Australian Government
Australian Fisheries Management Authority

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

FINAL MINUTES

SARAG 71

28–29 AUGUST 2024

SUB- ANTARCTIC RESOURCE ASSESSMENT GROUP (SARAG)

CHAIR: Dr Malcolm Haddon

Date: 28–29 August 2024

Venue: Hadley's Orient Hotel, Hobart, Tasmania

Attendance

Members
Dr Philippe Ziegler, AAD
Dr Cara Masere, AAD
Dr Rich Hillary, CSIRO
Dr Tim Ward, IMAS
Brad Milic, Industry (ALF Pty Ltd)
Rhys Arangio, Industry (Austral Fisheries)
Danait Ghebrezgabhier, AFMA

Executive Officer
Rachel Downes, AFMA

Invited Participants
Dr Heather Patterson, ABARES
Dr Pia Bessell-Browne, CSIRO
Dale Maschette, IMAS/AAD

Observers
Miriana Sporcic, CSIRO (AI 8.1, Day 2)
Martijn Johnson, Industry (ALF Pty Ltd)
Selina Stoute, AFMA
Anna Willock, AFMA
Dan Corrie, AFMA (Day 1)
David Smith, Invited Observer
Colette Appert, IMAS/AAD (AI 8.2, Day 2)
Kelly Buchanan, AAD (AI 5, Day 1)
Rhonda Bartley, AAD (AI 5, Day 1)
Sally Carney, AAD

Introduction

Agenda item 1 - Preliminaries

1.1 Welcome and Apologies

The seventy-first meeting of the Sub-Antarctic Resource Assessment Group (SARAG 71) was opened at 9:00am on 28 August 2024 by the interim Chair, Dr Malcolm Haddon. The Chair welcomed members, invited participants and observers to the meeting. The AFMA member acknowledged the Muwinina people as the Traditional Owners and custodians of the land SARAG 71 met on, including their ongoing connections to Land and Sea Country and paid respects to their Elders past, present and emerging.

Members noted that the meeting was being recorded for the purpose of developing the meeting minutes.

1.2 Declarations of Interest

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. If a member discloses an interest in an item, and unless the RAG decides otherwise, the

member must absent themselves from the meeting while the RAG deliberates and decides about the matter where a conflict exists, including any discussions about decisions to allow the member to be present during deliberations on the matter in conflict. If the RAG decides at any time that a conflict of interest exists and that this conflict is likely to interfere with the RAG's consideration of a particular issue(s), the RAG may ask to hear the member's views on the issue and then require them to retire from the meeting while it is discussed by the other members and the advice/recommendation is formalised.

The Chair noted that industry has a strong interest in stock assessment items, and that while all members would discuss the technical input aspects of these items, industry members would leave during the RAG's deliberations of total allowable catch (TAC) recommendations.

SARAG noted declarations of interest from members, invited participants and observers at the start of the meeting. All declared interests are reflected in the standing register at **Attachment A**.

1.3 Adoption of Agenda

The agenda **Attachment B** was adopted without any changes.

Agenda item 2 – Actions Arising

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

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

3.2 Industry member updates

SARAG noted the following verbal updates from industry members:

Australian Longline Fishing Pty Ltd

- The Antarctic Discovery has been fishing in the Macquarie Island Toothfish Fishery. The season has been standard, and fishing has now finished as the TAC has been reached.

- Combined with the above-mentioned trip, the Antarctic Discovery also undertook exploratory fishing for Patagonian toothfish for the first time in the SPRFMO Area. The fishing grounds are new and limited due to a requirement to spatially spread effort. The catch rates were good, and the vessel is on its way back to port to unload next week.

- The Antarctic Aurora fished in the Heard Island and McDonald Islands Fishery and has had good catch rates in some areas and not so good in other areas which is standard for the fishery. The vessel is estimated to return to port at the end of November.

- No reported orca sightings or notable whale depredation during this trip.

Austral Fisheries Pty Ltd

- Both boats have finished their second trip of the season and are unloading in Mauritius.
- The trips this season have been standard with reasonable catch. Average size as expected around 5–7kg, dependent on locations.
- Some sperm whale depredation occurred. One larger whale was seen recently, which is notable as sperm whales are not normally seen this time of year (August).
- Completed about 70% of estimated fishing days and have completed about the same amount of their allocated 'research hauls.'. There is one trip remaining for each vessel in the season which is expected to be finished by the end of November.
- Austral will attempt to fish Williams Ridge next year.

Agenda item 4 – AFMA's Climate Change Adaptation Program

AFMA Climate Risk Framework

SARAG noted the written update on AFMA's Climate Change Adaptation Program, including the development of the Climate Risk Framework (CRF), as well as a presentation from the AFMA Climate Change Adaption Program on the CRF and the role of the expert Working Group that has been established to support the trial.

The RAG noted that there is currently uncertainty on the likely climate impact on Patagonian toothfish as the ecosystem modelling assesses the combined potential climate impact on Patagonian toothfish for HIMI and MITF. The RAG **recommended** that the expert Working Group consider separating the two fisheries.

The RAG further noted that CCAMLR, at its climate change discussions in 2023, developed a draft list of biological variables for which data may already be available and that could inform the assessment of the overall climate risk to the species. The RAG **agreed** it would be useful to provide this information to the upcoming Working Group meeting.

Draft Climate and Ecosystem Status Reports

SARAG noted a presentation by CSIRO on the Climate and Ecosystem Status Report Cards on the HIMIF and MITF (**Attachment E**). The RAG noted the following key observations:

HIMI

- Climate drivers: Global Sea Surface Temperature (SST) remains at a record high from 2023 into 2024. The Southern Annular Mode (SAM) positive phases have become more common and are intensifying around the polar region. These are thought to be associated with an increase in sea ice extent.
- Regional dynamics: Monthly average bottom temperature at 400–2000 m depth in 2023/24 has been above the long-term average. Noting that the HIMI bottom temperatures are near the lower temperature range preferences for Patagonian

toothfish, higher temperatures may improve catchability in this fishery. There has been some spatial variability of bottom temperatures on the shelf. Note there is no current ability to forecast bottom temperatures. Mean micronekton density has not varied much over the past 5 years.

- Patagonian toothfish body condition has been above average in recent years (2013-2021, excluding 2020).

- The future outlook for HIMI shows a 50/50 chance of La Niña forming beyond early spring with SAM positive phases and strong circumpolar westerlies which will affect conditions down south. It is unclear how this affects catchability.

MITF

- Climate drivers are the same as HIMI.

- Regional dynamics: Monthly average bottom temperature at 400–2000 m depth has increased over time, most notably since 2004. Compared with HIMI, there is more variability in the micronekton, particularly fish with gas bladders.

- Patagonian toothfish body condition has been below average in 2019 and 2020. Note that this was previously above average.

- The long-term average bottom temperature is 2.5°C. Over the past year, temperatures greater than this were present over of most of the shelf. Temperatures on the shelf were quite varied but over the past year (warm and cool) but were anonymously warm for most of the year.

The RAG discussed the depth scale at which bottom temperature is measured and noted industry comments that splitting the depth ranges for both HIMI and MITF, in line with the characteristics of the fisheries, may show greater data variability and insights not captured on the current scale (400 – 2000 m).

The RAG **recommended** that the bottom temperature graphs in the next iteration of the Climate Ecosystem Status Reports for HIMIF and MITF are adjusted to include three different depth ranges to highlight temperature variability that may not be evident in the current graph. The RAG **agreed** for the graph to include 0 – 400 m (relevant to mackerel icefish), 400 – 1000 m (relevant to juvenile toothfish and more representative of fishing operations) and 1000 – 2000 m (more representative of fishing operations). The RAG noted that the AAD would confirm whether the minimum depth range for the HIMI fishery should extend from 0-400m or 0–500m.

With regards to any anecdotal information and observations to be considered in the climate report. The Austral member noted that the observations for both fisheries from the last discussion were still relevant (SARAG 69).

ACTION ITEM – CSIRO to revise the bottom temperature graphs in the next iteration of the Climate Ecosystem Status Reports for HIMIF and MITF to include three different upper and midwater column observations at 0–400m, 400–1000m and 1000–2000m depths.

Agenda item 5 – HIMI Patagonian Toothfish stock assessment and TAC 2024-25

5.1 – Progress against the CCAMLR workplan

SARAG noted the written update and presentation from AAD on the progress against the CCAMLR Patagonian toothfish stock assessment workplan (CCAMLR workplan) from 2023 as discussed at the Working Group on Statistics, Assessments and Modelling (WG-SAM) held.

on 24-28 June 2024 which include discussions relating to:

- Consideration of the impact of tagging and recapture effort on mark-recapture abundance estimators within integrated Casal2 stock assessments
- Approaches to projecting recruitment in toothfish assessment models
- Effects of implementing dynamic B_0 in toothfish fisheries
- An introduction to management strategies and harvest control rules
- Development and exploration of U-based harvest control rules for assessed toothfish fisheries.

SARAG further noted the recommendations arising from the WG-SAM meeting in relation to progressing the work on the CCAMLR toothfish stock assessments. The discussion items above were further considered under agenda items 5.2 and 5.3.

5.2 – Updated stock assessment and **5.3 – Recruitment estimates in future spawning stock biomass projections**

The AAD member presented the August 2024 progress update and results of the '*Integrated stock assessment for the Heard Island and McDonald Islands Patagonian toothfish (Dissostichus eleginoides) fishery in Division 58.5.2*'

The RAG noted that:

a. All Sub-Antarctic Patagonian Toothfish fisheries are complex and difficult to assess. Further, the assessments are different between the fisheries and need to be tailored to suit the specific characteristics of each fishery;

b. The CCAMLR harvest control rule is used to set catch limits (based on a constant catch projected over a 35-year period);

c. The assessment uses an age-structured population dynamics model in Casal 2, is single sex and has no spatial structure;

d. The model includes longline release and recapture tag data since 2012 that are not processed before being incorporated in the assessment model[1];

[1] AAD suggested clarification to this point – The model includes longline tagging data since 2012 as a total annual released by length bin and subsequent annual recaptures by length bin.

e. The model includes (absolute) biomass estimates from the RSTS from 2001, and age-composition data from RSTS since 2006;

f. Biomass estimates are largely driven by Chapman estimates from tagging data. Some of the key assumptions of the Chapman estimator include:

    i. The population is closed (geographically and demographically)
    ii. All animals are equally likely to be captured in each sample
    iii. Each sample is a random sample from the population, either random at release or random at recapture or random fish movement is required

g. AAD has made significant progress in identifying sources of uncertainty in the model and data.

Key issues

1. There are conflicting signals in observations in the assessment that the current model cannot resolve. In particular, there are conflicts between abundance indices inferred from the different tag release cohorts, and conflicts with the trend in biomass estimates from the RSTS.

2. The tagging program provides information on stock abundance that is important to the assessment however, there are some years of tagging data in conflict with other years of tagging data and with other data sets (i.e. RSTS) as demonstrated by the:

    i. likelihood profiles of tag release cohorts
    ii. highly variable recapture rates within and between tag-release cohorts, and
    iii. high variability in annual spatial fishing effort as indicated by dissimilarity index and correspondence analyses.

3. The tag peel analysis (where, starting from the most recent year, annual tagging data are sequentially removed from 2023 to 2014 in the model) showed:

    i. increased overall *SSB* and decreased steepness of the *SSB* decline and a consequent improvement in the stock status (38% to 47%, Figure 1b).
    ii. increased estimates of recent recruitment (YCS) (Figure 1a).
    iii. decreased survey catchability (q) from 1.27 to 0.58, Table 1), where values greater than 1.0 are considered unrealistic.

4. The inclusion of the tag data in their current, largely unprocessed form fails to meet some key assumptions of the Chapman estimator. This leads to an apparent model misspecification which results in the predicted recruitment patterns, *SSB* stock status, and *q* values described above.

5. There is no clear evidence that there has been a decline in the productivity of the stock and the RSTS data also indicates that there has been no change in stock biomass over time.

6. The trajectory in modelled YCS is highly unusual and the tag peel analysis suggests that this is due to misspecification of the tagging data in the model. Estimates of recent recruitment YCS (i.e. at least the last 10 years) appear to be highly uncertain and likely to be biased low and should not be used in isolation to inform future recruitment in model projections used to determine catch limits. Until the uncertainty in the recruitment dynamic is resolved, the most appropriate approach is to use the full time series of recruitment to inform recruitment in model projections. This is because it does not change the mean recruitment but also captures the full variability in recruitment and is more robust to changes in YCS estimates as a result of the tag data bias.

