17th MEETING OF THE TORRES STRAIT FINFISH FISHERY RESOURCE ASSESSMENT GROUP

15 OCTOBER 2024

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17th MEETING OF THE PZJA TORRES STRAIT
FINFISH FISHERY RESOURCE ASSESSMENT GROUP

Tuesday 15th October 2024
8:30am – 5:00pm

Novotel Oasis Hotel - Cairns

DRAFT AGENDA

1 PRELIMINARIES

1.1 Acknowledgement of Traditional Owners, Welcome and Apologies

The Chair will welcome members and observers to the meeting.

1.2 Adoption of Agenda

The FFRAG will be invited to adopt the draft agenda.

1.3 Declaration of Interests

Members and observers will be invited to declare any real or potential conflicts of interest and determine whether a member may or may not be present during discussion of or decisions made on the matter which is the subject of the conflict.

1.4 Action Items from Previous Meetings

The FFRAG will be invited to note the status of action items arising from previous meetings.

1.5 Out-of-Session Correspondence

The FFRAG will be invited to note out of session correspondence on FFWG matters since the previous meeting.

2 UPDATES FROM MEMBERS

2.1 Industry & Scientific Members

Industry and scientific members will be invited to provide a verbal update on matters concerning the Torres Strait Finfish Fishery, in particular, providing comment on fishing patterns, behaviours, prices, and market trends this season.

2.2 Government Agencies

The FFRAG will be invited to note updates from AFMA, TSRA and QDAF on matters concerning the Torres Strait Finfish Fishery.

2.3 PNG National Fisheries Authority

The FFRAG will be invited to note a verbal update from the PNG National Fisheries Authority if a representative is in attendance.

2.4 Native Title

DRAFT

The FFRAG will be invited to note a verbal update from Malu Lamar (Torres Strait Islander) Corporation RNTBC if a representative is in attendance.

2.5 Climate and Ecosystem Update

The FFRAG is invited to note an update on climate and ecosystem changes and discuss their impacts on Torres Strait finfish fisheries.

The FFRAG will also be invited to note a presentation from Dr Laura Blamey regarding current research investigating climate change modelling and impacts in the Torres Strait.

3 RECCOMENDED BIOLOGICAL CATCH ADVICE (RBC)

3.1 Spanish Mackerel

Having regard for new catch data, and previous assessments, the FFRAG will be invited to provide advice on an RBC for Spanish mackerel for the 2025-26 fishing season.

3.2 Coral Trout

Having regard for new catch data, and previous assessments, the FFRAG will be invited to provide advice on an RBC for coral trout for the 2025-26 fishing season.

4 MANAGEMENT

4.1 Observer Coverage Update and Planning

The FFRAG will be invited to review the draft fisheries observer program plan for the 2024-25 season.

5 RESEARCH

5.1 Biological Sampling Project

The FFRAG will be invited to note an update from the QDAF project team on the current project *Torres Strait Finfish Fishery Coral Trout and Biological Sampling.*

6 RAG PRIOITIES / DATE AND VENUE FOR NEXT MEETING

The FFRAG will consider their priorities, and discuss arrangements for following FFRAG meetings and be advised of upcoming meetings of the FFWG (16 October 2024) and the PZJA meeting to decide next season's sustainable catch limits (January 2025).

7 OTHER BUSINESS

FFRAG members will be invited to discuss other business for consideration.

The Chair must approve the attendance of all observers at the meeting. Individuals wishing to join the meeting as an observer must contact the Executive Officer – Chris Boon (chris.boon@afma.gov.au)

DRAFT

Torres Strait Finfish Resource Assessment Group	15 October 2024
PRELIMINARIES **Welcome and Apologies**	**Agenda Item 1.1** **For Noting**

RECOMMENDATIONS

1. That the Resource Assessment Group **NOTE**:
    a) an acknowledgement of Traditional Owners;
    b) the Chair's welcome address;
    c) apologies received from members unable to attend.

2. As of 1 October 2024, one formal apology from Terrence Whap was received.

Torres Strait Finfish Fishery Resource Assessment Group	15 October 2024
PRELIMINARIES **Adoption of Agenda**	**Agenda Item 1.2** **For Decision**

RECOMMENDATION

1. That the Resource Assessment Group consider and **ADOPT** the draft agenda.

BACKGROUND

2. A first draft annotated agenda was circulated to members and observers on 17 September 2024. As of 1 October 2024, no comments were received on the draft agenda.
3. An update on the biological sampling project was added to the agenda by the EO (Agenda item 5.1).

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
PRELIMINARIES Declarations of Interest	Agenda Item 1.3 For DECISION

RECOMMENDATIONS

1. That the Resource Assessment Group members:

   a) **DECLARE** all real or potential conflicts of interest in Torres Strait finfish fisheries at the commencement of the meeting (**Table 1**).

   b) **DETERMINE** whether the member may or may not be present during discussion of or decisions made on the matter which is the subject of the conflict;

   c) **ABIDE** by decisions of the Resource Assessment Group regarding the management of conflicts of interest.

   d) **NOTE** that the record of the meeting must record the fact of any disclosure, and the determination of the Resource Assessment Group as to whether the member may or may not be present during discussion of or decisions made on the matter which is the subject of the conflict.

BACKGROUND

2. Consistent with *Protected Zone Joint Authority (PZJA) Fisheries Management Paper No. 1* (FMP1), which guides the operation and administration of PZJA consultative forums, members are asked to declare any real or potential conflicts of interest.

3. Resource Assessment Group members are asked to declare all real or potential conflicts of interest or update the standing list of declared interests (**Table 1)** if required.

4. FMP1 recognises that members are appointed to provide input based on their knowledge and expertise and as a consequence, may face potential or direct conflicts of interest. Where a member has a material personal interest in a matter being considered, including a direct or indirect financial or economic interest; the interest could conflict with the proper performance of the member's duties. Of greater concern is the specific conflict created where a member is in a position to derive direct benefit from a recommendation if it is implemented.

5. When a member recognises that a real or potential conflict of interest exists, the conflict must be disclosed as soon as possible. Where this relates to an issue on the agenda of a meeting this can normally wait until that meeting, but where the conflict relates to decisions already made, members must be informed immediately. Conflicts of interest should be dealt with at the start of each meeting. If members become aware of a potential conflict of interest during the meeting, they must immediately disclose the conflict of interest.

6. Where it is determined that a direct conflict of interest exists, the forum may allow the member to continue to participate in the discussions relating to the matter but not in any decision-making process. They may also determine that, having made their contribution to the discussions, the member should retire from the meeting for the remainder of discussions on that issue. Declarations

of interest, and subsequent decisions by the forum, must be recorded accurately in the meeting minutes.

Table 1. FFRAG member and observer declarations of interest to be updated at the meeting. Interests declared by those persons at FFRAG 15 meeting are shown.

Name	Position	Declaration of interest
Members		
David Brewer	Chair	• Director – Upwelling P/L (David Brewer Consulting). • Honorary Fellow - CSIRO • Chair - Torres Strait Finfish RAG • Scientific member – Torres Strait Finfish Working Group • Scientific member – Northern Prawn Fishery RAG • Current consultancies with Quandamooka Yoolooburrabee Aboriginal Corporation, Newcrest Mining Ltd. • Ex co-investigator on the completed Torres Strait 'Non-commercial catch' project. • As a fisheries consultant, may apply for funds for Torres Strait fishery research projects in the future where consistent with his role as Chair.
Rocky Stephen	TIB industry member	• Councillor for Ugar. • Chairperson of Kos and Abob Fisheries Ugar. • Works with brother in a commercial fishing business on Ugar (Brother Bear Fisheries). • Eastern cluster representative on the PZJA Finfish RAG & Working Group. • Traditional Inhabitant member - Torres Strait Scientific Advisory Committee. • TSRA Board member for Ugar • TSRA Finfish Quota Management Committee. • TSRA Board Fisheries Advisory Committee member. • Member of Zenadth Kes Fisheries company.
Gavin Mosby	TIB industry member	• Yorke Island Central Island representative • Member to Finfish Working Group, Prawn MAC
Harry Nona	TIB industry member	• TIB licence holder – fulltime cray fishermen • Member for Kaiwalagal
Terrence Whap	TIB industry member	• President of the local fisherman's association in Maluialgal • PBC Director • TSRA Board Member and Ranger
Benny Dau	TIB industry member	• TIB Licence holder • Member of Zenadth Kes Fisheries company.
Michael O'Neill	Scientific member	• Principal fisheries scientist working with the Queensland Government (Department of Agriculture and Fisheries, Fisheries Queensland) in

Name	Position	Declaration of interest
		the stock assessment program. • Principal scientist for TSSAC three-year project for Spanish mackerel stock assessment work. • Member of PZJA Finfish RAG and Working Group. • Working on and supporting work on coral trout CPUE standardisation presented at previous meetings
Ashley Williams	Scientific member	• CSIRO Scientist • Scientific member of Tropical Tuna RAG and MAC • Project leader for Torres Strait Spanish mackerel Close-kin mark-recapture (CKMR) design project
Andrew Penny	Scientific member	• Researcher and management scientist. • Is a consultant (Pisces Australia) with a general interest in tropical fisheries. • Serves on six AFMA/PZJA advisory groups. • Conducted research previously with the Torres Strait Prawn fishery and Tropical Rock Lobster fishery. No current Torres Strait projects. • Researcher on current projects involving climate change/stock assessments.
Steven Harris	AFMA Member	• TBC
Chris Boon	Executive Officer	• Employed by AFMA • No pecuniary interests or otherwise
Adam White	Torres Strait Regional Authority (TSRA) Member	• Employed by TSRA – Project Manager (Fisheries)
Chad Lunow	QDAF Member	• Fishery manager for Queensland East coast for Spanish Mackerel, Reef line, Rocky reef and charter fishing. Avid spear fisher and recreational fisher and have no pecuniary interests in either the Queensland fisheries or the Torres Strait.
Permanent Observers		
Egon Stewart	Industry Observer	• Sunset sector operator who participates in both the TS Spanish mackerel and Reef Line fisheries.
Casual Observers		
Yen Loban	TSRA observer	• TSRA member for Ngurapai and Muralag • Holds TSRA portfolio for fisheries • TIB licence • Traditional Owner • Zenadth Kes Fishing Company
Trevor Hutton	CSIRO	• Sits on Finfish Working Group as permanent observer • Interest in finfish projects

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
PRELIMINARIES Actions Arising from Previous Meetings	Agenda Item 1.4 For NOTING

RECOMMENDATIONS

1. That RAG **NOTE**:

    a) the progress of actions arising from previous FFRAG meetings.

KEY ISSUES

Actions arising

2. Progress against the actions arising from previous FFRAG meetings are detailed in **Table 1**.

Table 1: Status of previous outstanding FFRAG action items as of August 2023.

Number	Action	Status update
FFRAG 16, Action 1	Pursue sampling kit for communities to contribute biological samples to the current research project.	**Ongoing –** AFMA to liaise with project team to organise sampling kits for next field trip to communities.
FFRAG 14, Action 1	When discussing Spanish mackerel stock assessment development, the RAG reconfirmed previous agreements that standardising catch-rate data by skipper rather than vessel name is more appropriate, however this is challenging to progress given the capacity required to resolve issues in the skipper name dataset.	**Ongoing –** AFMA to consider how to achieve this action item. Identified as a potential AFMA graduate project.
FFRAG 14, Action 3	The RAG noted feedback from TIB members that the current grid zones outlined in the TDB02 Catch Disposal Record are too small, which may concern fishers in providing this level of information. AFMA to review option to apply grid zones in future TIB daily fishing logbook to make them consistent with grid zones applied to sunset sector logbook data. Consultation will need to be conducted.	**Ongoing –** To be considered within the broader development of daily logbook reporting for the TIB sector across TS fisheries.
FFRAG 13, Action 1	RAG recommended for AFMA and the stock assessment project team to produce a one-page summary document for future assessments, commencing in 2023.	**Actioned –** Submitted to AFMA during the 2023 stock assessment project.
FFRAG 13, Action 2	The RAG recommended to produce a 'weight of evidence' document and progress a deep-dive review of 2019 assessment to support the assessment of the coral	**Actioned/Ongoing –** Scientific sub-group workshop with invited experts scheduled for 28

	trout stock. A workshop day (attached to a RAG) with the author is required.	November 2023. Outcomes to be considered by the RAG at FFRAG15. Outcomes of the workshop and RAG meeting are summarised in the FFRAG15 record.
FFRAG 12, Action 1	It was suggested by TIB members to also review the 'Catch Disposal Record' (CDR) TDB02 form to investigate whether it could be developed into an 'all in one' catch/effort reporting form, in place of a daily logbook for the TIB sector. It was suggested that effort data should be mandatory for the TIB sector, as it has been noted that the volunteer 'part b' section of the CDR form was not fully utilised in the most recent season. If the CDR form were to be amended to include the collection of robust effort data, then this would be an efficient mandatory reporting system for the TIB sector. AFMA agreed to investigate this consideration as an action item, including consulting with communities.	**Ongoing –** To be considered throughout AFMA's ongoing licencing/reporting development process and community consultation rounds.
FFRAG 8, Action 1	AFMA to complete project work with industry members in 2021 with a view to implementing a new logbook for the 2021-22 season.	**Actioned –** Updates to the previous TSF01 logbook were guided by FFRAG advice and formalised with the production of a new logbook titled 'TSF02 Daily Fishing Logbook'. At the time of writing, the Logbook Instrument, which gives effect to the TSF02 logbook and this condition, is awaiting approval from the PZJA.
FFRAG 5, Action 5	FFRAG are to work on forming a matrix of scenarios (different target reference points and building rates) to support RBC setting and deciding control rules for the harvest strategy. Matrix is to compare RBC, time to reach B Target and risk to stock (being number of model runs dropping below the limit reference point.	**Ongoing –** The RAG agreed to retain this action item, noting that further refinements to this process are to be actioned at the harvest strategy workshop scheduled for March 2025.

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
PRELIMINARIES Out of Session Correspondence	Agenda Item 1.5 For NOTING

RECOMMENDATIONS

1. That the RAG **NOTE** the correspondence sent out-of-session since FFRAG 15 meeting.

BACKGROUND

2. The following correspondence was circulated out-of-session since FFRAG 15 meeting. Copies of this correspondence can be requested at any time from the FFRAG Executive Officer.

Date	Subject
14/03/2024	Seeking availabilities - FFRAG 16, June 2024
08/05/2024	Seeking availabilities - FFRAG16- 19th June 2024
10/05/2024	FFRAG16 - 19th June 2024 – Teams invite
10/05/2024	Updated TSF01 logbook, and minutes from the last meeting
10/06/2024	FFRAG 16 Papers
19/06/2024	FFRAG 15 Record
08/08/2024	For OOS Clearance: Updated 5-Year rolling research plan.
30/08/2024	Availabilities for 2024 FFRAG/FFWG meetings
16/09/2024	RE: Availabilities for 2024 FFRAG/FFWG meetings.
17/09/2024	RE: Availabilities for 2024 FFRAG/FFWG meetings – plus draft agenda
19/09/2024	FFRAG 17 (RBC meeting) – Teams invite

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
UPDATES FROM MEMEBRS Industry and Scientific members	Agenda Item 2.1 For NOTING and DISCUSSION

RECOMMENDATIONS

1. That the RAG**:**
    a) **NOTE** any updates provided by industry and scientific members;
    b) **DISCUSS** strategic issues, including economic trends, affecting the management and development of Torres Strait fisheries.

Key Issues

2. Verbal reports will be provided by industry and scientific members under this item. The FFRAG Chairperson may also welcome a short report from any invited participants from industry at this agenda item.
3. It is important that the Finfish RAG (and also the Finfish Working Group (FFWG)) develop a common understanding of any relevant matters within adjacent jurisdictions and what issues if any, are having the greatest impact on industry and the management of fisheries. Such understanding will ensure proceedings of the FFRAG and FFWG are focused and may more effectively address each issue.
4. FFRAG members are asked to provide any updates on trends and opportunities in global markets, processing and value adding. Industry is also asked to contribute advice on economic and market trends where possible. Scientific members are asked to contribute advice on any broader strategic research projects or issues that may be of interest to the Torres Strait industry in future.

