel returned to Williams Ridge before returning to HIMIF for gear recovery before starting the core HIMI longline season on 1 May.
- The RSTS began on 1 March and concluded at the end of March. The survey was productive with similar catches to the past years.
- The Cape Arkona began longlining for toothfish on 1 April at the start of the longline extension season. The vessel incidentally caught three white-chinned petrels and was excluded from the longline extension season. The vessel switched to trawling and proceeded to alternate between targeting toothfish and icefish until the start of the core HIMI longline season began

on 1 May. Trawling occurred at Gunnari Ridge and Evitas Patch which are the only fishable areas where trawling is permitted outside of the Marine Reserve.

- The Cape Arkona exceeded the 2t skate limit twice in the trip where the vessel abided by the move-on rule in accordance with SFR Conditions. Due to the move-on rule provision of moving 5nm for 5 days, the icefish fishery is effectively shut for 5 days once the move-on rule has been triggered due to the small area of icefish fishing ground. The Cape Arkona undertook gear recovery during this period.
- During the total period of icefish fishing (24 days), the vessel had 29 interactions with porbeagle sharks which is unprecedented. The skipper made modifications to the net (Bastard net) to reduce porbeagle interactions by reducing the headline height, while also trying to float the net to reduce skate bycatch. Due to operational constraints changing the net, the vessel fished for both toothfish and icefish with the Champion net. Icefish aggregations increased and the vessel has clean shots of icefish, however porbeagle interactions continued with the Champion net.
- The Austral member highlighted the importance of the ability to trawl in the HIMI Fishery, noting the impact of the current seabird bycatch limits in the longline extension season. Without the ability to switch to trawling, the quota would have been under caught by several hundreds of tonnes. Noting the exclusion from the season extension includes both the month of April and 15 September – 30 November, this puts pressure on companies to catch the quota within a much shorter timeframe. Maintaining access to trawling is of great importance to Austral.
- The Cape Arkona unloaded from the first trip and has departed for the second trip. The vessel will first target icefish and then longline for toothfish. Austral plan to catch around 500 t of icefish.

3.3 AAD update

13. SARAG **NOTED** the following updates from AAD:

- Significant work has been dedicated to the HIMI toothfish stock assessment, with good progress to date.
- AAD are in the process of developing the East Antarctica Research Plan, for submission to CCAMLR WG-SAM.
- A UTAS-AAD research project looking at biodiversity and ecosystems across the Kerguelen Plateau has been granted ARC Linkage funding. Collaborating with French scientists, this project will extend work by Joel Williams on fish community dynamics, trophic linkages and recruitment patterns of key fish species.

Agenda Item 4: Random Longline Survey: 2025 results and future survey use

14. SARAG **NOTED** that the voluntary RLS has been underway since the 2023/24 season. The objective of the RLS is to address spatial distribution issues by developing a series of fishery-independent longline hauls which can be used for the estimation of an unbiased tag-based abundance index for the stock assessment.

15. SARAG **NOTED** a presentation by AAD on the results of the 2025 RLS as follows:

- The survey design put in place looked at 2012-2022 fishing footprint and made a qualitative assessment of fishing areas – this split the survey area in seven ‘core’ areas and five ‘non-core’ areas. The RLS covers about 10% of fishing effort which is approximately 120 hauls and 1.2 million hooks.
- The 2025 design largely replicated the approach undertaken in the 2024 RLS. Sampling instructions were provided to the vessel with the addition of vessel choice for set location in non-core areas to further encourage effort spread. Random locations were only provided for hauls to be undertaken in core areas.
- For 2025, total number of hooks set under the RLS was 1,368,028 (core= 720,900, non-core= 647,128). There was a total of 115 RLS hauls in 2025. Effort was similar to 2024 with 119 hauls and 1,341,623 hooks set. Comparing across areas and year, SARAG **NOTED** the effort spread presented in **Table 1**.

Area	N hauls			N hooks		
	Target	2024	2025	Target	2024	2025
NW	6	6	7	60 000	59 634	75 000
W	10	9	17	100 000	106 899	198 400
SW	8	8	6	80 000	93 096	65 000
Central W	7	7	7	70 000	83 798	88 200
Central	11	8	5	110 000	102 899	72 900
Central NE	9	10	8	90 000	93 600	92 700
Central E	15	13	10	150 000	171 000	128 700
S	12	12	13	120 000	134 100	133 087
SE Central	18	22	20	180 000	233 900	266 400
SE South	14	14	14	140 000	159 002	155 700
NE	4	4	8	40 000	46 800	91 941
WR	5	6	0	50 000	56 895	0
Total	119	119	115	1 190 000	1 341 623	1 367 628

Table 1 Effort spread between areas and across years in the Random Longline Survey

- It appeared this analysis was missing data from research lines across multiple areas and would be updated following the meeting. AFMA agreed to confirm how RLS lines were being recorded to help ensure that all relevant data is being included.
- Median CPUE was slightly higher in the non-RLS hauls (commercial) compared to the RLS hauls. This was observed across areas, however some variability in CPUE was noted.

- Tag recapture proportions were higher in the RLS hauls for the Central W, Central and Central NE areas. The SE Central area had higher tag recaptures in the commercial hauls.
- Modelling tag recapture rates within TMB is currently being explored.

16. SARAG **DISCUSSED** the following:

- There are operational and economic constraints associated with the RLS;
 - When setting 2nm apart vessels may run out of room within the designated box to set required research lines, especially when catch rates are high within an area.
 - Setting RLS lines changes skippers' operational planning for an entire trip to ensure lines are being set and not relegated all to one trip.
 - There is a steaming time and fuel cost to setting in areas which would normally not be visited.
- Completing the RLS hauls will be difficult this season. The exclusion of all vessels from the longline season extension periods will make it difficult for industry to catch the full quota in the available time. Industry will make an effort to set the research longlines where possible, noting this is voluntary.
- Although the RLS data is not currently being integrated into the HIMI toothfish stock assessment, it is still a useful fishery independent tag recapture time series. An updated stock assessment is required to provide complete and informed advice on the value and future purpose of the RLS.
- Noting and appreciating the voluntary effort of industry to participate in the RLS, a presentation to industry members (including skippers), as has been done previously, would be beneficial.

17. SARAG **RECOMMENDED** that the RLS should be continued, noting there are immediate benefits to understanding the spatial variation of the Patagonian toothfish stock and potential long-term benefits for the stock assessment. Noting the constraints on industry, fully understanding the benefits and utility of the RLS will take several years and so should be revisited in future.

18. SARAG **RECOMMENDED** that consideration by CSIRO and AAD of the potential inclusion of the RLS data in the TMB HIMI toothfish stock assessment should be included under the new SARAG priorities list (see Agenda Item 2).

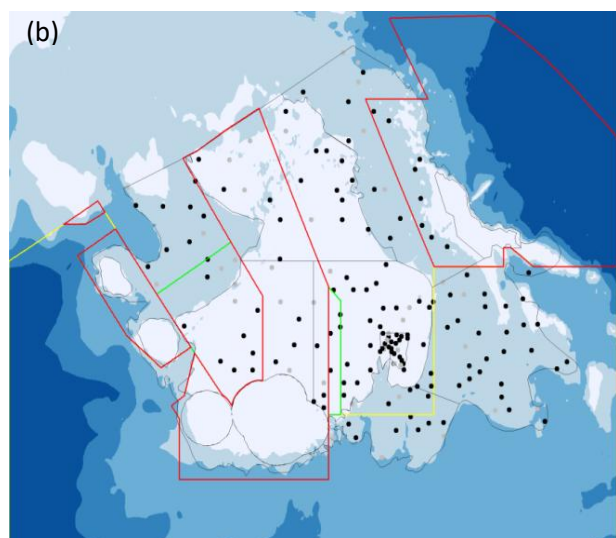
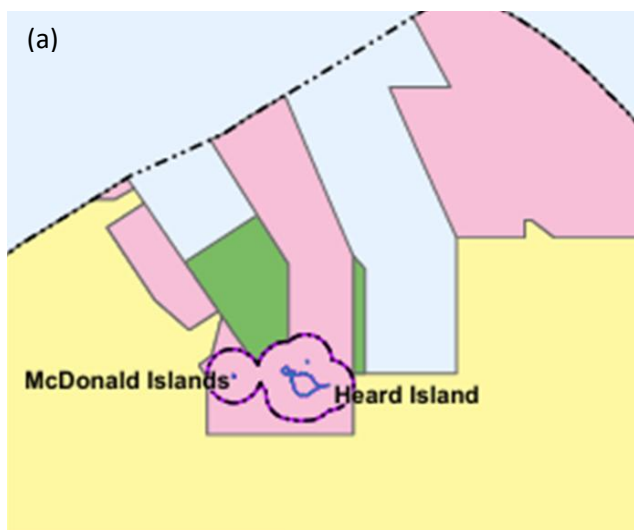
ACTION ITEM – AFMA to confirm how RLS lines were being recorded to help ensure that all relevant data is being included.

Agenda Item 5: TWG report to SARAG on progress and recommendations

19. SARAG **RECALLED** that the HIMIF Expert Technical Working Group (TWG) has been established to provide advice to SARAG on the appropriate use of tagging data within the integrated stock assessment of Patagonian toothfish at HIMI and that [SARAG 73](#) (August 2025) endorsed the TWG recommended approach for incorporating the available tagging data into the HIMI toothfish integrated stock assessment, noting that this model will not use Casal2, will be spatially explicit, and will be sex-based.
20. SARAG **NOTED** that since SARAG 73 the TWG has met in December 2025 (TWG 3), March 2026 (TWG 4) and immediately preceding SARAG 74 (TWG 5). At these meetings the TWG continued to progress a spatially explicit, sex-based model in TMB model builder, and also considered bridging analyses between Casal2 and TMB based models. Recommendations from TWG 3 and TWG 4 are at **Attachment E** and **Attachment F**.
21. SARAG **NOTED** the update from the TWG Chair on the outcomes of the most recent TWG meeting, held immediately preceding SARAG 74 (TWG 5, 27 May 2026). The work of the TWG is on track and showing positive progress. It is currently not possible to include a large amount of conditional age-at-length data in Casal2. However, the bridging analysis is complete and shows that results from the Casal2 and TMB assessments are comparable at an acceptable level. The TWG will meet again after WG-SAM-2026.
22. SARAG **ENDORSED** the recommendations and workplan from TWG 5 (**Attachment G**).

Agenda Item 6: Assessing the impacts of the RSTS without IUCN1a and II Marine Reserve Areas and future planning

23. SARAG **RECALLED** that the RSTS has been in place since 1997 and provides critical information for the assessment of HIMIF Patagonian toothfish stock (particularly on recruitment), the mackerel icefish stock assessment, bycatch management, and ecological monitoring of the fishery and Marine Reserve, especially in the face of climate change. It is the only fishery independent data set available in the HIMIF.
24. Specifically, the RSTS has two long-term principle aims; (1) to assess the abundance of juvenile and adult Patagonian toothfish on the shallow and deep parts of the Heard Island Plateau and (2) to assess the abundance of mackerel icefish on the Heard Island Plateau. It also has a range of secondary benefits including estimating biomass of bycatch species (of which some are subject to species specific TACs) and informing broader ecosystem and climate change effects. The data provided by the RSTS is an integral input to the Patagonian toothfish stock assessment model and the only data source for the mackerel icefish assessment to set TACs.
25. SARAG **NOTED** that in the 2026 RSTS, 163 (total) stations were allocated inside and outside the different Marine Reserve zones as follows (**Figure 1**):
- Sanctuary Zone (IUCN 1a, pink): 20 preferred and 8 reserve stations
 - National Park Zone (IUCN II, green): 13 preferred and 4 reserve stations
 - Habitat Protection Zone (IUCN IV, yellow): 33 preferred and 8 reserve stations
 - Outside Marine Reserve (blue): 54 preferred and 23 reserve stations



Likely impacts, risks and benefits of proceeding with a reduced RSTS

26. SARAG **AGREED** that removing RSTS survey sites in the IUCN 1a and II Marine Reserve Zones (zones) will have a negative impact (i.e., increased uncertainty) on the stock assessments for toothfish, icefish and all bycatch assessments. The additional removal of survey sites in the IUCN IV zone would strongly diminish the statistical power and the information it provides for stocks, most likely making continuation of the RSTS of questionable value.
27. SARAG **ACKNOWLEDGED** the potentially significant risk to the stock assessment of proceeding with the RSTS without survey sites in the IUCN 1a and II zones, without careful redesign. There is a material risk of not being able to utilise the data set if a survey in 2027 is not carried out in a manner that will be consistent with both past and future surveys. Conversely, SARAG **ACKNOWLEDGED** the longer-term risk of not undertaking a reduced RSTS in 2027 and breaking the time series i.e., not obtaining data needed to inform future assessments.

Patagonian toothfish

28. In addition to providing a fishery independent abundance indicator and a critical input for TAC setting, the RSTS is the only data collection method that provides information on Patagonian toothfish juveniles and recruitment. This is because toothfish are known to recruit to the plateau and then move off the plateau into deeper shelf waters as they grow larger and mature.
29. Changes to the RSTS have the potential to seriously undermine the recent development of a new multi-area toothfish stock assessment. Unlike the previous model, the spatially explicit assessment models the ontogenetic movement of the species and spatial differences in this movement across the fishery. The RSTS is an important data input, and in the future the likely only data source to inform the plateau area for the multi-area model. However, SARAG **NOTED** that without further analysis it is difficult to quantify the impacts of the proposed changes on the assessment.