Table 1 Tagging peel summary

Assessment year	Last year of tagging releases (recapture)	B_0	B_{2024}	Stock status	q
2024	2012 (2013)	103239	58103	0.56	0.58
2024	2013 (2014)	77076	36076	0.47	0.80
2024	2014 (2015)	73481	33119	0.45	0.85
2024	2015 (2016)	74705	34052	0.46	0.83
2024	2016 (2017)	72594	31807	0.43	0.88
2024	2017 (2018)	69381	28264	0.40	1.00
2024	2018 (2019)	67603	25977	0.39	1.11
2024	2019 (2020)	67677	26561	0.39	1.08
2024	2020 (2021)	66299	25216	0.38	1.20
2024	2021 (2022)	66200	25070	0.38	1.24
2024	2022 (2023)	64609	24374	0.38	1.27

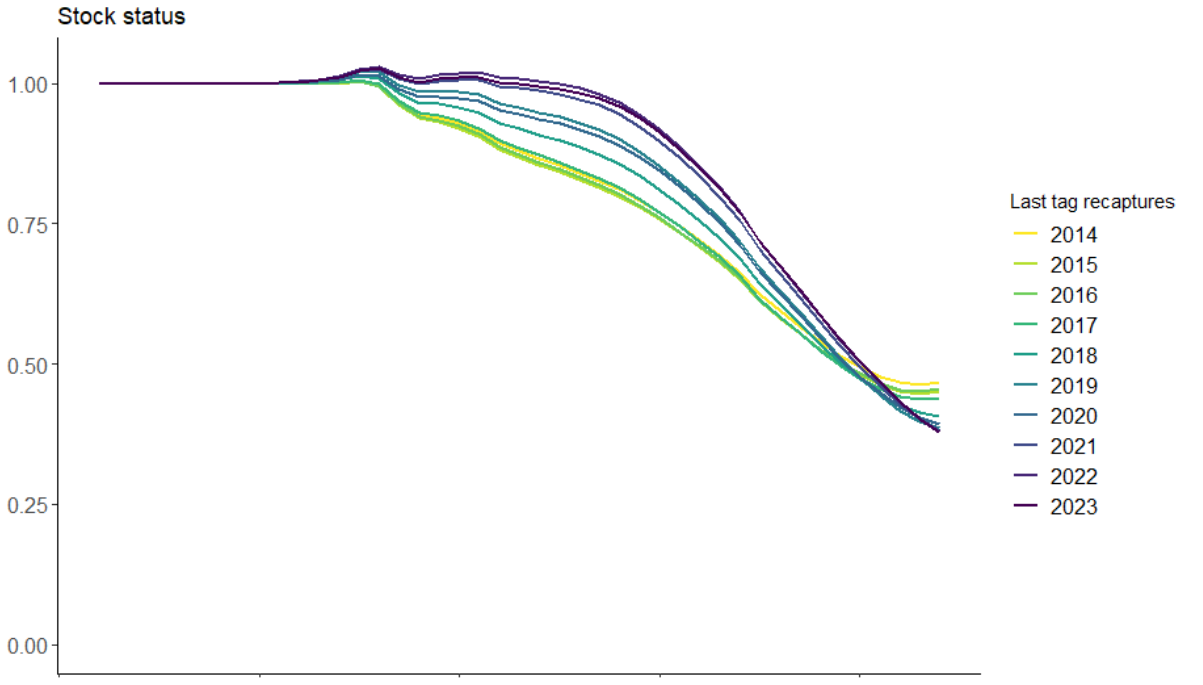


Figure 1 Tagging peel plots of the 2024 base case Model for HIMI toothfish, with estimated trajectories for (a) year class strength, (b) spawning biomass status (Figure 22 in the stock assessment report)

Current stock status

The 2024 median stock status estimated in the base case model is at 0.38 (CI 0.38–0.38). However, the tag peel analysis provides MPD estimates that range from 0.38 (recaptures up to 2023) to 0.56 (recaptures up to 2013) when tagging data is sequentially removed (Table 1 and Figure 1).

The base case assessment and sensitivity analyses provide strong evidence that the stock is above the limit reference point (B_{20}).

Workplan

In order to produce an updated stock assessment model for the HIMI Patagonian Toothfish Fishery in 2025 the RAG **recommended** the following high priority work plan for the next 12 months

High priority next 12 months

i. Develop an alternative to the current model (Chapman estimator) to estimate an abundance time series from tag data outside the stock assessment model
ii. Investigate effects on model outputs of spatial and temporal variations in fishing effort and tag release/recaptures
iii. Develop approaches to mitigate any effects of higher than predicted tag recaptures in some locations and years
iv. Longline Research Hauls (LRH) – investigate the integration of data from structured longline fishing into the stock assessment
v. Sensitivity tests: Remove the Sum to 0 assumption in the recruitment deviates (YCS)
vi. Use parametric bootstrapping of YCS rather than empirical bootstraps
vii. Develop a streamlined stock assessment model process for Casal2 (automatic tools)

The RAG recognised that there is currently inadequate resourcing within the AAD stock assessment team to complete all of the above work. In order to complete the workplan in the available time and produce a formal recommendation of catches for the 2025-26 fishing season, the RAG **recommended** that the resourcing of the workplan be resolved around November, following the CCAMLR 43 meeting. The RAG noted that it may need to address other high priorities identified by CCAMLR 43 as that may have an impact on the high priority work identified above.

The RAG identified additional work for the medium term to be prioritised by the RAG at a future meeting, following the outcomes of work completed under the high priority 12-month work plan above.

Medium term

- Develop a sex-based model in Casak2 that better reflects the specific biological characteristics of species (this work has already begun as part of a current FRDC project)

- Develop model that better reflects the spatial dynamics of the fishery (dependent on the extent that 1–4 above address current issues in the stock assessment and Casal2's capacity to accommodate this)

- Develop a stock assessment model that can better accommodate the new tagging model

- Consideration of alternative assessment approaches (e.g. CKMR)

- Evaluation of alternate decision rules. Such an evaluation of the CCAMLR decision rules is not funded. Outcomes of the MITF MSE will likely inform approaches for HIMI.

5.4 – Recommended TAC for the 2024–25 fishing season

- The RAG, excluding industry members, noted that the 2024 stock assessment model is an update of the 2023 assessment with one year of extra observations but no major structural changes. Therefore, the RAG considered that this assessment does not provide updated advice to form the basis of the RAG's TAC recommendation. However, there has been a significant amount of supplementary work that characterises key sources of uncertainty within the model and has demonstrated that there is a downward bias in the recent YCS and *SSB* estimates from the base-case stock assessment model.

- The RAG (excluding industry members) **recommended** rolling over the current TAC of 2400 t into 2024/25 fishing season.

- The RAG considers this approach precautionary given that current estimates of recent YCS underestimate the potential contribution of these year classes to future spawning biomass, so recovery towards the target may proceed faster than currently projected.

- The RAG has also identified a detailed workplan for the next 12 months to continue to address the uncertainties within the model that currently prevent its use for projections and catch recommendations.

- The risk to the stock of rolling over the current TAC for one year while this work is undertaken has been demonstrated to have a negligible impact on stock status in 2025 (Table 2).

Table 2 Stock status (*SSB*) in 2025 for different catch limits (t) and applying differing future recruitment scenarios to those limits.

Recruitment	2640t (35-yr limit)	2400t (domestic limit)
Last 10 years (2010 – 2019)	0.353	0.356
Last 15 years (2005 – 2019)	0.354	0.356
Last 20 years (2000 – 2019)	0.354	0.356
Average (1986 – 2019)	0.356	0.359

ACTION ITEM - AAD to consider the required resourcing to complete the workplan following the CCAMLR 43 meeting and to discuss with SARAG in November.

Agenda item 6 – Paper to CCAMLR Working Groups and SC 2024

SARAG took agenda item 6 as read, having previously discussed some of the papers under agenda item 5.1. The RAG noted the papers submitted to WG-ASAM, WG SAM and WG-EMM and the papers proposed to be submitted by AAD to the WG-FSA-IMAF and Scientific Committee meetings as per **Attachment F**.

Agenda item 7 – HIMI Mackerel Icefish TAC 2024-25

SARAG noted a presentation from AAD on the results of the Random Stratified Trawl Survey (RSTS) and the 2024 HIMI Mackerel Icefish stock assessment. The RAG further noted the following key points regarding the RSTS results:

- There appears to be a skipper effect in the RSTS regarding the frequency of reserve station being used. The Austral member requested that clear instructions be included for the skipper to note the reason a reserve station is used.
- The mean biomass estimate of mackerel icefish for 2024 was estimated at 16,051t, which was almost identical to last year.
- The 2024 biomass of bycatch species has dropped for skates, unicorn icefish and macrourids, and slightly increased for grey rock cod. All species are scheduled to have updated assessments in the near future.
- The age cohort analysis indicated that Icefish biomass was dominated by 1- and 2-year, 3 and 4-year olds were largely lacking.

The RAG further noted the following key points regarding the mackerel icefish stock assessment

- A CCAMLR workshop in 2023 agreed that all stock assessments should provide evidence for changes in stock assessment and population parameters or processes that could be due to the effects of climate.

- The 2024 stock assessment re-estimated growth (last estimated in 2017). There has been a considerable increase in growth rates observed in 5-year old individuals relative to what was observed at the beginning of the fishery (40 – 60 mm longer).

- The stock assessment produced three different catch limits, depending on the growth scenario used, as displayed in Table 3.

Table 3 Suggested mackerel icefish TACs for the 2024/25 and 2025/26 fishing season

Growth scenario	Initial biomass estimate 1-3 year olds (t)	Target fishing mortality rate (yr^{-1})	Yield (t)	
			Year 1	Year 2
2011-2017	9363	0.1488	1659	1466
2011-2024	9363	0.1487	1707	1534
2018-2024	9363	0.1488	1824	1723

- The RSTS and stock assessment have the following observed issues and suggested improvements:

  a) As there is only one trip a year, it is harder to get experienced observers which results in data that needs to be standardised.

  b) AAD are working on better guides for icefish species, particularly for identifying maturity.

  c) There is a need to improve the RSTS instructions (some species have been missed in sampling).

  d) There is a need to explore how to account for singular large hauls in a survey strata when conducting the biomass bootstrap procedure.

  e) Gear type is no longer captured in the AFMA observer report and the CCAMLR observer report has ceased collecting this data, therefore gear type and mesh size data is not being captured.

SARAG **recommended** that AFMA re-include gear type in the observer reports.

The RAG discussed the results of the HIMI mackerel icefish stock assessment and considered the annual yields of mackerel icefish for the 2024/25 and 2025/26 season estimated to satisfy the CCAMLR decision rule for the species in Division 58.5.2 (HIMI). The RAG noted AAD advice that all the catch limit options in 3 should be presented to CCAMLR as they may be interested in considering the yield derived from the 2011–2024 growth scenario, noting the 2018–2024 growth scenario does not include data from 5-year olds.

SARAG noted that the consideration of potential climate change factors affecting the fishery are in Appendix C of the stock assessment.

SARAG **recommended** a TAC of 1824 t for 2024/25 and 1723 t for 2025/26 for mackerel icefish in the HIMI fishery based on the 2018–2024 growth scenario.

ACTION ITEM – AFMA to re-include a field for gear type reporting in the observer reports.

ACTION ITEM – AAD to update RSTS instructions to instruct skippers to provide reasoning when a reserve station is used and additional species sampling guidance.

Agenda item 8 – Bycatch and protected species

8.1 Draft Ecological Risk Assessment for longline fishing in the MITF

SARAG noted a presentation by CSIRO on the draft results of the Ecological Risk Assessment (ERA) for longline fishing in the MITF The RAG noted the following key results:

- Effort has slightly varied over time but has been reasonably stable. 43 species were assessed. Patagonian toothfish is the key commercial species.
- The most vulnerable species identified were deepwater ghost sharks and Antarctic sleeper sharks.
- Protected species were scored moderately. These were the southern royal albatross, the wandering albatross and the porbeagle shark.
- Level 1 conclusions: Approximately 95% of all hazards were eliminated at Level 1. All assessed ecological components, except for protected species and communities were eliminated at Level 1
- Level 2 conclusions: PSA and bSAFE methods used to assess 7 species (6 PSA, 1 bSAFE). Porbeagle rated low and six species rated medium risk (PSA). The six species were three albatross species and 3 petrel species.

SARAG **discussed** the draft results of the ERA assessment and provided the following initial comments:

- Table on seabird interactions includes data on interactions that are not with fishing gear and needs to be revised

- There are missing trophic levels for some seabird species and seabird experts should be approached for additional information (although it was noted that this is unlikely to make a difference in the outcome of the assessment).

- The Marine Reserve coverage of the fishery has not been captured adequately

- Fishing effort should be characterised in number of hooks, as opposed to number of sets

- There are inaccurate references to CCAMLR requirements that are not relevant to the fishery and need to be revised.

SARAG noted that there are additional comments and **recommended** that these are compiled out of session and provided to CSIRO. SARAG **recommended** that the MITF ERA is recirculated to the RAG for finalisation.

ACTION ITEM – 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.

8.2 Skate post-release survival project update

The RAG noted a presentation by AAD on the updated results of the skate post-release survival project titled '*Managing Skate Bycatch in the Heard Island and McDonald Islands'*. The RAG noted the following main points:

- Tag-recapture rates of *Bathyraja irassa* in the HIMI toothfish fishery are low. Similarly, a mark recapture study in the Kerguelen Island toothfish fishery has also had very few recaptures of *B. irassa*.

- Popup satellite archival tags (PSATs) were deployed on *B. irrasa* that were by-caught in the HIMI toothfish fishery in this study to get an initial estimate of tag-release mortality.

- The PSATs detached after a maximum of 30 days and subsequently transmitted location, depth and pop-up reason via a satellite

- The majority of tags popped-up around 20km from where they were released. One tag was later found in New Zealand and one in Tasmania.

- The study looked at vertical mobility to identify whether the released skate is alive. Six individuals were highly mobile, signifying that they were alive. 18 tags had little to no movement, signifying that the skate may have died after being released. To investigate this, tag mobility was investigated.

- The study estimated that post-release survival was 26% with a 95% confidence interval of 13-46% for *B. irrasa* caught between 1200 – 1600 m. To reduce the confidence interval by half, the study estimated that at least 100 more tags would be required.

- Chances of survival multiplied by 5 for every 100 m shallower the skate was caught.

SARAG discussed the results of the project, including the effect of handling practices on release mortality, and how the collected blood samples that are yet to be analysed could improve understanding stress related effects.