PZJA Torres Strait Finfish Fishery Resource Assessment Group	15 October 2024
RAG UPDATES **Government member updates**	**Agenda Item No. 2.2** **FOR NOTING**

RECOMMENDATIONS

1. That the Resource Assessment Group (RAG):
    a) **NOTE** the update provided by the Australian Fisheries Management Authority (AFMA) below;
    b) **NOTE** the Wildlife Trade Operation (WTO) conditions for the Torres Strait Finfish Fishery (TSFF) as summarised in **Table 3**;
    c) **NOTE** the verbal update provided by the Queensland Department of Agriculture and Fisheries (QDAF); and
    d) **NOTE** the verbal update provided by the Torres Strait Regional Authority (TSRA).

AFMA UPDATE

TAC, Leasing, Licencing, & Catch Data

2. At its out-of-session meeting on 29 May 2024 the Protected Zone Joint Authority (PZJA) decided that the Total Allowable Catches (TAC) for the Torres Strait Finfish Fishery 2024-25 season will be 77 tonnes for Spanish mackerel and 123 tonnes for coral trout. The PZJA decision was in line with advice from the RAG and Torres Strait Finfish Working Group (WG).

3. In line with advice from the TSRA Finfish Quota Management Committee (FQMC) and the TSRA Board, the following catch amounts were allocated to the Sunset sector (**Table 1**). These allocations were applied to Sunset licence conditions by AFMA as the PZJA licencing delegate.

Table 1: 2024-25 fishing season TACs and catch allowance by sector.

Species	Agreed TAC	Sunset Sector Catch Share	TIB Sector Catch Share
Spanish Mackerel	77	44	33
Coral Trout	123	15	108
Other reef line species	n/a	0	No Limit

4. As of 2 October 2024, the following number of licences were registered for the 2024-25 season:

Table 2: Number of licenses issued for the 2021-22, 2022-23, 2023-24 and 2024-25 Torres Strait Finfish Fishery seasons.

Fishing season	Number of TIB licences			Receiver licences	Number of active Sunset licences
	Spanish mackerel	Reef line	Dual endorsed		Spanish mackerel/Reef line combined
2021/22	56	22	166	83	3
2022/23	34	20	107	66	3
2023/24	31	33	41	69	3
2024/25	48	11	96	52	3

5. A Catch Watch Report for the 2023/24 season can be reviewed at **Attachment 2.2a**.

6. In accordance with AFMA's Information Disclosure Policy, catch amounts have not been provided for the 2024-25 season as the catch reported is from less than five boats. AFMA continues to closely monitor individual catches against quota holdings.

WTO approval under the EPBC Act

7. The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires the Australian Government to assess the environmental performance of all commercial fisheries, including those in the Torres Strait, and promote ecologically sustainable fisheries management. WTO approval under the EPBC Act is necessary for fisheries to be able to legally export commercially wild caught seafood from Australia. Such approvals may be subject to conditions applicable to the responsible management authority and fishers.

8. In June 2023, AFMA applied for WTO approval for the TSFF under the EPBC Act. The application was assessed, and the fishery was declared by the Delegate for the Minister of the Environment and Water, as an approved WTO under Part 13A of the EPBC Act until 1 November 2026. More information can be accessed at the following link: https://www.dcceew.gov.au/environment/marine/fisheries/commonwealth/torres-strait-finfish

9. Live coral trout were exported for the first time in 2017[1]. Maintaining a WTO approval for the fishery allows for the continued opportunity for live and frozen product to be exported, as well providing a sound basis for responsible fisheries management.

10. The WTO approval for the TSFF is subject to 7 conditions to ensure ecological risks continue to be managed.

11. AFMA invites both the RAG and WG to monitor progress against each condition and provide advice on addressing conditions. To assist the RAG and WG, **Table 3** provides a summary of progress made for each condition.

Table 3. Progress made against current Wildlife Trade Operation (WTO) conditions for the Finfish fishery as of September 2024.

WTO Conditions for the Finfish Fishery	Progress as of September 2024
Condition 1: Operation of the Torres Strait Finfish Fishery must be carried out in accordance with *Torres Strait Finfish Fishery Management Plan 2013* in force under the *Torres Strait Fisheries Act 1984* and the Torres Strait Fisheries Regulations 1985	**On track:** The TSFF continues to be managed in accordance with management arrangements in force under the *Torres Strait Fisheries Act 1984.*
Condition 2: The Australian Fisheries Management Authority must inform the Department of Climate Change, Energy, the Environment and Water of any intended material changes to the Torres Strait Finfish Fishery management arrangements that may affect the assessment against which *Environment Protection and Biodiversity Conservation Act 1999* (Cth) decisions are made.	**On track:** AFMA, on behalf of the PZJA, has provided an update on material changes to management arrangements in the 2024 Annual Report submitted in September 2024. Correspondence between AFMA and DCCEEW has been ongoing throughout the period of the current WTO approval.

[1] Fishery Status Reports 2021, Chapter 16 – ABARES

WTO Conditions for the Finfish Fishery	Progress as of September 2024
Condition 3: The Australian Fisheries Management Authority must inform the Department of Climate Change, Energy, the Environment and Water of any intended changes to fisheries legislation that may affect the legislative instruments relevant to this approval.	**On track:** AFMA, on behalf of the PZJA, has provided an update on material changes to legislation in the 2024 Annual Report submitted in September 2024. Correspondence between AFMA and DCCEEW has been ongoing throughout the period of the current WTO approval.
Condition 4: The Australian Fisheries Management Authority must produce and present reports on the Torres Strait Finfish Fishery to the Department of Climate Change, Energy, the Environment and Water by September annually, as per Appendix B of the *Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition.*	**On track:** AFMA, on behalf of the PZJA, provided the first annual report under the current WTO approval in September 2024.
Condition 5: a) By 30 June 2024, the Australian Fisheries Management Authority must implement mandatory bycatch reporting for the sunset sector of the Torres Strait Finfish Fishery. This must include the mandatory reporting of all non-retained species, undersized target or byproduct species, and any shark depredation incidents. b) By 30 June 2026, the Australian Fisheries Management Authority must review reporting measures in the Torres Strait Finfish Fishery to ensure the accuracy of bycatch, discard and protected species interaction data. This review must incorporate evidence taken from independent data validation methods. A final report detailing the review's findings and any management responses must be provided to the Department of Climate Change, Energy, the Environment and Water by this date.	**a) Completed:** AFMA, as the licensing delegate, imposed a condition on sunset sector licences, for the 2024-25 fishing season, which requires the mandatory reporting of all non-retained species, undersized target or byproduct species, and any shark depredation incidents. The Logbook Instrument is currently awaiting approval by the PZJA, which will give full effect to this condition. **b) On Track:** AFMA has developed a fisheries observer program for the TSFF for the 2024-25 fishing season. Updates on data collection will be provided as they become available.
Condition 6: By 30 June 2026, the Australian Fisheries Management Authority must implement species-specific coral trout reporting in the Torres Strait Finfish Fishery and ensure this data is considered in any future stock assessments and the determination of total allowable catches in the fishery.	**On Track:** AFMA, in collaboration with the PZJA advisory groups, have made key amendments to the TSF02 daily fishing logbook, which includes species-specific coral trout reporting. At the time of writing, the Logbook Instrument, which gives effect to the TSF02 logbook and this condition, is awaiting approval from the PZJA. Further amendments to management arrangements are required to mandate species-specific coral trout reporting for the TIB sector.

WTO Conditions for the Finfish Fishery	Progress as of September 2024
Part 13 Conditions	
Condition A: By 30 June 2026, the Australian Fisheries Management Authority must review reporting measures in the Torres Strait Finfish Fishery to ensure the accuracy of bycatch, discard and protected species interaction data. This review must incorporate evidence taken from independent data validation methods. A final report detailing the review's findings and any management responses must be provided to the Department of Climate Change, Energy, the Environment and Water by this date.	**On Track:** AFMA has developed a fisheries observer program for the TSFF for the 2024-25 fishing season. Updates on data collection will be provided as they become available.

ABARES Fishery Status Reports

12. Each year, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) compiles fishery status reports which provide an independent assessment of the biological status of fish stocks and the economic status of fisheries managed, or jointly managed, by the Australian Government (Commonwealth fisheries). The most recent ABARES Fishery Status Report was released in 2023 and summarises the performance of the finfish fishery in 2021 and 2022, against the requirements of fisheries legislation and policy.
13. The 2024 ABARES Fishery Status Report is scheduled for publication in Q4 2024, and updates will be sent to the RAG out-of-session as they become available.
14. In the 2023 report, both Spanish mackerel and coral trout are classified as not being overfished, and not subject to overfishing. The status of the Torres Strait Finfish and Fishery is summarised in table four on the following page.

Table 4. Extract from Chapter 15 of the 2023 Torres Strait Finfish Fishery ABARES Fishery Status Report.

Biological status					
	2021		2022		
Stock	Fishing mortality	Biomass	Fishing mortality	Biomass	Comments
Coral trout (*Plectropomus* spp.)					Recent catches are below levels that are likely to drive biomass below B_{LIM}.
Spanish mackerel (*Scomberomorus commerson*)					Current catch is below recommended biological catch. Most recent estimate of biomass is above $0.2B_0$.
Economic status					
The key objectives of the fishery are based on socio-economic outcomes. Catch has been relatively stable in the last decade and leasing revenue for the Traditional Inhabitant Boat Sector has increased recently.					

Notes: $0.2B_0$ 20% of unfished biomass. B_{LIM} Biomass limit reference point.

Fishing mortality	Not subject to overfishing	Subject to overfishing	Uncertain
Biomass	Not overfished	Overfished	Uncertain

15. ABARES fishery status reports can be accessed on the ABARES website at: https://www.agriculture.gov.au/abares/research-topics/fisheries/fishery-status

TSRA UPDATE

16. The RAG will be invited to note a verbal update from TSRA.

QDAF UPDATE

17. The RAG will be invited to note a verbal update from QDAF.

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
UPDATES FROM MEMBERS Papua New Guinea National Fisheries Authority	Agenda Item 2.3 For NOTING

RECOMMENDATIONS

1. That the RAG **NOTE** the update to be provided by the PNG National Fisheries Authority (NFA).

BACKGROUND

2. A verbal report will be provided under this item.

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
UPDATES FROM MEMBERS **Native Title**	**Agenda Item 2.4** **For NOTING**

RECOMMENDATIONS

1. That the RAG **NOTE** any updates on Native Title matters from members, including representatives of Malu Lamar (Torres Strait Islanders) Corporation RNTBC (Malu Lamar).

BACKGROUND

2. On 7 August 2013 the High Court of Australia confirmed coexisting Native Title rights, including commercial fishing, in the claimed area (covering most of the Torres Strait Protected Zone). This decision gives judicial authority for Traditional Owners to access and take the resources of the sea for all purposes. Native Title rights in relation to commercial fishing must be exercisable in accordance with the *Torres Strait Fisheries Act 1984*.
3. Traditional Owners and Native Title representative bodies have an important role in managing Torres Strait fisheries. It is important therefore that the RAG keep informed on any relevant Native Title issues arising.

PZJA Torres Strait Finfish Fishery Resource Assessment Group	15 October 2024
UPDATES FROM MEMBERS **Climate and Ecosystem Update**	**Agenda Item 2.5** **For Noting**

RECOMMENDATIONS

1. That the Finfish Fishery Resource Assessment Group (FFRAG):
    a. **NOTE** work being undertaken to incorporate climate change information into fisheries management advice and decisions in other Commonwealth managed fisheries, with a view to implementing a similar process for Torres Strait fisheries;
    b. **DISCUSS** the Climate and Ecosystem Status report for the Torres Strait Finfish fishery (**Attachment 2.5a**);
    c. **NOTE** an overview of recent work undertaken in Torres Strait fisheries related to climate change.

KEY ISSUES

AFMA Climate Adaptation Program

2. AFMA has commenced a program of work to ensure that climate impacts are more strategically incorporated into the decision-making processes for AFMA-managed fisheries. As a foundational element of the Climate Adaptation Program, a suite of actions are being pursued to build explicit and structured consideration of climate change impacts into decision-making processes. These initiatives are at different stages of development and implementation, as detailed below, and are intended to be extended to the management of Torres Strait fisheries through the PZJA's advisory committees.

Climate Adaptation Handbook

3. In 2021, AFMA and the CSIRO teamed up to develop the Adaptation of Fisheries Management to Climate Change Handbook (FRDC project 2016-059) (the Handbook). The Handbook is designed to help fisheries managers and operators identify effective responses to climate change by working through an evidence-based process. AFMA is using the Handbook to develop and implement operational and management adaptation options in close consultation with the fishing industry and other fishery stakeholders.

4. Initial workshops have been held with fisheries that operate in south-east Australia and the sub-Antarctic region and workshop reports are available on the AFMA website[1]. While this project was developed for Commonwealth fisheries, the process described in the handbook can be equally applied to fisheries managed by all jurisdictions.

5. Recognising the priority that the Torres Strait communities place upon management of climate change impacts and the vulnerability of Torres Strait fisheries to climate change, AFMA intends to hold workshops with Torres Strait fisheries. Subject to resource constraints, AFMA will work through the PZJA to identify priority fisheries and timelines.

Climate Risk Framework

6. At its November 2023 meeting, the AFMA Commission approved a proposal to proceed with a trial implementation of AFMA's draft Climate Risk Framework (CRF). The initial draft CRF was

[1] https://www.afma.gov.au/climate-change

developed throughout 2023 in consultation with key stakeholders as an approach to integrate climate risks into formal decision-making processes at AFMA.

7. AFMA established a Working Group to support the trial implementation of the CRF and provide strategic advice to the AFMA Commission and AFMA Management on the development, coordination and implementation of the CRF across Commonwealth fisheries. The Working Group membership includes Dr Beth Fulton, Dr Alistair Hobday, Dr David Smith and Dr Keith Sainsbury, with administrative support from AFMA's Climate Adaptation team.
8. The Working Group convened throughout early 2024 to evaluate species assessments using the CRF and seek input from fisheries managers and assessment scientists. The CRF (**Attachment 2.5b**) has been revised based on Working Group feedback, and the AFMA Commission has endorsed continued trials. The Working Group has recommenced trials and will liaise with relevant industry, scientists and fishery managers.
9. The application of the CRF to Torres Strait Tropical Rock Lobster is planned for December 2024 and AFMA will provide updates as this progresses.
10. AFMA will maintain flexibility in the consultation timeline to ensure stakeholders have the opportunity to properly consider the CRF, it's utility, benefits and potential implications. Initial application of the CRF will be for trial purposes only. AFMA does not intend to implement any of the recommendations resulting from the trial (at the fishery level) until the framework is fully developed and implemented across fisheries.

Climate and Ecosystem Status Reports

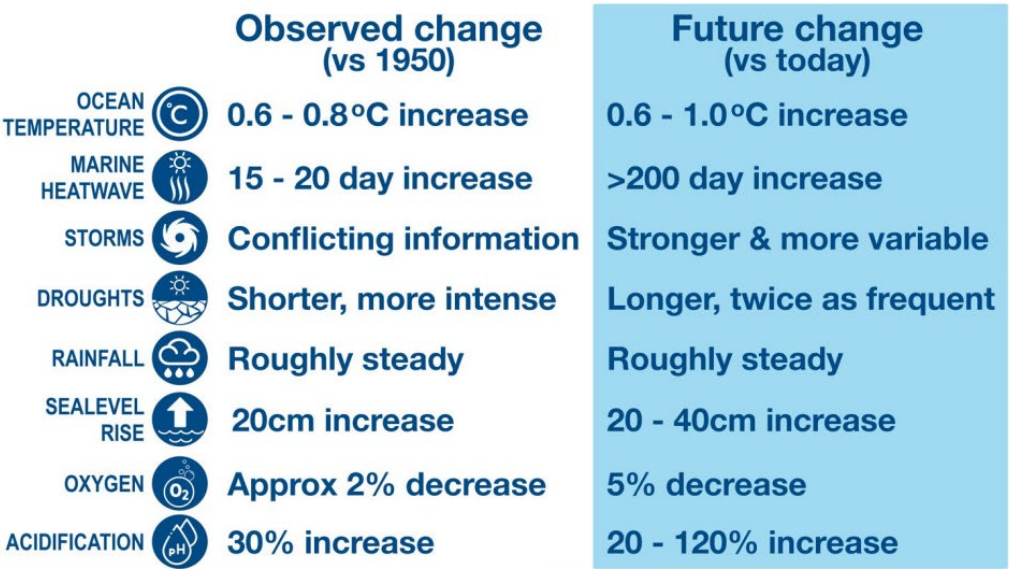
11. To inform management decision-making processes, including advisory body discussions, annual Climate and Ecosystem Status Reports are being developed for key Commonwealth fisheries. These reports are intended to provide a short, accessible update on key indicators of climatic or ecosystem status and trends relevant to the fishery, utilising readily available information.
12. Noting the interest in climate impacts on Torres Strait fisheries, and the body of work to better understand the effect of climate change on these fisheries, AFMA has prepared a Climate and Ecosystem Status Report for consideration by the FFRAG (see **Attachment 2.5a**). This report utilises currently available information, noting that limited climate and ecosystem/oceanographic observations are available in the Torres Strait.
13. The intent is that this report will be refined over time based on FFRAG, Finfish Fishery Working Group (FFWG) and expert feedback. Feedback in particular is encouraged on the following:
    a. What key indicators would the FFRAG like included in the report?
14. Consideration of climate and ecosystem impacts in the context of fisheries management is complementary to a range of other work being undertaken by researchers to understand and model climate impacts on Torres Strait and related fisheries in northern Australia (see further information below).