Mackerel icefish

30. The icefish assessment is a deterministic stock assessment which directly uses biomass and abundance estimates calculated from the RSTS of 1–3-year-olds in the population to project the population forward 2 years to determine catch limits. Icefish recruit on the west side of the plateau (Plateau West) and then migrate to the Southeast part of the plateau (Plateau Southeast) before migrating to Gunnari Ridge where the main fishery operates. See Appendix A for maps of icefish grounds provided for context after the meeting.
31. Noting the biology of icefish (as described above), SARAG **AGREED** that the removal of the survey sites within the IUCN 1a and II zones will significantly impact the utility of the RSTS to determine the biomass and population structure of mackerel icefish. The IUCN 1a and II zones cover the entirety of the Plateau West and parts of the Plateau Southeast survey strata therefore:
- Not sampling these areas would result in lower biomass estimates, and in turn produce lower catch limits for the fishery, even though there would not necessarily be a real reduction in biomass.

- Additionally, not sampling Plateau West will result in limited ability to estimate the proportion of 1-year olds, and result in greater uncertainty for two-year olds in the population projected forward in the stock assessment. This will give even greater uncertainty, and therefore likely lower catch limits in the second year of the stock assessment.

Assessment of impacts and advice on mitigating those impacts

32. SARAG **NOTED** advice from the SARAG TWG (TWG meeting 4), to explore the impact of a reduced RSTS in two stages:

- Stage 1: AAD to assess implications to the RSTS through a retrospective analysis, and
- Stage 2: MSE testing using TMB to evaluate new approaches/designs potentially replacing the RSTS.

33. SARAG **NOTED** that Stage 1 would involve comparative re-estimation of biomass and population composition from historical RSTS using reduced sampling stations made inaccessible in the IUCN Marine Reserve areas and then runs of past stock assessments with the revised estimates. For the MSE in Stage 2, the new stock assessment for toothfish needs to be developed first.

34. Results from neither analysis recommended by the TWG were available at the meeting. Noting there was no analysis available, SARAG **AGREED** that there was insufficient information to guide a more detailed assessment of the implication of a reduced RSTS and how those implications might be addressed. SARAG **REITERATED** that analyses of the existing data, with and without the sites that may be removed, are needed to guide advice.

Recommended analysis required to guide future SARAG advice on the impacts of a reduced RSTS survey area and advice on how to those impacts may be mitigated.

35. SARAG **RECOMMENDED** priority work to be completed in the short term and in time for SARAG's meeting in August 2026 as well as work that should be completed in the longer term. Of the recommended work to be completed in the short-term, items 1 and 2 were considered the minimum level of information required to inform RAG advice in August on the impacts and consequences of proceeding with a reduced RSTS survey in 2027, given the anticipated impacts on the results.

36. In recommending the future work, SARAG **NOTED** that resourcing availability within AAD to complete the recommended work is unknown, but identified this work a high priority.

Short-term

At a minimum the recommended analysis to be completed in time for SARAG's next meeting in August are items 1 and 2.

	Work	Objective
1	Summarise changes in biological-indicator values and patterns with the removal of data collected in: a) the IUCN Ia and II zones; and b) IUCN Ia, II and IV zones).	To understand the effects on the precision and trends of indicators obtained from the full RSTS as compared to defined subareas in which given IUCN zones have been omitted.
2	Identify efficient and robust survey design options for redesigning the RSTS outside of closed areas (IUCN Ia and II, or IUCN Ia, II and IV zones)	The survey will need to be re-designed ('New RSTS') to account for the impacts of reducing the size of the survey to ensure the statistical power of the survey is maintained and that the impact of a break in the time series is minimised.
3	Toothfish biomass and composition estimates	Re-estimation of toothfish biomass and composition from step 2 using both randomised bootstrap approach and length-based estimators (whole time series).
4	Icefish retrospective analysis	Re-run the last 10 annual icefish assessments in Grym with outcomes from the results of step 2.

Long-term

Work	Objective
Bycatch analysis	Qualitative evaluation of the impact on future bycatch analysis, e.g. macrourids, skates, rock cod and unicorn icefish
Ecosystem impacts	Evaluation of the impact on abundance and trends in fish community and ecosystem with new RSTS using models by Williams et al. 2025 (Global Change Biology 31:e70549)

Toothfish MSE	MSE to evaluation impact on toothfish assessment using the new RSTS once the stock assessment has been developed and accepted (post CCAMLR-45)
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Agenda Item 7: MITF MSE and HCRs – results

37. SARAG **RECALLED** that [SARAG 73](#) (August 2025) agreed that CSIRO should progress a tag-based model with spatial structuring for the MITF to develop an alternative management procedure (MP) approach to the current CCAMLR decision rules.
38. SARAG **NOTED** that the MITF TAC has currently been determined for 2026/27 and 2027/28 seasons. SARAG will be asked to consider and recommend a TAC for the 2028/29 season in August 2027 using the HCRs agreed through this project rather than the CCAMLR toothfish decision rules.
39. SARAG **NOTED** a presentation (**Attachment H**) by Dr Pia Bessell-Browne on the preliminary progress and results, in particular:
- Current work completed includes: the Observation Model (OM) has been conditioned based on the Markov chain Monte Carlo (MCMC) output of the 2025 stock assessment, the Estimation Method (EM) has been set up using tag-based estimators that fit to the real MITF tag data up until 2025, and a range of initial simulations have been completed to test performance.
 - The Management Procedures (MPs) have been tuned for the stock status to reach the Target Reference Point (TRP) of $SSB_{0.5}$ in 20 years, based on previous SARAG advice, and have used spatial tag-based estimators.
 - Results indicate that achieving the TRP of $SSB_{0.5}$ for the total population can result in the stock status in the south falling below the TRP and in some case the limit reference point (LRP) after 20 years.
 - This has been tested across three catch splits between the north and south (10:90, 20:80 and 30:70). Catch splits chosen are representative of past fishery effort spread.
 - These results confirm that there are large differences between the biomass in the north and south. Overall, the various catch splits have a larger impact on stock status in the south than the north.
 - Of the results presented, catch variability is around 20%, which is half the variability under the current stock assessment. By moving away from the CCAMLR decision rule, interannual variability is reduced by 25-50% while still meeting fishery objectives.

40. SARAG **DISCUSSED** the following:

- The north:south split is a feature of the data and is based on recapture rates, not biogeographical features. Tag-recaptures are consistently lower in the north compared to the south. The main fishing ground, the Aurora Trough, is located in the south and most catch comes from this area (**Table 2**).
- Initial stock assessments considered two and three areas, whereby the three-area stock assessment separated the Aurora Trough from the rest of the south. The Aurora Trough and the rest of the south area have similar recapture rates and have been considered the same area in the stock assessment. A non-spatial assessment would ignore the tag-data from the north and result in poor fits to the data. It is not possible to fit the tagging data non-spatially due to the differences in the north and south.
- Recent fishing effort in the north has resulted in higher tag returns that have provided confidence around the biomass estimates for this area. However, industry noted that increasing effort in the north will result in higher gear loss due to the rough ground, especially when there are strong tides and coupled with night-time setting. The Macquarie Island Marine Park expansion in 2023 has somewhat limited the ability to understand biomass across the whole of the MITF.
- Tag recaptures from other areas, including SPRFMO and New Zealand, should be investigated to help understand MITF stock dynamics.
- The economic performance of the fishery is important in the consideration of MPs, specifically considering impact of depletion in the main fishing ground, relative to other areas of the fishery, on economic performance.
- Other fisheries, such as the Spencer Gulf Sardine Fishery, have management approaches which include limits on catch for only a few specific areas, which may be useful to consider in the MITF.
- Industry observations on tides and currents, moon phase and observed intra and inter-annual changes in fish size within and between areas suggest great natural variability in the MITF. These observations have been noted in both the current longline fishery and the previous trawl fishery. Including skippers in potential MP discussion would help ensure operational flexibility is retained.

Table 2 Catch splits at MITF over the past six seasons. North % is made up of 'Longline NMR' only and south % is 'Longline AT' and 'Longline SMR.'

Fishing season	Longline AT	Longline NMR	Longline SMR	% north	% south
2019/20	227.9	143.5	79.7	32	68
2020/21	292.8	192.9	51.6	36	64
2021/22	252.1	34.6	171.4	8	92
2022/23	262.9	37.2	139.2	8	92
2023/24	186.0	66.4	204.1	15	85
2024/25	221.5	32.4	211.5	7	93

41. Regarding the above discussion, SARAG **PROVIDED ADVICE** to support the completion of the project as follows:

- There is strong support for focusing on a three-area model in the EM and OM to separate the Aurora Trough from the south area. The final assessment may not be three-area, but this will be determined once the results have been updated.
- Explore the effect of putting a catch limit (cap) on different areas. Options could include a cap on the south or the Aurora Trough, a cap on the whole south area (including Aurora Trough), or specifying a minimum percentage of catch that must come from the north. Where possible, the MP should avoid rigid, area specific TACs and should allow for operational flexibility.
- Explore the effects of fishing more conservatively by increasing the TRP, thereby providing a buffer against depletion and allowing for flexibility between catches in the north and south.
- Undertake data analysis of the north:south split line with updated data to determine if the geographic split is still appropriately placed.
- Allowing the south region to drop below $SSB_{0.2}$ is not a desirable outcome and should be avoided. SARAG would not support a MP that resulted in any area having a SSB below 0.2.
- A time frame of 20 years for the reference points remains appropriate.
- Industry still retains an interest to restrict inter-annual change to 10%.

42. SARAG strongly **SUPPORTED** continuing progress to moving away from the CCAMLR toothfish decision rules.

ACTION ITEM – AFMA to investigate MITF tag-recaptures in SPRFMO and share available data with SARAG to determine if the recaptures have originated from the north or south regions

ACTION ITEM – CSIRO to analyse updated tag-recapture data to determine is the N:S split line

Agenda Item 8: Seabird bycatch at HIMI in April 2026, ecological drivers and bycatch limits

43. SARAG **NOTED** that in the first two weeks of the HIMI Fishery longline season extension for 2025-26, three boats reached the three seabird bycatch limit per boat for the longline season extension. There were 13 seabird interactions, all of which were white-chinned petrels (*Procellaria aequinoctialis*) in the April longline season extension. There has been one additional interaction at the start of the season, also a white-chinned petrel.
44. SARAG **NOTED** that one of the recent incidentally caught seabirds was banded at Kerguelen Island in 2019 as a chick. The bird was an unsexed breeding adult when incidentally caught in April 2026.
45. SARAG **NOTED** a presentation on the behaviours and abundance of white-chinned petrels by Invited Participant Sam Thalmann from NRE Tasmania (**Attachment I**). SARAG **NOTED** the following points:
- White-chinned petrels are listed as Vulnerable by the IUCN and included in [Annex 1](#) of the Agreement on the Conservation of Albatrosses and Petrels (ACAP). The global population is estimated ~3 million mature individuals (IUCN), but with a decreasing trend. White-chinned petrels are one of the dominant species of residual seabird bycatch in Southern hemisphere longline fisheries, and pelagic longline bycatch is identified as the primary driver of this decline.
 - They are a relatively large and long-lived petrel species (1.5kg, >30 years) and start to breed around six years of age.
 - Bycatch composition is biased toward males. The species display sexual dimorphism with males being larger and more aggressive. Males are more likely to outcompete females for discarded offal of baited hooks, can dive deeper (up to 16 meters) than females, and have a greater overlap in foraging area with heavily fished pelagic and demersal regions in subpolar waters.
 - White-chinned petrels do not breed at HIMI. Interactions with white-chinned petrels in the HIMI Fishery are with birds originating from Kerguelen, Crozet, and South Georgia, however white-chinned petrels are distributed around the whole Southern Ocean.
 - Several factors can influence white-chinned petrels foraging drive and intensity, and bycatch interactions.
 - Environmental variables, including ocean productivity and the position of the polar front (noting the latter is variable around the Kerguelen area).
 - White-chinned petrels will forage in the day and night and are one of the most active nocturnal foragers in the procellariiform group. They require some light to forage, therefore a small increase in ambient light significantly increases their ability and interest to forage and dive deeply. Bait visibility is affected by the moon phase and time when lines are set, with CCAMLR [CM 41-05 \(2025\)](#) specifying that 'wherever possible, when night setting, setting of lines should be completed at least three hours

before sunrise (to reduce loss of bait to/catches of white-chinned petrels).’ Night setting is less effective for this species.

- White-chinned petrels are very proficient divers. Birds are believed to dive to a maximum depth of 16 m with a descent rate maximum of 2.0 ms^{-1} , however recent evidence has shown they can dive up to 25m deep. Line weighting may also be a less effective mitigation measure for this species.
- The species show a strong detection of and attraction to vessels, with high attendance to vessels following an encounter. Studies have shown that once a white-chinned petrel detects a vessel, foraging patterns change and the bird is unlikely to leave the vessel.
- The April longline season extension (1-30 April) is within the breeding season, and the September-November longline extension (15 September-30 November) is within the pre-breeding and beginning of the breeding season when petrels are north of the islands and moving to the Kerguelen area. Given the biological and spatial considerations, the April extension presents an increased interaction risk.