The ALF industry member noted that industry is committed to continue to improve handling practices on the boat to improve skate survival post release, noting that improvements have been made already over the years.

8.3 Trawl gear trial project update

SARAG noted the written update on the status of the HIMI trawl gear modification trial that commenced in 2020, following SARAG's consideration of an industry proposal in 2019 (**Attachment G** and **Attachment H**)

SARAG further noted the following update on the trial from the Austral industry member:

- Austral are interested in the proposed modified gear to reduce skate bycatch and catch mackerel icefish more efficiently
- Since Austral received the scientific permit, the new trawl gear has been used for 4 years (2020 – 2023). The new trawl gear not been, and will not be used, in 2024 as Austral is not intending to fish commercially for icefish.
- With the new trawl gear, Austral have done 183 tows over the trial period, catching close to 1,000 t of mackerel icefish
- There have been 12 comparable side-by-side tows done in 2022 on the Atlas Cove.
- The tows have been compared to historical icefish catches while the fishery has been in a similar state (due to the substantial changes in the nature of the fishery, noting icefish are either aggregating with less tows and higher catch rates, or more tows with lower catch and higher skate bycatch). The analyses compare the new trawl gear against the old trawl gear in the different states of the fishery. The results show that regardless of the state of the fishery, the new trawl gear performed better in both lower skate to icefish bycatch ratio and also creating a more efficient icefish catch with less net drag and fuel use.
- SARAG has previously been supportive of the project, including presentations from AAD in 2022. However, the consideration of the trial had not progressed beyond the RAG.

The AFMA Member sought the RAG's advice on how to best proceed with the project given a fulsome analysis of the data collected, as previously requested by SARAG is still pending. SARAG noted that a preliminary analysis by the AAD of data from 12 paired tows was presented to the RAG at SARAG 65 and found that the bycatch CPUE was lower in the new gear, which has an improved icefish to skate ratio. Interrogation of species composition found that *B. irrasa* presence was substantially lower in the new gear compared to the old gear. On this basis and given the objective of the trial to reduce the overall environmental impact of trawl fishing, SARAG supported adopting the new trawl gear and deemed the trial complete. SARAG **recommended** that AFMA progress the implementation of the new trawl gear, including consultation with SouthMAC, noting that AFMA needs to progress legislative amendments for the change to take effect.

Agenda item 9 – HIMI bycatch limits for the 2024–25 fishing season

SARAG **recommended** maintaining the current bycatch limits outlined in Table 4 for the 2024/25 HIMI fishing season, noting that there is currently no updated information or assessment to indicate those levels should be revised. SARAG noted the outcomes of the skate post-release survival project discussed under agenda item 8.2 will assist with the update of skate assessment. SARAG further noted that the bigeye grenadier (*Macroutus halotrachys*) and ridge tailed rattail (*M. carinatus*) fall outside of the coverage of the RSTS (BANZARE Bank) and that stock assessments for these species may be more difficult to update.

Table 4. SARAG 71 recommended HIMI bycatch limits for the 2024-25 fishing season

Species	TAC (tonnes)
Caml grenadier (*Macrourus caml*) and Whiton's grenadier *(M. whitsoni)*	409
Bigeye grenadier (*M. halotrachys*) and Ridge tailed rattail (*M. carinatus*)	360
Unicorn icefish (*Channichthys rhinoceratus*)	1 663
Grey rockcod (*Lepidonotothen squamifrons*)	80
Skates and rays (Bathyraja spp.)	120
All other species (each)	50

Agenda item 10 – Annual research statement and five-year strategic research plan 2024–28

SARAG **agreed** to defer Agenda item 10 until the HIMI Patagonian Toothfish workplan devised under Agenda item 5 and the resourcing required to support this is finalised following the CCAMLR 43 meeting. The RAG will consider the annual research statement and five-year strategic research plan for sub-Antarctic Fisheries after this meeting.

Agenda item 11 – HIMI FAPs 2024–25

Agenda item 11 was deferred to out of session consideration by SARAG once the TAC for the 2024/25 season has been set by the AFMA Commission.

Agenda item 12 – Live release of small toothfish

SARAG noted the agenda paper on the live release of small toothfish (less than 1 kilogram) caught during longline fishing (in the HIMIF and MITF) that have a high chance of survival (**Attachment I**) SARAG noted the advice from the AAD that they do not foresee any scientific implications in releasing small toothfish as they make up a very small proportion of the catch, however minor changes may be required to the current sampling method to ensure that the

fish are being captured in the random sampling undertaken by the observers (including whether the fish need to be tagged before they are released).

SARAG **recommended** that 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.

This analysis will also inform the changes required to current sampling protocols as well as any other relevant onboard processes to ensure data on small fish continues to be captured and survival of released fish is maintained.

SARAG noted that SouthMAC will be consulted on this matter following SARAG's advice on any changes to sampling protocols having considered the results of the recommended analysis.

ACTION ITEM – 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 protocols.

Agenda item 13 – Other business

No other business items were raised.

Agenda item 14 – Next Meeting

SARAG **agreed** that SARAG 72 would take place in May 2025. AFMA will check with SARAG after CCAMLR to see if this needs to be altered, noting there will be a meeting in November 2024 post CCAMLR 43.

The ALF member thanked AAD and AFMA for the work put into the HIMI Patagonian Toothfish stock assessment.

The Chair closed the meeting at 4:30pm.

Attachment A

Table 2. Member, invited participant and observer declarations of interest as advised to date.

Name	Membership	Declared interests
Dr Malcolm Haddon	Interim 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.
Dr 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.
Dr 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.
Dr Tim Ward	Scientific member	Institute Marine and Antarctic Studies, University of Tasmania, Associate Professor, Fisheries Scientist AFMA Small Pelagic Fishery Resource Assessment Group, Scientific Member AFMA Research Projects (SPF Monitoring, Blue Mackerel Spawning Fraction), Principal Investigator Natural Environment and Resources, Tasmania (Developmental Tasmanian Sardine Fishery), Scientific Advisor, Principal Investigator South Australian Marine Scalefish Fishery Management Advisory Committee, Independent Conservation Scientist, Member Pelamis Pty Ltd (Environmental Consulting Company), Director
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. I own a consultancy business that currently has a contract with Atlantis Fisheries Consultancy Group, involved with their clients interests in

Name	Membership	Declared interests
		the BSCZSF, and their fishery and cold chain 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.
Danait Ghebrezgabhier	AFMA member	AFMA employee, no interests pecuniary or otherwise.
Rachel Downes	Executive officer	AFMA employee, no interests pecuniary or otherwise.
Dr 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.
Dr Pia Bessell-Browne	Invited participant	Employed by CSIRO as an assessment scientist. Dr Bessell-Brown 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 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.
Martijn Johnson	Observer	An employee of Australian Longline Fishing Pty Ltd (ALFPL). Mr Johnson is the Sustainability and Operations Coordinator of 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 Johnson is not aware of any investigation or prosecution action by AFMA against ALFPL or any litigation entered in to by ALFPL.

Name	Membership	Declared interests
Selina Stoute	Observer	AFMA employee, no interests pecuniary or otherwise.
Dan Corrie	AFMA	AFMA employee, no interests pecuniary or otherwise.
Anna Willock	AFMA	AFMA employee, no interests pecuniary or otherwise.
Dr 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.
Collette Appert	AAD	PhD candidate supervised by Dr Jaimie Cleeland at the Institute of Marine and Antarctic Studies, studies focus on post-release mortality of skates in the HIMI toothfish longline fishery. No pecuniary interests.
Kelly Buchanan	AAD	Branch Head, Policy & Strategy Branch AAD. Has no pecuniary interest in Antarctic fisheries.
Dr Miriana Sporcic	CSIRO	Employee of CSIRO, no pecuniary interest in sub-Antarctic fisheries.
Sally Carney	AAD	AAD employee and works with colleagues undertaking research in HIMI including stock assessments for the HIMI Fishery. Has no pecuniary interest in Antarctic fisheries.
Dr Steph Brodie	CSIRO	Employed by the CSIRO and through the organisation either has in the past or may in the future receive funding for research related to the fishery

Attachment B

71st Meeting of the Sub-Antarctic Resource Assessment Group (SARAG)

Hadley's Orient Hotel, 28–29 August 2024

Draft Agenda

Chair: Dr Malcolm Haddon

Approx time	Item	Purpose	Presenter
Day 1 – 28 August 2024, Hadley's Orient Hotel, 9:00am - 5:00pm (AEST)			
9:00 (30 min)	**1. Preliminaries**		
	1.1 Welcome and apologies	For noting	Chair
	1.2 Declaration of interests	For action	Chair
	1.3 Adoption of agenda	For action	Chair
	2. Actions Arising	For noting	AFMA
	3. Member updates	For noting	All
9:30 (60 min)	**4. AFMA's Climate Change Adaptation program**	For noting	AFMA/CSIRO
10:30 (30 min)	**Morning Tea**		
11:00 (90 min)	**5. HIMI Patagonian Toothfish TAC 2024-25**		
	5.1 Progress against the CCAMLR workplan	For noting	AAD
	5.2 Updated stock assessment	For advice	AAD
	5.3 Recruitment estimates in future spawning stock biomass projections	For advice	AFMA/AAD
	5.4 Recommended TAC for the 2024-25 fishing season	For advice	AFMA/AAD
12:30 (30 min)	**Lunch**		
13:00 (120 min)	**5. HIMI Patagonian Toothfish TAC 2024-25 (continued)**		
15:00 (30 min)	**Afternoon Tea**		
15:30 (60 min)	**5. HIMI Patagonian Toothfish TAC 2024-25 (continued)**		
16:30 (30 min)	**6. Papers to CCAMLR Working Groups and SC 2024**	For noting	AAD

Approx time	Item	Purpose	Presenter
17:00	**Day 1 Meeting Close**		

Approx time	Item	Purpose	Presenter
Day 2 – 29 August 2024, Hadley's Orient Hotel, 9:00am - 16:30pm (AEST)			
9:00 (60 min)	**7. HIMI Icefish TAC 2024-25**	For advice	AAD
10:00 (30 min)	**8. Bycatch and protected species**		
	8.1 Draft Ecological Risk Assessment for longline fishing in the MITF	For advice	CSIRO
	8.2 Skate post-release survival project update	For discussion	AAD
	8.3 Trawl gear trial project update	For advice	Industry/AFMA
10:30 (30 min)	**Morning Tea**		
11:00 (90 min)	**8. Bycatch and protected species (continued)**		
12:30 (30min)	**Lunch**		
13:00 (60 min)	**9. HIMI Bycatch limits for the 2024-25 fishing season**	For advice	AAD
14:00 (30 min)	**10. Annual research statement and five-year strategic research plan 2025-29**	For advice	AFMA
14:30 (30 min)	**11. HIMI FAPs 2024-25**	For advice	AFMA
15:00 (30 min)	**Afternoon tea**		
15:30 (30 min)	**12. Live release of small toothfish**	For advice	AFMA
16:00 (15 min)	**13. Other Business**	For discussion	AFMA
16:15 (15 min)	**14. Next Meeting**	For advice	Chair
16:30	**Day 2 Meeting Close**		

Attachment C

Item	Action arising	Status as at SARAG 71
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)	**Ongoing** No change since SARAG 70. SARAG 70 advised that it still considers this work as an ongoing priority for the HIMI Fishery. SARAG suggested revising the wording of the action item to reflect the development and continued refinement of the longline research hauls at HIMI which has been completed.
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)	**Ongoing** No change since SARAG 70. 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.
3	**MITF Bycatch Analysis** Analysis of bycatch trends over time to be provided as part of the stock assessment to inform future SARAG considerations of bycatch limits for the MITF.	**Ongoing - Due May 2025**
4	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.	**Ongoing** No change since SARAG 70. 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 trail.
5	**Sub Antarctic Fisheries 5-Year SRP** AFMA to circulate the revised draft Sub Antarctic Fisheries 5-Year SRP (2024-2028) for comment out of session.	**Completed** The draft strategic research plan was circulated to SARAG members for comment on 11 October 2023 with a response received from one member. The draft annual research statement for 2024-25 and draft five year research plan will be discussed at the meeting under agenda item 10.

Sub-Antarctic Resource Assessment Group (SARAG)

Meeting 71 28–29 August 2024

Agenda item 3 Member Updates

Purpose: FOR NOTING

Recommendation

That SARAG:

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

AFMA update

Longline fishing season extension trial

1. 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 arrangements outlined in **Table 1**.
2. The approved arrangements incorporate advice from the Protected Areas and Species Section of the Australian Antarctic Division (AAD) which was requested by AFMA and received following the SARAG 70 meeting. The advice from this section was considered by SouthMAC (meeting 43, 1 July 2024)
3. A summary of the advice on the proposed longline seasons trial arrangements from SARAG 70, SouthMAC 43 and AAD are summarised in **Table 2.**
4. In making its decision, the AFMA Commission noted the extensive discussions held by SARAG about the parameters of the trial, as well as the advice from SouthMAC, and welcomed the thorough scientific approach taken to accounting for the increased risk to seabirds from fishing into September.
5. While the Commission is highly cognisant of the potential risks, including reputational risk to AFMA and industry, it considered that:
   - The trial presents a reasonable balance between providing operational flexibility for industry while mitigating any additional risk of seabird interactions.
   - There is a high level of technical assurance for the trial through the involvement of seabird experts and officers from the Australian Antarctic Division (AAD).
   - This is a further extension of fishing that has already occurred in the first week of the extension period with no interactions.
   - The consequences of interaction under the trial are clear and provide an incentive for industry to maintain high levels of vigilance about mitigation.
   - There will be ongoing analysis by appropriate scientific experts under the guidance of the Sub-Antarctic RAG of AFMA's observer data as it relates to seabird abundance.