Investigating the future impacts of climate change on Torres Strait fisheries

15. Funded by the Torres Strait Regional Authority (TSRA) and CSIRO, the new project *'Modelling climate change impacts on key fisheries in the Torres Strait to co-develop adaptation and mitigation strategies'* will provide vital information into the impacts of climate change on key fisheries in the Torres Strait. The project commenced in November 2023, and updates will be provided to the FFRAG as the project progresses.

Climate related changes expected in Northern Australia

16. FRDC project 2016-059 produced a series of regional projections of climate impacts for Australian fisheries. While this did not include projections specific to the Torres Strait, the regional projection for northern Australia predicted climate-related changes as summarised in the table below.



(Excerpt from: Regional Projection for Northern Australia. FRDC 2016-059: Guidance on Adaptation of Commonwealth Fisheries management to climate change)

BACKGROUND

17. At its meeting on 19 July 2023, the PZJA agreed that a standing agenda item "Climate and ecosystem update" be introduced to all RAG and Working Group agendas where total allowable catch (TAC) and/or effort limits are to be considered. The PZJA also directed PZJA agencies, RAGs and Working Groups to further develop mechanisms to collate and incorporate Traditional Ecological Knowledge into fisheries monitoring and assessment.

Other relevant research to date on climate change impacts on Torres Strait Fisheries

18. In terms of assessing the likely impacts of climate change on Torres Strait Fisheries the following has been undertaken:

    a. Climate variability and change relevant to key fisheries resources in the Torres Strait – a scoping study[2]

        i. This project provides background information about Torres Strait and reviews previous projects and other relevant literature to identify environmental drivers that affect recruitment, growth, mortality rates, catches and relevant habitats of selected fisheries (tropical rock lobster (TRL), bêche-de-mer (BDM), finfish, prawns, turtles and dugongs), and potential effects of climate change on these environmental drivers. The review informed the second objective of the project, which was to provide a detailed technical specification of the over-arching data framework, and spatial scales for a future project scope that would address future climate variability and change scenarios for Torres Strait fisheries.

    b. Qualitative Sensitivity Analysis: Assessing the vulnerability of Torres Strait fisheries and supporting habitats to climate change[3];

[2] Dutra LXC, Plagányi E, Kenyon R, Hutton T, Murphy N, Blamey LK, Edgar S, Moeseneder S (2020) Scoping a future project to address impacts from climate variability and change on key Torres Strait Fisheries. CSIRO, Australia. 181 pp.
[3] Welch DJ and Johnson JE (2013) Assessing the vulnerability of Torres Strait fisheries and supporting habitats to climate change. Report to the Australian Fisheries Management Authority. C2O Fisheries, Australia 114 pp.

c. Management Strategy Evaluation to integrate climate changes into the TRL Stock Assessment: An Integrated Management Strategy Evaluation (MSE) for the Torres Strait Rock Lobster *Panulirus ornatus* fishery[4];

d. System Modelling: Models of Intermediate Complexity of Ecosystems (MICE) – applied to TRL in the Torres Strait. Used in the following projects:

   i. Environmental drivers of variability and climate projections for the Torres Strait tropical lobster *Panulirus ornatus*[5];

   ii. Decadal-Scale Forecasting of Australian Fish and Fisheries[6].

e. TRL stock assessment model sensitivity analyses when explicitly incorporating climate change influences on survival and growth – presented in TRLRAG meetings, milestone reports (Plagányi *et al*. 2020[7]) and published paper (Plagányi *et al*. 2019[8]).

[4] Plagányi, E. E., Dennis, D. M., Campbell, R., Deng, R., Hutton, T., Haywood, M. H. (2012) Refined survey, stock assessment and MSE for the Torres Strait rock lobster (TRL) fishery. Australian Fisheries Management Authority Torres Strait Research Program Final Report AFMA Project Number: 2012/810. 106 pp.
[5] Plagányi, É, Haywood, M, Gorton, B and Condie, S (2018) Environmental drivers of variability and climate projections for Torres Strait tropical lobster Panulirus ornatus, AFMA and CSIRO final project report, AFMA project 2017/0816, CSIRO, Cleveland, Queensland.
[6] Fulton EA, Hobday AJ, Pethybridge H, Blanchard J, Bulman C, Butler I, Cheung W, Gorton B, Hutton T, LozanoMontes H, Matear R, Pecl G, Villanueva C, Zhang X (2017) Decadal scale projection of changes in Australian fisheries stocks under climate change.
[7] Plagányi, É., Tonks, M., Murphy, N., Campbell, R., Deng, R., Edgar, S., Salee, K., Upston, J. (2020) Torres Strait Tropical Rock Lobster (TRL) Milestone Report 2020 on fishery surveys, CPUE, stock assessment and harvest strategy: AFMA Project R2019/0825. May 2020 Draft Final Report. 183 pp
[8] Plagányi, É.E., Haywood, M., Gorton, R., Siple, M. & Deng, R. (2019) Management implications of modelling fisheries recruitment. *Fisheries Research* 217: 169-184

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
RECOMMENDED BIOLOGICAL CATCH ADVICE Spanish mackerel	Agenda Item No. 3.1 For Discussion and Advice

RECOMMENDATIONS

That the Resource Assessment Group (RAG):

1. Having regard for recent stock assessment outcomes, and advice on a harvest strategy for the fishery, **DISCUSS** and **PROVIDE ADVICE** on a Recommended Biological Catch (RBC) and an estimate of non-commercial catch for Spanish mackerel for the 2025-26 season.

KEY ISSUES

2. The most recent stock assessment for Torres Strait Spanish mackerel was completed in 2023. This assessment used data to 30 June 2023 and was considered by the RAG at FFRAG 15 meeting in providing RBC advice for the 2024-25 season.
3. A call for research for the 2024-25 financial year was conducted in late 2023, which included a scope for a further stock assessment for Spanish mackerel. No proposals were received, and therefore there is no new assessment information to inform advice on an RBC for the 2025-26 season.
4. Having regard for recent stock assessment outcomes, and advice on a harvest strategy for the fishery, the RAG is asked to advise on a RBC for the 2025-26 season.

BACKGROUND

5. Prior to the 2016-17 fishing year, a Spanish mackerel TAC of 187.7 tonnes had been in place since 2007-08. This TAC was based on the average catch between 2001 and 2005 and included historic high catches reported in the fishery.
6. Since 2017-18, a RBC has been calculated to cover all fishing sector harvests and have been based on updating the stock assessment model with new data. The model has been updated annually since, and based on the outcomes and interim harvest strategies, the TAC has been reduced each season; see **Table 1**.

Table 1. Spanish mackerel TACs by year from 2007-08 to present.

Year	TAC (tonnes)
2007-08 to 2016-17	187.7
2017-18	132
2018-19	110
2019-20	82
2020-21	59
2021-22	74
2022-23	75
2023-24	75
2024-25	77

7. The latest stock assessment update was considered by the RAG on 29-30 November 2023 (FFRAG 15). The assessment is a stock synthesis model, which has been developed through the current project

"*Torres Strait Spanish mackerel stock assessment*" (project number 200815). The assessment uses all available harvest and catch rate data and fish age-frequency data. The updates to the model in 2023 included an additional year of harvest and age-frequency data from the 2022-23 fishing year. The stock synthesis model has been guided by RAG advice, including through a technical meeting held on 6-7 June 2023.

8. All data inputs into the 2023 assessment were applied in line with recommendations from FFRAG 13 (8 June 2023) and FFRRAG 14 (30 August 2023). Twelve specific model analyses were performed to build agreed variables into the assessment and account for uncertainties.

9. Based on the twelve agreed model runs, the results of the updated 2023 stock assessment show the estimated median spawning biomass of Torres Strait Spanish mackerel across all model scenarios for 2022-23 was 41% (B_{41}) of unfished biomass in 1940 (B_0), which is a 10% increase to the estimated level of 31% (B_{31}) in 2022-23.

10. This follows an upward trend since an estimated biomass of 23% in 2019. Notably, Sunset standardised catch rates remain well above the 20-year low in 2019.

Selecting an appropriate RBC calculation method

11. In 2023, the RAG agreed to apply the same methodology from 2022 which guided advice on a RBC for the 2023-24 fishing season. The RBC calculations are projected over a 12-year period using a 'constant catch' rule. This approach was agreed to under the harvest strategy framework to supply the model with a range of decision rules.

12. The RAG agreed that the current method is a conservative approach in line with past harvest strategy workshop advice to "bank fish". This methodology aims to achieve the established objective to 'not significantly raise the TAC while the stock recovers' to ensure the population recovers to the target reference point as soon as practicable.

13. In providing advice on a RBC for the 2024/25 season the RAG considered the calculated risk-levels of a range of RBC options. Presented as a 'matrix of scenarios' **(Table 2)**, the potential RBC figures are based on different target reference points**.**

14. The RAG:

    a) agreed to forecast the stock biomass to the 2024-25 fishing season based on an assumed level of total harvest in 2023-24 of 81 tonnes.

    b) considered four[1] different constant harvest rates applied to the results of the twelve key model runs. Each level of harvest rate (labelled F_{40} through to F_{60}) related to building the stock to different target reference points (B_{40} – B_{60});

    c) reviewed fish population projections to evaluate risk to the spawning stock. Consistent with approach followed since 2019, it was agreed to consider how many years in a model projection the stock would drop below the limit reference point (B_{20} or 20% of the unfished spawning biomass level in 1940) during a 12 year-time period (three times the age of full sexual maturity), assuming average recruitment and the constant catch (RBC) related to building the stock to the different target reference points.

    The RAG agreed to be guided by the '90% risk criterion' of the *Commonwealth Fisheries Harvest Strategy Policy* (CHSP), that if more than 10% of model runs (based on 1000 simulations) dropped the stock below B_{LIM}, this would represent unacceptable risk to the

[1] Previously five constant harvest rates ≤ 2022. At FFRAG 13 meeting (June 8, 2023), noting the advice of the stock assessment team and SS technical subgroup, the RAG agreed to remove F_{MSY} from future matrices of RBC options.

stock.

d) agreed B_{60} continued to be a sensible long term target reference point, noting that B_{48} is the interim target reference point; and

e) reviewed the fish population projections to evaluate the likelihood of the biomass reaching the interim reference point of B_{48} 12 years.

RBC advice

15. Noting the 90% risk criterion, the RAG elected to rule out the RBC options which were assessed to exceed this acceptable risk level. This left the RAG with three options: F_{48} - 141 tonnes, F_{50} – 133 tonnes, or F_{60} - 97 tonnes. The RAG noted that the F_{48} harvest level of 141 tonnes did not rebuild the stock to the interim target reference point B_{48} in all forecasts.

16. **The RAG recommended an RBC for Spanish Mackerel of 97 tonnes for the 2024-25 season.**

17. This RBC falls within the acceptable risk-level and considers the objectives of the *Torres Strait Fisheries Act 1984.* The RBC also fulfills the requirements of both the interim and long-term target reference points.

18. Having considered advice from the FFRAG and advice on the harvest strategy to date, **the Finfish Fishery Working Group (FFWG) agreed to recommend a TACC for Spanish mackerel for the 2024-25 fishing season of 77 tonnes.**

19. The TACC is based on an agreed RBC of 97 tonnes minus 20 tonnes of estimated non-commercial catch (15 tonnes traditional fishing (kai kai), 5 tonnes recreational fishing, 0 tonnes charter fishing and 0 tonnes PNG catch sharing).

Table 2: RBC options considered by the RAG at FFRAG 15 (29-30 November 2023), derived from the 2023 Torres Strait Spanish Mackerel Stock Assessment.

No.	Name of RBC approach 1941-2023 SS model	Forecast % of biomass below S_{20} over 12 years and 12 analyses (upper 95% confidence interval in parenthesis) Assuming average recruitment and constant RBC	Median RBC tonnes Over analyses 1 to 12 Gridded analyses bracketed	Do forecasts achieve S_{48} within 12 years? Over analyses 1 to 12
1	Constant F_{40}	7.7% (11.5%)	162 (149)	No
2	Constant F_{48}	4.0% (5.3%)	141 (132)	Mostly
3	Constant F_{50}	3.1% (5.0%)	133 (124)	Yes
4	Constant F_{60}	1.6% (5.0%)	97 (91)	Yes

Non-Commercial Catch Estimates

20. When setting a TAC, all sources of fishing mortality (catch) are taken into account and, if needed, a discount is applied to the RBC. This generally means the TAC equates to the RBC for the species minus expected catches that may be taken outside of the commercial fishery (for example recreational and traditional catches). This is consistent with the principles of the CHSP.

21. Noting that there was no new information available, the RAG recommended applying the same estimates originally developed at FFRAG 8 (4-5 November 2020) (Table 3).

22. The FFWG at their meeting on 5-6 December 2023 supported this approach.

Table 3. Summary FFRAG advice (meeting 8, 4-5 November 2020) on catches outside of the Australian Torres Strait commercial Spanish mackerel fishery.

Source of catches	Expected catch (t)	Comments
Subsistence catch (kai kai) by Traditional Inhabitants	15	Based on data from *Busilacchi 2013* this includes total of catch estimates for Mer, Masig and Erub Islands. The Finfish Working Group (FWG) agreed in July 2016 that the catch figures from the *Busilacchi 2013* research are the best estimates of Traditional take of finfish. While originally reported by CSIRO as 12 t this was further refined to 5.155 t. At FFRAG meeting 4, the RAG recommended that an estimate of 10 t be used for decision making noting data was only from three islands, the number of TIB fishing endorsements has increased and effort creep may be occurring. At FFRAG meeting 8, the RAG accepted advice from industry members and the TSRA member that estimate should be increased to 15 tonnes to account for anecdotal information that 10 tonnes would be an underestimate.
Recreational	5	Previously, the RAG advised that, based on QDAF survey (2013) which included TS, 2 t was appropriate. At FFRAG meeting 8, the RAG agreed to recommend the estimate be increased to 2 t having regard for accepted industry member advice that the recreational boat numbers have increased over time, with a lot more contractors resident in Torres Strait taking boats out to communities to fish in their spare time. Following FFRAG meeting 8, QDAF advised AFMA that under the 2019-20 Queensland state-wide recreational fishing survey, there were only seven catch records from two people on four fishing days in Region B (Torres Strait). There was only one record of a coral trout and none for Spanish mackerel.
Charter	Likely to be minimal	Available QLD logbook records show Charter boat line catches are low. Logbook records for the period between 1995 and 2014 report a total of 19.58 tonnes of mixed species taken from Torres Strait waters. The RAG has advised, based on the available evidence from QDAF logbook data, that charter catches are likely to be minimal.
PNG catch sharing	0	Catch sharing arrangements have not been entered into for Spanish mackerel.

Harvest Strategies for the Torres Strait Finfish Fishery

5. The AFMA funded project *Harvest Strategies for the Torres Strait Finfish Fishery* (the Harvest Strategy Project) was completed in 2019. This project provided the foundation and framework of a harvest strategy for the two key species of the TSFF (Spanish mackerel and coral trout). Since project completion, the RAG has used this document as a basis for ongoing development, prioritizing harvest strategy components for Spanish mackerel due to the underutilised nature of the coral trout fishery. This has guided the TAC-setting process for this species.