46. SARAG **NOTED** a presentation on elevated occurrence of white-chinned petrel bycatch in the HIMI Fishery from 2016-2026 by the Austral industry member. SARAG **NOTED** the following points specific to the Austral Fisheries’ fleet:

- There has been an unusual concentration of white-chinned petrel mortalities in the current 2025-26 HIMI season. Between the 4-6 April, Austral’s vessels recorded six white-chinned petrel mortalities (3 per vessel) while longlining for Patagonian toothfish. This is the highest number of interactions in Austral’s records. Both vessels were compliant with mitigation measures as specified in the CCAMLR [CM 41-08 \(2025\)](#) and HIMI SFR Conditions.
 - Mandatory mitigation measures in place were: two or more tori lines, integrated weight line systems, management of offal discharge, brickle curtain, minimised deck lighting, spatial closures and seasonal closures (i.e., not longlining prior to 1 April).
 - Additional mitigation measures in place were: voluntary night setting, self-designed ‘jigglers’ on tori lines, additional weights at regular intervals, and strategic vessel design choice to deploy hooks at or below sea level using a shooting sleeve.
- For Austral Fisheries, of the 22 seabird mortality events from 2016-2026, 15 were white-chinned petrels, or 68% of mortalities.
- On average most bycatch of white-chinned petrels occurs in April (average of 1.1 per year) with few encounters in the September-November season extension (average of 0.4 per year). There have only been two seasons with a white-chinned petrel interaction in the September-November season extension. During the core season no white-chinned petrels have been caught.
- Overall, the April extension period (30 days) exhibited substantially higher bycatch rates than the September-November season extension (77 days), particularly for white-chinned petrels. It is ~7 times more likely to catch a white-chinned petrel in the April season extension compared to the September-November extension period.

- The French Crozet and Kerguelen toothfish fisheries have also encountered high numbers of white-chinned petrels:
 - 53 white-chinned petrels were recorded as bycatch from mid-March to mid-April 2026.
 - French management re-enacted previously used bycatch area-based seabird mitigation rules using a system of grid cells. Under this system, if two seabirds are caught and killed within a grid cell within a seven-day period, the grid cell is closed to fishing for 10 days. Over March-April 2026, nine of the grid cells were closed.
 - French management are convening a working group to consider the unusually high level of bycatch.

47. SARAG **DISCUSSED** the information presented above, as well as the below additional points:

- Observations on the water during the season extension varied. Some observations noted an increased prevalence of birds and others noted it as standard.
- Seabird population counts may not have been updated recently and discerning true increase or decrease in bird observations may be challenging given the species is wide ranging.
- White-chinned petrels are not a tight, colonial species and therefore transmission of bird flu is reduced and more sporadic than birds that cluster together. White-chinned petrels are not resistant to bird flu, but the impact is less relative to other species with different colonial behaviours.
- The [HIMI Ecological Risk Assessment](#) published in 2018 determined that white-chinned petrels were at low risk from the effects of fishing at HIMI.
- The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) has undertaken a Spatially Explicit Fisheries Risk Assessment ([SEFRA](#)) project to look at seabird species across all RFMOs as part of the Seabird Project. Relative to the SEFRA estimate, bycatch at HIMI is quite low.
- Under normal circumstances with current mitigation measures deployed, a small biological or environmental change can result in the mitigation measures failing for white-chinned petrels. However, questions remain on what environmental variables may be available or useful for forecasting.
- Exceeding the three bird bycatch limit results in cessation of fishing in both extension periods, regardless of when the birds were caught, but it is unclear whether there is any correlation or relationship in risk between the two extension periods.
- Division 58.5.2 is the only CCAMLR fishery that has a CM seabird trigger that results in the complete cessation of fishing within the management period. Previous CCAMLR trials in other divisions have removed trigger limits to cease fishing in a trade-off for night-setting in the CM.
- Sink rate tests conducted by industry this season under additional weighting (beyond ACAP standards) showed sink rates were nearly identical to tests without additional weighting.
- ACAP best practice advice is suitable for larger species of Procellariiformes which are not as proficient at diving as white-chinned. Reducing effort around full moon phases and employing additional mitigation may help reduce white-chinned petrel interactions specifically.

48. SARAG thanked the NRE Invited Participant for their presentation and informative discussion on white-chinned petrels and their recent bycatch.

Agenda Item 9: Modification to minimum trawl gear disc size, to account for wear

49. SARAG **RECALLED** that, following a successful four-year trial, [SARAG71](#) (August 2024) and [SouthMAC44](#) (November 2024) endorsed the use of ground trawl gear for mackerel icefish with bobbins that are 400mm in diameter and rock hopper rubber discs that are 200mm in diameter for oh the HIMI Fishery.

50. SARAG **NOTED** that the original 2019 gear trial proposal accounted for wear down of 50mm for bobbins but did not account for wear down in rock hopper rubber disc sizes. Industry have requested a similar reduction in minimum size to account for wear in rock hopper rubber disc sizes. The proposed minimum diameter for rock hopper rubber discs would be 150mm.

51. SARAG **CONSIDERED** the following:

- Individual rock hopper discs cannot be swapped, only an entire section of discs. AFMA management propose introducing a minimum average size per section of 150mm.
- The results of the trial as considered in 2024 concluded that bycatch CPUE was lower, icefish to skate ratio was higher and that *B.irrassa* presence was substantially lower under the trial.
- There were no additional environmental impact concerns identified.

52. SARAG **NOTED** that the proposed change would require consideration by SouthMAC and an amendment to the HIMI SFR Conditions if supported.

53. Having regard for SARAG's previous decision at [SARAG71](#) (August 2024), SARAG **ADVISED** that the trial lasted several years and would have included wear down of gear during that time. Therefore, SARAG's previous considerations and advice would still hold and be scientifically valid when considering the proposed 150mm minimum diameter for rock hopper rubber discs. On this basis SARAG **SUPPORTED** changes the HIMI SFR Conditions to account for wear in the rock hopper rubber discs when fishing for mackerel icefish using trawl gear.

Agenda Item 10: Research Items

10.1 Update on the *RSV Nuyina* HIMI Voyage

82. SARAG **NOTED** an update on the *RSV Nuyina* HIMI Management Campaign voyages presented by AAD. SARAG noted the challenges of conducting research at HIMI and potential use of commercial vessels as ships of opportunity for future research.

83. SARAG **NOTED** that as part of the second research voyage, AFMA issued a Scientific Permit for the *RSV Nuyina* to take 1 tonne of Patagonian toothfish and 2 tonnes of mackerel icefish within the HIMI

Fishery across December 2025 and January 2026. Under the Scientific Permit, total catch was 2.37 kg of Patagonian toothfish and 2.64 kg of mackerel icefish.

2. Skate bycatch research at HIMI

54. SARAG **NOTED** a presentation on reducing the bycatch mortality of *Bathyraja irrasa* by Invited Participant, Colette Appert from IMAS and AAD. The research presented is the final outcome of the skate bycatch work previously considered at [SARA69](#), [SARAG70](#) and [SARAG71](#). SARAG **NOTED** the following points:

- *B. irrasa* are the main bycatch species in the HIMI Fishery. They are caught between 300-2000m depth which covers 80% of the fishery area open to longlining.
- Current mitigation measures include avoiding capture through the Marine Reserve and the move-on rule, mitigating effects of bycatch by releasing skates with a high probability of survival and limiting catch with a bycatch limit of TAC of 120t.
- Considering previous post-release mortality work presented at [SARAG71](#), *B. irrasa* over 1 m in length released at depths 1,200-1,700m with popup satellite tags had an estimated 74% mortality rate (95% CI 54-87%).
- Capture depth has a strong influence on the probability of survival. All skates caught deeper than 1,400 m died.
- Skates surveyed showed an average home range of 38km. Considering the current 5nm move on rule and the home range behaviour, released skates may still be susceptible to recapture after the move on rule has been triggered.
- Haematocrit levels in blood samples are a signifier of blood loss and blood dilution which occurs through hook wounds on captured skates. Surviving skates had a significantly higher level of haematocrit compared to those that died. Skates caught in deeper waters had lower haematocrit.
- Gill colour changed with haematocrit level and oxygenation of the blood. Skates that were assessed as having pink gills were less likely to survive post-release than skates assessed as having red gills. Considering both haematocrit and oxygenation, there is potential to develop tools to subjectively identify skates with a high chance of post-release survival based on gill colour.
- Potential future actions to reduce skate bycatch and mortality include:
 - identify hotspots to avoid skate interactions.
 - undertake a species specific spatio-temporal stock assessment.
 - deploy popup satellite tags during fishery operations.
 - fish in shallower waters to reduce skate interaction and increase chance of post release survival.
 - undertake future research on how to reduce skate blood loss.
 - undertake research to develop a tool to grade the colour of skate gills and chance of post release survival.

- reassess skate bycatch limits.

55. SARAG **DISCUSSED** the following:

- Behaviour of released skates showed that smaller skates tended to be more active in the water compared to larger skates. Results may be confounded by a survivability bias of smaller skates as they are caught at shallower depths, rather than a higher chance of survival based on size alone. Conversely, smaller skates have lower energy reserves and may have low survivability compared to larger skates when all other factors are accounted for.
- Industry have previously undertaken on-water experiments utilizing different bait types to assess the types of catch. Changing baits had resulted in a decrease in macrourid bycatch but increased skate bycatch. Industry have noted there is future work to explore bait type and flavour that attracts toothfish but not rattails or skates.
- Skate distribution was not assessed in the project and is the suggested next step to identify high density areas for skate bycatch.
- The current electronic monitoring trial is exploring the ability to detect and identify skates.
- The level of retained skate catches over the past 10 seasons has remained relatively low, noting that updating the assessment is important.
- The level of mitigation required will be informed by the level of total mortality in the fishery. This will enable a risk assessment and evaluation of the management rules to be undertaken before any additional management actions are considered.

56. SARAG **AGREED** that an updated skate assessment is required before any additional bycatch management decisions can be made.

10.3 Metal Detecting PIT tags report

57. SARAG **NOTED** a presentation by the Austral industry member on the outcomes of the FRDC project [2023-066](#) 'Metal detector installation on Toothfish vessels to improve PIT tag recovery rates -Southern Ocean IPA.'

58. SARAG **NOTED** the following points:

- The project was undertaken to explore whether modern metal detection technology could assist in better detecting tags and reduce product-integrity risks. The project investigated metal detection systems suitable for wet factory environments on fishing vessels.
- PIT tags were deployed in Patagonian toothfish as part of Australia's toothfish tag-and-release program between 2000-2016. Results showed that tag recoveries are low and continue to decline. As the tagging program ages, opportunities to recover historical PIT tags are declining.
- Due to updates in electronic observer data capture software, PIT tagged toothfish are automatically flagged when its reciprocal external T-bar is recorded.
- There is a small risk that PIT tags could remain undetected if external T-bar tags have been shed, or if the metal detector does not work as intended. Metal detectors may still provide

additional operational safeguards, although the metal detector used as part of this project did not perform satisfactorily.

59. SARAG **NOTED** the recommendations of the project:

- There is a need to maintain enhanced electronic data system checks that support identification of electronic tags at recapture. No further dedicated investment in PIT tag recovery infrastructure is required unless it also delivers clear operational or product-integrity benefits.
- The use of metal detectors in wet processing factories on board fishing vessels needs further consideration due to the difficulties encountered in the tested model, but under the right circumstances, could be useful as part of broader quality-assurance systems.

10.4 Australian Centre for Excellence in Antarctic Science (ACEAS) research

60. SARAG **NOTED** a presentation by Professor Julia Blanchard (ACEAS) on work underway with the Fisheries & Marine Ecosystem Model Intercomparison Project ([FishMIP](#)).

61. SARAG **NOTED** the following reports and modelling tools available under the project:

- The FAO published the paper [Climate change risks to marine ecosystems and fisheries](#) (Blanchard & Novaglio et al., 2024) which looks at FishMIP future projections to 2100 considering two possible future pathways under contrasting Intergovernmental Panel on Climate Change Scenarios.
- FishMIP online interactive Shinyapp tool '[Country-level Ensemble Model Outputs](#)' to project global fish biomass change per Exclusive Economic Zone.
- FishMIP online interactive Shinyapp tool '[Input Explorer for Regional Modellers](#)' to examine environmental area inputs per region, including HIMI and Macquarie Island.
- The specific Southern Ocean Projections interactive explorer tool will be made available in the coming year.
- The Southern Ocean Marine Ecosystem Model Ensemble (SOMEME) is a tool developed by [Murphy et al., 2025](#) that aims to reduce model uncertainties by better representing regional characteristics, such as sea ice and marine life in the Southern Ocean.

62. SARAG **NOTED** the following climate projections in the absence of fishing:

- Between 2041-2050, global exploitable fish biomass is predicted to fall by 5% ($\pm 1.6\%$) under low emissions and 7% (± 1.6) under high emissions.
- Between 2091-2100, global exploitable fish biomass is predicted to fall by 7% ($\pm 3.1\%$) under low emission and by 21% ($\pm 6\%$) under high emissions.
- Biomass in the Southern Ocean is predicted to decrease by up to 35% by 2100.
- Uncertainty remains around how biomass will decline with various level of fishing pressure

63. SARAG **NOTED** the results of the various tools and resources available through ACEAS, and their potential utility under AFMA'S ongoing [Climate Adaptation Program](#).

Agenda item 11: Any other business and next

64. SARAG **NOTED** that the AFMA member has finished acting in the Antarctic Manager position and the substantive manger will be returning as of 8 July 2026.
65. SARAG **TENTATIVELY AGREED** to hold the next SARAG meeting the week starting 17 August 2026.
66. The Chair closed the meeting at 5:01pm

Attachment A

Table 3. Member, invited participant and observer declarations of interest as advised to date.