6. The Commission noted, with appreciation that industry has demonstrated the capability to avoid seabird interactions over a sustained period and have also indicated their ability to deploy additional measures should seabird abundance be higher than anticipated.

7. Overall, the Commission decided to approve the trial of a longline fishing season extension from 1 September to no later than 21 September in the MITF subject to the arrangements outlined in **Table 1.**

8. Finally, the Commission noted that, if the trial runs to completion, post-trial arrangements will need to be developed. Such arrangements would be developed through the SouthMAC and Sub-Antarctic RAG process and be subject to AFMA Commission approval and periodic review over time.

Table 1. Proposed longline fishing season extension trial arrangements for the MITF as agreed by the AFMA Commission.

Trial component	Detail
Purpose	Consistent with AFMA objectives to maximise net economic returns and have regard to the impact of fishing on non-target species, the purpose of the trial is to test whether longline fishing in the extension periods can be undertaken without adding unacceptable additional risk to seabirds.
Starting two-week extension period	1–14 September. Week one is 1–7 and week two is 8–14 September.
Possible third week inclusion to the extension period.	Once a minimum of 250,000 hooks have been set in the period 8–14 September (week 2), over at least three fishing seasons, SARAG will discuss the results to date of that trial extension period. If the RAG is satisfied that any new data does not increase the level of risk to unacceptable levels, then AFMA Management will consider extending the trial period to 21 September, following consultation with SouthMAC.
Implementation	Fishing in the trial will be authorised through Scientific Permits granted under section 33 of the *Fisheries Management Act 1991.* Only SFR holders in the MITF will be eligible to participate in the trial.
Minimum effort required to complete the trial	500,000 hooks set within each week (1–7, 8–14 and, if included, 15–21 of September). To avoid doubt, hooks set within week one in 2022 and 2023 count towards the minimum number of hooks to be set in that week for the trial. Consideration of post-trial arrangements for the two-week extension period (1–14 September) can commence once the minimum effort deployment of 500,000 hooks has been achieved in each week. This means that a minimum of 500,000 hooks need to be set in week one and a minimum of 500,000 hooks need to be set in week two. To avoid doubt, all trial arrangements continue to apply until such time as ongoing arrangements are developed and implemented for the fishery.[2]
Monitoring and analysis	As far as practical having regard for other data collection priorities, the AFMA observer program is to include daily seabird abundance counts during the season extension and standard season.

[2] This clarifying point was provided to the AFMA Commission to assist with their decision making and not expressly considered by SouthMAC. AFMA Management has informed the AFMA Commission that this is the case. not expressly considered by SouthMAC however AFMA Management has notified SouthMAC of its inclusion.

	AFMA's observer data must be analysed by appropriate scientific experts under the guidance of SARAG.
Seabird interaction limits[3]	***Arrangements for the 5 identified species.*** If one of the 5 identified species is caught and killed by fishing gear during the trial, fishing will cease for that season. Continuation of the trial will be subject to the following rules: • if the mortality occurs in week one of the trial extension period, the trial will cease. • if the mortality occurs in week two of the trial, the second week of the extension period will be removed from the trial. The trial may continue in week one, but no fishing will be permitted in week two in future seasons and there will be no consideration of including week three in the trial. • if week 3 is added to the extension period and the mortality occurs in week three of the trial, the third week of the extension period will be removed from the trial. The trial may continue in week one and two, but no fishing will be permitted in week three in future seasons. ***Arrangements for all other seabird species ('other' seabirds).*** If three of the 'other seabirds' are caught and killed by fishing gear during the trial extension period within a single fishing season, the trial in its entirety will cease for that season. Recommencement of the trial in the next or future seasons will be considered by SouthMAC and decided by AFMA based on a review of circumstances of interactions.

[3] 'Identified' seabird species are: Wandering albatross, Black-browed albatross, Grey headed albatross, Grey petrel, Soft-plumaged petrel. 'Other' seabird species are species that are not an 'identified' species.

Table 2. Summary of advice on proposed longline fishing season extension trial arrangements for the MITF from SARAG70, SouthMAC43 and the Protected Areas and Species Section of the Australian Antarctic Division (AAD).

Trial component	Detail as supported by SARAG 70	AFMA management advice to SouthMAC 43 inclusive of advice from the AAD	SouthMAC 43 recommendation
Purpose	Consistent with AFMA objectives to maximise net economic returns and have regard to the impact of fishing on non-target species, the purpose of the trial is to test whether longline fishing in the extension periods can be undertaken without adding unacceptable additional risk to seabirds.	No change	No change
Starting two-week extension period	1–14 September. Week one is 1–7 and week two is 8–14 September.	No change	No change
Possible third week inclusion to the extension period.	Once a minimum of 250,000 hooks have been set in the period 8–14 September (week 2), over at least three fishing seasons, SARAG will discuss the results to date of that trial extension period. If the RAG is satisfied that any new data does not increase the level of risk to unacceptable levels, then AFMA Management will consider extending the trial period to 21 September once 300,000 hooks have been set in the week 2.	SARAG70 recommended two-step process for extended the trial to week 3, with an AFMA decision to extend the trial occurring (once 250,000 hooks had been set in week two over at least three seasons) ahead of requiring a further 50,000 hooks to be set. The intention of such an approach was to ensure that an extension, if approved, would occur in the very next season the prerequisite conditions had been met. Upon reflection, AFMA Management did not consider it necessary to have the two-step process to achieve this outcome	No change to AFMA proposed approach
Implementation	Not applicable. AFMA did not seek SARAG advice from SARAG on this aspect of the trial.	Fishing in the trial will be authorised through Scientific Permits granted under section 33 of the *Fisheries Management Act 1991.* Only SFR holders in the MITF will be eligible to participate in the trial.	No change to AFMA proposed approach
Minimum effort required to complete the trial	500 000 hooks set within each week (1–7, 8–14 and if included, 15–21 of September).	For clarity and in responses to a suggestion from AAD to identify when the trial is to commence, AFMA Management added: 'To avoid doubt, hooks set within week one in 2022	SouthMAC accepted the proposed approach but recommended that consideration of post-trial arrangements for the two-week extension period (1-14 Sep) commence once the minimum effort deployment of 500,000 hooks has been

		and 2023 count towards the minimum number of hooks to be set in that week for the trial'.	achieved in each of those weeks. This means that a minimum of 500,000 hooks need to be set in week one and a minimum of 500,000 hooks need to be set in week two.
Monitoring and analysis	As far as practical having regard for other data collection priorities, the AFMA observer program is to include daily seabird counts during the season extension and standard season.	For clarity AFMA Management added that AFMA's observer data must be analysed by appropriate scientific experts under the guidance of SARAG. AAD recommended replacing the word 'data' with 'abundance'.	No change to AFMA and AAD additions.
Seabird interaction limits	***Arrangements for the 5 identified species.*** If one of the 5 identified species is caught and killed by fishing gear in week one of the trial extension period, the trial in its entirety will cease. If one of the 5 identified species is caught and killed by fishing gear in week two of the trial, the second week of the extension period will be removed from the trial. The trial may continue in week one, but no further fishing will be permitted in week two and there will be no consideration of including week three in the trial. If week 3 is added to the extension period and one of the 5 identified species is caught and killed by fishing gear in week three of the trial, the third week of the extension period will be removed from the trial. The trial may continue in week one and two, but no further fishing will be permitted in week three. ***Arrangements for all other seabird species ('other' seabirds).*** If three of the 'other seabirds' are caught and killed by fishing gear during the trial extension	Having regard for advice from the AAD and other improvements to clarify process, AFMA proposed the changes below (underline text is new text). It was AAD's initial preference for option 1. ***Arrangements for the 5 identified species.*** If one of the 5 identified species is caught and killed by fishing gear during the trial, fishing will cease for that season. Continuation of the trial will be subject to the following rules: • if the mortality occurs in week one of the trial extension period, the trial in its entirety will cease. • if the mortality occurs in week two of the trial, the second week of the extension period will be removed from the trial. The trial may continue in week one, but no further fishing will be permitted in week two and there will be no consideration of including week three in the trial. • if week 3 is added to the extension period and the mortality occurs in week three of the trial, the third week of the extension period will be	SouthMAC accepted the proposed approach from AFMA and AAD with an alternate option 2 (see below – underline text is new text). SouthMAC also recommended several editorial improvements that added clarity to the arrangements for the 5 identified species but did not change the substance. ***Arrangements for all other seabird species ('other' seabirds).*** If three of the 'other seabirds' are caught and killed by fishing gear during the trial extension period within a single fishing season, the trial in its entirety will: ~~**Option 1:** cease in its entirety; or~~ **Option 2:** cease for that season. Recommencement of the trial in the next or future season will be considered by SouthMAC and decided by AFMA based on a review of circumstances of interactions. by ~~AFMA of any exceptional circumstances.~~

	period within a single fishing season, the trial in its entirety will cease, pending review by AFMA of any exceptional circumstances.	removed from the trial. The trial may continue in week one and two, but no further fishing will be permitted in week three. ***Arrangements for all other seabird species ('other' seabirds).*** If three of the 'other seabirds' are caught and killed by fishing gear during the trial extension period within a single fishing season, the trial in its entirety will: **Option 1:** cease in its entirety; or **Option 2:** cease for that season. Recommencement of the trial in the next or future season will be considered by SouthMAC, based on a review by AFMA of any exceptional circumstances.	
Seabird interaction report	If a seabird is caught and killed, AFMA will seek further information from industry on the potential cause of the interaction and, if relevant, whether industry could address the cause.	AAD recommended that following change: If a seabird is caught and killed, AFMA will seek further information from industry on the potential cause of the interaction and, identify what additional mitigation measures will be required to address the cause.	SouthMAC recommended: If a seabird is caught and killed, AFMA will seek further information from industry on the potential cause of the interaction and, identify what additional mitigation measures may be applied ~~will be required~~ to address the cause.

Sub-Antarctic Fisheries Electronic Monitoring trial

9. The Southern Ocean Fisheries Electronic Monitoring Trial is now underway. The aim of the project is to undertake a comprehensive trial to understand the feasibility and applications of using EM as an independent data collection and logbook data validation tool in the SOF. The objectives of the project include:

    i. To deploy electronic monitoring systems on three commercial fishing vessels operating in the SOF to collect required fishing data for a period of up to one year.
    ii. To determine to what extent EM can be used to collect and verify current data requirements as previously identified by the fishery/SARAG.
    iii. To undertake a cost analysis for the use of EM and supplementing data collection programs to collect required fishery data in the SOF
    iv. To determine the potential of artificial intelligence machine learning (AIML) applications in the SOF.

10. The first meeting of the Southern Ocean Fisheries Business Reference Group (SOFBRG) held on 25 July to:

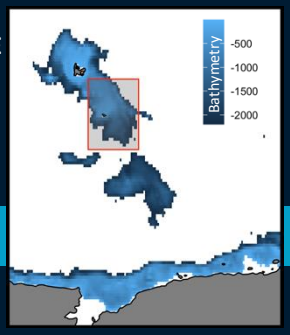
    a) confirm and finalise the Terms of Reference for the Southern Ocean Fisheries Business Reference Group (SOFBRG).
    b) note the final Southern Ocean Fisheries Electronic Monitoring Trial Project Plan.
    c) consider updates on the progress of EM hardware installations across trial vessels. The Antarctic Discovery has successfully completed its system upgrade, which includes upgrades for artificial intelligence (AI) development. The Antarctic Aurora is scheduled for installation in November 2024, and the Cape Arkona is planned for installation in January 2025.
    d) note CSIRO update on the AIML seabird detector and counter, *Jonathan*, which was initially tested on the *RV Investigator* in May this year. This involved the deployment of cameras and a processor that could detect birds in near real-time on the vessel. These records are now being compared with co-incident human observer counts on the vessel and in the lab. The next version of the *Jonathan* software will be deployed on *RV Investigator* in November 2024.

11. The next SOFBRG meeting is scheduled for early November 2024.

Climate & Ecosystem Status Report Attachment E

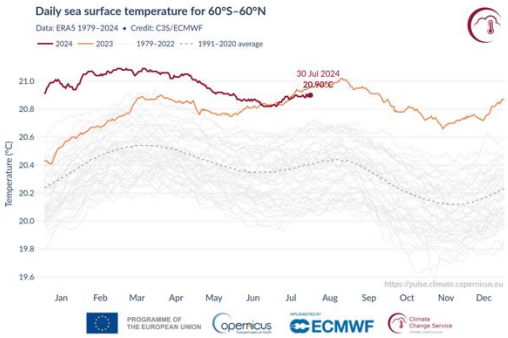
Heard Island and McDonalds Islands Fishery

August 2024

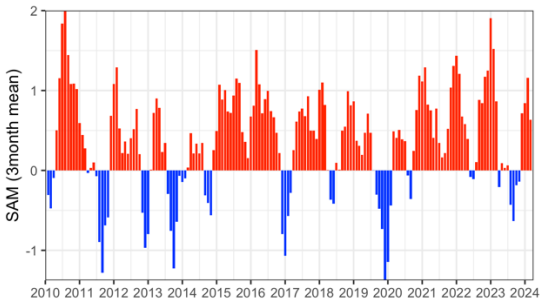


Historical Period

Climate Drivers



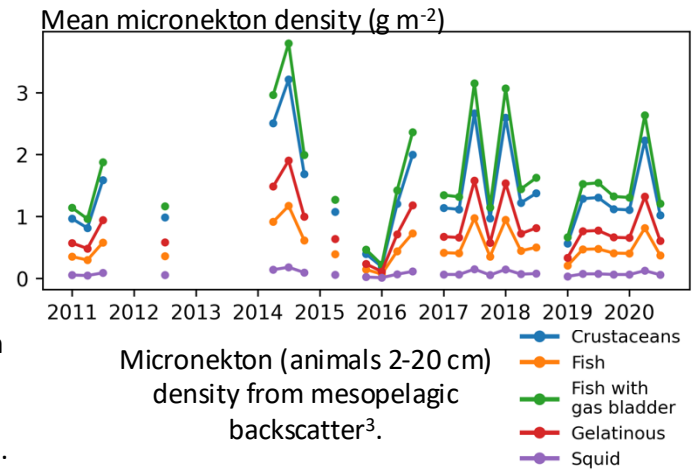
Global Sea Surface Temperature (SST) have remained at record highs from 2023 through 2024 (link)[1].