6. At FFRAG 10 meeting (3-4 November 2021), the RAG reviewed work to date and agreed that objectives (including guiding principles), indicators (biomass), reference points (target and limit reference points), and decision rules of the preliminary Spanish mackerel harvest strategy were well progressed. The RAG recommended that a Management Strategy Evaluation (MSE) be undertaken to assess and refine the harvest strategy for Spanish mackerel, to ensure that it meets Traditional Owner objectives and is

robust to uncertainties. A public call for research for this work was released in 2021 and 2022 however, no proposals were received.

7. See **Attachment 3.1a** for a summary of the harvest strategy for Spanish mackerel, including components identified for further development through the FFRAG and a future MSE. Key components include:

    - Biomass limit reference point (B_{LIM}): 20% unfished biomass
    - Interim target reference point: 48% unfished biomass
    - Long-term (>12 years) target reference point: 60% unfished biomass
    - Yearly stock assessment to be conducted until population is assessed to be >40% unfished biomass
    - Yearly biological sampling to be conducted to support stock assessments
    - Fishery to be closed if assessed when a stock assessment determines the Fishery to fall below B_{LIM}
    - Fishery can only be re-opened when a stock assessment determines the Fishery to be above the biomass limit reference point.

8. The FFRAG, with consideration of the CHSP and agreed harvest strategy components, formulates a yearly RBC. In forming its RBC advice, the FFRAG:

    1. considers different constant (non-hockey-stick) harvest rates applied to the results from a yearly stock assessment. Each level of harvest rate relates to building the stock to different target reference points (B_{MSY} through to B_{60});
    2. agrees to a forecasted estimate of stock biomass in the following fishing season based on an assumed level of harvest.
    3. agrees to an estimate of ongoing recruitment.
    4. reviews fish population projections to evaluate risk to the stock. The RAG considers how many years in the stock assessment model-runs would the stock drop below the limit reference point during a 12 year-time period (three times the age of full sexual maturity). In line with the CHSP, if more than 10% of model runs (based on over 1000 simulations), dropped the stock below B_{LIM}; this would represent an unacceptable risk to the stock. The RAG discounts approaches that represent unacceptable risk to the stock.
    5. selects an RBC which, assuming a constant-catch rule, would build the stock, on average, to the interim target reference point (F_{48}) within a reasonable timeframe of 12 years (three times the age of sexual maturity).
    6. Provides an estimate of non-commercial catch (fishing mortality) to be deducted from the RBC to set the TAC.

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
STOCK ASSESSMENTS AND RBC ADVICE Coral trout	Agenda Item No. 3.2 For Discussion and Advice

RECOMMENDATIONS

That the Finfish Fishery Resource Assessment Group (RAG):

1. Having regard for new catch data, previous assessments, and the 2022 coral trout standardised catch per unit effort (CPUE) timeseries, **DISCUSS** and **PROVIDE ADVICE** on a Recommended Biological Catch (RBC) for coral trout for the 2025-26 fishing season.
2. **DISCUSS** and **PROVIDE ADVICE** on an estimate of non-commercial catch for coral trout.

KEY ISSUES

3. Total catches for coral trout have continued to decline in recent seasons, attributed to the departure of a key Sunset sector operation in the 2022-23 fishing season, and a reduction of demand/effort from the Sunset sector in the 2023-24 fishing season.
4. High latency in the Traditional Inhabitant Boat (TIB) sector across both TSF fisheries are attributed to increased operating costs. Through the Protected Zone Joint Authority (PZJA) advisory groups it has been reported that a lack of infrastructure and high fuel and freight costs are major barriers to participation from this sector.
5. Recent commercial catches of coral trout in the Torres Strait Finfish Fishery (TSFF) are summarised below:

    - 21 tonnes in 2014-15
    - 38.4 tonnes in 2015-16.
    - 25.7 tonnes in 2016-17
    - 27.3 tonnes in 2017-18
    - 17.3 tonnes in 2018-19
    - 32.5 tonnes in 2019/20
    - 18.9 tonnes in 2020-21
    - 41.9 tonnes in 2021-22
    - 27.8 tonnes in 2022-23
    - 10 tonnes in 2023-24

6. A coral trout RBC/Total Allowable Commercial Catch (TACC) of 135 tonnes has been in place since 2007-2008 (note historically the TACC was 134.9 tonnes but the PZJA agreed to simplify the TACC for the 2019-20 fishing season). This TACC was based on the average catch between 2001 and 2005 and included historic high catches reported in the fishery.
7. For the 2020-21, 2021-22, 2022-23, and 2023-24 fishing seasons the FFRAG and FFWG recommended maintaining the TACC without change.
8. At its meeting on 3-4 November 2022 (FFRAG 12) the RAG considered an additional source of information on coral trout: an updated CPUE timeseries (standardised). The RAG noted that catch rates remain above 130 kg per boat day.
9. The RAG agreed that the updated CPUE timeseries did not provide a cause for concern in the status of the stock. The current trend is following an up-cycle which succeeds a cyclical but marginally upward trend since the early 1990s.
10. At its meeting on 29-30 November 2023 (FFRAG 15) having considered recent catch data, previous assessments, and the 2022 CPUE timeseries, the RAG concluded that there is no evidence to suggest amending the substantive RBC of 135 tonnes; the available data does not suggest a

decline in the coral trout population, and there were no justifications identified to increase the RBC.

11. The FFRAG agreed that, based on all lines of evidence, it is highly unlikely that the stock is at risk from fishing:

    a) Fishing levels remain low in the Fishery. The total reported catch for 2021-22 fishing season is 28 tonnes;

    b) Outcomes of the 2006 Management Strategy Evaluation (MSE) analysis and the 2019 preliminary stock assessment both predict the current biomass to be high relative to virgin biomass:

        - *MSE:* Four constant catch scenarios of 80, 110, 140 and 170 tonnes were tested which all achieved a biomass for the fishery of at least 60 per cent of virgin total biomass by 2025 (B_{60}). The biomass in 2004 was estimated to be more than 60 per cent of unfished levels (Williams et al. 2011, 2007). Commercial catch in recent years has been below historical catch levels and well below the lowest catch level simulated in the MSE (80 t per year).
        - *Preliminary stock assessment:* This assessment found the coral trout stock to be around 80 per cent of virgin biomass (B_{80}). All of the model estimates of current spawning biomass were above 65 per cent estimated virgin biomass (B_{65}). The results were also consistent with the current 135 t TACC (discussed at FFRAG 15).

    c) The standardised CPUE timeseries does not reveal a decline to the stock assessment trigger level of 90.6 kg per boat-day considered under the harvest strategy work completed to date for the fishery.

12. The RAG recommended an RBC for coral trout of 135 tonnes for the 2024-25 season.

13. Notably, in 2023 the FFRAG and FFWG provided a first estimate of non-commercial catch for coral trout to support TACC setting.

14. Previously, the TACC for coral trout had not been calculated with an explicit deduction to account for non-commercial catch (eg traditional, recreational or charter fishing). This is because it had not been a high priority to undertake work to determine catch estimates whilst catches remain very low compared with the TACC. However, the RAG at FFRAG 12 agreed to reconsider an estimate of non-commercial catch in 2023, noting the aspirations of the TIB sector to increase the quantum of effort in the reef-line fishery in the future. This was subsequently actioned at FFRAG 15 meeting and the following FFWG meeting (5-6 December 2023).

15. The RAG provided the following estimates of non-commercial catch (12 tonnes):

    <u>Traditional/Subsistence Catch</u>

    - I tonne (Maluligal Nation)
    - I tonne (Gudamaluligal Nation)
    - I tonne (Kaiwalagal Kaureg Nation)
    - 2 tonnes (Kulkalgal Nation)
    - 2 tonnes* (Kemer Kemer Meriam Nation) *Confirmed at the FFWG meeting.

    <u>Recreational Catch</u>

    - 5 tonnes

16. The FFWG supported the FFRAG's advice on an RBC of 135 tonnes and recommended that the coral trout TACC be reduced to 123 tonnes for the 2024-25 fishing season. This new TACC was been calculated with an explicit deduction to account for non-commercial catch.

BACKGROUND

17. The status of coral trout has been assessed against both the results of a MSE undertaken in 2006 (Williams et al. 2007, 2011) and more recently, a preliminary stock assessment undertaken by Dr George Leigh (QDAF) and Dr Matthew Holden (University of Queensland) under the previously funded project "*Harvest strategies for the Torres Strait Finfish Fishery*'.

18. At FFRAG 5 (31 October-1 November 2019) the RAG recommended that a stock assessment be conducted during the 2021-22 fishing season, once further data is available. At the time, the FFRAG considered that postponing the stock assessment for three years would allow enough time for additional data to be included. The additional data priorities identified being:

    a) Review and possible inclusion of data from a 1994-95 CSIRO fish survey data in the Torres Strait (*Influence of Coastal Processes on Large Scale Pattern in Reef Fish Communities of Torres Strait, Australia*, Milton & Long, CSIRO 1997);

    b) Improved catch and effort data from TIB fishers; and

    c) Fishery independent data such as an underwater survey or biological sampling.

19. Biological sampling for coral trout commenced in the 2020-21 fishing season for the first time.

20. At FFRAG 5 the RAG identified two triggers that may indicate changes in the risk profile for the stock:

    a) Catches from TIB and Sunset sector exceeding 90 t (being two thirds of the constant catch TAC of 134.9 t); and

    b) If the standardised catch rate per day drops below 90.6 kg per primary vessel day[1].

21. The RAG advised that either of these two triggers being met would flag a change in the stock status and will mean a stock assessment is to be carried out to investigate. FFRAG considered that further work would be required to develop decision rules based on the outcomes of this assessment if triggered; i.e. how are the outputs of the assessment used to then move the stock relative to the reference points.

22. Relevantly the RAG also recommended that an alternative, robust indicator of stock status, other than CPUE from the small number of sunset boats targeting coral trout, needs to be developed to track the stock status over time.

23. At FFRAG 9 (14-15 October 2021), the RAG noted the 2020 *ABARES Fishery Status Report* for the Torres Strait Finfish Fishery. It was raised by a scientific member that although coral trout are currently classified as not being overfished, and not subject to overfishing, due to the increasing length of time since the last evaluation of the coral trout stock, there is an increasing risk of it becoming unknown what the productivity of the stock is.

24. The RAG noted unless a stock assessment can be endorsed, then there is a risk that the fishery may be classed as 'status uncertain' for being over-fished/subject to overfishing.

25. A coral trout TAC of 135 tonnes had been in place since 2007–2008 (note historically the TAC was 134.9 tonnes but the PZJA agreed to simplify the TAC for the 2019-20 fishing season). This TAC was based on the average catch between 2001 and 2005 and included historic high catches reported in the fishery.

[1] The catch rate associated with B80 was determined to be 120 kg per day based on an average from 2012-2017 advice is that if it falls below 90 kg per day (as a proxy for B60) it would trigger an assessment.

26. In the absence of a formal stock assessment, the status of the coral trout stock has been evaluated against the results of a MSE undertaken in 2006 (Williams et al. 2007, 2011). In this MSE exercise, four constant catch scenarios of 80, 110, 140 and 170 tonnes were tested which all achieved a biomass for the fishery of at least 60 per cent of virgin total biomass by 2025. The biomass in 2004 was estimated to be more than 60 per cent of unfished levels (Williams et al. 2011, 2007). Commercial catch in recent years has been below historical catch levels and well below the lowest catch level simulated in the MSE (80 t per year).

27. At its meeting on 13-14 March 2019 the FFRAG considered a preliminary stock assessment for coral trout. The FFRAG accepted the assessment as preliminary noting the stage of development of the assessment and the range of uncertainties within the assessment. The FFRAG noted the results of the preliminary stock assessment suggest the coral trout stock is healthy with around 80 per cent of virgin biomass available. The RAG noted that all of the model estimates of current spawning biomass were above 65 per cent estimated virgin biomass.

28. At its meeting (14-15 October 2021, meeting 9), the FFRAG did not recommend undertaking a stock assessment for coral trout as an immediate research priority for funding in 2022-23 nor did the FFRAG support a fishery-independent-survey at that time.

29. Dr Trevor Hutton summarised coral tout data from the 1995-1996 CSIRO dive survey and presented to the RAG at FFRAG 10. The RAG considered this summary along with an updated standardized CPUE timeseries when formulating an RBC for the 2022-23 season. The RAG did not consider the substantive annual RBC of 135 tonnes to be a risk to sustainability based on the available information.

30. The RAG at FFRAG 13 meeting (8 June 2023) upgraded a stock assessment for coral trout to an ‘essential’ priority (previously ‘desirable’), in its 5-Year Rolling Research Plan. The RAG clarified that this research is now essential, given the current interest in increasing the quantum of effort in the fishery, noting that this would be a logical step in providing a key input into a future harvest strategy.

31 At FFRAG 15 meeting (29-30 November 2023) The FFRAG noted a presentation from Dr Trevor Hutton regarding the TS coral trout stock assessment workshop which was held on 28 November 2023. The purpose of this meeting was to evaluate the available information, including a review of the 2019 preliminary stock assessment, to identify and address uncertainties in the current understanding of the stock’s status. A key point from the workshops discussions was the confirmation that the assumed coral trout densities inputted into the 2019 assessment are consistent with the observed densities established in the Great Barrier Reef marine park. This conclusion was supported by available survey data.

32 However, the major uncertainty which cannot be addressed with available data is information on the species split between the four main coral trout species found in the Torres Strait. This factor was considered a major uncertainty due to the observed species spilt in the available biological sampling data.

33 The coral trout workshop concluded that, while the 2019 assessment provides valid evidence that the coral trout ‘basket’ is being managed to a sustainable level, there are fundamental uncertainties about the stock status at an individual species level. A key conclusion of the 2019 assessment was that the stock biomass has not been reduced by a significant amount by recent catches.

34 To summarise, based on the outcomes of the coral trout workshop, the RAG concluded that there was sufficient evidence to suggest the following:

- The coral trout fishery has not been subjected to overfishing.
- There is no evidence to suggest amendment to the current RBC.
- A statistically significant stock assessment on the coral trout basket could be conducted in future based on the identified improvements to the preliminary assessment. Such a future assessment would have to split historic catch proportions and downscale the fishery zones/areas to assess catch rates on a refined scale.

2022 updated standardised CPUE timeseries

35. At their meeting on 7-8 December 2022, the FFWG noted a presentation by scientific member Dr Michael O'Neill on an updated CPUE timeseries for coral trout. This timeseries standardised the catch rates of sunset fishers, accounting for the various geographic zones of the fishery area, and the efficiency of individual fishing vessels. The WG noted that the current iteration of the timeseries contains all available data, including catch data from QDAF (pre-2004). This was incorporated into the CPUE analysis as an action from FFRAG 12 meeting (3-4 November 2022).
36. The WG noted that with the inclusion of the QDAF data that catch rates remain above 130 kg per boat day. Therefore, the 'trigger level' of 90.6kg per boat-day, considered under the harvest strategy work completed to date for the fishery, has not been reached. The WG recalled that should catch rates decline to 90.6kg per boat day, then this was trigger an immediate priority to conduct a formal stock assessment.
37. The WG agreed that the finalised CPUE time series did not suggest a decline in the coral trout population, noting that the addition of historical QLD data suggest that catch rates remain consistent with the long-term average.
38. The WG noted that the FFRAG provided the following advice at their meeting on 3-4 November 2022:

    - Having considered recent catch data, previous assessments, and the updated CPUE time series, the RAG concluded that there is no evidence to suggest amending the substantive RBC of 135 tonnes; the available data does not suggest a decline in the coral trout population, and there were no justifications identified to increase the RBC.
    - The FFRAG agreed that, based on all lines of evidence, it is highly unlikely that the stock is at risk from fishing:
        1. Fishing levels remain low in the Fishery. The total reported catch for 2021-22 fishing season is 42 t;
        2. Outcomes of the 2006 Management Strategy Evaluation (MSE) analysis and the 2019 preliminary stock assessment both predict the current biomass to be high relative to virgin biomass:
        3. MSE: Four constant catch scenarios of 80, 110, 140 and 170 tonnes were tested which all achieved a biomass for the fishery of at least 60 per cent of virgin total biomass by 2025 (B60). The biomass in 2004 was estimated to be more than 60 per cent of unfished levels (Williams et al. 2011, 2007). Commercial catch in recent years has been below historical catch levels and well below the lowest catch level simulated in the MSE (80 t per year).
        4. Preliminary stock assessment: This assessment found the coral trout stock

to be around 80 per cent of virgin biomass (B80). All of the model estimates of current spawning biomass were above 65 per cent estimated virgin biomass (B65).