Name	Membership	Declared interests
Bruce Wallner	Chair	No pecuniary or other potential interests in sub-Antarctic fisheries.
Dr Philippe Ziegler	Scientific member	Employed by AAD and is the Fishery scientist responsible for Heard Island and McDonald Islands Fishery (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 principle and co-investigator on current FRDC projects. Dr Ziegler is also the scientific member of SouthMAC, and the Scientific Representative for Australia to CCAMLR.
Cara Masere	Scientific member	Member of the Fisheries team within the Southern Ocean Ecosystems Program at the AAD and has no pecuniary or other interests in the sub-Antarctic fisheries.
Rich Hillary	Scientific member	Employed by CSIRO and is the Principal Investigator of the Macquarie Island Toothfish Fishery (MITF) stock assessment. 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.
Tim Ward	Scientific member	Associate Professor in Fisheries Science, Institute Marine and Antarctic Studies, University of Tasmania Scientific Member, AFMA Small Pelagic Fishery Resource Assessment Group (SPFRAG) Principal Investigator (PI) on AFMA and FRDC research projects on SPF (e.g. Blue Mackerel DEPM) and other fisheries (Bass Strait Central Zone Scallop Fishery) Conservation Member, AFMA Great Australian Bight Management Advisory Committee (GABMAC) PI and Scientific Advisor, Department of Natural Resources and Environment Tasmania (Tasmanian Sardine Fishery) Conservation Member, South Australian Marine Scalefish Fishery Management Advisory Committee (MSFMAC) Member, MSFMAC Science Subcommittee Chair, AFMA Tropical Rock Lobster RAG

Name	Membership	Declared interests
Brad Milic	Industry member	Senior Manager of Policy and Resource at ALFPL 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 Milic owns a consultancy business that currently has a contract with Atlantis Fisheries Consultancy Group, involved with their clients' interests in the BSCZSF, and their fishery and chain of custody MSC accreditation.
Rhys Arangio	Industry member	Employed by Austral Fisheries P/L (Austral Fisheries) as the General Manager of Science and Policy. Austral Fisheries owns Statutory Fishing Rights (SFRs) in the Australian sub-Antarctic fisheries, which include waters under the jurisdiction of CCAMLR. Noting no changes since the last meeting, Mr Arangio is the Executive Officer of COLTO, as well as being a member of SouthMAC. He was not aware of any investigation or prosecution action by AFMA against his Company, nor of any legal action taken by his Company against AFMA, and has an interest in all agenda items.
Elissa Mastroianni	AFMA member	AFMA employee, no interests pecuniary or otherwise.
Rachel Downes	Executive officer	AFMA employee, no interests pecuniary or otherwise.
Heather Patterson	Invited participant	Employed by the Department of Agriculture, Fisheries and Forestry and is the author of the chapters relevant to SARAG in the Australian Bureau of Agricultural Resource Economics and Sciences (ABARES) Fishery Status Reports. Dr Patterson noted that she has no pecuniary interest in the sub-Antarctic fisheries.
Pia Bessell-Browne	Invited participant	Employed by CSIRO as an assessment scientist. Dr Bessell-Browne advised they are the principal investigator on the FRDC project 'Developing a harvest control rule to use in situations where depletion can no longer be calculated relative to unfished levels.' Dr Bessell-Browne noted she has no pecuniary interests in the sub-Antarctic fisheries.
Dale Maschette	Invited participant	Employed by IMAS & AAD and is a fishery scientist responsible for HIMI work including the HIMI icefish stock assessments. They hold no pecuniary interest in the subantarctic fisheries. Their salary is connected to two FRDC research grants related to Southern Ocean fisheries, one that they are the primary investigator on, another that they are a co-investigator on.
Selina Stoute	AFMA Observer	AFMA employee, no interests pecuniary or otherwise.

Name	Membership	Declared interests
David Smith	AFMA	Dr Smith consults on the fisheries and marine resources research and assessment. Dr Smith is an observer of the AFMA Research Committee, AFMA Climate Risk Framework Working Group and Commonwealth Research Advisory Committee. Dr Smith is an Adjunct Professor at IMAS, University of Tasmania and an Independent Fisheries Scientist for the SA Marine Scalefish Fishery Management Advisory Committee (MSFMAC). Dr Smith is also the chair of the MSFMAC Science Subcommittee and a coinvestigator to the FRDC Project 2021-042 Impacts of COVID19 on the Australian Seafood Industry: Extending the assessment to prepare for uncertain futures and FRDC Project 2021-077 Development of "guidance" for conducting stock assessments in Australia.
Ryan Leadbetter	AAD	AAD employee, no interests pecuniary or otherwise.
Sam Thalmann	Invited Participant	Wildlife biologist, Marine Conservation Program, NRE Tasmania
Henry Oak	AFMA	AFMA employee, no interests pecuniary or otherwise.
Justine Johnson	AFMA	AFMA employee, no interests pecuniary or otherwise.
Colette Appert	Invited Participant	PhD candidate, IMAS, University of Tasmania
Julia Blanchard	Invited Participant	Professor and ARC Future Fellow in Global Change Ecology, IMAS, University of Tasmania
Denisse Fierro Arcos	Invited Participant	Research Assistant, University of Tasmania
Kieran Murphy	Invited Participant	Research Associate, University of Tasmania
Rohan Currey	Observer	Employee of ABARES/DAFF. No pecuniary interests in Australian fisheries. Australia's Scientific Committee Representative to the Western and Central Pacific Fisheries Commission and Australia's Head of Delegation to the Commission for the Conservation of Southern Bluefin Tuna Ecologically Related Species Working Group. Advises DAFF policy on international fisheries matters.
Sally Carney	Observer	Assistant Director, CCAMLR Policy, AAD
Rhonda Bartley	Observer	Branch Head, Australian Antarctic Division

74th Meeting of the SARAG Technical Working Group (TWG)

The Old Woolstore Apartment Hotel, 27-28 May 2026

SARAG Draft Agenda

Chair: Bruce Wallner

Approx time	Item	Purpose	Presenter
Day 1 – SARAG – Wednesday 27th			
15:00 (30 mins)	1. Preliminaries		
	1. Welcome and apologies	For noting	Chair
	2. Declaration of interests	For action	Chair
	3. Adoption of agenda	For action	Chair
	2. Actions Arising	For noting	AFMA
	3. Member updates	For noting	All
15:30 (1 hr)	4. Random Longline Survey: 2025 results and future survey use	For advice	AAD
16:30	Day 1 Meeting Close		

Approx time	Item	Purpose	Presenter
Day 2 – SARAG – Thursday 28 th			
9:00 (45 mins)	5. TWG report to SARAG on progress and recommendations	For advice	TWG Chair
9:45 (1 hr)	6. Assessing the impacts of the RSTS without IUCN1a and II Marine Reserve Areas and future planning	For advice	AAD/CSIRO
10:45 (15 mins)	Morning Tea		
11:00 (2 hrs)	7. MITF MSE and HCRs – results	For advice	CSIRO
13:00 (45 mins)	Lunch		
13:45 (1 hr)	8. Seabird bycatch at HIMI in April 2026, ecological drivers and bycatch limits	For advice	AFMA/Industry
14:45 (30 mins)	9. Modification to minimum trawl gear disc size, to account for wear	For advice	AFMA
15:15 (15 mins)	Afternoon Tea		
15:30 (1hrs 15 mins)	10. Research Items		
	1. Update on the <i>RSV Nuyina</i> HIMI Voyage	For noting	AAD
	2. Skate bycatch research at HIMI	For advice	AAD and Colette Appert
	3. Metal Detecting PIT tags report	For noting	Austral
	4. Australian Centre for Excellence in Antarctic Science (ACEAS) research	For noting	ACEAS – Julia Blanchard
16:45 (15 mins)	11. Any other business and next meeting	For advice	All
17:00	Day 2 Meeting close		

Attachment C

Item	Action arising	Status as at SARAG 74
1	HIMI Data Collection Approaches AAD to work with CSIRO, industry and AFMA to provide a paper to the next SARAG meeting outlining the broad scientific and resource costs and benefits associated with the implementation of different surveys and research proposals: Random Stratified Trawl Survey (RSTS review, including variations to the periodicity), continued refinement of the longline research hauls (RLH) and development of a time series of fishery independent longline hauls & Close Kin Mark Recapture (CKMR) (SARAG 66 – Agenda Item 5.4)	Removed from action list – moved to list of priorities SARAG 70 advised that it still considers this work as an ongoing priority for the HIMI Fishery. There have been no changes since SARAG 73. RLH/RLS to be considered under agenda item 4 and the future planning for the RSTS under agenda item 6. SARAG to advise any updates to the action item after consideration of agenda items 4 and 6. SARAG confirmed that this item is a priority. SARAG agreed to remove the item from the action list and place it on the priority list.
2	Domestic Decision Rule HIMI Development of a domestic decision rule for HIMI Toothfish TAC setting be explored going forward, noting this may require specific funding (SARAG 69 – Agenda Item 6).	Removed from action list – moved to list of priorities SARAG 70 noted that the progress of this action item is to some extent dependent on other work that is currently underway such as the MSE project for MITF and the exploration of different decision rules at CCAMLR. No update since SARAG 73. SARAG to advise of any update and expected timeline for completion with the HIMI TWG workplan. SARAG confirmed that this item is a priority. SARAG agreed to remove the item from the action list and place it on the priority list.

3	Observer Data Observer data to be analysed for gaps in observation (time of day) and develop paper on species specific diurnal patterns and risk for SARAG 70 (SARAG 69 – Agenda Item 7).	Removed from action list – moved to list of priorities No change since SARAG 73. SARAG 70 noted that the additional analysis required to further evaluate the risk of daylight setting to seabirds in MITF has not been undertaken due to lack of resourcing, further noting AFMA’s advice that if such work remains a priority a scope needs to be developed for a discrete project. Such work may also include the scientific analysis of observer seabird data to support SARAG’s ongoing risk-assessment of the season extension trial. SARAG recalled that the item requested observers to take more seabird abundance counts, if possible, however this was not usually achievable due to the observer workload. SARAG confirmed that this item is a priority. SARAG agreed to remove the item from the action list and place it on the priority list.
4	Sub Antarctic Fisheries 5-Year SRP AFMA to circulate the revised draft Sub Antarctic Fisheries 5-Year SRP (2025-2029) for comment out of session (SARAG 69 – Agenda Item 11).	Complete The draft annual research statement for 2026-27 and draft five-year research plan (2026-2030) were considered at SARAG 73 and finalised late 2025.
5	Draft MITF ERA SARAG member comments on the draft MITF ERA to be compiled out of session and provided to CSIRO. The final draft MITF ERA to be recirculated to SARAG for finalisation (SARAG 71 – Agenda Item 8.1).	Complete The MITF ERA was finalised in April 2026 and is available on the AFMA website. An email was sent to SARAG members and invited participants in April informing them of this update.
6	Live Release of Small Toothfish The AAD and CSIRO undertake an analysis of historical data for HIMIF and MITF, respectively, of small fish under 1kg to better understand the proportion of catch that they make up and inform any changes required to sampling protocol (SARAG 71 – Agenda Item 12).	Removed from action list – moved to list of priorities Due to competing priorities and limited resources at both the AAD and CSIRO this has not progressed since SARAG 73. SARAG confirmed that this item is on hold. SARAG confirmed that this item is a priority. SARAG agreed to remove the item from the action list and place it on the priority list.

7	Climate and Ecosystem Report updates CSIRO to add in EEZ and marine park boundaries for sea surface and bottom temperature graphs on the Climate and Ecosystem Status Report Cards for next year.	Incomplete Climate report cards to be presented at SARAG in August 2026.
8	Bycatch assessment timing AAD to confirm timing of the skate bycatch assessment, grey rockcod, and both <i>Macrourus</i> spp at SARAG 75 (scheduled for August 2026)	Incomplete AAD to confirm any updates since SARAG 73. SARAG confirmed that this item will be considered at SARAG 75 in August.



Sub-Antarctic Resource Assessment Group (SARAG)

Meeting 74

27-28 May 2026

Agenda item 3 Member Updates

Purpose: FOR NOTING

Recommendation

That SARAG:

1. **NOTE** verbal updates from Industry and Scientific Members;
2. **NOTE** the written update from AFMA in this paper.

AFMA update

Sub-Antarctic Fisheries Electronic Monitoring trial

1. The EM trial is ongoing, with concession holders continuing to voluntarily operate EM systems. EM data is being routinely collected and provided to CSIRO for AI model training, validation and performance assessment.
2. CSIRO has progressed deployment of edge AI capability to support near realtime EM analysis onboard vessels.
 - a. This can provide a live count and weight estimate for use by skippers and crew while at sea.
 - b. Edge AI equipment (CSIRO owned laptop) is scheduled for deployment on the Antarctic Discovery in June 2026, following successful bench testing and validation work using historical EM footage.
 - c. Work is underway to develop automated feedback to support vessel managers, AAD and AFMA in their reporting requirements.
3. The Austral Odyssey was fitted with a Saltwater EM system in March 2026, prior to its inaugural fishing trip. The vessel is now operational and available for inclusion in ongoing EM data collection for the trial.
4. CSIRO is providing regular progress reports based on reviews of complete fishing trips, enabling assessment of EM data quality, vessel practices and AI model performance.
 - a. AI-derived abundance and length estimates of Patagonian Toothfish demonstrated improved alignment with observer data following various model refinements.
 - b. Skate bycatch provided valuable material to scope future automated detection, species identification, and sex determination, with CSIRO confirming sufficient imagery exists to support further development subject to improved imaging conditions.
 - c. Actions include:

- i. AFMA adopting recommendations relating to ruler integrity, facilitating measurement calibration and reviewing maintenance procedures.
 - ii. Industry implementing onboard improvements such as camera cleaning and operational changes to reduce occlusions including removing plastic sheeting.
 - iii. CSIRO incorporating all model-related recommendations, such as handling of occluded and stacked fish, curvature effects, region-of-interest refinement, and calibration improvements, directly into AI model design.
- 5. With significant outcomes close to being achieved, AFMA and CSIRO have agreed to extend the project, with CSIRO to provide a final report in December 2026. AFMA intends to use the outcomes of the trial and final report to progress an EM implementation decision in early 2027.