Southern Annular Mode[2] (link) indicates the north-south movement of westerly winds in the mid-high latitudes. Positive phases (westerlies move south) have become more common over time & are associated with increased sea ice extent.

Regional Dynamics

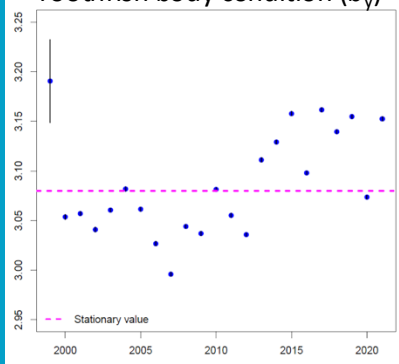
Monthly average bottom temperature at 400-2000 m depth[1]. 2023/24 has been above long-term average (pink line: 2.05°C). Low (high) temperatures can decrease (increase) Patagonian toothfish catchability[3].



Micronekton (animals 2-20 cm) density from mesopelagic backscatter[3].

Ecosystem and Fishery

Toothfish body condition (b_y)



Toothfish body condition in recent years (<2021) has been above average (pink line)[3].

Black vertical lines on blue dots shows error is very small.

Observations

To be discussed at RAG.

Example 2023 observations:

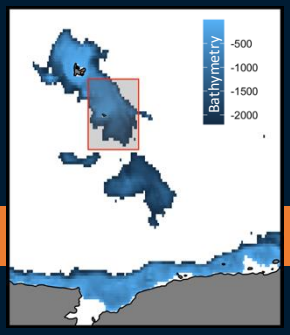
- Catches have been unremarkable, but in-line with the past few years. Two size classes.
- Small increases in fish size
- Increased interference from sea lice
- Killer whales observed, and the 90-mile move-on rule worked effectively.

Sources: Copernicus[1] NOAA[2] CSIRO[3] BOM[4]

Climate & Ecosystem Status Report

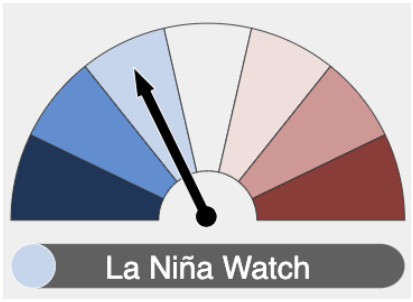
Heard Island and McDonalds Islands Fishery

August 2024

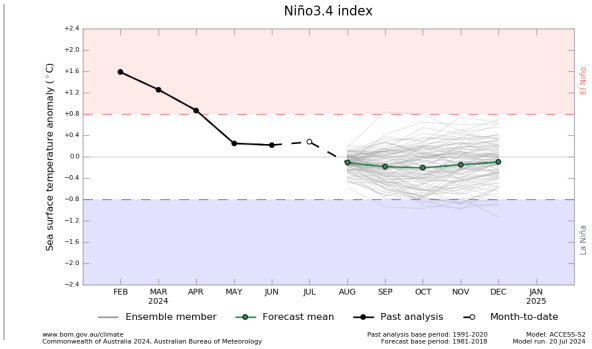


Future Outlook for 2024

Climate Drivers



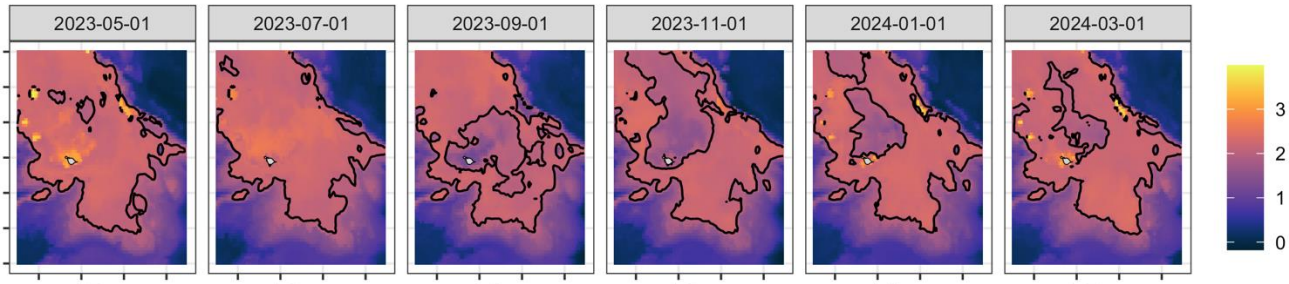
BOM Outlook is La Niña watch (50% chance of La Niña) (link)[4].



ENSO is likely to remain neutral until early spring. During La Niña, the Southern Annular Mode tends to shift to positive phases, where westerly winds move south and result in strong circumpolar westerlies. (link)[4].

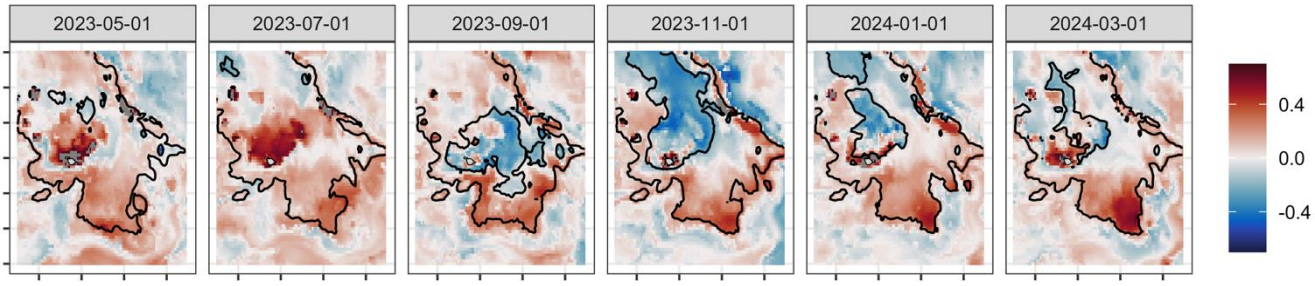
Regional Dynamics

Bottom temperature (°C) showing the long-term average at 2.05 °C (black contour)[1]



Low (high) temperatures can decrease (increase) toothfish CPUE at a lag of ~6months[3]. Over the past year, temperatures >2°C were present over most of the HIMI shelf. A cool pool formed around and to the north of the island (Sep-March). 2°C is the lower preferred temperature of Patagonian toothfish.

Bottom temperature anomaly (°C) showing the same contour as above[1]



Bottom temperatures were anomalously warm (>0.5 ° C) across most of the southern HIMI shelf over the past year.

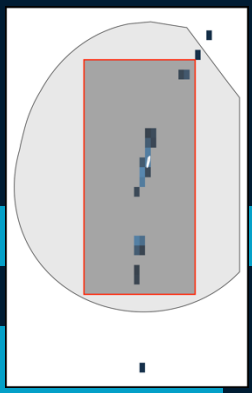
Sources: Copernicus[1] NOAA[2] CSIRO[3] BOM[4]

contact details: steph.brodie@csiro.au

Climate & Ecosystem Status Report

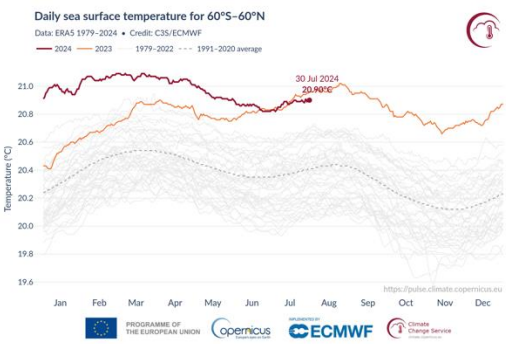
Macquarie Island Toothfish Fishery

August 2024

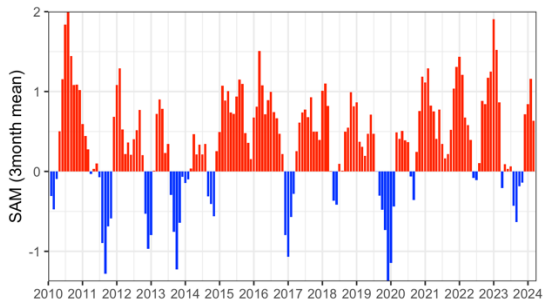


Historical Period

Climate Drivers

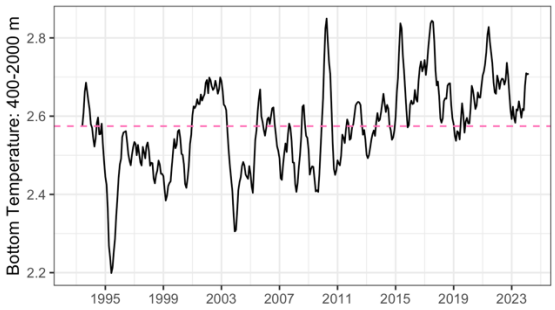


Global Sea Surface Temperature (SST) have remained at record highs from 2023 through 2024 (link)[1].

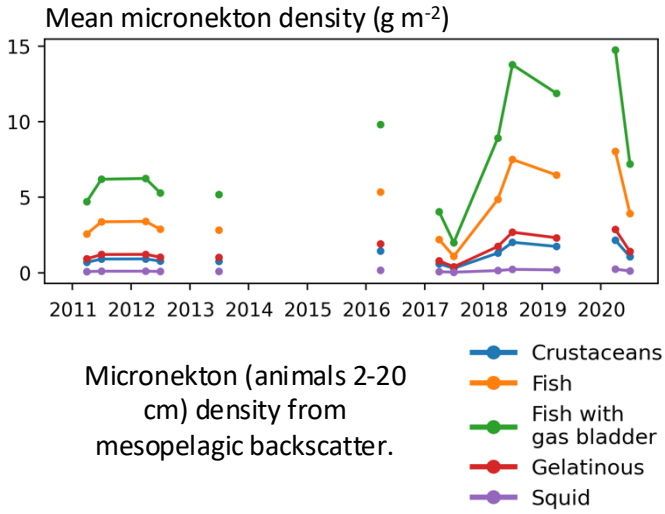


Southern Annular Mode[2] (link) indicates the north-south movement of westerly winds in the mid-high latitudes. Positive phases (westerlies move south) have become more common over time.

Regional Dynamics



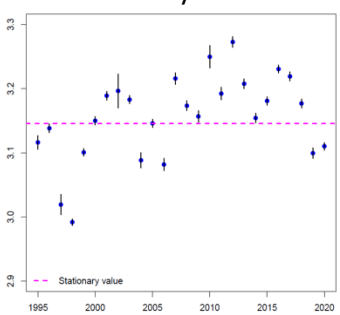
Monthly average bottom temperature at 400-2000 m depth has increased over time[1]. Time-series is a rolling 6-month average to remove variability. 2023/24 has been above the long-term average (pink line: 2.57°C). Low (high) temperatures can decrease (increase) Patagonian toothfish catchability[3].



Micronekton (animals 2-20 cm) density from mesopelagic backscatter.

Ecosystem and Fishery

Toothfish body condition



Below average body condition in 2019 & 2020 follows ~12 year of good condition[5].

Pink line is the long-term average.

Observations

To be discussed at RAG.