5. Although there is some uncertainty with the 1995/96 CSIRO dive survey (reviewed at FFRAG 10), the density estimates provide a level of validation of the density estimates derived from the preliminary stock assessment; and
6. The RAG recommended an RBC for coral trout of 135 tonnes for the 2023/24 season.

39. The FFWG supported the FFRAG's advice and recommended that the coral trout TAC remain at 135t for the 2023-24 fishing season.
40. In providing its advice, the WG considered that TAC for coral trout has not been calculated with an explicit deduction to account for likely catches taken outside the fishery (eg traditional, recreational or charter fishing). This is because it has not been a high priority to undertake work to determine catch estimates whilst catches remain very low compared with the TAC.
41. The WG noted advice from TIB members that it is desirable to reassess the priority of providing an estimate of non-commercial catch when recommending a TAC for the 2024/25 season.
42. Advice from TIB members at FFRAG 14 meeting affirmed the intention to consider an estimate of non-commercial catch when providing RBC advice at FFRAG 15.

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
MANAGEMENT Fisheries Observer Program for the 2024-25 Season	Agenda Item No. 4.1 FOR NOTING

RECOMMENDATION

1. That the RAG **NOTE** the draft fisheries observer program plan for the 2024-25 season.

Torres strait finfish fishery resource assessment group	Meeting 17 15 October 2024
RESEARCH Project update – Spanish mackerel and coral trout biological sampling	Agenda Item 5.1 For NOTING

RECOMMENDATIONS

1. That the Resource Assessment Group (RAG) **NOTE** the update provided by Andrew Trappett, Queensland Department of Agriculture and Fisheries (QDAF), on the biological sampling project.

BACKGROUND

1. Age data is an important input into the Spanish mackerel stock assessment, helping to understand: changes in abundance, the impact of fishing and fishing selectivity, as well as recruitment variability. In line with recommendations from the FFRAG, the collection of age and length data for Spanish mackerel resumed in the 2019-20 fishing season (most recent ageing data before this was from 2005).
2. QDAF, led by Jo Langstreth, was funded by AFMA and TSRA to undertake the sampling (AFMA Project number: 2019/0832, project title: *Enhancing biological data inputs to Torres Strait Spanish mackerel stock assessment)*.
3. A subsequent project was funded to continue sampling in the 2020-21 fishing season. Under the project, for the first time, samples were collected from coral trout (AFMA project number: 190851, project title: *Torres Strait Finfish Fishery: Coral trout and Spanish mackerel biological sampling*).
4. The project was funded again for another three fishing seasons 2021-22, 2022-23, 2023-24 (AFMA project number 2020/0814, project title: *Torres Strait Finfish Fishery Coral Trout and Biological Sampling 2021-2024*). The project was subsequently extended for a further season in 2024-25.
5. Research has continued for the current fishing season with Spanish mackerel samples being collected and processed (length, sex and otoliths taken for ageing later in the season) at the Cairns based laboratories.
6. As part of the project for the 2023-24, the project team planned two rounds of community visits on Erub and Mer, and completed an additional visit to Ugar.
7. Andrew Trappett will be attending the FFRAG meeting to provide a project update for 2024-25. Members are asked to consider the update and if relevant, provide any advice on any additional initiatives to ensure industry support and participation in the sampling.

Torres Strait Finfish Resource Assessment Group	Meeting 17 15 October 2024
RAG PRIOITIES / DATES AND VENUE FOR NEXT MEETINGS	Agenda Item 6 For Discussion & Advice

RECOMMENDATIONS

1. That the Resource Assessment Group (RAG):

    a) **NOTE** the management priorities for 2024 for the fishery supported by the Finfish Working Group (WG) at their meeting on 5-6 December 2023.

    b) **DISCUSS** and **PROVIDE ADVICE** on priorities for the RAG together with a work plan for addressing recommended priorities;

    c) **REVIEW** the proposed dates for future meetings.

KEY ISSUES

2. The FFRAG last reviewed their management priorities at FFRAG 15 (29-30 November 2023). Whilst discussion on previously identified priorities was deferred to a future meeting, the RAG agreed that the immediate priorities for the RAG are:

    a) the development of multi-year TAC setting.

    b) data preparation work for a future coral trout stock assessment.

Previously identified priorities are:

    c) provide advice as necessary on the Western Line Closure including any future fishing that may occur;

    d) further develop harvest strategies for the Spanish mackerel and coral trout;

    e) undertake annual fishery assessments and provide RBC advice.

3. The WG also considered management priorities at its meeting on 5-6 December 2023.

4. A summary of these combined management priorities and their current progress can be found in **Table 1.** This table forms a workplan for the FFRAG to address its priorities.

5. The RAG are invited to review this workplan and provide advice on the current priorities of the FFRAG.

6. In developing its work plan, the RAG may consider the summary of key due dates for the Finfish Fishery outlined in Table 2.

Table 1. Comments relating to any progress against each management priority considered by the FFRAG and the FFWG. Management priorities are classified as 'low', 'medium', or 'high', based on FFWG advice.

Priority	FFRAG 4-5 Nov 2020 comments	FFWG 7-8 December 2022 comments	Progress to date and further comments
High Priority Progress the development of a harvest strategy	Subject to funding this will require additional workshops with members and broader industry stakeholders including the FFRAG.	This remains a high priority, to be progressed further at the proposed harvest strategy workshop scheduled for March 2023.	**In progress.** **FFRAG 9** noted an update from QDAF on the development of the East Coast Spanish Mackerel Fishery harvest strategy, and the current QLD Reef Line Fishery harvest strategy: 2020-2025. **FFRAG 10:** Developed a scope for an MSE project to finalise a harvest strategy for the Spanish mackerel fishery. **FFWG Dec 2021:** Remains a high priority **FFRAG 12:** RAG to identify outstanding refinements to be progressed at a harvest strategy workshop in March 2023**.** Refinements/HCRs to be developed through MSE project (approved for funding in 2023-24. RAG also noted the East Coast Spanish Mackerel Harvest Strategy. **2023 update** No proposals received for MSE project. Harvest strategy/MSE workshop postponed until the RAG reassess the most appropriate workplan to develop HCRs for testing in a future MSE project. **FFRAG 15:** A harvest strategy workshop with stakeholders is now proposed to be held in 2025 to identify the specific aspirations for rebuilding/monitoring the stock.

Priority	FFRAG 4-5 Nov 2020 comments	FFWG 7-8 December 2022 comments	Progress to date and further comments
			FFWG meeting 5-6 December 2023: Recommended to conduct community consultation on harvest strategy work to date, to inform/prepare stakeholders before the proposed workshop.
High Priority Application of VMS on tenders	FFRAG provided advice on the potential scientific benefits from using VMS data to address data needs in the fishery at meeting 6 (27-28 November 2019). AFMA will continue to prepare information, including implementation costs across all licence holders to support further consideration of this initiative.	The WG recommended to increase this from low priority to high priority. The WG agreed that the application of VMS on tenders in the sunset sector would introduce several benefits to the fishery, including the collection of fishing-effort data to reduce uncertainty in standardised catch rates. It would also serve as a compliance tool to monitor specific spatial and temporal closures which apply to this sector. The WG agreed that these closures were implemented for significant cultural and environmental reasons. The WG noted that VMS data is being utilised in adjacent jurisdictions to refine the stock assessments of several fisheries. The member for QDAF agreed to distribute to members a copy of the Vessel Tracking Post Implementation Review which is currently out for public consultation. This review contains a cost/benefit summary of the application of VMS. The WG noted advice from TIB members that the Traditional Inhabitant sector may wish to pursue the use of VMS on TIB vessels <6 metres in the future, noting the perceived benefits of high-quality data collection. It was discussed whether there are mechanisms for dual-licenced fishers to operate in separate fisheries with the same VMS device. This would be relevant for those wishing to fish for TRL within the finfish closure area. The AFMA member confirmed that there are	**FFWG 2022:** Upgraded to high priority. **FFWG 2023:** Remains a high priority. The FFWG endorses VMS in principle, noting there are financial considerations for economics of the fishery. Proposed workplan to progress to PZJA for decision for 2025-26 season. Proposed that FFWG will await formal advice from the TSRA FQMC/FAC, then TSRA to prepare paper for PZJA for 2024.

Priority	FFRAG 4-5 Nov 2020 comments	FFWG 7-8 December 2022 comments	Progress to date and further comments
		established mechanisms in Commonwealth fisheries to account for such scenarios.	
Data preparation work for a future coral trout stock assessment.	N/A	N/A	**FFRAG 15:** Added as a priority to support a future coral trout stock assessment.
Development of multi-year TAC setting for Spanish mackerel.	N/A	N/A	**FFRAG 15:** Added as a priority to support TAC setting, noting that a yearly stock assessment for Spanish mackerel may not be feasible.
High Priority Adherence to WTO conditions	N/A	N/A	**FFWG 2023:** Added as a priority to support compliance with new WTO conditions.
Update the daily fishing logbook (TSF01) in line with recommendations from the FFRAG.	The RAG supported the logbook changes recommended by AFMA to various aspects of the TSF01 logbook to improve Sunset sector catch and effort data and support spatial	Not discussed at FFWG meeting 7-8 December 2022	**Actioned.** AFMA has drafted the new TSF02 logbook (June 2024). The Logbook Instrument is currently awaiting approval by the PZJA, which will give full effect to this recommendation.

Priority	FFRAG 4-5 Nov 2020 comments	FFWG 7-8 December 2022 comments	Progress to date and further comments
	reporting by the TIB sector.		
Medium Priority Formalising total allowable catches for the Finfish fishery	N/A	The WG recalled that an enforceable TAC is a management arrangement that would formally limit the catch of the TIB sector, noting that current arrangements require catch data to be monitored against the 'Olympic' TAC. A formalised TAC would mitigate the current requirement to reactively close the fishery to ensure that the TAC isn't exceeded. A formalised TAC would also support the aspired utilisation of the entire TAC by the TIB sector. The WG acknowledged the views of TIB members, who maintain strong opposition to individual quota unit allocation options. TIB members expressed a preference to maintain an Olympic TAC style system, pending further review by the TSRA. The WG noted that the TSRA continue to lead a review into the allocation of TRL resources, and that the outcomes from this process will guide future advice on the allocation of finfish catch allowances. The WG agreed that it is not appropriate for the WG to provide formal advice on the process of allocation while the review is being undertaken, noting that the PZJA will consider the outcomes of the review before recording a decision. The WG suggested that AFMA conduct a review of the Torres Strait Finfish Fishery Management Plan 2013 to assess whether an amendment to this plan could provide for an enforceable TAC. The WG also suggested that future harvest strategy documents could capture the inclusion of catch triggers against the current Olympic TAC to formalise the current process to reactively close the fishery. The WG agreed	**FFWG 2022:** Remains a medium priority **FFWG 2023:** Remains a medium priority. No update available, noting that a tender process for a consultant to investigate TRL resource allocation is currently underway.

Priority	FFRAG 4-5 Nov 2020 comments	FFWG 7-8 December 2022 comments	Progress to date and further comments
		that these points should be discussed further at the HS workshop scheduled for early 2023. The WG agreed to maintain this item as an ongoing medium priority, noting that further action is pending the review process lead by the TSRA.	
Low priority Supporting possible changes to the Western Line Closure	The RAG noted a number of risks and considerations with lifting the northern part of the closure and supported a suggestion that a targeted round of consultation occurs in Gudumalulgal to discuss the three options to support opening the reef line fishery in this area: 1. Opening with data collection and monitoring 2. Survey before opening Adaptive management	The WG acknowledged the aspirations of several community members in Maluligal and Kaiwalagal Kaureg clusters to extend the recently amended 'western line' area to provide an additional fishing opportunity to these communities. The WG supports future consultation on this subject, agreeing that this remains an important matter. The WG agreed to list this as a low priority, noting that immediate consultation is not required. The priority to progress with formal community consultation will be guided by further advice from TIB members.	**Progressed:** Based on a final round of advice from the FFRAG and FFWG in 2021, and community consultation, the PZJA decided in March 2022 to amend the boundary of the Western Line Closure. This decision came into effect on May 1 2022. As per FFRAG advice, catch records will be monitored carefully to assess the level of effort. **FFWG 2023:** Maintain as a low priority to monitor for potential amendments based on community aspirations. Advice received that current border is appropriate at this point in time.

Table 2. Key dates for the Finfish Fishery for 2024 and 2025.

Key date	Activity
16 October 2024	• Finfish Working Group meeting • Spanish Mackerel Total Allowable Catch Advice for the 2025-26 Season • Coral Trout Total Allowable Catch Advice for the 2025-26 Season
Jan/Feb 2025	• PZJA meeting to decide TAC for Spanish mackerel and coral trout for 2025-26 season.
Q2 2025	FFRAG 18 • Research priorities (5-Year rolling research plan) • Priorities for the RAG • Harvest Strategy development
Q2 2025	FFWG meeting • Torres Strait Finfish Fishery management priorities • Research priorities (5-Year rolling research plan) (For noting)
Q2 2025	Harvest Strategy workshop/consultation
30 September 2025	• Annual WTO report due to the Department of Climate Change, Energy, the Environment and Water.
September 2025	FFRAG 19 • Review the data for the Spanish mackerel stock assessment. * • Non-commercial catch estimates. *If stock assessment project occurs in 2025
November 2025	FFRAG 20 – RBC meeting • Review updated Spanish mackerel stock assessment. * • Spanish mackerel - Recommended Biological Catch for 2026-27 Season. • Coral trout - Recommended Biological Catch for 2026-27 Season. *If stock assessment project occurs in 2024
November 2025	FFWG meeting • Spanish Mackerel Total Allowable Catch Advice for the 2026-27 Season • Coral Trout Total Allowable Catch Advice for the 2026-27 Season • Torres Strait Finfish Fishery management priorities

Torres Strait Finfish Fishery Resource Assessment Group	Meeting 17 15 October 2024
OTHER BUSINESS	Agenda Item 7 For Discussion

RECOMMENDATION

1. That RAG members **NOMINATE** and **DISCUSS** any additional items of business for the meeting.

AFMA CATCHWATCH

A REPORT FROM THE AUSTRALIAN FISHERIES MANAGEMENT AUTHORITY

Notice Issued on 27 September 2024

Torres Strait Finfish Fishery - Data Period 1 July 2023 to 30 June 2024 (End of Season Report)

Species Name		Agreed Total Allowable Catch (TAC) (kg)	Reported catch^ (kg)	Available TAC (kg)	% TAC Caught
Traditional Inhabitant Boat Licence (TIB) sector					
Spanish mackerel		13,000	3,612.9	9,387.1	27.8 %
Coral Trout		122,500	1,147.1	121,352.9	0.93 %
Basket species	Barramundi cod	No catch limit	10.2	n/a	n/a
	Cobia		-		
	Emperor		-		
	Spangled Emperor		-		
	Red emperor		3.6		
	Rockcod		-		
	School mackerel		-		
	Shark mackerel		-		
	Trevallies and scads		-		
	Tripletail maori wrasse		-		
	Tropical snappers (mixed)		-		
	Basket species TOTAL		**13.8**		
Sunset Licence (Sunset) sector					
Spanish mackerel		62,000	54,270.5	7,729.5	87.5 %
Coral Trout		12,500	8,874.6	3,625.4	70.1%
Basket species	Barramundi cod	1,700	-	1473.5	13.3 %
	Cobia		34.8		
	Emperor		96.5		
	Mixed fish		-		
	Red emperor		44.5		
	Rockcod		-		
	School mackerel		-		
	Shark mackerel		-		
	Trevallies and scads		15		
	Tripletail maori wrasse		-		
	Tropical snappers (mixed)		35.7		
	Basket species TOTAL		**226.5**		

Notes:
^ Catch reported through mandatory TDB02 Catch Disposal Records (CDRs) and does not include any unreported catches or outstanding catches (there is an expected processing delay of 2-3 weeks from when a Fish Receiver completes a CDR and AFMA receives and processes it). TIB sector operates under a competitive total allowable catch. Sunset sector boats have individual vessel catch allowances detailed here: www.afma.gov.au/fisheries-services/ concession-holders-conditions

Conversion ratios used to convert back to whole weight are:

	Spanish mackerel	Coral trout	Other reef-line species
Filleted	1.608 : 1	2 : 1	2.5 : 1
Gilled & Gutted	1.048 : 1	1.1 : 1	1.1 : 1

Season date is financial year 1 July to 30 June

While care is taken to ensure the accuracy of information, readers should not base business decisions or actions soley upon the information contained within.
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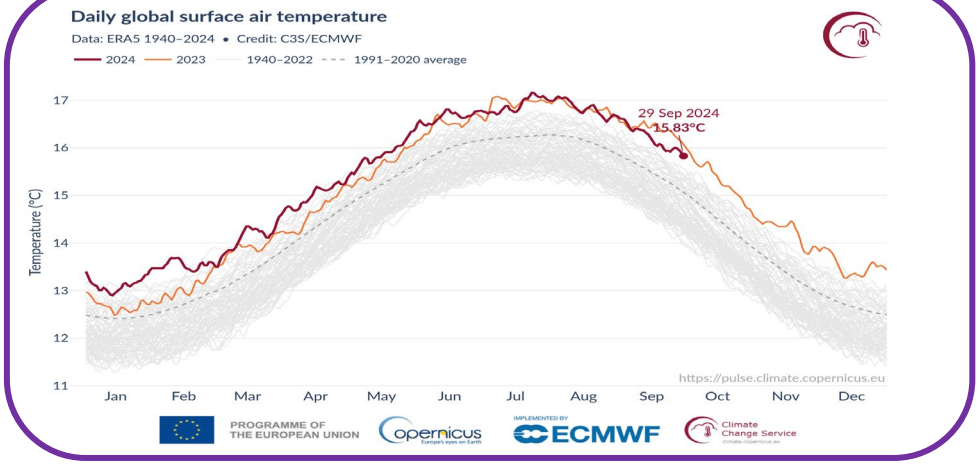
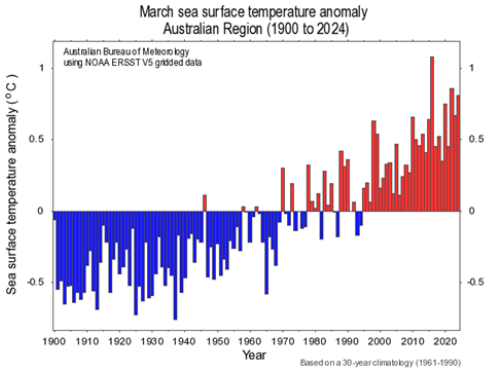
Hindcast

Attachment 2.5a





Sea surface temperature anomalies in the Australian region have been generally trending upwards over the past 30 years.

What is happening on the water and what are fishers seeing?

- Industry to advise

Hard coral

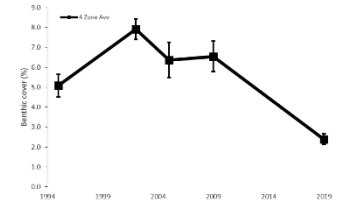


Figure 4-9. Zones (A) and East Torres Strait (4 zone) (B) average (stratified) benthic cover (%) for live coral (hard) from five surveys (does not include deep-reef strata) (error bars = 1 s.e.).

Soft coral

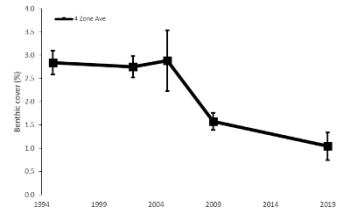


Figure 4-10. Zones (A) and East Torres Strait (4 zone) (B) average (stratified) benthic cover (%) for soft coral from five surveys (does not include deep-reef strata) (error bars = 1 s.e.).

Sponges

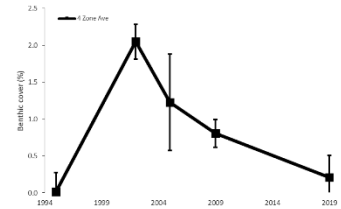


Figure 4-11. Zones (A) and East Torres Strait (4 zone) (B) average (stratified) benthic cover (%) for sponge from five surveys (does not include deep-reef strata) (error bars = 1 s.e.).

Algae

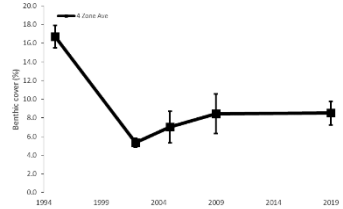


Figure 4-13. Zones (A) and East Torres Strait (4 zone) (B) average (stratified) benthic cover (%) for algae from five surveys (does not include deep-reef strata) (error bars = 1 s.e.).

Seagrass

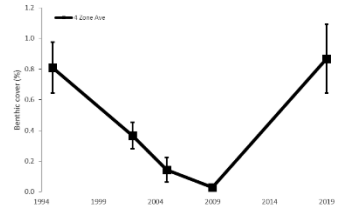


Figure 4-12. Zones (A) and East Torres Strait (4 zone) (B) average (stratified) benthic cover (%) for seagrass from five surveys (does not include deep-reef strata) (error bars = 1 s.e.).

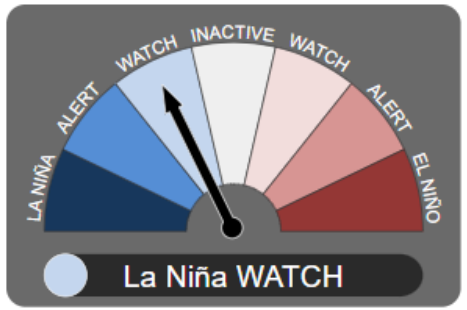
In eastern Torres Strait:

- Cover of hard coral, soft coral and sponges has declined since 2002 – concern as perform key ecosystem functions
- Seagrass cover has increased since 2009

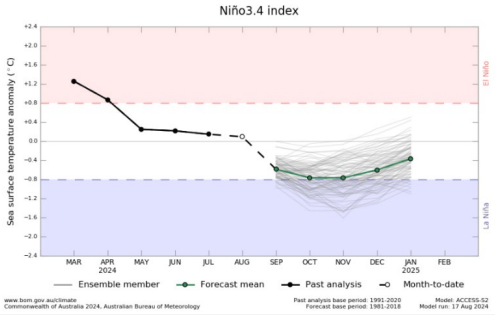
Other indicators and trends e.g. turbidity, sea level, pH?

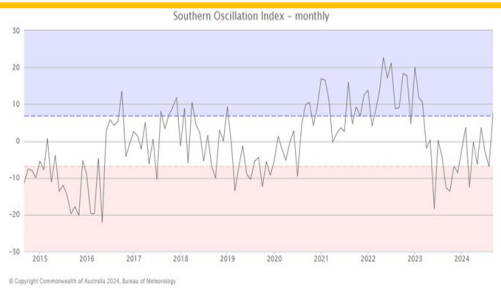
Forecast

ENSO outlook

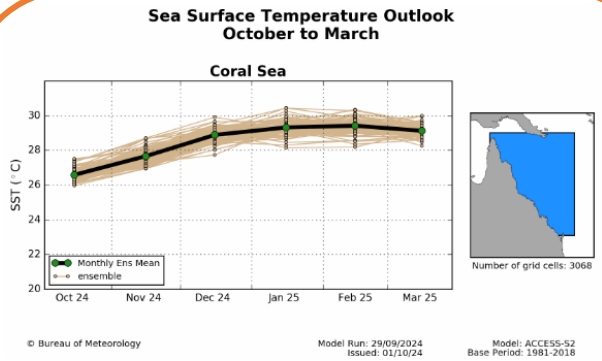


The ENSO outlook is currently at La Niña Watch, meaning there are some signs that a La Niña may form in the Pacific Ocean later in 2024. Climate model outlooks suggest ENSO is likely to remain neutral until at least early spring. An La Niña phase typically produces wetter years



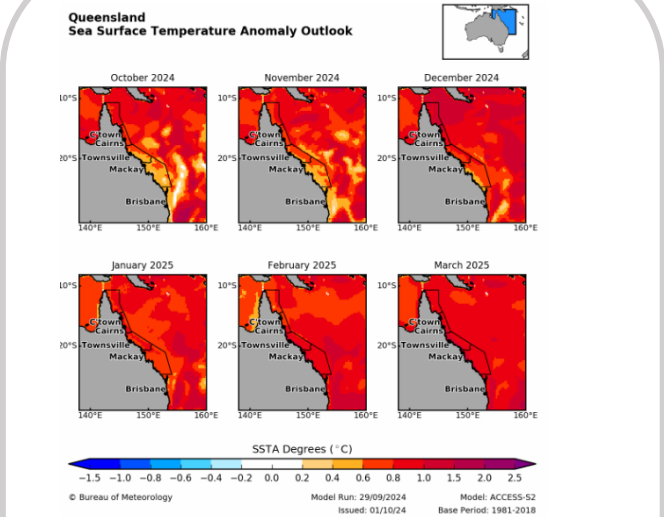


Sustained negative values of below −7 typically indicate El Niño, while sustained positive values above +7 typically indicate La Niña

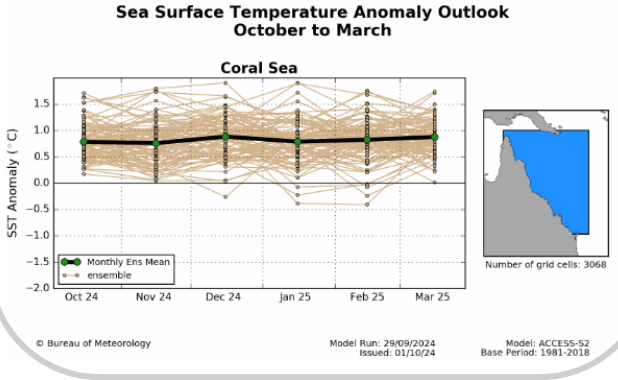


Water temperatures for the Coral Sea (closest to Torres Strait) are forecast to be 27°C in October 2024, increasing to around 29°C by December 2024

Other indicator forecasts?



Between October 2024 and March 2025, water temperatures are predicted to be between 0.5-1.0°C above the long-term average water temperature



Attachment 2.2b

Australian Government

Australian Fisheries Management Authority

Climate Risk Framework

Integrating climate risk in decision-making

Securing Australia's fishing future

www.afma.gov.au

Executive summary

The impact of climate change on Commonwealth fisheries is becoming increasingly evident. The effects of climate change on marine ecosystems are accelerating and Intergovernmental Panel on Climate Change (IPCC) projections indicate that fish production will be further affected within the relatively short term (e.g., 10 years), to the point where management advice that does not consider this change could be rendered invalid[1].

AFMA has developed the Climate Risk Framework (the Framework) to integrate climate risk into management decisions for Commonwealth-managed species/stocks (herein referred to as species). The framework is based on a risk assessment approach, similar to that which has been utilised in other fisheries internationally to integrate ecosystem and environmental considerations and uncertainty into existing management frameworks.

The Framework involves a four-step process that seeks to:

1. Assess the overall risk to a species based on the impacts of climate change and the biological status of the stock using the best available information,
2. Consider whether there are sufficiently precautionary measures in the existing science, management or industry adaptation pathways to respond to the impacts of climate change,
3. Assess the residual risk to a species, and where required
4. Provide advice to the AFMA Commission on any additional measures required to respond to the impacts of climate change.

The Framework is structured to ensure risks and appropriate adaptation measures are considered on an annual basis, with a view to providing advice to the AFMA Commission as part of the Total Allowable Catch (TAC) or Total Allowable Effort (TAE) setting process for the coming fishing year.

The Framework is one element of a broader program of climate adaptation work being undertaken by AFMA. It is intended as a transitional mechanism, to enable rapid integration of climate risk into decision-making processes until such time as climate impacts are more explicitly integrated into science and management processes, such as harvest strategies, stock assessments or Ecological Risk Assessments (ERAs). For data-poor species, the Framework will likely remain an appropriate tool to assess and respond to the impacts of climate change into the future.

[1] Duplisea DE, Roux MJ, Hunter KL, Rice J (2021) Fish harvesting advice under climate change: A risk-equivalent empirical approach. PLOS ONE 16(2): e0239503. https://doi.org/10.1371/journal.pone.0239503

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Version	Updates	Approver
12 Jan 2024	Version for trials, commencing Feb 2024.	Alice McDonald
10 Jul 2024	Revised version for trials, commencing Aug 2024.	Dan Corrie

1 Introduction

Climate change is already impacting Australia's marine ecosystems and fisheries in a range of complex ways. Australian waters are becoming warmer and more acidic, sea-levels are rising, major ocean currents are changing, and extreme weather events are becoming more severe. The effects of climate change on marine ecosystems are accelerating and Intergovernmental Panel on Climate Change (IPCC) projections indicate that fish production will be further affected within the relatively short term (e.g., 10 years), to the point where management advice that does not consider this change could be rendered invalid (Duplisea, et al. 2021).

Research predicts that climate change will have both positive and negative impacts on reproduction, recruitment, and distribution of biomass of Australia's commercially important marine species (Fulton, et al. 2021). The Commonwealth Harvest Strategy Policy (HSP) and HSP Implementation Guidelines (the Guidelines) recognise that non-fishery effects can see species abundance fluctuate and conclude that timely responses by management to changes in stock productivity and distribution are important in areas where climate is shown to be changing rapidly.

AFMA's legislative obligations include the need to ensure that the exploitation of fisheries resources is conducted in a manner consistent with the principles of ecologically sustainable development, including the exercise of the precautionary principle:

> *Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

To ensure that these objectives continue to be met, AFMA has initiated a dedicated program focused on incorporating climate change information and potential risks into our decision-making processes. By doing so, we aim to make fisheries management more adaptable to the evolving marine environment.

1.1 Impacts of climate change on Commonwealth Fisheries

An increasing amount of information, research and data is available on the sensitivity of fish stocks to climate change and associated impacts on current and future stock status. This information is being considered by AFMAs Resource Assessment Groups (RAGs), Management Advisory Committees (MACs) and managers when providing advice and making management decisions for Commonwealth-managed species and stocks (herein generally referred to as 'species').

Climate and Ecosystem Status Reports are available for key fisheries, drawing upon readily accessible climatic and environmental data and trends. The first iterations of these reports are relatively high level, containing hindcast and forecasts derived from information such as sea surface temperature, El Nino Southern Oscillation (ENSO) cycle status, water chemistry and fishers' observations. These reports are still in their infancy in terms of development and use in Commonwealth fisheries, however as the indicators are refined and their relevance and influence on stock abundance and distribution is better understood, these will also provide an insight into climate impacts and risks for some stocks.

Over time, the Climate and Ecosystem Status Reports could evolve to include more sophisticated population and environmental indicators of climate-influence. Several Australian researchers have been leaders in the field of identifying ecosystem indicators and have close connections with US and EU groups who are applying indicators in this way. Lessons gained from that network suggest it is a useful framework which can be adapted to Australian conditions and refined through time, as has occurred elsewhere.

Potential indicators that could be considered in the future, to provide more sophisticated insight into climatic impacts and ecosystem shifts, can be found in the Alaska Marine Ecosystem Status Reports and in a list proposed by the National Oceanic and Atmospheric Administration (NOAA) for US fisheries in Link, et al., 2021.

Ideally the influence of climate and ecosystem factors on stocks would be integrated quantitatively into stock assessments and harvest strategies, so that they would directly influence Recommended Biological Catches (RBCs). However, many of these approaches are complex and unlikely to be implemented in the near-term. A fully quantitative integration may also not be necessary, possible, or cost effective for many species.

1.2 A transitional mechanism to integrate climate risk and impact

AFMAs legislative obligations include the need to ensure that the exploitation of fisheries resources is conducted in a manner consistent with the principles of ecologically sustainable development, which includes the exercise of the precautionary principle. The precautionary principle requires AFMA to address uncertainty and account for known risk, and potential risks, in decision making[2].

Given the increasingly evident impacts and risk of climate change, and the understanding that climate change is accelerating (Duplisea, et al. 2021), a mechanism to integrate climate risk into management decisions is needed in the short term, while more sophisticated longer-term solutions are being developed.

While climate and ecosystem status reports provide valuable contextual information, AFMA must ensure that climate and ecosystem risks are explicitly considered and appropriately integrated in the production of management advice for Commonwealth-managed fisheries. While 'Climate-ready' stock assessments and harvest strategies are unlikely in the near-term for most species, and may never be necessary or possible for others, semi-quantitative or qualitative approaches are already used in some jurisdictions.