Longline fishing season extension trial MITF

- 6. SARAG will recall that at its meeting on 9-10 July 2024, the AFMA Commission approved a trial of a longline fishing season extension from 1 September to no later than 21 September in the MITF subject to specific arrangements. Fishing is yet to occur under the current trial. AFMA management will advise when fishing does occur, and report on relevant data collected.

CCAMLR Exploratory Fishing Applications

- 7. Two Australian proposal were received for 2026/27 CCAMLR New and Exploratory fisheries season. The proposals were endorsed by AFMA and presented to the CCAMLR Consultative Forum (CCF) on 30 April 2026. Notification of the proposals will be made to CCAMLR and will be considered at the coming CCAMLR meetings.

Amendment of gear specifications in the *Fisheries Management (Heard Island and McDonald Islands Fishery) Regulations 2002*.

- 8. SARAG will recall that at SARAG 73 in August 2025, AFMA was in the processing of amending the [*Fisheries Management \(Heard Island and McDonald Islands Fishery\) Regulations 2002*](#) to repeal trawl gear specifications. The amendment came into effect on 16 September 2026. AFMA varied the 2024/25 HIMI Statutory Fishing Conditions (SFR) Conditions to include minimum trawl gear specifications for Patagonian toothfish and mackerel icefish. The current 2025/26 HIMI SFRs conditions prescribe the trawl gear specification and any future amendment of these will occur through an SFR variation.

Export approval under the EPBC Act

- 9. On 5 January 2026 AFMA Management submitted an application to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for the assessment of the HIMI Fishery under the EPBC Act. The application is used by DCCEEW to assess the management arrangements for the HIMI Fishery against the Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition and the requirements set out in relevant sections of the EPBC Act. The HIMI Fishery was declared an approved Wildlife Trade Operation (WTO) under the EPBC Act in 2002 and has been re-approved three times. The current WTO accreditation expires on 9 October 2026.
- 10. The application was published on the [DCCEEW website](#) for public comment open from 9 February – 13 March 2026. DCCEEW will consider any submissions received and where necessary seek further information from AFMA prior to finalising their assessment.

11. On 2 April 2026 AFMA Management submitted an application to DCCEEW for the assessment of the Macquarie Island Toothfish Fishery the EPBC Act. The MITF was declared an approved WTO under the EPBC Act in 2002 and has been re-approved two times. The current WTO accreditation expires on 9 October 2026. The submission will be published on the [DCCEEW website](#) and available for public comment shortly.
12. On 20 April, AFMA Management submitted an application to DCCEEW for the assessment of Australia's high seas fisheries under the EPBC Act. The current WTO accreditation expires on 9 October 2026. The submission will be published on the [DCCEEW website](#) and open for public comment in the coming months.

Climate Risk Framework implementation

13. AFMA has finalised the Climate Risk Framework (the Framework) following an extensive development and trial process. This trial included the application of the draft Framework to Patagonian toothfish in the MITF. Endorsed by the AFMA Commission at its September 2025 meeting, the final Framework has been published alongside the Trial Implementation Report. The trial implementation report captures key outcomes and insights from the trial application across a range of Commonwealth fisheries. The final CRF and Trial Implementation Report are available on the AFMA website at www.afma.gov.au/climate-change.
14. The Framework will be progressively implemented across Commonwealth fisheries over the coming three years. To support the roll out, the expert Working Group (WG) used in the trial will be retained to provide oversight and strategic advice to the AFMA Commission and AFMA Management. Draft species assessments will be developed by AFMA's Climate Adaptation Program (CAP) and reviewed by the WG. The draft assessments will then be presented to the relevant RAGs and MACs for review and finalisation. Consistent with the approach taken during the trial, AFMA would like relevant scientists and industry members to participate in the WG meetings.
15. The WG membership includes Dr Beth Fulton, Dr Alistair Hobday, Dr David Smith and Dr Keth Sainsbury, with administrative support from AFMA's Climate Adaptation Program team.
16. For the HIMI, AFMA is proposing to finalise assessments for all quota species this year. To do so, AFMA's Climate Adaption Program team are working to have draft species assessments prepared in time for an WG meeting in July 2026. All things going to plan, the draft assessments would then be considered by the RAG in August 2026. For the MITF, this process will be undertaken in 2027.

ERA and Bycatch Strategy

17. The 2025 MITF ERA, using data from 2019-2023, has now been updated and the report has been finalised by CSIRO. This is available on [AFMA's website](#).

18. Likewise, the Sub-Antarctic Fisheries Bycatch Strategy 2026 has now been finalised and published. SARAG will recall considering the draft strategy in August 2025 ([SARAG 73](#)) and should note their advice has been included in the final strategy. This is also available on [AFMA's website](#).



Sub-Antarctic Resource Assessment Group Technical Working Group (TWG)

RECOMMENDATIONS

MEETING 3

4 DECEMBER 2025

FINAL

SARAG - Technical Working Group (TWG)

CHAIR: Dr David Smith

Date: 4 December 2025

Venue: Lead Light Room, Hadley's Orient Hotel, 34 Murray Street, Hobart

Attendance

Members

- Dr Philippe Ziegler
- Dr Cara Masere
- Dr Rich Hillary
- Dr Pia Bessell-Browne
- Dr John Hampton
- Dr Tim Ward
- Dr Paige Eveson
- Selina Stoute

Observers

- Rhys Arangio (online)
- Brad Milic
- Elissa Mastroianni (online)

Apologies

- Dr Graham Pilling

Executive Officer: Rachel Downes, AFMA

Member interests are at **Table 1**.

Progress

The TWG noted:

- That their recommended approach for developing a spatially disaggregated stock assessment in RTMB had been supported by SARAG
- The approach was very well received at CCAMLR WG-FSA-2025, who noted the ambitious workplan.
- It was also noted that the CCAMLR WG-FSA-2025 recommended that stock specific MSE be prioritised, with an acknowledgement that different models and/or HCRs may be appropriate for different stocks.
- CSIRO presented a high-level progress report on modelling. A flexible and pragmatic approach is being taken, with increasing complexity added in a stepwise manner. The population dynamics component, likelihood functions and future work needed to complete the new stock assessment were described. Mark-recapture likelihood code is complete, but checks are ongoing. Significant progress has been made with 90–95% of code completed, and on track for February/March 2026. Future work includes testing assessment structures on real/simulated data, developing the suite of model choice/validation protocols and finally exploring assessment structures on HIMI data.

- Dr Masere presented a paper on the proposed structure of the Casal2 bridging model which supported key discussions and recommendations of the TWG at the meeting (see recommendations on future work below).
- Work by Ryan Leadbetter (AAD) detailed an interim conditional age at length approach to estimating the proportion at age in the catch of toothfish in the HIMI fishery. This approach is proposed to underpin one of the steps within the Casal2 bridging analysis.
- In discussion, AFMA requested that the stock assessment team might consider the possibility that sampling of RSTS sites within the IUCN 1a zones of the HIMI MPA may not be possible in the future.
- Dr. Masere presented a preliminary overview of the general patterns and trends of HIMI tagging data with respect to the factors used within the Spatial-Brownie tag recovery model. No immediate issues or obvious outliers were identified yet. As work on the stock assessment progresses this type of review will need to be continued as appropriate.

TWG recommendations on future work

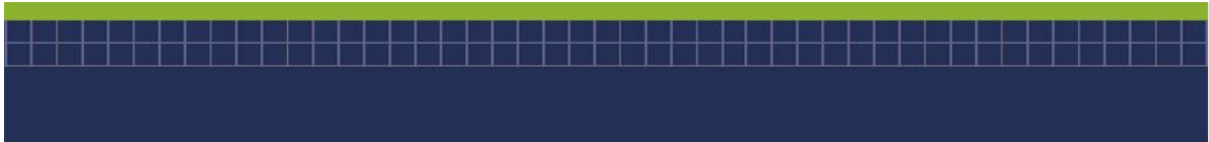
1. The highest priority remains to develop a spatially disaggregated stock assessment in RTMB.
2. Consistent with best practice, a formal bridging analysis between Casal2 and RTMB should be undertaken. For this purpose, the analysis only requires a comparison of the models using a single spatial area. The single area RTMB and Casal2 bridging analysis will require these additions to Casal2 model:
 - Conditional age-at-length and length frequency data (rather than age frequency data)
 - Sex disaggregated model
3. Completing the bridging analysis should be highest priority in the short term, and the aim is to have this work completed prior to the Christmas shut down.
4. To assist understanding and support of the assessment, targeted communications on the new methods underpinning the assessment should be undertaken in the New Year. Including:
 - Spatial Brownie versus Chapmans estimator.
 - Separate to the formal bridging analysis, explore a range of spatial areas between the Casal2 and RTMB models to demonstrate the difference between model approaches.

Next meeting

The TWG agreed the next meeting will be held mid-March 2026.

Table 1 TWG member and observer interests

Name	Interest
Dr David Smith	Senior Scientific Advisor to AFMA
Dr Philippe Ziegler	Fish & Fisheries Scientist, Southern Ocean Ecosystems Program, AAD. SARAG Scientific Member.
Dr Cara Masere	Senior Research Scientist, Southern Ocean Ecosystem Program, AAD. SARAG Scientific Member.
Dr Rich Hillary	Senior Principal Research Scientist, CSIRO. SARAG Scientific Member
Dr Pia Bessell-Browne	Senior Research Scientist, CSIRO. SARAG invited participant.
Dr Tim Ward	UTAS/IMAS, Associate Professor and Fisheries Scientist. SARAG Scientific Member
Dr Graham Pilling	Deputy Director, Fisheries, Aquaculture and Marine Ecosystems (FAME) (Oceanic Fisheries), The Pacific Community (SPC)
Dr John Hampton	Consultant
Dr Paige Eveson	Research Scientist, CSIRO
Selina Stoute	Senior Manager, Tuna and International Fisheries, AFMA
Rachel Downes	Senior Management Officer, Antarctic Fisheries, AFMA. SARAG Executive Officer
Anna Willock	Deputy CEO, AFMA
Elissa Mastroianni	Manager, Antarctic Fisheries, AFMA. SARAG AFMA member
Rhys Arangio	General Manager of Science and Policy, Austral Fisheries. SARAG Industry member
Malcolm McNeill	Managing Director, Australian Longline
Brad Milic	Senior Manager of Policy and Resource, Australian Longline. SARAG Industry member



Sub-Antarctic Resource Assessment Group Technical Working Group (TWG)

RECOMMENDATIONS

MEETING 4

18 MARCH 2026

FINAL

SARAG - Technical Working Group (TWG)

CHAIR: Dr David Smith

Date: Wednesday 18 March 2026

Venue: Lead Light Room, Hadley's Orient Hotel, 34 Murray Street, Hobart

Attendance

Members

- Dr Philippe Ziegler
- Dr Cara Masere
- Dr Rich Hillary
- Dr Pia Bessell-Browne
- Dr John Hampton
- Dr Tim Ward
- Dr Paige Eveson
- Selina Stoute

Observers

- Brad Milic, ALF
- Rhys Arangio, Austral
- Jessica Tengvall, Austral (online)
- Sarah Kirkcaldie, AFMA (online)
- Rhonda Bartley, AAD (online)
- Dr Liz Brierly, AAD
- Dr Ryan Leadbetter, AAD
- Dr David Souter, AAD

Executive Officer: Rachel Downes, AFMA

Member interests are at **Table 1**.

Apologies

- Dr Graham Pilling
- Malcom McNeill
- Elissa Mastroianni

Progress

The TWG considered the following progress against recommendations arising from TWG meeting 3.

Recommendation 1- *The highest priority remains to develop a spatially disaggregated stock assessment in RTMB.*

- Dr Hillary presented progress on the TMB stock assessment. Progress included preparatory work for the initial bridging process from Casal2 to TMB using the first stage of the non-spatial, sex-structured model. Validation checks and limited simulated data testing showed no issues with the non-Spatial Brownie mark-recapture model. Progress includes updating and re-estimating key inputs. After the non-spatial model is run, progress will move to spatial model exploration. There has been some engagement with CCAMLR Members, primarily New Zealand, on the proposed modelling approaches.
- Dr Bessell-Browne presented updated assessment inputs for sex specific growth and maturity, along with tag shedding estimates, noting that ageing error updates are still to be processed. The models presented showed good fits to data and results consistent with those observed for other toothfish stocks.

Recommendation 2 – *Consistent with best practice, a formal bridging analysis between Casal2 and RTMB should be undertaken. For this purpose, the analysis only requires a comparison of the models*

using a single spatial area. The single area RTMB and Casal2 bridging analysis will require these additions to Casal2 model:

- Conditional age-at-length and length frequency data (rather than age frequency data)
- Dr Leadbetter presented a paper on the bridging analysis work undertaken to move from the single-sex 2024 stock assessment in Casal2 (Masere et al., 2024), to a new sex-disaggregated Casal2 model. The intent of this work is to develop a non-spatial Casal2 model that is comparable with a non-spatial version of the new TMB model from which spatial versions will be explored. The steps in the bridging process included:
 1. Apply a smoothed age-length-key using conditional age-at-length data to the 2024 assessment
 2. Update step 1 with data to 2025
 3. Update step two with sex specific growth and maturity that share age-based selectivity between sexes
 4. Step 3 with length-based selectivity
- The work showed little change in B_0 , B_{2024} , and the 2024 Stock Status among bridging steps. As a consequence of moving to length-based selectivity, the estimate of survey catchability, q , was higher in the final step. The TWG noted that the conditional age-at-length data was used to generate age-frequency data external to Casal2, rather than directly incorporating the data source within the population dynamics model. This approach provided consistent results with previous stock assessments and mimics the processes applied by the TMB model but does not fully align with the approach intended for use in the TMB implementation, where this process occurs within the model. Whilst the impact of the different approaches on model estimates are yet to be determined, it remains one of the differences, alongside the tag estimators, between the two stock assessment models in the bridging process.