Examples from 2023 RAG

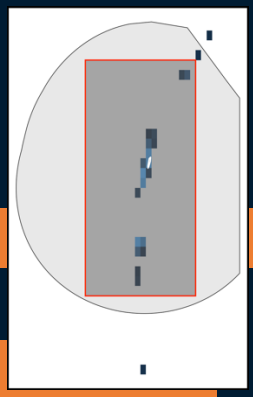
- Initial fishing efforts finding good sized fish
- The interaction and location of currents in this region are of interest, and a better indicator of ecosystem and fishing conditions

Sources: Copernicus[1] NOAA[2] CSIRO[3] BOM[4]

Climate & Ecosystem Status Report

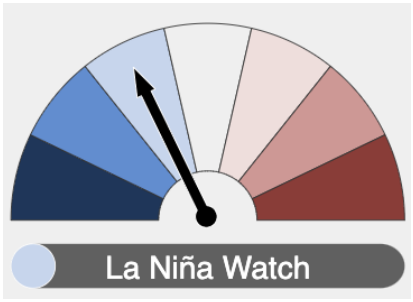
Macquarie Island Toothfish Fishery

August 2024

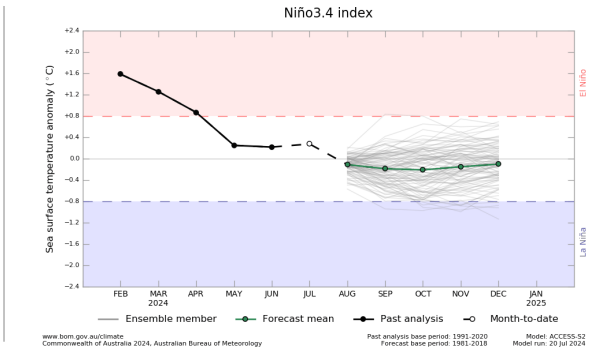


Future Outlook for 2024

Climate Drivers



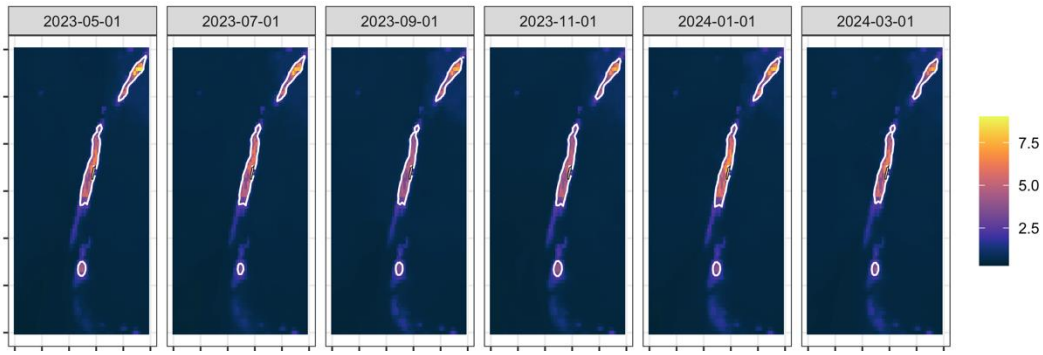
BOM Outlook is La Niña watch (50% chance of La Niña) (link)[4].



ENSO is likely to remain neutral until early spring. During La Niña, the Southern Annular Mode tends to shift to positive phases, where westerly winds move south and result in strong circumpolar westerlies. (link) [4].

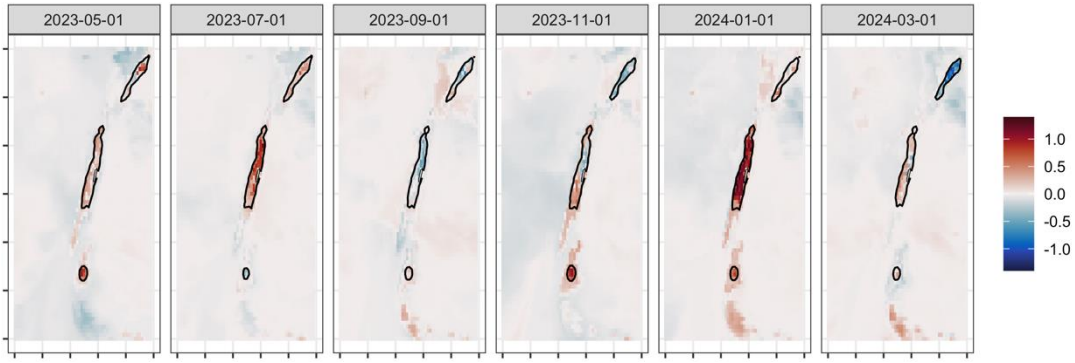
Regional Dynamics

Bottom temperature (°C) showing the long-term average at 2.57 °C (white contour)[1]



Over the past year, temperatures >2.57°C were present over most of the shelf. 2°C is the lower thermal preference of Patagonian toothfish[3].

Bottom temperature anomaly (°C) showing the same contour as above[1]



Bottom temperatures were anomalously warm across the shelf for most of the year. Anomalies can change rapidly between months, as seen in September 2023.

contact details:steph.brodie@csiro.au

Australian Government
Australian Fisheries Management Authority

Attachment F

Sub-Antarctic Resource Assessment Group (SARAG)

Meeting 71 28-29 August 2024

Agenda item 6 Papers to CCAMLR Working Groups and SC 2024

Purpose: FOR NOTING

SARAG to note the papers submitted to WG-ASAM, WG SAM and WG-EMM and note the proposed papers to be submitted by AAD to the WG-FSA-IMAF, Scientific Committee.

Recommendation

That SARAG:

1. **NOTES** the papers to be submitted by AAD to the 2024 CCAMLR working groups on:
   a. Acoustic Survey and Analysis Methods (WG_ASAM)
   b. Statistics, Assessments and Modelling (WG-SAM), and
   c. Ecosystem Monitoring and Management (WG-EMM).
2. **NOTES** the papers to be submitted by AAD to the 2024 CCAMLR working group on Fish Stock Assessments and Incidental Mortality Associated with Fishing (WG-FSA-IMAF) and Scientific Committee (SC).

Background

1. Papers provided by the AAD to the WG-ASAM (20–24 May 2024), the WG-SAM (24–28 June 2024), WG-EMM (4–11 July 2024) are listed in **Table 1**. These meetings have now been held and AAD will provide SARAG an update on any relevant outcomes (note outcomes of WG-SAM as they relate to Patagonian toothfish will be discussed under Agenda item 5.1).

2. Papers proposed for submission to the WG-FSA-IMAF (30 Sep – 11 Oct 2024) and SC (14 Oct–18 Oct 2024) are also listed in **Table 1.** AAD will provide an overview of the advice proposed in those papers.

Table 1. AAD papers submitted to the 2024 CCAMLR working groups on ASAM, SAM and EMM and papers proposed for submission to the 2024 WG-FSA-IMAF and SC.

Meeting	Paper
WG-ASAM	• Krill TEMPO biomass estimate – addressing SC-CAMLR-2023 comments • Sampling and measurement variability in Krill biomass estimation (Bairstow et al. 2022)
WG-SAM	• Addressing potential bias in toothfish stock assessments from spatial effort distribution (with UK, NZ, FRA) • Trends and patterns in toothfish recruitment for stock projections (with UK, NZ, FRA) • Evaluation for Dynamic B0 for toothfish stock assessments (with UK, NZ, FRA) • History of CCAMLR Decision Rules and evaluation of alternative harvest control rules for TOP (with UK, NZ, FRA) • EA: Updated research plan
WG-EMM	• SKEG Annual Meeting Report • CEMP: Role of cetacean science in CEMP/krill fishery management • CEMP: Framework for CCAMLR's scientific data collection needs • CEMP: Pan-Antarctic camera network • CEMP: DNA tools for diet assessment • CEMP: Whale observations from tourist vessels
WG-FSA-IMAF	• HIMI Report of RSTS • HIMI Icefish assessment • HIMI: Icefish biological parameters through time • HIMI TOP assessment and accompanying papers • EA: Progress Report 2024 • EA: Stock assessment • EA: Updated research plan • IMAF: Training materials for data collection form for whale IMAF • IMAF: IWC-SC Intersessional Work on whale bycatch
SC	• Krill catch limits in 58.4.1 and 58.4.2 / Response to SC-CAMLR-2023 • Krill fishery Data collection requirements • Report from IWC-SC Meeting 2024 • New Annex for CM 21-02 - Template for research plans in exploratory toothfish fisheries

Sub-Antarctic Fisheries Resource Advisory Group (SARAG)

Meeting 71 28-29 August 2024

Agenda item 8.3 HIMI Trawl Gear Modification Trial

Purpose: FOR ADVICE

Recommendation

That SARAG:

1. **NOTE** that the trial of modified trawl gear in the HIMI Fishery commenced in November 2020, following SARAG's consideration of an Industry proposal in 2019 to trial lighter trawl gear with smaller bobbins and rock hopper rubber discs (High lift Bastard net + lighter rig) than currently allowed, aiming to reduce skate bycatch, reduce benthic impact and improve operational efficiency (Attachment A). Industry has provided updates throughout the trial, including preliminary summaries of the data which are provided in Attachment B and discussion paper at C.

2. **RECALL** that SARAG 63 recommended that the trial continue for a further 12 months, and that if possible, both vessels, using the differing gear types, fish in the same period to allow for a direct comparison of the gear types. Industry would provide the following season's raw data to the AAD, to be presented at a SARAG meeting in 2022. A fulsome analysis is still pending due to time and resourcing constraints, however a preliminary analysis of 12 paired tows by AAD presented to SARAG 65 in 2022 found that the bycatch CPUE was lower in the modified trawl net being trialled, which has an improved icefish: skate catch ratio. Interrogation of species composition also found that *B. irrasa* presence was substantially lower in the new net compared to the original trawl net (Champion trawl + rockhopper rig).

3. **RECALL** that SARAG 65 has previously noted that, in addition to an overall reduction in skate bycatch, SARAG skate condition is of interest, and that while the proportion of released skates was similar between the two nets, the condition of the released skates was poorer in the new net, potentially as a function of net dimensions.

4. **RECALL** that SARAG 68 did not make any additional requests for data when it considered Industry's update in May 2023, noting the discussions at SARAG 65 requiring completion of 40 tows. SARAG 68 noted that at the conclusion of the trial the results should be passed to SouthMAC.

5. **CONSIDER** a project update from industry, including outcomes of the trial in 2024 (if available) and any proposed future work;

6. Having regard for the project update under (5) above, and SARAG's recommendations for i) AAD to analyse all relevant 2020–21 and 2021–22 fishing season icefish catch and effort data

comparing both gear types (SARAG 63); and ii) 40 tows to be completed, **DISCUSS** and **PROVIDE ADVICE** on results available to date and proposed future work.

Key Issues

7. Industry put forward a proposal in 2019 seeking to trial modified trawl fishing gear due to concern over the level of skate bycatch when trawling for mackerel icefish. Industry was further concerned that the skate bycatch limit (120 tonne) could be reached before the end of the season if the icefish quota increases in future years. Industry further pointed out that the minimum gear requirements in the HIMI Regulations restrict Industry's ability to utilise trawl gear technology that minimises the impact of fishing on non-target species and the environment. Furthermore, the Regulations have not kept up with the gradual variation of trawl ground gear that has occurred over time, for example the transition from using bobbins to chains or weight and wire rope.

8. SARAG 59 supported a 12-month trial which commenced in November 2020 under a scientific permit. Since the start of the trial, Industry have continued to provide periodic updates to SARAG on the progress of the trial, including preliminary summaries of the data collected. SARAG has continued to provide feedback on the trial, including:
    - the continuation of the trial for a further 12 months due to insufficient data to assess the performance of the modified trawl gear
    - if possible, for two fishing vessels to fish in the same period, using the differing gears (i.e. original and modified trawl gear) to allow for a direct comparison of the gear types, and
    - for the AAD to analyse all relevant 2020–21 and 2021–22 fishing season icefish catch and effort data comparing both gear types to be considered by SARAG.

9. In addition, AFMA understands that it was agreed at the time (2022) that a minimum of 40 tows would need to be completed during the trial.

10. A fulsome analysis of the trial results is pending (SARAG 65). Industry's preliminary summaries indicate that the modified trawl gear achieved improved catches of icefish, lower retention of skate bycatch and greater fuel and operational efficiency while towing. These results have persisted as more data has been collected during the trial. Preliminary analysis of data from 12 paired tows by the AAD also found that the bycatch CPUE was lower in the new net, which has an improved icefish:skate ratio. Interrogation of species composition found that *B. irrasa* presence was substantially lower in the new net compared to the old net (SARAG 65).

11. An industry, AFMA and AAD skate bycatch workshop was held on 10 August 2022 at which the results of the trial up to that point where presented and discussed. A comparison of the icefish trawl nets showed positive signs that the new bastard trawl net has lower skate CPUE than the older champion net, however large catches were still evident.

12. SARAG 65 also noted that the condition of released skates is of interest, in addition to species volumes, while the proportion of released skates was similar between the two nets, the condition of the released skates was poorer in the new net, potentially as a function of net dimensions. Referring to previous advice that the trial should comprise a minimum of 40 tows, that more fulsome analysis of the results was pending, and not wanting to discourage innovation, SARAG 65 recommended that the trial continue and noted that further information would enhance understanding of the performance of the new net.

13. SARAG 68 noted a further update from Industry on the progress of the project and noting the discussions at SARAG 65 requiring completion of 40 tows, SARAG did not make any additional requests for data at this time and noted that at the conclusion of the trial the results should be passed to the MAC.

Background

2019

14. At SARAG 59 (May 2019), Austral put forward a proposal (Attachment A) to modify the trawl fishing gear used to commercially target mackerel icefish to reduce skate bycatch and benthic impacts and increase operational efficiencies. The trawl gear modifications include:
    - smaller bobbins of 400 mm
    - smaller rock hoppers rubber discs of 200mm
    - new trawl net with larger mesh size to reduce bycatch
    - different ground rope configuration (smaller ground rope diameter) to target icefish whilst reducing skate bycatch
    - overall 30% lighter than the gear being used at the time

15. Austral further noted that their proposed gear modifications would require the use of smaller bobbins and rock hopper rubber discs than is currently allowed under the HIMIF Regulations which specify a minimum size (520mm for bobbins and 400mm for rock hopper discs). In considering the proposal, SARAG 59 was asked to consider:
    - the likelihood of the new gear reducing skate and other bycatch
    - any environment impacts and/or benefits of the proposal, and
    - any other issues as relevant to SARAG

16. SARAG members at the time did not express any concerns with using a lighter rig for mackerel icefish and AAD suggested that a trial could compare the two gear set ups. SARAG 59 supported Austral running the fisheries trial for 12 months either through statutory fishing right (SFR) conditions or a scientific permit. SARAG 59 supported implementation of the new gear requirements if the trial proves that the new gear specifications reduce bycatch.

17. While the trial is underway, AFMA would commence the process of amending the *Fisheries Management (Heard and McDonald Islands Fishery) Regulations 2002* (the Regulations) to remove the trawl gear requirements and implement any gear specifications through SFR conditions which are easier and quicker to amend if required.