Risk assessment approaches are utilised widely in fisheries, including in assessing and responding to ecological risks in Commonwealth fisheries under the Ecological Risk Management Framework. A risk table (see Dorn and Zador 2020) is being utilised in Alaskan groundfish fisheries to support TAC decision making in the North Pacific Fisheries Management Council (NPFMC). In these fisheries, RBC estimates and final TAC levels are presented alongside relevant information around assessment uncertainty or modifications, population dynamics not explicitly addressed in the model, and ecosystem state. This provides the context for the decision making, particularly when there are lower catch recommendations than the 'acceptable

[2] OECD Joint Working Party on Trade and Environment (2002) *Uncertainty and Precaution: Implications for Trade and Environment*, OECD, September.

biological catch' due to ecosystem/environment concerns (including climate impacts). The use of this Alaskan risk table is dependent on informative ecosystem indicators that have been identified and refined through time in Alaska (see for example the Alaska Marine Ecosystem Status Reports).

AFMA has developed the Climate Risk Framework to assess the risk to Commonwealth-managed species from climate change utilising existing information, and then respond to or mitigate that risk using the tools that are available within the existing scientific, management and industry adaptation pathways. While this might be considered a transitional mechanism for some species as the science evolves and more sophisticated approaches are developed, it will likely remain an appropriate measure for many data poor species into the future.

Development of the Climate Risk Framework has been an iterative process, including trial application in several AFMA-managed fisheries during early development. Ongoing development and refinement will continue to be a focus as more information becomes available and the utility of the framework becomes apparent. This current version will continue to be used on a trial basis throughout 2024. A trial report is scheduled for early 2025 to include a review of the trial process, and recommendations for future implementation (Figure 1).

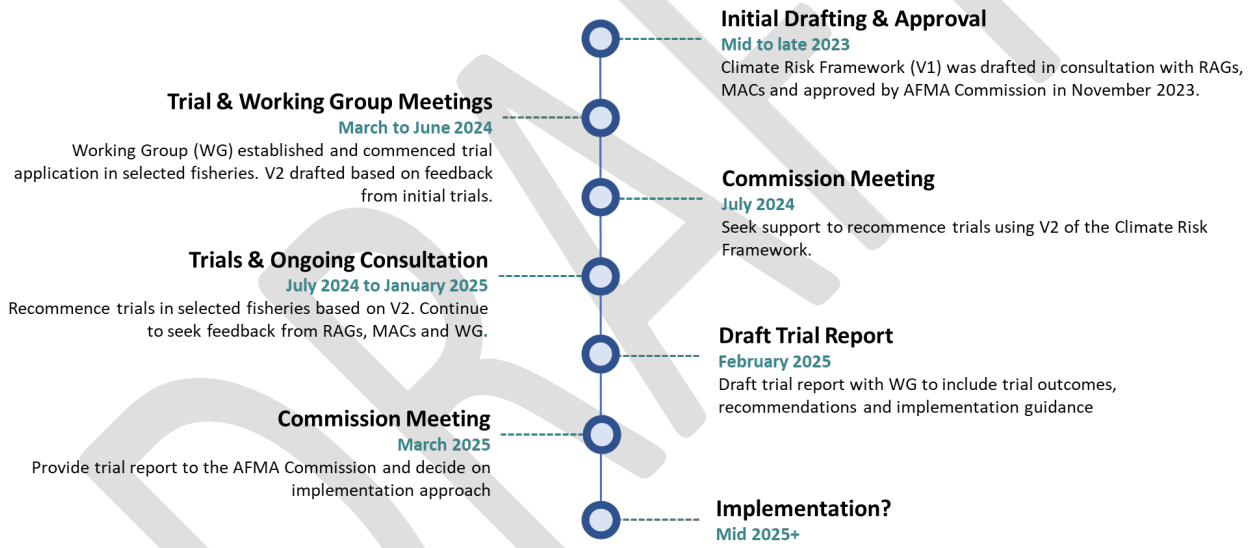

Figure 1 Development timeline for AFMA's Climate Risk Framework

2 AFMA Climate Risk Framework for Commonwealth Fisheries

The Climate Risk Framework employs a risk-based assessment approach to identify and integrate climate impacts and uncertainty into formal decision-making processes. The process allows for rapid identification of expected climate-driven changes in productivity using readily available information, and then determine whether additional measures are required to respond to the identified change. The approach has been adapted to integrate with existing management processes (Figure 2) and utilise tools already available to fisheries scientists, managers, and industry.

Figure 2 Linkages between the Climate Risk Framework, Science and Research, Management & Regulation and Commercial Fishing Industry

The Framework involves a four-step process that seeks to:

1. Assess the overall risk to a species based on the impacts of climate change and the biological status of the stock using the best available information,
2. Consider whether there are sufficiently precautionary measures in the existing science, management or industry adaptation pathways to respond to the impacts of climate change,
3. Assess the residual risk to a species, and where required
4. Provide advice to the AFMA Commission on any additional measures required to respond to the impacts of climate change.

The following section provides a detailed overview of each of the steps, including implementation guidance.

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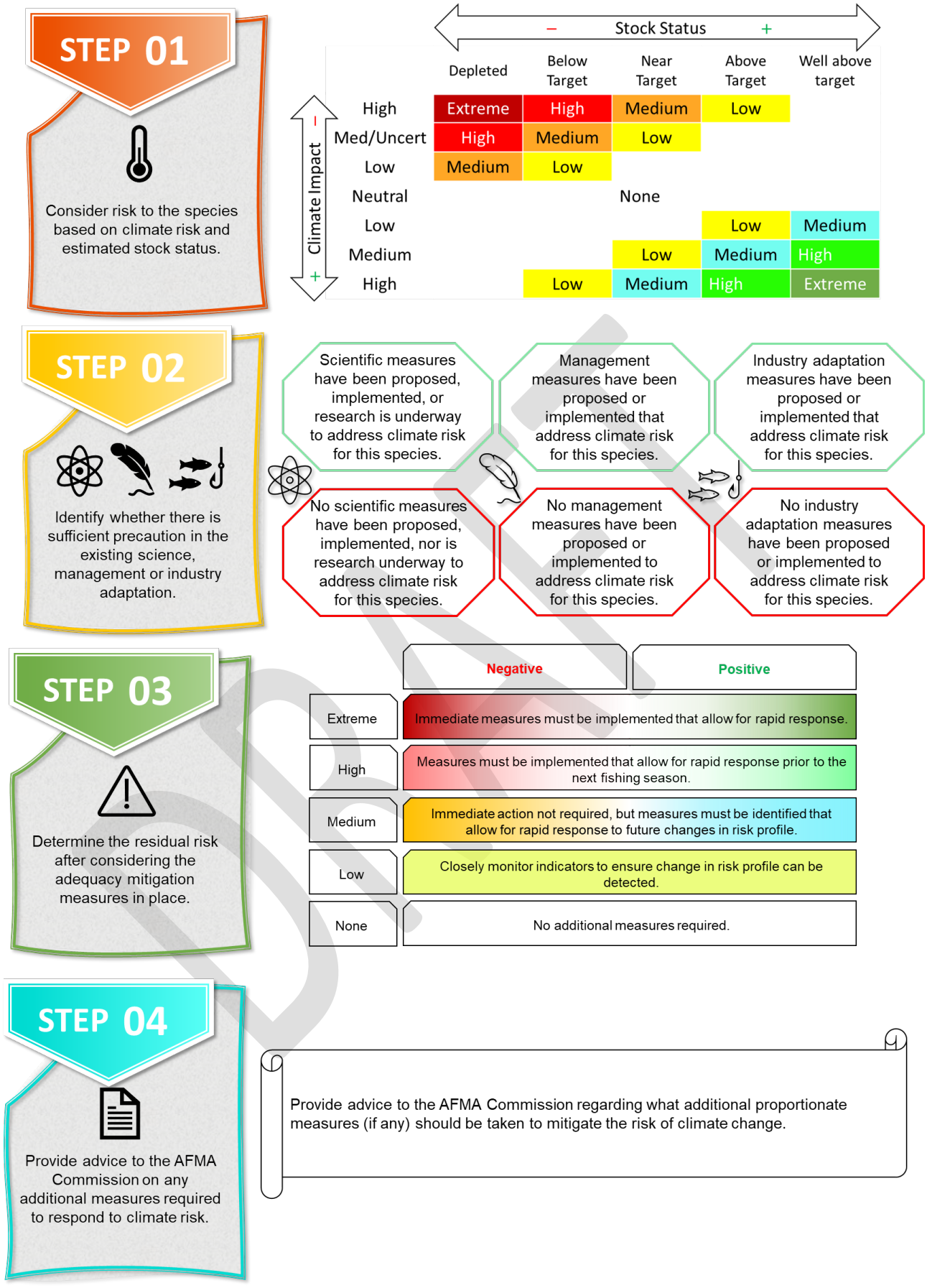

Figure 3 The AFMA Climate Risk Framework 4-step process

2.1 Implementation process

The Framework is designed to integrate with the existing consultation and advisory group processes and align with the annual TAC/E setting process. For each species, relevant RAGs and MACs (with support from AFMA management) will step through the process and provide advice to the AFMA Commission, prior to the start of the next fishing season. The Framework will be established as a guidance piece, rather than established as policy. This will allow for improvements over time, based on trials and implementation experience and as our understanding of climate impacts and appropriate mitigation evolves.

The RAG will complete Step 1 through to Step 4, including providing advice to the AFMA Commission. The MAC can review the risk ranking established at Step 1 but are largely responsible for validating or adding to the measures identified at Step 2, and then revising or validating the residual risk ranking at Step 3. Depending on the measures identified at Step 2, both groups should provide advice to the AFMA Commission at Step 4. It will be the responsibility of AFMA management to consolidate this advice and have it cleared by both groups, including where there is conflicting advice, and produce the Species Assessment Report (example at **Appendix A**).

The AFMA Commission will consider the advice, including where there is conflicting advice from the RAG and MAC, and make a final decision.

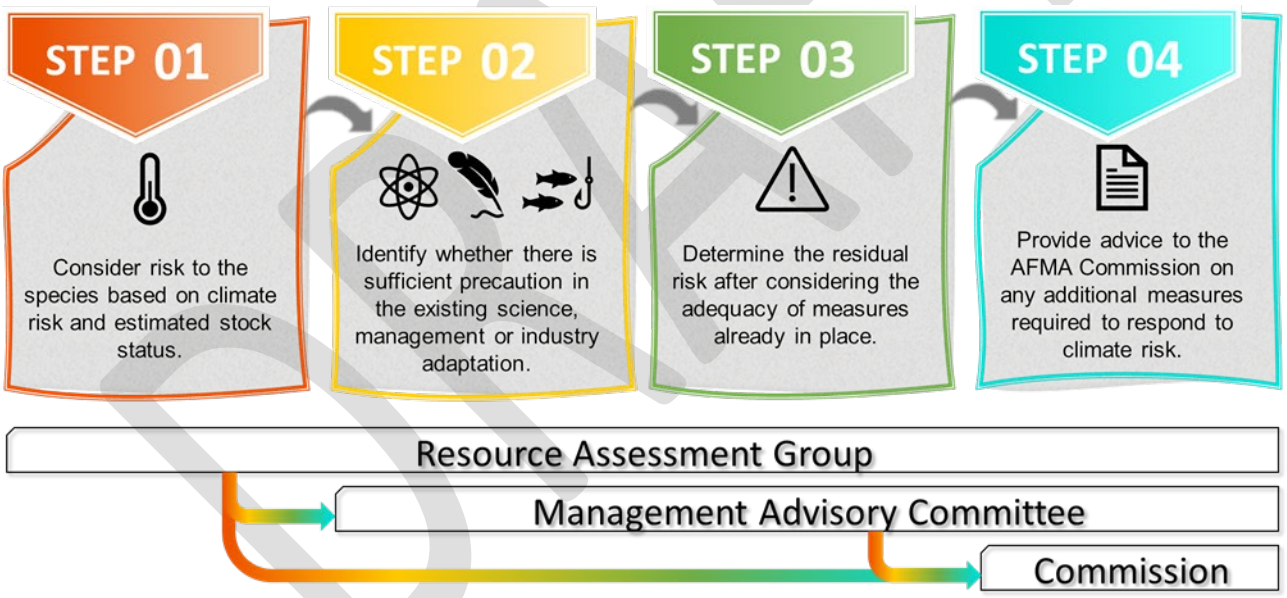

Figure 4 The role of RAGs, MACs and the AFMA Commission in implementation of the Climate Risk Framework

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Step 1: Assess species risk due to climate change and stock status

Climate Risk

The RAG, utilising the best available climate information for the species, undertake an assessment of the climate risk ranking using the criteria set out in **Table 1** below. The RAG should draw upon the most robust information source available for the species, listed here as categories 1-4.

1. Attribution studies of counterfactual simulations include sophisticated ecosystem modelling of existing and projected climate impacts. These and are available for some Commonwealth species, for example climate forced modelling using CSIRO Atlantis ecosystem simulations for key species in the Southern and Eastern Scalefish and Shark Fishery (SESSF) (Fulton, et al. 2024). Models of Intermediate Complexity for Ecosystem assessments (MICE) being undertaken for some Commonwealth fisheries (CSIRO n.d.), are also more specifically fit. These robustly fit models have good model skill scores (i.e., have real information content that exceeds what would be gained from a time series alone).

2. Preliminary projections of change in abundance due to climate change is available for most Commonwealth fish species from the FRDC Project "Guidance on Adaptation of Commonwealth Fisheries management to Climate Change" (Fulton, et al. 2021). These projections come with varying levels of confidence and additional interpretive comments (e.g., likely geographic shifts) for some species. They are based on quantitative models that consider additional factors not picked up in the sensitivity assessments described below.

3. Climate sensitivity based on an assessment of life history characteristics is also available for all fish species in Commonwealth fisheries (Fulton, et al. 2021). This information poor assessment provides a climate sensitivity rating of 'low', 'medium' or 'high' for each species following the method of Pecl, et al. (2014) applied to all species currently listed in the ERA level 2 productivity-susceptibility analysis for each fishery.

4. Climate and ecosystem indicators are now actively considered as a standing agenda item at most AFMA RAG and MAC meetings when TACs or TAEs are being considered. Climate and Ecosystem Status Reports provide information that is useful in predicting species or stock-specific responses.

Only a few species are likely to have attribution studies or counterfactual simulations available, while most species will have preliminary projections and climate sensitivity assessments available to draw upon. AFMA will support the RAG by ensuring the available information for the species of interest is available.

Stock Status Risk

It is important to understand the most recent estimate of stock status in the context of climate risk. For species that are above the Target Reference Point (TRP), the potential risk of climate change impacting sustainability is lower than that for a species that is near or below the Limit Reference Point (LRP).

Estimates of stock status vary across AFMA-managed species and are based on a range of assessment approaches, from robust data-rich methods that provide estimates of spawning biomass and depletion, to data-poor methods that provide estimates of recent fishing mortality but provide no estimate of stock status.

Table 2 provides guidance on how to rank stock status based on a range of assessment methods, grouped here into three categories. The examples provided here (and in Table 2) are not considered exhaustive, and RAGs should use their own discretion and expertise when determining how stock status should be characterised at Step 1 where assessment methods/outputs do not reasonably align with the examples provided. (Derived from NOAA[3], ICES (2012) and Dowling, *et al*. (2016)).

1. Robust assessments of fishing mortality (F) and biomass (B) based on fishery-independent and/or fishery-dependent data. The models utilize statistical techniques to match information about age classes to assumptions about a stock's birth, growth, and death rates to estimate a stock's current size, harvest rate, and its management reference points associated with a target reference point. These models also provide forecasts of catch and biomass that managers can use to evaluate the risk associated with a range of harvest options.
2. Empirical or index-based models providing estimates of F (based on size and/or age data) or trends in relative abundance based on as indicator such catch-per-unit-effort (CPUE) from fishery-independent (e.g., surveys) or fishery-dependent (e.g. logbooks) data. Trends are analysed over time, including how they respond to various levels of catch, to provide advice on catches that are expected to maintain the index (considered a proxy for biomass) at a preferred level (i.e., a target reference point).
3. Data-poor or weight of evidence methods are used when there is little to no knowledge of a stock's size or fishery characteristics. Estimates of F might be available, so while they cannot determine the current status of the stock, they can assess whether recent fishing pressure is sustainable. In some instances, the collective outputs of multiple data poor assessment types can be used in a 'weight of evidence' approach to provide TAC/E advice.