Recommendation 4 - To assist understanding and support of the assessment, targeted communications on the new methods underpinning the assessment should be undertaken in the New Year. Including:

- Spatial Brownie versus Chapmans estimator.
- Dr Masere presented a Spatial-Brownie tag recovery model overview, noting significant work to document the clear process, data, model structure and statistical assumptions. The work presented shows that the Spatial-Brownie model is fit for use, including that it is more statistically efficient to account for toothfish movement. The work presented showed the work undertaken to explore the best-fitting parameterisation of estimated parameters using the Rmark package.

Other issues – RSTS

- The TWG members and observers discussed the future planning of the Random Stratified Trawl Survey (RSTS) in the HIMI Marine Reserve and reduction in the area able to be surveyed for research purposes. The members and observers noted that 2026 is the last year the RSTS will occur in its current design. Specifically, AAD advised that it is highly unlikely that trawling for survey purposes in IUCN 1a and IUCN II zones will be permitted from the

2026/27 season onward. Trawling for survey purposes in the IUCN IV zone is uncertain and subject to assessment. It was noted that reducing access to IUCN 1a and II zones will reduce the RSTS sampling stations by approximately 30%. Excluding the IUCN IV from the RSTS as well would be a reduction of approximately 50% in sampling stations.

- Members and observers noted that the Random Longline Survey (RLS) is also undertaken each year and has been proposed as a future alternative for the RSTS. It was noted that adjusting the format of the RSTS would require additional work to understand the implications on the toothfish stock assessment, including reducing the sample size, fishable area and frequency of the RSTS.
- It was noted that reducing the RSTS to areas outside of the Marine Reserve or completely abandoning the RSTS would also affect or remove the ability to undertake mackerel icefish assessments and bycatch assessments. It was also noted by AAD scientists that this would affect surveys to evaluate abundance and trends in fish biodiversity around HIMI. The effect of changing or completely removing the RSTS was noted as having significant business impacts on Industry, including changing operational requirements, running costs and fishing plans, including the ability to target mackerel icefish.

TWG recommendations and future work

1. The highest priority remains to develop a spatial stock assessment using TMB, with sufficient complexity to fit the data inputs.
2. AAD to explore the potential to include the conditional age-at-length and length frequency data within Casal2 to match the approach implemented in the TMB assessment.
3. Exploration of the impact of no future access by the RSTS to IUCN zones 1a and II, and potentially IUCN zone IV, of the HIMI Marine Reserve:
 - Stage 1: AAD to assess implications of this to the RSTS through a retrospective analysis
 - Stage 2: MSE testing using TMB to evaluate new approaches/designs potentially replacing the RSTS
4. CSIRO to provide updates to the TWG on TMB progress.
5. AAD to provide updates to the TWG on interactions and feedback from engagement with other CCAMLR members.
6. TWG members be invited to attend SARAG in May.

Next meeting

The TWG agreed the member will next meet as part of SARAG to be held May 2026.

Table 1 TWG member and observer interests

Name	Interest
Dr David Smith	Senior Scientific Advisor to AFMA
Dr Philippe Ziegler	Fish & Fisheries Scientist, Southern Ocean Ecosystems Program, AAD. SARAG Scientific Member.
Dr Cara Masere	Senior Research Scientist, Southern Ocean Ecosystem Program, AAD. SARAG Scientific Member.
Dr Rich Hillary	Senior Principal Research Scientist, CSIRO. SARAG Scientific Member
Dr Pia Bessell-Browne	Senior Research Scientist, CSIRO. SARAG invited participant.
Dr Tim Ward	UTAS/IMAS, Associate Professor and Fisheries Scientist. SARAG Scientific Member
Dr Graham Pilling	Deputy Director, Fisheries, Aquaculture and Marine Ecosystems (FAME) (Oceanic Fisheries), The Pacific Community (SPC)
Dr John Hampton	Consultant
Dr Paige Eveson	Research Scientist, CSIRO
Selina Stoute	Senior Manager, Tuna and International Fisheries, AFMA
Rachel Downes	Senior Management Officer, Antarctic Fisheries, AFMA. SARAG Executive Officer
Sarah Kirkcaldie	Acting Manager, Antarctic Fisheries, AFMA.
Elissa Mastroianni	Manager, Antarctic Fisheries, AFMA. SARAG AFMA member
Rhys Arangio	General Manager of Science and Policy, Austral Fisheries. SARAG Industry member
Jessica Tengvall	Science and Policy Officer, Austral Fisheries
Malcolm McNeill	Managing Director, Australian Longline
Brad Milic	Senior Manager of Policy and Resource, Australian Longline. SARAG Industry member
Dr David Souter	Chief Research Officer, AAD
Dr Liz Brierly	Branch Head, Policy and Strategy Branch, AAD
Dr Ryan Leadbetter	Fisheries Research Scientist, AAD
Rhonda Bartley	Branch Head, Chief Scientist Branch, AAD



Sub-Antarctic Resource Assessment Group Technical Working Group (TWG)

RECOMMENDATIONS

MEETING 5

27 MAY 2026

FINAL

SARAG - Technical Working Group (TWG)

CHAIR: Dr David Smith

Date: Wednesday 27 May 2026

Venue: The Wapping Room, The Old Woolstore Apartment Hotel, 1 Macquarie Street, Hobart

Attendance

Members

- Dr Philippe Ziegler
- Dr Cara Masere
- Dr Rich Hillary
- Dr Pia Bessell-Browne
- Dr John Hampton
- Dr Tim Ward
- Dr Paige Eveson
- Dr Graham Pilling (online)
- Selina Stoute

Observers

- Brad Milic, ALF
- Rhys Arangio, Austral
- Rhonda Bartley, AAD
- Sally Carney, AAD
- Dale Maschette, AAD
- Dr Ryan Leadbetter, AAD
- Dr David Souter, AAD
- Anna Willock, AFMA
- Bruce Wallner, SARAG Chair

Executive Officer: Rachel Downes, AFMA

Member and observer interests are at **Table 1**.

General

The TWG acknowledged the five papers submitted by the CSIRO and AAD science teams:

- Overview of Patagonian toothfish (*Dissostichus eleginoides*) stock assessment development in the Heard Island and McDonald Island (HIMI) toothfish fishery in Division 58.5.2;
- Updated biological relationships and tag shedding estimates for the 2026 stock assessment of the Heard Island and McDonald Islands Patagonian toothfish fishery;
- A non-spatial TMB-based stock assessment model for Patagonian toothfish at Heard Island and McDonald Islands;
- Single area model comparison for TMB and Casal2; and
- Development of a 2-area stock assessment at HIMI.

The TWG considered the progress made by the science teams to be significant, of high quality and on track to present a scientifically robust bridging analysis and substantially progressed two-area spatially disaggregated model to the CCAMLR WG-SAM 2026.

Progress

The TWG considered the following progress:

Bridging analysis

Dr Leadbetter presented joint work by AAD and CSIRO on the latest component of the bridging analysis. Specifically bridging from the Casal2 single area, sex-based model to the initial TMB assessment. The TWG agreed with the key conclusions of the work that:

- the results from the Casal2 and TMB assessments are comparable to an acceptable level.
- the comparability of the results suggests that the TMB assessment has been implemented consistently with Casal2 and that the noted contrasts reflect different approaches to fitting to data rather than misspecification of population processes; and
- this work will be presented alongside the Casal2 bridging analysis at WG-SAM 2026 to facilitate the delivery of a new spatially explicit TMB assessment at CCAMLR-45.

The TWG noted advice from AAD that after consulting with Casal2 developers, internal conditional age at length to derive age frequencies is not currently possible for the HIMI assessment due to memory constraints.

Development of a spatially disaggregated stock assessment in TMB.

Dr Hillary presented results of an initial exploration of the 2-area TMB model. The TWG noted the progress made and agreed the preliminary results provide confidence in the direction and were impressed by the quality of the fit at this early stage.

Overall summary:

- The assessment gives better fits to both RSTS and tagging data
- Some tagging data issues still need to be resolved for some release years
- Estimated movement rates between plateau-and-shelf resolve some of the apparent data conflicts
- Plan to look at time-dependent movement in next phase
- Recruitment patterns are better, but some uncertainty remains
- There is clear improvement, but more model development is required

TWG recommendations and future work

1. Highest priority remains to be the development of the spatially explicit disaggregated stock assessment in TMB.
2. Future work

Prior to the WG-SAM 2026 meeting

- a) explore whether we need to retain the unsexed size data for the RSTS. All other unsexed size data can be removed;
- b) to better understand recruitment patterns, more model exploration should be undertaken;
- c) explore Random Effects to account for interannual variability in recapture probabilities;
- d) undertake a series of simulations on TMB in order to demonstrate the performance of the TMB-based assessment and provide confidence that the modelling framework is behaving as expected.

Post WG-SAM 2026 meeting

- e) if required, explore the potential to include more areas in the model noting the 2-area model is preliminary.

Other issues

The TWG noted that its advice on the retrospective analysis of the RSTS will be considered by SARAG.

Next meeting

The TWG agreed the members will next meet in August 2026 prior to SARAG.

Table 1 TWG member and observer interests

Name	Interest
Dr David Smith	Senior Scientific Advisor to AFMA
Dr Philippe Ziegler	Fish & Fisheries Scientist, Southern Ocean Ecosystems Program, AAD. SARAG Scientific Member.
Dr Cara Masere	Senior Research Scientist, Southern Ocean Ecosystem Program, AAD. SARAG Scientific Member.
Dr Rich Hillary	Senior Principal Research Scientist, CSIRO. SARAG Scientific Member
Dr Pia Bessell-Browne	Senior Research Scientist, CSIRO. SARAG invited participant.
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Brad Milic	Senior Manager of Policy and Resource, Australian Longline. SARAG Industry member
Dr David Souter	Chief Research Officer, AAD
Dr Ryan Leadbetter	Fisheries Research Scientist, AAD
Rhonda Bartley	Branch Head, Science Branch, AAD
Dale Maschette	Senior Research Scientist, AAD, SARAG Invited Participant
Sally Carney	Assistant Director, CCAMLR Policy, AAD
Bruce Wallner	SARAG Chair



MP development for Macquarie Island Patagonian toothfish

SARAG Meeting 74

Pia Bessell-Browne & Rich Hillary | 28th May 2026

Australia's National Science Agency

Attachment H



Management Procedures (MPs)

- A set of rules used to determine management actions, including specification of:
 - Data collection
 - Assessment methods
 - Control rules
- Sometimes referred to as harvest strategies
- Are required for Commonwealth fisheries in Australia as described in the Harvest Strategy Policy



Aims of MPs

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- The objectives of a MP will be set in a broad sense by the HSP
 - E.g. aim to maintain biomass at TRP and prevent decline below LRP
- However, more detailed aspects of MPs and how they achieve the goals specified by policy will vary by fishery:
 - Economic constraints
 - Data availability
 - Fishery constraints (e.g. preference for stable catches)
- There are different ways to achieve the same overarching goal, e.g. a MP for SBT will be different to that for the NPF

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Development of MPs

- The objectives of MPs will vary by fishery
- We need to test the performance of different options, including:
 - Assessment type
 - Control rules
- History has shown that the most popular ideas on paper do not always have the best performance
- We need to test performance of potential options using Management Strategy Evaluation (MSE)



- A tool used to quantitatively evaluate the performance of alternative management measures
- The performance is evaluated over a range of different plausible fishery characteristics (e.g. spatial area, fleet dynamics)
- This ensures that the MP is robust to a spectrum of plausible future scenarios

MSE features

Observation Model (OM)

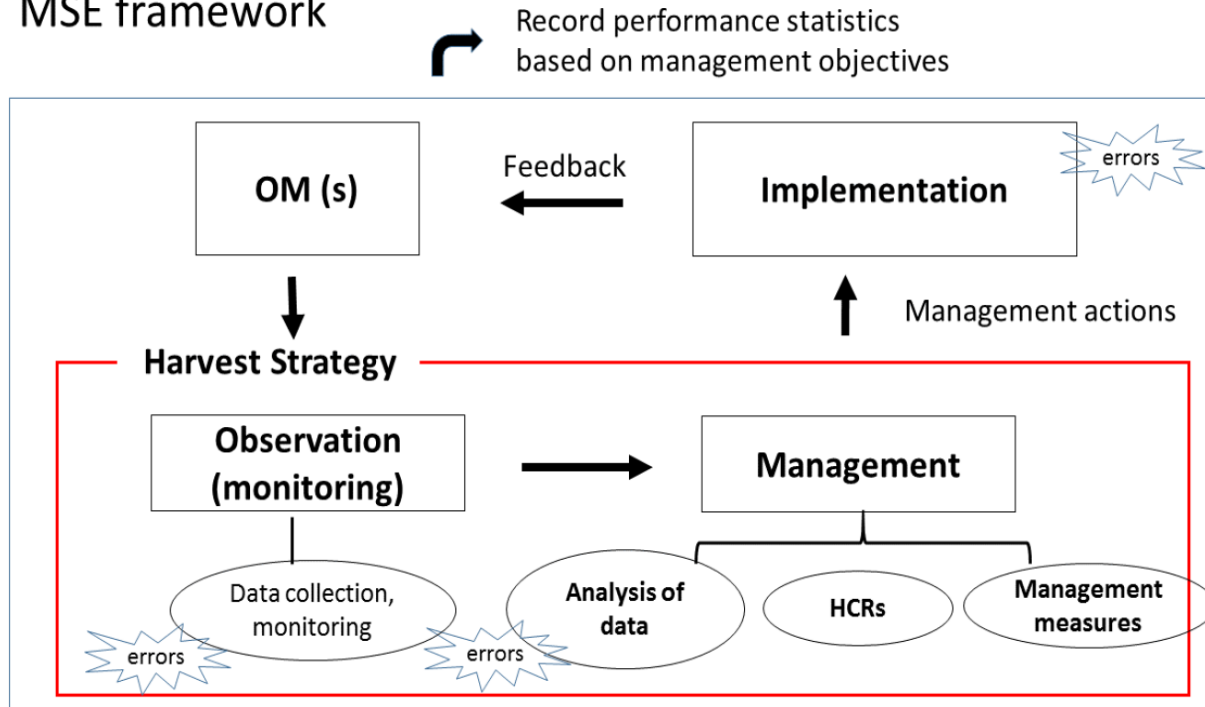
- A 'true' version of reality
- Contains range of uncertainty in the system
- Used to generate data and test performance of assessment and management measures

Estimation Method (EM)

- The 'observed' system
- Includes assessment and management measures
- Does not need to be a stock assessment, can also be empirical rules etc.