2020

18. The trial commenced under Scientific Permit in November 2020. The trial was undertaken in December 2020/January 2021 and March/April 2021 with 54 shots completed using the new trawl gear on one fishing vessel.

2021

19. A preliminary summary of the raw data collected during the trial was presented to SARAG 63 in April (an updated version of this presentation is provided in Attachment B). Whilst the data was not enough to support analysis to conclusively determine the difference between the gears, it

showed a lower skate bycatch rate, and with a higher ratio of mackerel icefish to skates than when using the original gear (using data from a different fishing vessel from 2016/17–2020/21). The lighter gear also appeared to not be impacting the benthos as much with the skipper on the vessel reporting less sand and weeds in the net and also less damage to the mackerel icefish.

20. SARAG 63 requested that the trial continue for a further 12 months given the insufficient amount of data for the new trawl gear and that if possible, both fishing vessels, using the differing gears, fish in the same period to allow for a direct comparison of the gear types.

2022

21. SARAG 65 considered a further update from Industry on the progress of the trial in 2022 (Attachment C discussion paper) showing similar results to the data collected in 2021 in terms of improved catches of icefish, lower retention of skate bycatch in the new gear and greater fuel and operational efficiency while towing. In 2021, 59 icefish trawls were undertaken with the Champion net (old net) and 57 with the new net design. SARAG noted that the new net is larger with a greater horizontal (50%) and vertical opening, lighter, and can be trawled faster resulting in shorter tows covering a greater footprint.

22. SARAG also noted AAD advice that a preliminary review of 12 paired hauls found that the bycatch CPUE was lower in the new net, which has an improved icefish:skate ratio. Interrogation of species composition found that B. irrasa presence was substantially lower in the new net compared to the Champion net.

23. SARAG noted that skate condition is of interest, in addition to species volumes, and that the proportion of released skates was similar between the two nets, and that the condition of those skates was poorer in the new net, potentially as a function of net dimensions.

24. Referring to previous advice that the trial should comprise a minimum of 40 tows, that a more fulsome analysis of the results was pending, and not wanting to discourage innovation, SARAG recommended that the trial continue and noted that further information would enhance understanding of the performance of the new net.

25. SARAG requested that a presentation on performance of the new net be provided to the mid-year skate bycatch workshop.

2023

26. SARAG 68 noted a further industry update at their meeting in May (Attachment B). Three years of fishing with the new gear type under a scientific permit had occurred. The first two years of data were encouraging, and that in 2022 side by side tows facilitated near direct comparison of the old trawl net against the trial net.

27. Austral clarified that the 2023 data presented in the update was compared against data collected in the first year of the trial only, as Dr Cleeland provided data in the second year of the trial. SARAG heard that icefish is highly variable between years. Comparison of skate bycatch between periods representing good or poor icefish catch rates was described, with monthly icefish catch compared between 2021 and 2023. In January 2023, when icefish catch was poor, skates were caught at a comparably lower proportion than in 2021 with higher icefish catch. Members noted that in February 2022, good icefish catches were reported, with a 10-day

average catch of 11t of icefish against 400kg of skates, resulting in a 3.5% skate proportion of the total catch.

28. Similar catch rates were reported over 8 days in February 2023, and during that period there was a 5.5% skate proportion. While higher than 2022, it was lower compared to the old gear performance which had lower icefish catches and a skate bycatch proportion of 7%. Noting the discussions at SARAG 65 requiring completion of 40 tows, SARAG did not make any additional requests for data at this time and noted that at the conclusion of the trial the results should be passed to the MAC.

29. SouthMAC has been supportive of the trial and has recommended that AFMA pursue amending the HIMIF Regulations to relocate trawl gear specifications to a more appropriate legislative instrument such as SFR conditions.

30. AFMA is currently working with the Department of Agriculture Fisheries and Forestry to obtain policy approval from the Minister and the Office of Parliamentary Counsel to amend the Regulations 2002 to remove the gear requirements. The amendment is planned for submission in time for the call for the Autumn 2025 bids sitting. This amendment will allow AFMA to implement gear requirements through SFR conditions consistent with practice in other Commonwealth – managed fisheries.

Attachment H

Proposal for modifying HIMI Regulation on trawl gear

Austral would like to explore the possibility of broadening (or removing) the current HIMI Regulation on trawl gear (Part 4, Section 9) so that we have the ability to modify our current gear to reduce bycatch of skate while fishing for icefish, but at the same time, provide enough flexibility so that any future modifying of gear for either operational efficiencies, or reducing bycatch or benthic impacts can be made.

The HIMI Regulations state:

> *(1) The holder of a statutory fishing right must not use either of the following for fishing in the area of the fishery:*
>
> *(a) a bobbin that is less than 520 millimetres in diameter;*
> *(b) a rock hopper rubber disc that is less than 400 millimetres in diameter*

These Regulations came into place in the 1990s when these were the actual measurements of our existing ground gear at the time on the Austral Leader, targeting toothfish, and so it eventually became a HIMI-wide Regulation. We believe that with the improvement in fishing gear technology over the years, that this Regulation is restrictive, and that environmental impacts could be further minimised with gear that currently is prohibited under the current Regulation. Another point to consider, is that we are currently allowed to use 'no bobbins' for ground gear (e.g. just chain; or weights and wire rope). That reinforces, to us, of the existing allowance of variation of ground gear, which we hope to be able to increase the flexibility around, to minimise environmental impacts; reduce catch of non-target species; and to improve both economic and operational efficiencies in the fishery

For reference, we haven't used bobbins for around 10 years, and our rockhopper discs are 550mm diameter (but over time wear down to around 500mm).

We are interested in moving toward a different ground rope configuration for Icefish fishing (Figure 1) with the aim of reducing unwanted bycatch, specifically skates, which are a potential limiter for the toothfish fishery in years with a moderate icefish TAC, and will be a limiter in years with a high icefish TAC. This proposed gear is around 34% lighter (immersed weight) than our current gear. It has a smaller ground rope diameter for easier handling and improves the fit of this rig onto the net drum. The new trawl net that we have in mind also has a larger mesh size to help reduce unwanted bycatch. Unfortunately, while this rig is much lighter, the bobbins and discs are not permitted under the current Regulations because they are smaller than the specified measurements (bobbins 400mm and rubber discs 200mm diameter).

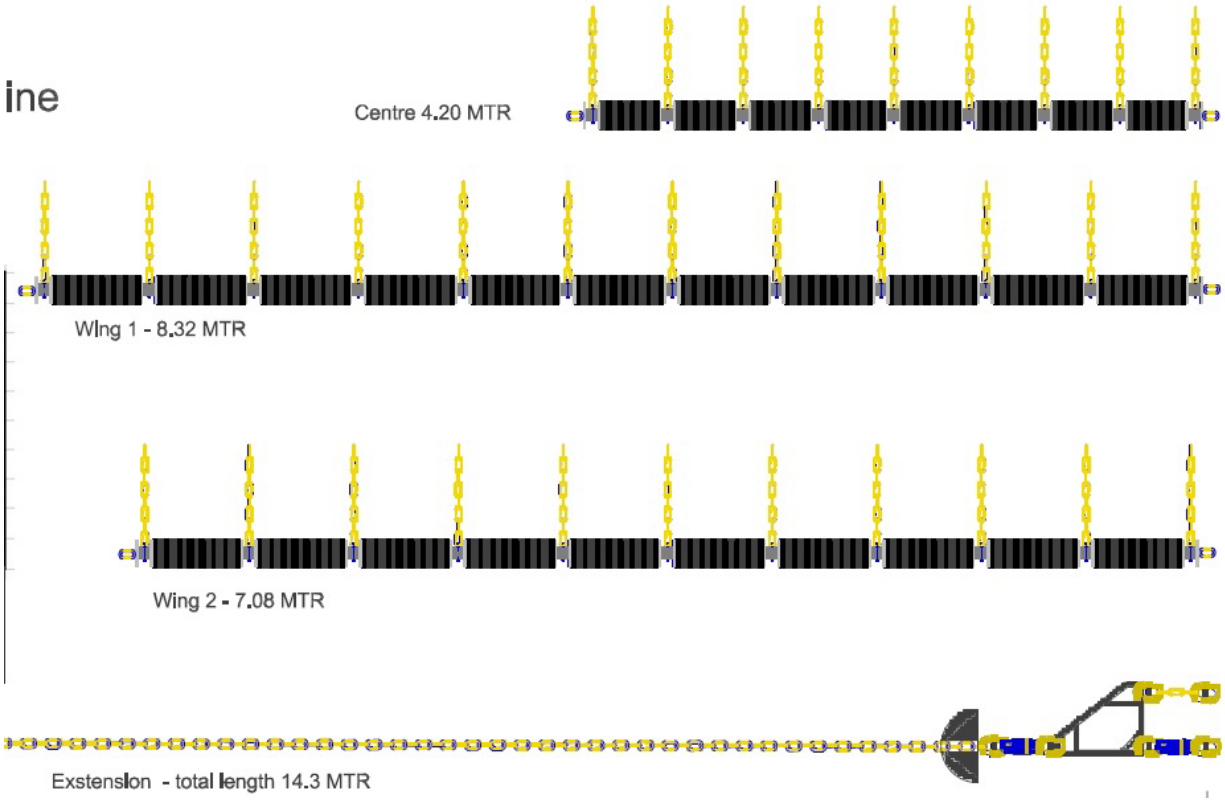


Figure 1: Proposed gear configuration prepared by Hampidjan Australia

We also note that the icefish fishery is confined to a very small area of the fishery, which has had repeated trawls over a long period, and so there will be minimal impact to the seabed regardless of bottom gear configuration when fishing over these same areas.

An alternative to removing the regulation, would be to amend it to specify that the current Regulation only applies to the toothfish fishery, or possibly to keep this Regulation in place but amend it to make it less prescriptive.

The current alternative approach for industry is midwater trawling, but the main problem with this method is there has to be a dense assemblage of icefish to make this a viable method of fishing. When the fishery is rather scattered, like it has been this year, we have been using bottom gear following the specifications in the Regulations, but as we have seen, this has its problems because of high skate and unicorn icefish bycatch. Historical data from midwater trawling on Gunnari Ridge and the Heard Island Plateau shows very minimal benthic impact, and bycatch levels of skates and unicorn icefish were also significantly reduced. These midwater trawls were usually fished on the bottom as well. We aim to achieve similar results with this new trawl and ground rope.

If the RAG and MAC are comfortable with this proposal, ideally, we are hoping to be able to use this new ground gear December 2019 at the earliest.

Comparing the old “Champion trawl + rockhopper rig” against the new “High lift Bastard net + lighter rig”

Summary:
- Compared raw C1 data from 2015/16 season through to current 2020/21 season
- Total tows with old gear (2016/17 – 2020/21) = 635
- Total tows with new gear (2020/21) = 54
- Given the low number of tows with the new gear, I have also examined the data and grouped it by icefish CPUE, by month, and by fishing season, to see if there were any obvious trends
- Kilograms used in analysis were ‘retained’ plus ‘released’ individuals (i.e. all indidivuals caught in the net). Weight of released individuals were calculated using average weight of retained for that tow.
- It should also be noted that the new configuration fishes a larger area than the old gear, which also must be taken into consideration when viewing this data:

	Headline length (m)	Groundrope length	Headline height	Door spread	Horizontal opening
Champion	38.5	18.3	5.5	185	25.0
Bastard	59.2	35.4	10.0	160	69.7
Difference	+154%	+193%	+182%	-14%	+279%

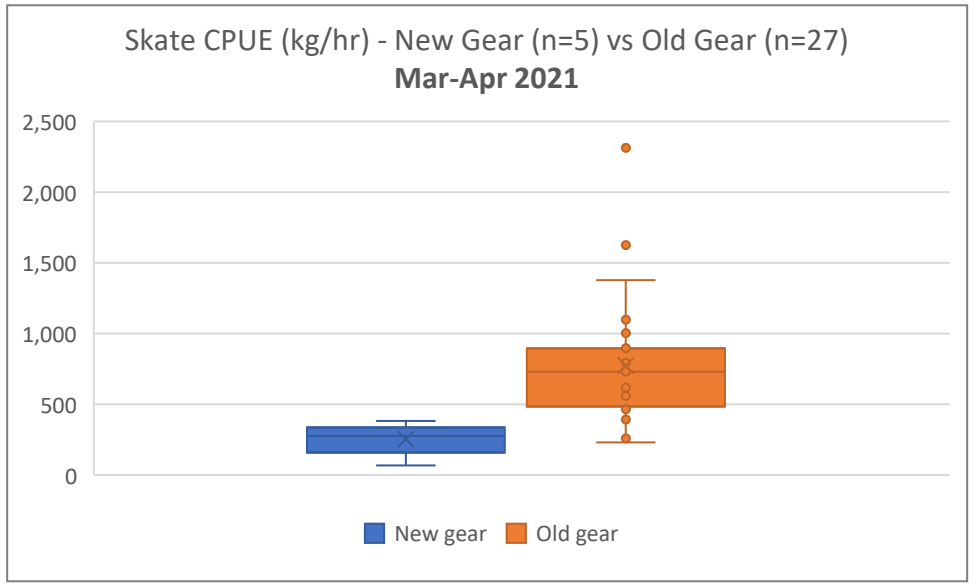
When only considering current season:

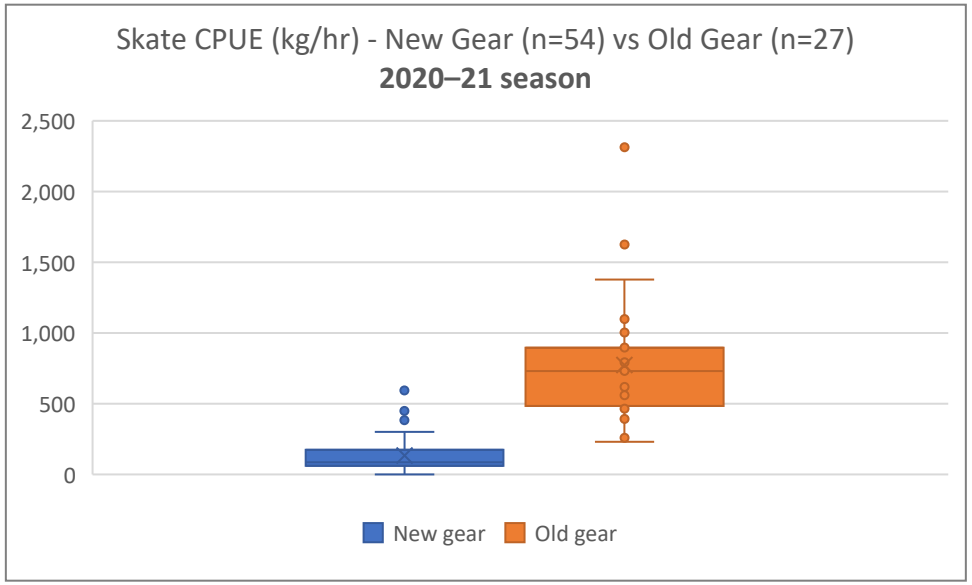
March-April 2021	Old gear (n=27)	New gear (n=5)
Mean Icefish CPUE	9,295 kg/hr	12,491 kg/hr
Mean Skate bycatch CPUE	754 kg/hr	223 kg/hr
Mean Toothfish bycatch CPUE	338 kg/hr	167 kg/hr

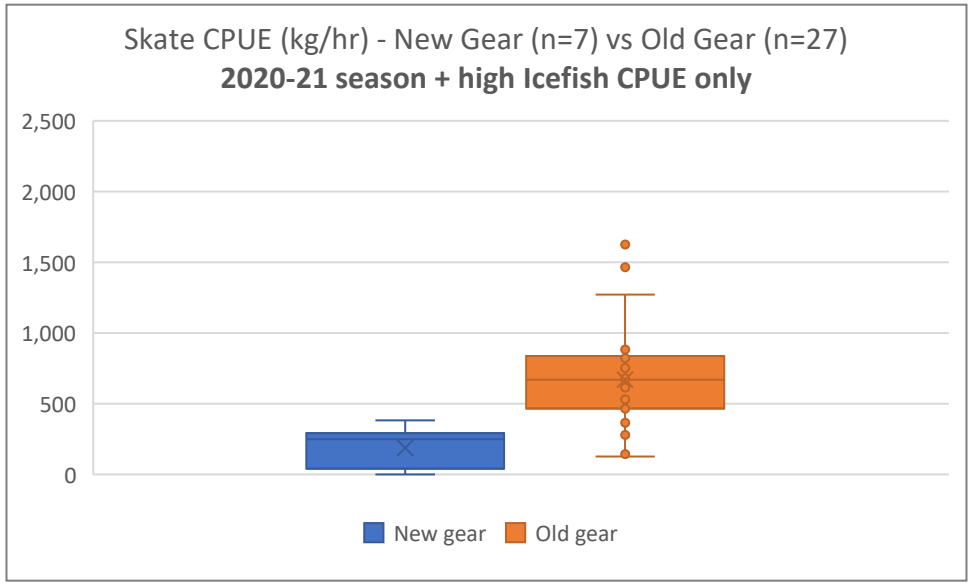
2020–21 Season (Dec-Apr)	Old gear (n=27)	New gear (n=54)
Mean Icefish CPUE	9,295 kg/hr	1,223 kg/hr
Mean Skate bycatch CPUE	754 kg/hr	118 kg/hr
Mean Toothfish bycatch CPUE	338 kg/hr	62 kg/hr

High Icefish CPUE tows (>1301 kg/hr)	Old gear (n=27)	New gear (n=7)
Mean Icefish CPUE	9,295 kg/hr	11,359 kg/hr
Mean Skate bycatch CPUE	754 kg/hr	204 kg/hr
Mean Toothfish bycatch CPUE	338 kg/hr	151 kg/hr

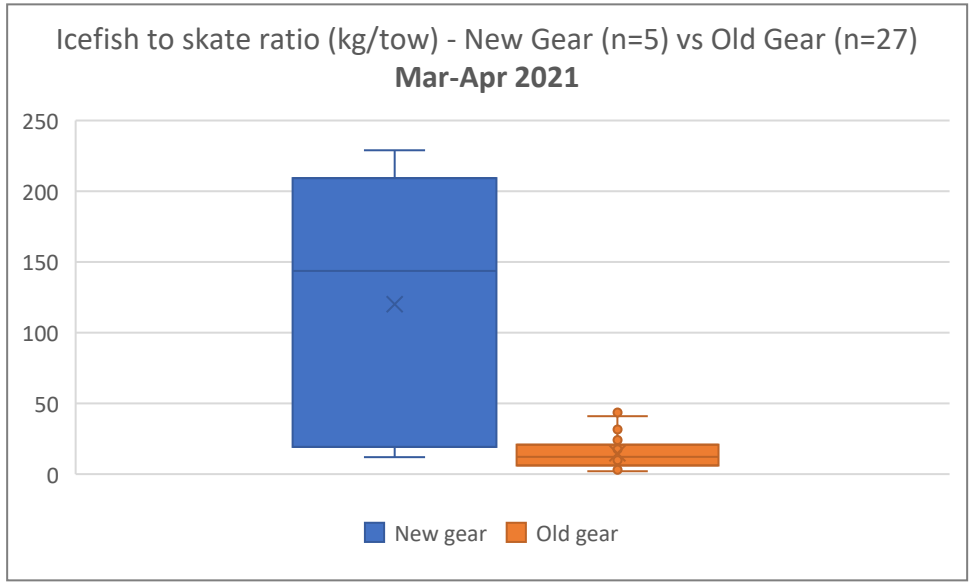
When only considering current season:

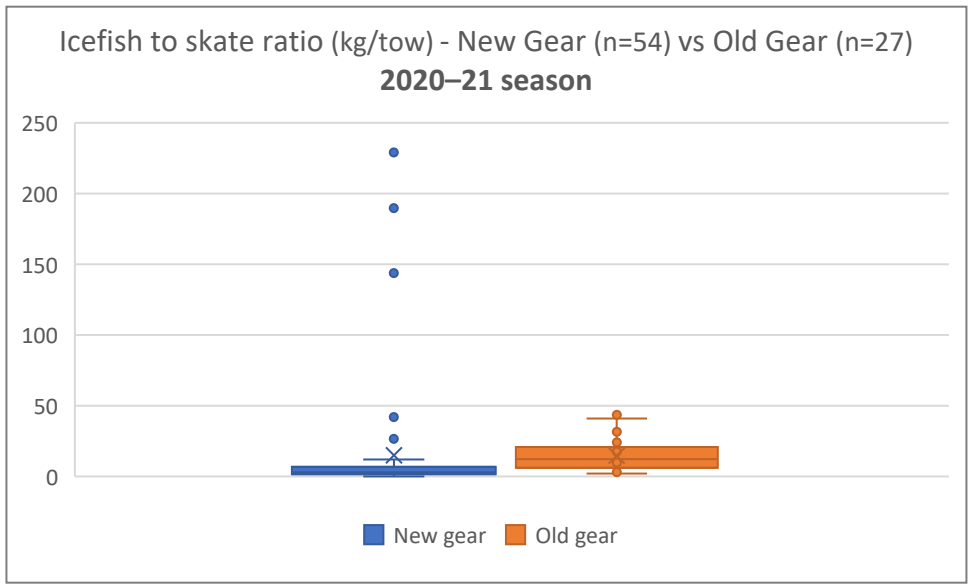


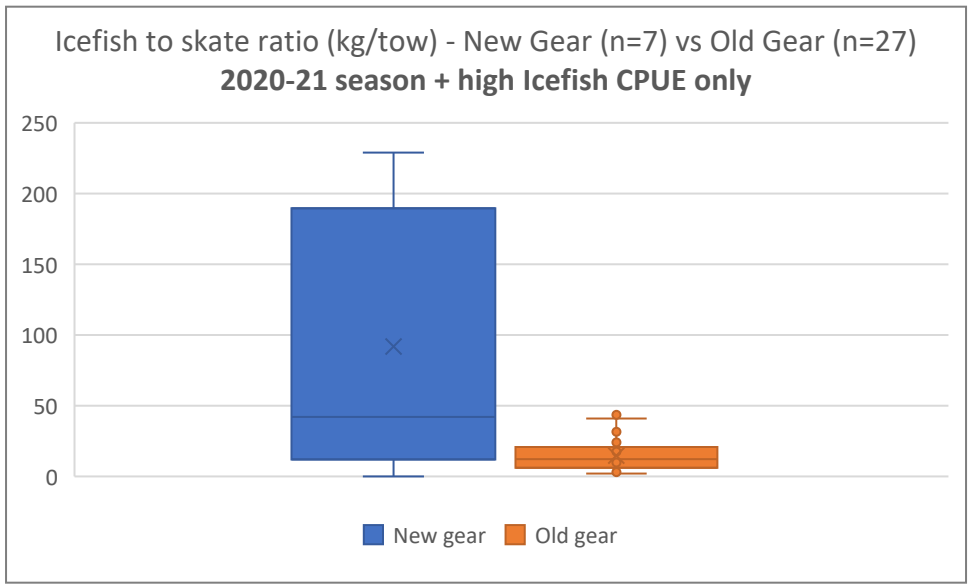




When only considering current season:







When considering all years 2016/17 to 2020/21:

(2023 January only). This shows that when Icefish fishing was generally not great at the start of this trip, Skate bycatch was very low

High Icefish CPUE tows (>1301 kg/hr)	New gear (n=7)	2023 new gear matching months (n 5)	Old gear matching months (n=78)	Old gear all months (n=181)
Mean Icefish CPUE	11,359 kg/hr	2607 kg/hr	4,141 kg/hr	4,549 kg/hr
Mean Skate bycatch CPUE	204 kg/hr	14 kg/hr	144 kg/hr	146 kg/hr

Medium Icefish CPUE tows (751-1300 kg/hr)	New gear (n=7)	2023 new gear matching months (n 1)	Old gear matching months (n=37)	Old gear all months (n=75)
Mean Icefish CPUE	1,031 kg/hr	1263 kg/hr	969 kg/hr	978 kg/hr
Mean Skate bycatch CPUE	192 kg/hr	24 kg/hr	59 kg/hr	69 kg/hr

Low Icefish CPUE tows (301-750 kg/hr)	New gear (n=19)	2023 new gear matching months (n 13)	Old gear matching months (n=130)	Old gear all months (n=170)
Mean Icefish CPUE	465 kg/hr	470 kg/hr	455 kg/hr	466 kg/hr
Mean Skate bycatch CPUE	121 kg/hr	10 kg/hr	76 kg/hr	77 kg/hr

Poor Icefish CPUE tows (<301 kg/hr)	New gear (n=21)	2023 new gear matching months (n 15)	Old gear matching months (n=198)	Old gear all months (n=209)
Mean Icefish CPUE	122 kg/hr	83 kg/hr	146 kg/hr	149 kg/hr
Mean Skate bycatch CPUE	81 kg/hr	4 kg/hr	55 kg/hr	57 kg/hr

*Matching months means only the tows that took place in the same months were used for that analysis, to take into account any potential seasonal effect. For example, if the new gear tows took place in Dec, Jan and March, then the matching month tows are only looking at tows from Dec, Jan and March from previous years.

Australian Government
Australian Fisheries Management Authority

Attachment I

Sub-Antarctic Resource Assessment Group (SARAG)

Meeting 71 28-29 August 2024

Agenda item 12 Live release of small toothfish

Purpose: FOR ADVICE

SARAG to provide advice on the scientific implications of releasing small fish with high chance of survival.

Recommendation

That SARAG **DISCUSS** and **PROVIDE ADVICE** on:

1. any scientific implications of releasing the small fish with a high chance of survival including appropriate sampling and accounting for the catch in the stock assessment; and

2. any further work needed to understand the potential implications and potential protocols needed to manage and/or account for the practice.

Key issues

3. SARAG will recall that at SARAG 70 AFMA reported that industry had sought clarification from AFMA and AAD on whether it would be permissible to release small live Patagonian toothfish. Industry advises that these small toothfish (less than 1 kilogram) have little commercial value and that approximately 1000 kilograms of small toothfish may be caught each trip. AFMA further advised that having reviewed CCAMLR obligations, AFMA is of the view that live releases of toothfish with a high expectation of survival would be permissible under CCAMLR rules and not count towards the CCAMLR agreed TAC.

4. As advised at SARAG 70, it is AFMA's intention, subject to resourcing, to consider this matter in more detail. As a starting point and as noted by SARAG 70, AFMA is seeking initial advice from SARAG at this meeting on any scientific implications of releasing the small fish including appropriate sampling and accounting for the catch in the stock assessment. SARAG is also being asked to advised on any further work needed to understand the potential implications and potential protocols needed to manage and/or account for the practice.

5. Following this meeting, it is more than likely that the matter will be deferred to 2025 to allow for management resources to focus now on fishery assessments, CCAMLR and TAC determinations.