MSE framework

MSE framework





A MP for Macquarie Island toothfish

- We're looking to develop an alternative MP approach to the current CCAMLR rule
- This involves stepping back from using the stock assessment to generate catch advice
- This has many benefits, including:

Complexity	Testability	Separation of powers
Simple often outperforms more complex	We often update stock assessments	Decoupling assessment and management advice
Easier to understand changes	This is impossible to MSE test	Allows more freedom for assessment development

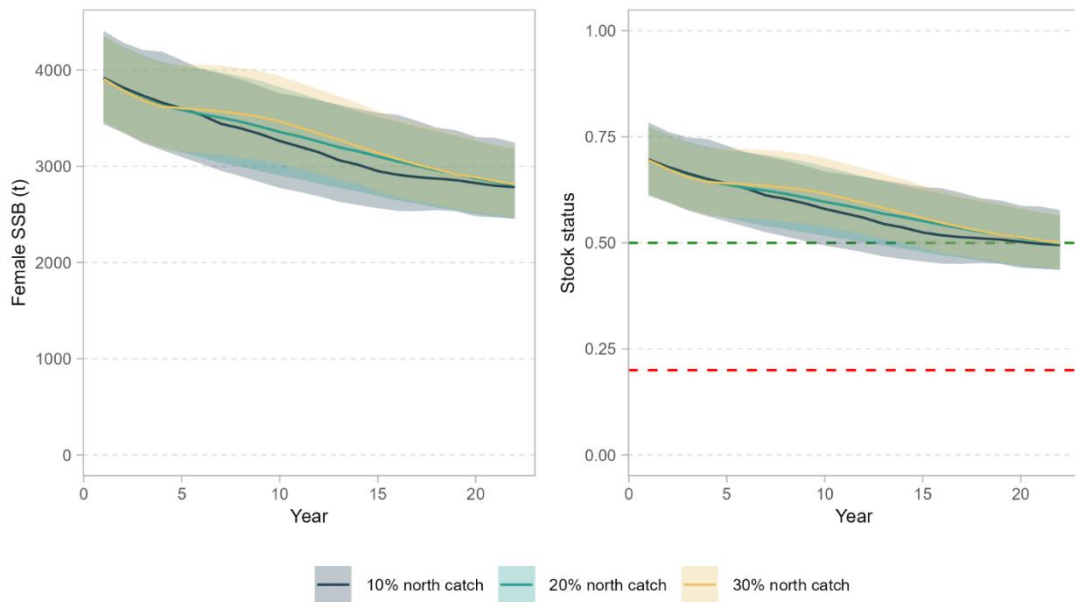


Macca MSE progress

- OM conditioned on the 2025 stock assessment MCMC outputs
- EM uses the actual Macca tag data before simulating data to append moving forward in projections
- Initial simulations completed

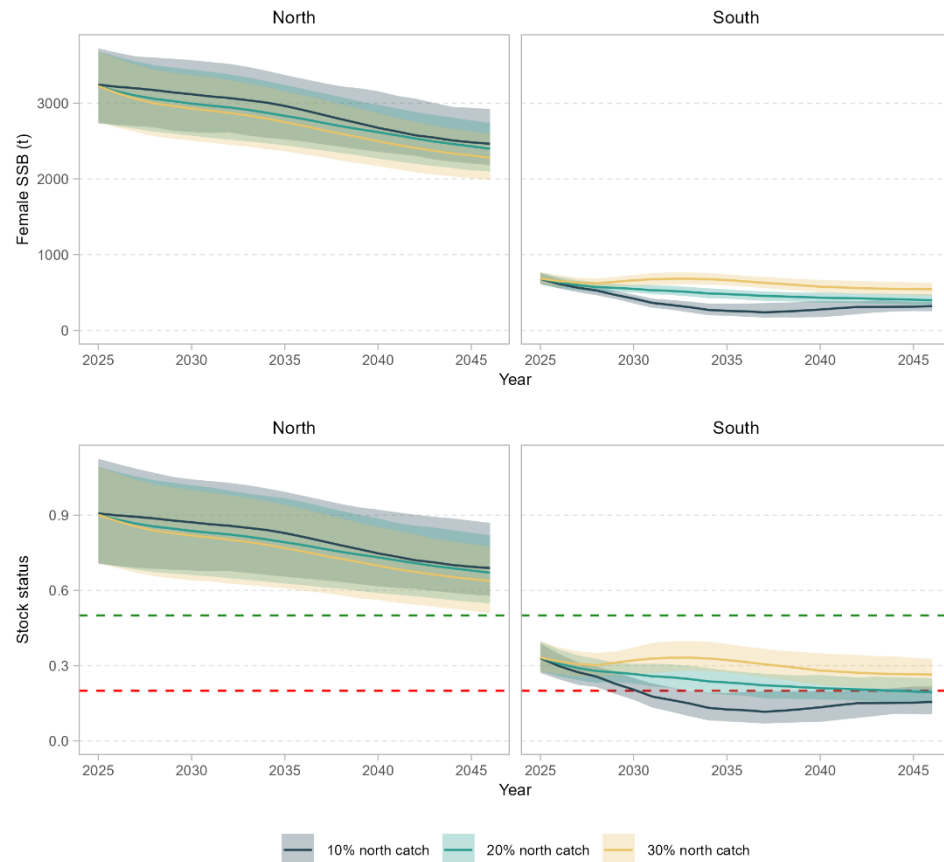
MSE results

- MPs tuned for stock status to reach the TRP in 20 years
- Using spatial tag-based estimators
- Tested 3 catch splits between north and south:
 - 10%, 20% and 30% in the north



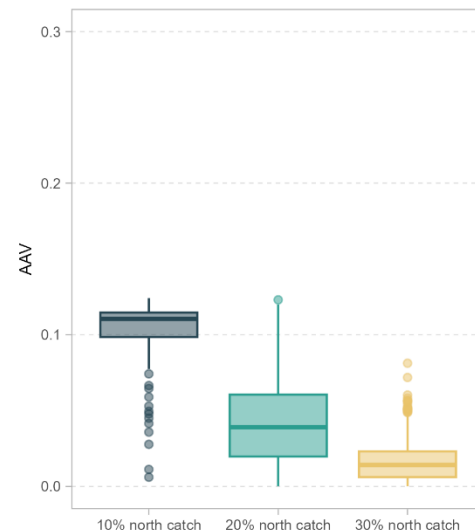
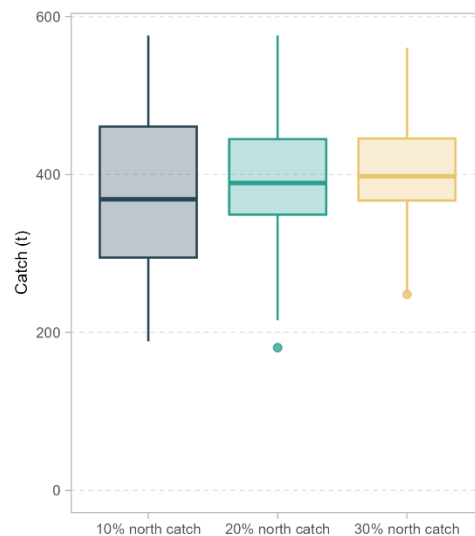
MSE results

- Large differences between biomass in the north and south have large impacts on the results
- With current catch splits (~10%) it is difficult to get the total stock status to the TRP



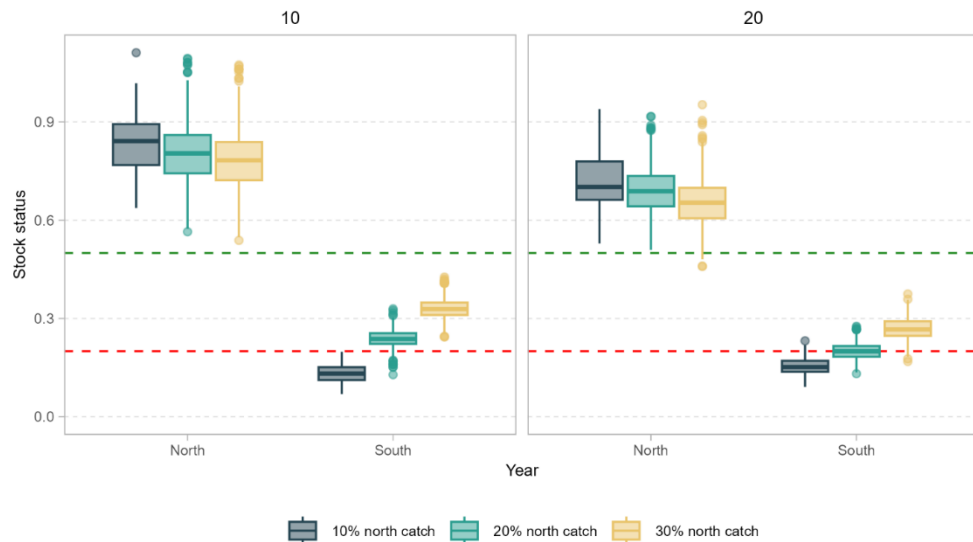
MSE results

- The larger catch percentage taken in the north led to:
 - High median total catch throughout the projection period
 - Reduced annual variation in catches (AAV)



MSE results

- There was limited difference in stock status after 10 and 20 years of projection
- The various catch splits had a larger impact on stock status in the south than in the north



Considerations for future work

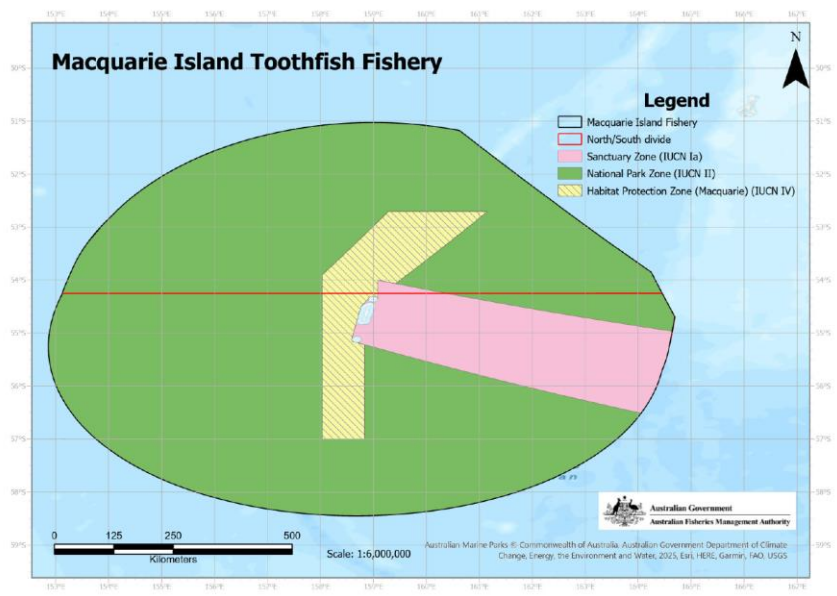
- There is complexity in the spatial management of this stock
- Current catch splits combined with a global TAC make it challenging to reach the TRP without reducing stock size in the south

Options for future work

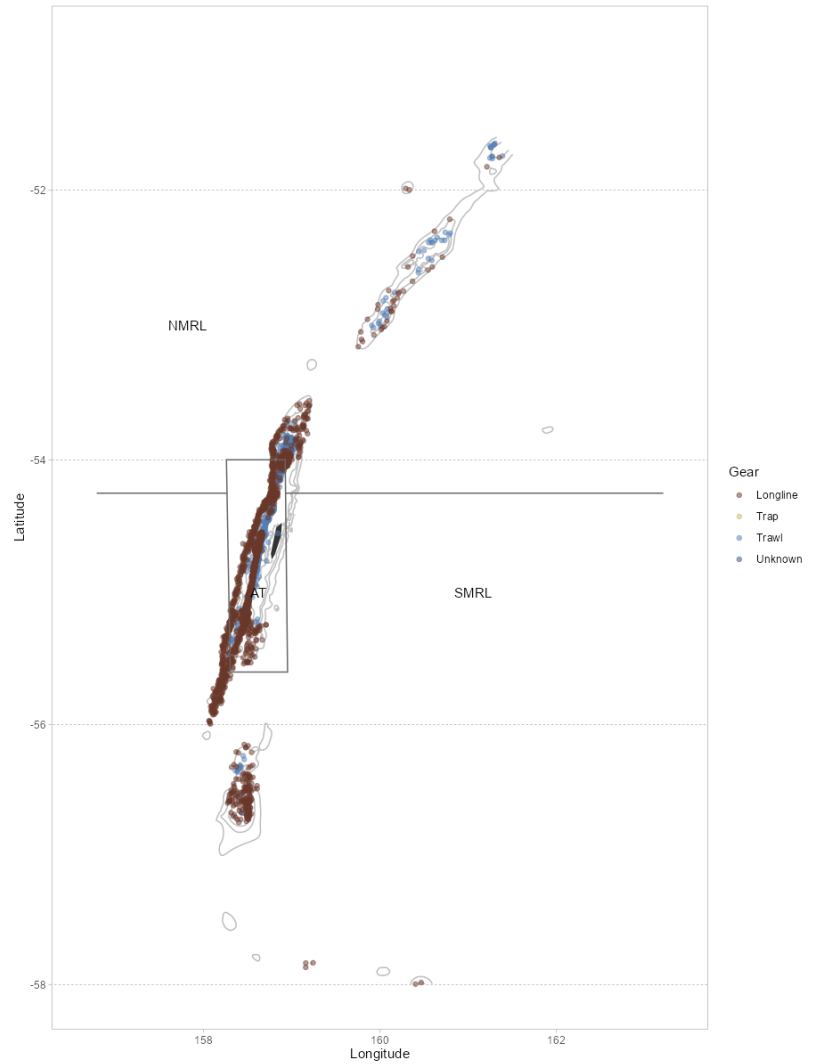
- Implementing a new condition of the MP that the stock in the south does not drop below the LRP (with a certain probability)
- Applying spatially explicit TACs (likely necessitating spatially explicit MP estimators and HCRs)
- Is the focus of the MP still on the overall relative female *SSB* reaching the TRP?



OFF



OFF





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Catch splits

Fishing season	Longline AT	Longline NMR	Longline SMR	% north	% south
2019/20	227.9	143.5	79.7	32	68
2020/21	292.8	192.9	51.6	36	64
2021/22	252.1	34.6	171.4	8	92
2022/23	262.9	37.2	139.2	8	92
2023/24	186.0	66.4	204.1	15	85
2024/25	221.5	32.4	211.5	7	93

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White-chinned Petrels

Sub-Antarctic Resource Assessment Group



Falklands Conservation



ACAP



White-chinned petrel (*Procellaria aequinoctialis*) is a seabird listed as Vulnerable by the IUCN, and included in Annex 1, Agreement on the Conservation of Albatrosses and Petrels

Large sized (1500 g) long lived (> 30 yrs) petrel species

Global population of ~3 million mature individuals (IUCN), but with a decreasing trend

Pelagic longline bycatch is identified as the primary driver of this decline, bycatch composition is biased toward males

The species does not breed at HIMI – birds interacting with the fishery originate from Kerguelen, Crozet, and South Georgia.



Nocturnal forager, with increased activity patterns at night. Predominantly forages by surface-seizing, however -

Very proficient diving seabird: - Both at maximum depth (>16 m), and
- Descent rate ($\text{max} = 2.0 \text{ m}\cdot\text{s}^{-1}$)

WCP show a strong attraction to vessels and high attendance following encounter

Dominant species within residual seabird bycatch in Southern hemisphere longline fisheries, with specific seasonal behaviours and sex bias (more males) driving the bycatch rates of WCP.

The location of the breeding sites and approximate range of *P. aequinoctialis* with the boundaries of selected Regional Fisheries Management Organisations (RFMOs) also shown.

HIMI Fishery in CCAMLR
Statistical Division 58.5.2





One of the WCP caught in 2026 was banded:

Details as provided by AFMA

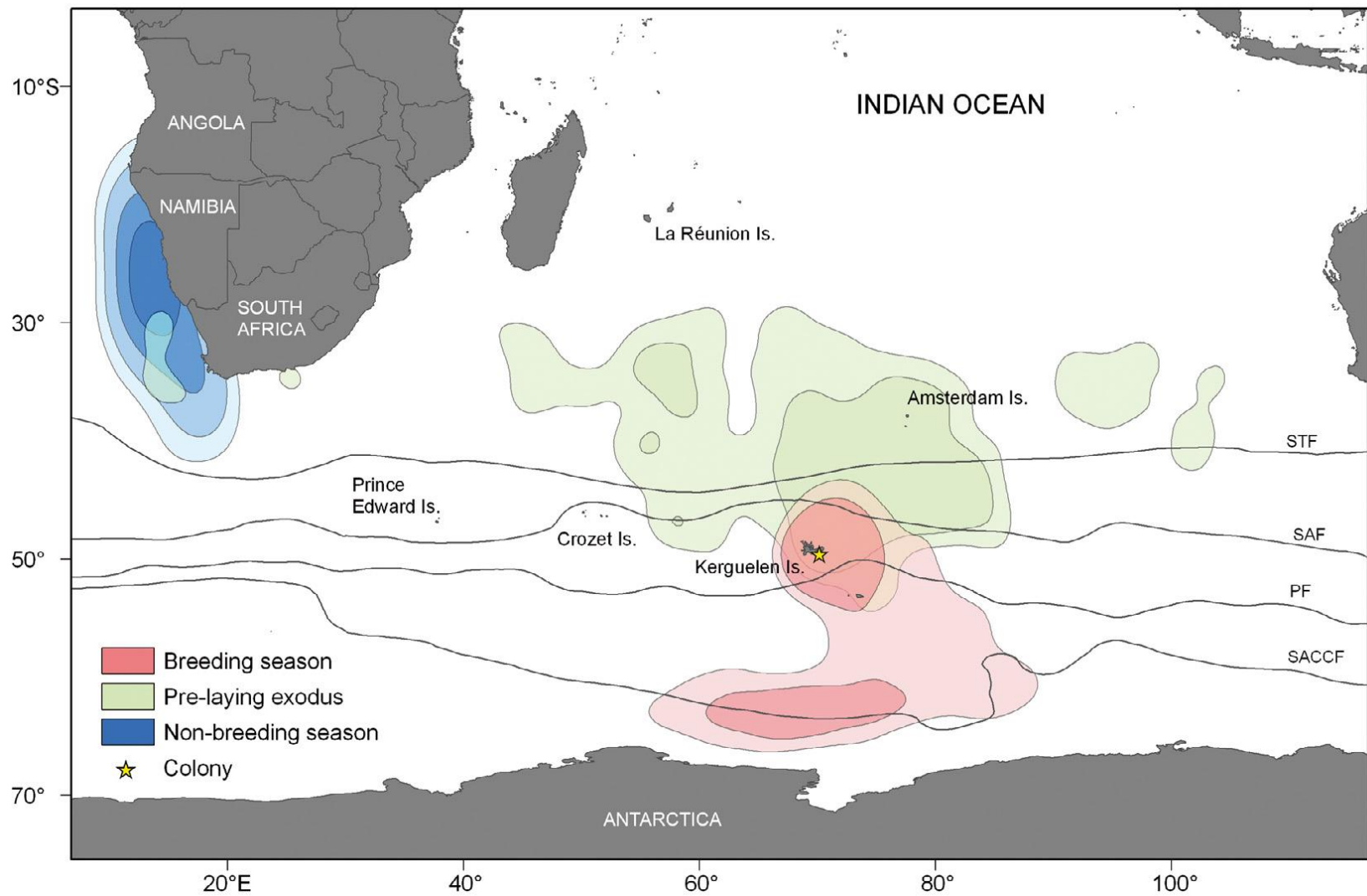
Metal Band Number DZ27561

Banded on Isle Kerguelen (Haute Island)

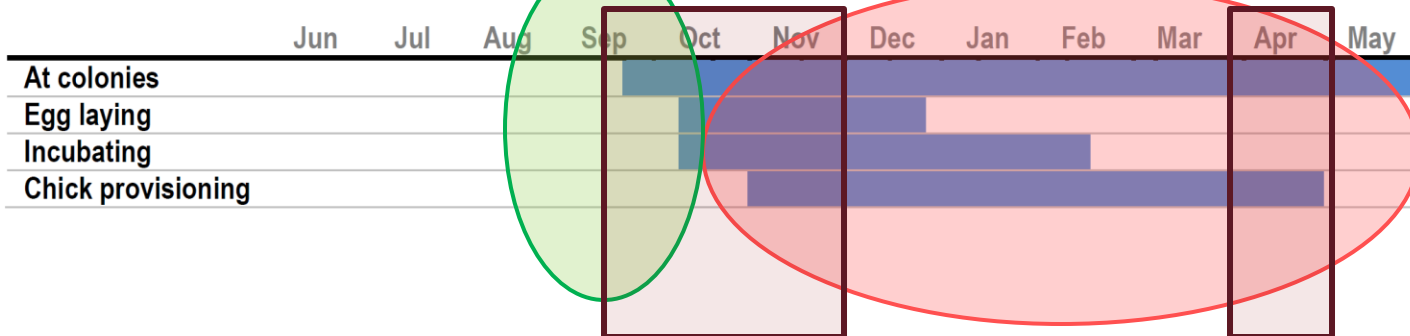
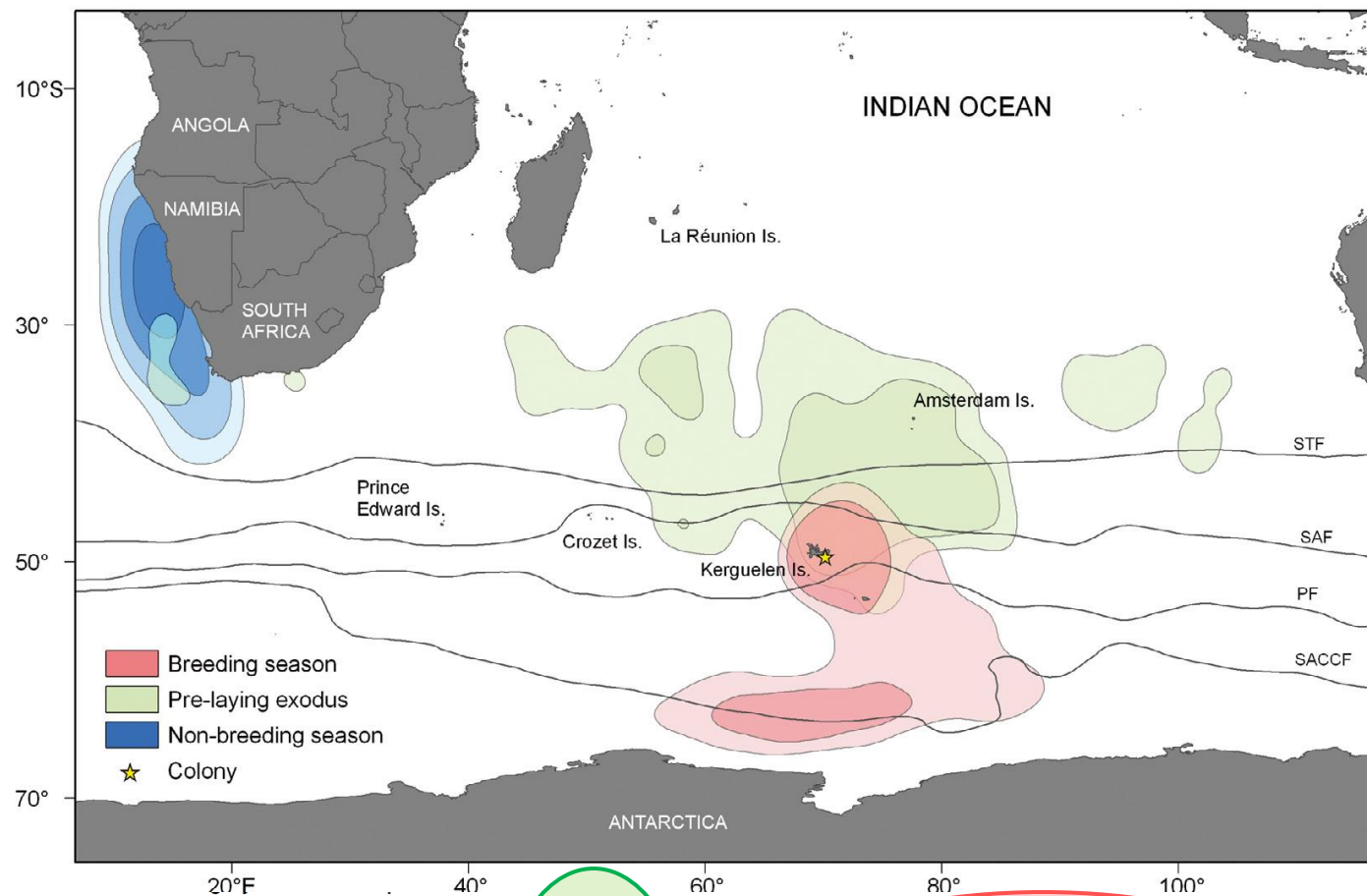
Banded as chick 2019...resulting in breeding adult status (7 yo) in 2026

Kerguelen popn estimate 234, 000.....but with a decreasing trend

WHITE-CHINNED PETREL: 26 BIRDS TRACKED FROM KERGUELEN, 2006 AND 2008



WHITE-CHINNED PETREL: KERGUELEN TRACKING DISTRIBUTION AND SEASONALITY



Extension periods

April extension presents increased interaction risk.....(driven by biology and distribution)

Retain seabird carcass for increased data resolution on spp, sex and age class

In particular, night-time setting and sink rates may be problematic for this species and current mitigation measures may fail through combination of:

- Diving proficiency greater than current sink rates....Sink rates may need to exceed ACAP guidelines
- Environmental variables influencing WCP foraging drive/intensity
 - Seasonal ocean productivity
 - Relative abundance and density
 - Position of polar front
- Moon phase and specific timing of set around sunset/sunrise with subsequent influence on bait visibility for WCP (for example CCAMLR Conservation Measure (41-05:2025) recommendation of completing set 3 hrs prior to sunrise)
- Appears that significant WCP (150-200) vessel attendance present at time of at least 6 interactions (during set or daytime previous), unknown at further 2 due to darkness and heavy cloud.