Assessment uncertainty and trends in abundance

The precision of stock assessments depends on the quality and quantity of data available, the complexity of the models used, and the inherent variability of the fish population itself. Generally, the risk to a resource increases as fewer data are available due to biases in the assessments and slow response times to unexpected declines in resource status (Dichmont, et al. 2016).

While species assessed using data-limited methods are inherently at more risk due to uncertainty in the assessment outputs, even those assessed using robust quantitative stock assessments can be uncertain if the assumptions around life-history parameters are erroneous or dated (Evans, et al. 2022). Similarly, climate risk assessments will become uncertain (or less reliable) over time unless assumptions about species productivity and climate drivers are reviewed or updated. In addition, new climate information will become available (e.g., improved projections of physical environmental change which could modify estimates of future productivity at all levels). This means climate projections for individual species or ecosystem will also age, potentially becoming less reflective of likely future states.

Trends in estimated biomass should also be considered. Two species might have similar estimates of biomass, however, if one has an increasing trend in biomass, and the other a declining trend in biomass, the latter should be considered higher risk. If increased variability is predicted for a species, the risk should be based upon the likely overall trend over time.

[3] https://www.fisheries.noaa.gov/insight/stock-assessment-model-descriptions#stock-assessment-models

This framework does not propose to incorporate a buffer to account for time-induced uncertainty in stock assessments or climate risks, however, to ensure a level of risk equivalency at Step 1, the RAGs should use expert judgement (or metrics where available) to determine whether time-induced uncertainty associated with the stock assessment outputs and overall trends in estimated (or proxies) warrant a change to the risk ranking.

Example: Species A is assessed using a quantitative stock assessment that incorporates a long-term time-series of fishery dependent data and biological information derived from sampling in the early 2000's. The median estimate of stock abundance is 38%B_0 – a decline from 41%B_0 at the time of the last stock assessment[4]. Assuming a target of 48%B_0 this stock would be ranked as 'medium' risk with regards to stock status (See Table 2). However, likelihood profiles suggest a broad range of plausible biomass estimates ranging 28-44%B_0. The declining trend in biomass, dated biological information, and uncertainty around the estimate of current biomass should be taken into consideration when resolving the stock status risk at Step 1. In this instance, the RAG may consider a risk ranking of 'high' more appropriate.

Guidance notes – Step 1

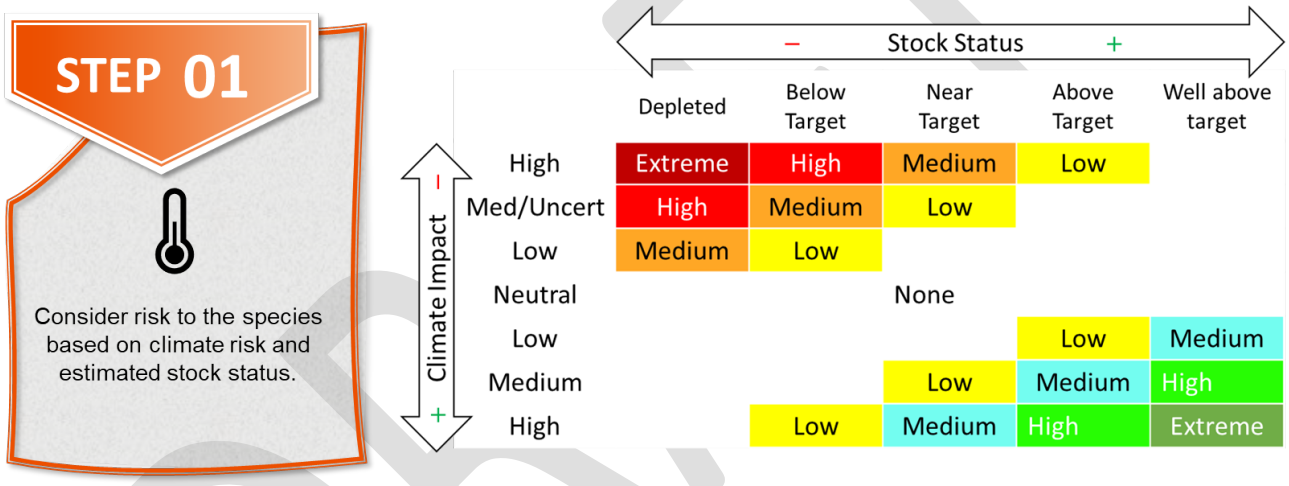

Figure 5 (Step 1) Preliminary risk rankings based on climate risk and stock status risk.

It is the role of the RAG to assess the overall risk to a species from climate risk (Table 1) and stock status risk (Table 2) using the most recent and robust information available. If two equally robust pieces of information indicate different risk rankings, the highest risk ranking should be used.

Using the matrix in Figure 5, a preliminary risk score can be determined. These progress from 'Extreme Negative' where a species is below the limit reference point and highly susceptible to climate change, to 'Extreme Positive' where a species is near virgin biomass levels and expected to benefit from climate change.

Note: Only species with a score of medium or above (positive or negative) need to progress to Step 2. Step 4 must be completed for all species.

[4] Revised in the most recent stock assessment.

Table 1 AFMA Climate Risk Framework - climate risk ranking criteria

CLIMATE RISK	1. Attribution studies or counterfactual simulations	2. Preliminary projections of change in abundance	3. Climate sensitivity assessment	4. Climate and ecosystem indicators
High	Climate change is the primary driver of stock abundance.	>20% change by 2040 with moderate to high confidence, OR >40% change with low confidence.	If projections are not available, where climate sensitivity has been rated high.	Relevant climatic or ecosystem indicators show adverse/positive signals in the near history and in short-medium term predictions
Uncertain	Where no information is available, significant uncertainty exists in available modelling and/or assessments, or both increases and decreases are considered equally possible.			
Medium	Climate change is contributing to changes in stock abundance.	10-20% change by 2040 with medium or high confidence, OR 10-40% change with low confidence.	If projections are not available, where climate sensitivity has been rated medium.	General climatic or ecosystem indicators indicate some changes to system productivity (e.g., recent marine heatwave in the fishery region)
Low	Climate Change is only a minor contributor to changes in stock abundance.	Up to 5% change by 2040 with medium or high confidence, OR 5-10% change with low confidence.	If projections are not available, where climate sensitivity has been rated low.	General climatic or ecosystem indicators indicate negligible changes to system productivity.
Neutral	Climate change does not have an influence on the stock.	Projections predict relative stability in abundance.		General climatic or ecosystem indicators indicate no change in system productivity

Table 2 AFMA Climate Risk Framework Stock Status Risk Ranking Criteria

STOCK STATUS RISK	1. Robust assessments of F and B	2. Empirical or index-based assessments	3. Data-poor methods or weight of evidence approaches
Depleted	Biomass is estimated to be below the limit reference point (LRP).	Recent index of abundance is estimated to be below the LRP. e.g., $CPUE_{REC}$ <$CPUE_{LIM}$	Available information suggests that the stock is depleted. Assessed as extreme high risk in the most recent ERA.
Below Target	Biomass is estimated to be above the LRP, but less than 75%B_{TARG}. e.g., <36%B_0 relative to a B_{48} target.	Recent index of abundance is estimated to be above the LRP but less than 75% of the TRP. e.g., $CPUE_{REC}$ < .75*$CPUE_{TARG}$.	Available information suggests the stock is not depleted or biomass is uncertain. Assessed as high risk in the recent ERA.
Near Target	Biomass is estimated to be within 25% of B_{TARG}. e.g., Between 36%B_0 and 60%B_0 relative to a B_{48} target.	Recent index of abundance is estimated to be within 25% of the TRP. e.g., $CPUE_{REC}$ is 0.75-1.25*$CPUE_{TARG}$.	Available information suggests the stock is sustainable and not subject to overfishing. Assessed as low risk in the most recent ERA
Above Target	Biomass is estimated to be more than 25% above the TRP. e.g. >60%B_0 relative to a B_{48} target.	Recent index of abundance is estimated to be more than 25% above the TRP. e.g., $CPUE_{REC}$ is >1.25*$CPUE_{TARG}$.	Available information suggests the stock has only been lightly exploited. Assessed as low risk in the most recent ERA
Well above target	Biomass is estimated to be within 25% of virgin biomass. i.e., >75%B_0.	Recent index of abundance is estimated to be more than 50% above the TRP. i.e., $CPUE_{REC}$ is >1.5*$CPUE_{TARG}$	

Step 2: Review existing mitigation and adaptation measures

Once the risk to the stock has been determined, the RAG needs to consider whether the existing science, management or industry adaptation measures in place are sufficiently responsive to the impacts of climate change, be they positive or negative. The mechanisms that are available and appropriate will depend on the fishery, species, and the sophistication of the stock assessments, harvest strategy and management arrangements.

The intent of Step 2 is to identify measures that have been taken to mitigate the risk of climate change for a species. Examples are provided here to illustrate how the impact of climate change on a species can be mitigated using measures this framework broadly refers to as 'science', 'management' or 'industry' adaptation.

There is not always a clear delineation between 'science', 'management' and 'industry' measures, as they are often intrinsically linked. For example, changes to stock assessment parameters (science) will translate to changes in TACs allocated as quota (management) which may influence fisher behaviour (industry adaptation). The examples are not exhaustive, and in some cases are still being explored as concepts. In practice, a mix of the three will exist in most fisheries. Provided these measures are sufficiently articulated, and their impact understood, the category they fall into is less important.

While many measures can be expected to reduce risk, it is important to consider the potential risks of 'maladaptive' responses. For example, fishing effort is redistributed due to shifts in stock distribution or the introduction of closures – this may increase the susceptibility of a different life history stage of the species or susceptibility of another species.

Science measures

Time-varying (or recent estimates of) life history and productivity parameters included in stock assessment models and projections. For example, high or low recruitment scenarios should be used to project future biomass where recruitment deviations show a long-term and consistent trend in recruitment success indicative of a change in productivity. These projections are typically only valid for a short period of time but are a useful way to illustrate the consequence of changes in recruitment and explore options for adjusted TACs.

Linking parameters in stock assessments to environmental variables. For example, sea-surface temperature could be used to modify the assumptions regarding life history traits, such as growth, used within a model. Careful consideration must be given to the resulting behaviour of the other standard parameter estimates.

Harvest Control Rules (HCRs). These are pre-determined rules that link the status of the fishery to management actions and typically result in more precautionary management actions if fishery status is low, or opportunistic measures if the fishery status is high. They are expected to account for uncertainties in both the current and prospective future stock status, and could include any uncertainties or observed changes that are caused by climate change (e.g., changes in species productivity, spatial distribution, ecosystems or fisheries operation). HCRs are usually selected on the basis of Management Strategy Evaluation (MSE) testing.

Management Strategy Evaluation (MSE). Compares the potential outcomes of alternative management actions across the objectives of management and can include climate scenarios when climate change is agreed to have caused, or is causing, a change. Where climate impacts are unknown, MSEs could include evidence from the fishery, or other similar fisheries, to understand the relative chance of the climate

effect occurring and the consequences to the fishery if it does occur. These are steps that are common in risk assessments, but they are not often applied to actual or potential climate change effects.

Dynamic reference points. Can be used to account for shifts in productivity. Shifts in productivity (non-stationarity) can be addressed by defining stock status (i.e., spawning biomass relative to unfished spawning biomass) using 'dynamic B_0' – the spawning biomass that would be expected in the absence of fishing. The implications of adopting a dynamic B_0 approach differs among species, with quite major changes in stock status and catch limits for some species and negligible changes for others (Bessell-Browne, et al. 2022). It has been shown that, in some cases, application of dynamic reference points can lead to a higher risk. This needs to be considered.

Ecosystem information provides context for stock assessment processes. This involves providing best available information on ecosystem and environmental properties to set the context for decision making or for any adjustments to be made to recommendations coming from stock assessments. For example, in years where environmental conditions have been poor (e.g., marine heatwaves or lower levels of primary production) then caution would be advised around any expansion of the fishing footprint or increases in recommended biological catch.

Ecosystem modelling informs stock assessment processes. This is where output from ecosystem modelling is used to modify operational considerations. For example, checking for unintended ecosystem consequences of recommendations coming from stock assessments; or considering driver interactions; or deriving time varying parameter values, reference points or exploitation rates from the ecosystem model (as has been done in a small number of systems in the USA and Scandinavia) and using that to modify what is used by (or comes from) the standard stock assessment process. Or joint climate informed "ecoviability" envelopes that look to find levels of fishing pressure that account for climate influenced productivity, economic and social objectives (as have been calculated for a small number of fisheries in Europe)**.**

Ecosystem model-based indicators. For example, ecosystem models can be used to correct target F to account for food web interactions. Another example is when recommended catches from single species assessments are selected against ecosystem measures (such as the "green band") to check for distortive pressure on ecosystem structure.

Monitoring and research. While on its own will not reduce on-the-water risk to a species, can provide fisheries scientists (and managers) with further insight to reduce uncertainty and understand risk, which then enables more tangible actions to be taken. For some species, particularly those ranked as negligible or medium risk, promoting monitoring and research may be a sufficient response to climate risk in the short-term. However, it cannot be used to reduce risk unless other measures are also in place.

For species with less sophisticated stock assessments, or no assessment at all, the RAG may choose to use less technical options to mitigate risk. These are likely to be case-specific but could include 'borrowing' attributes from species with similar life-history characteristics (e.g., in ERAs) or applying generic discounts (buffers) to assessment outputs.

Management Measures

The management measures available will also depend on the size and complexity of the fishery. In small single-species fisheries, targeted measures like closures or gear restrictions are likely to be effective mitigation options. However, in larger and more complex fisheries, particularly multi-species and multi-gear fisheries, technical interactions (the catch of a mix of species using a single gear type) may render similar options ineffective or undesirable. Positive climate impacts may not be able to be realised in multi-species fisheries with clear technical interactions. The management options listed here are not exhaustive and will be more applicable in some fisheries than others.

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Catch limits. These can be adjusted to control total mortality of a species, depending on the risk profile. Catch limits are typically derived from outputs of a stock assessment or survey followed by application of a harvest strategy and are sometimes subject to **discount factors** or **buffers** that account for uncertainty or risk. In some cases, particularly in multi-species fisheries, they can be further adjusted to minimise unintended catch of associated bycatch species.

Spatial/temporal closures. Typically designed to control catches of at-risk species by preventing fishing in an area, either permanently or at certain times of the year. While closures are particularly effective for sessile species like scallops, they can also be targeted temporally and spatially to protect vulnerable age-classes of mobile or migratory species, such as juveniles or older spawning fish. Changes in zoning, or other reductions in fishing footprint as a result of other users of the marine estate (e.g., wind farm exclusion zones) should also be considered as they may indirectly mitigate climate-fishery risks for some species. Managers should consider modifying closure boundaries as risk profiles change, or as shifts in distribution become apparent.

Flexible season dates. Allows for key biological process to occur undisturbed by fishing activity (e.g., spawning prawn migration from estuaries to the ocean) or to align with expected aggregations and promote catching efficiency (e.g. orange roughy on seamounts). Flexible season dates allow industry to adapt to climate-driven changes in the fishery.

Gear modification can include amendments to existing gear to improve selectivity (e.g., increase mesh size) or the addition of exclusion devices to prevent capture of vulnerable species (e.g., turtle exclusion devices). Gear modification may be an effective solution if climate change is known to impact a particular species or age-class.

Buffers may be considered an appropriate option to adjust the TAC/E for a stock where the risk or uncertainty has not been sufficiently dealt with elsewhere. The RAG and MAC should use their expert judgment to recommend the size of the buffer, with consideration for the following factors:

- The climate risk rating and stock status of the species,
- The impact climate change is having (or is predicted to have) on the species,
- The role of the species in the ecosystem and fishery,
- Other discounts already included in the development of the RBC, and
- Other mitigating factors in the management of the fishery (e.g., spatial closures).

There are often a mix of management controls in place for each fishery. Some are species-specific, while others are broader. The RAG and MAC should take note of the various measures in place and determine the cumulative benefits to the species.

Industry Adaptation Measures

While governments and natural resource managers consider climatic changes, many marine-dependent individuals, organisations, and user-groups in fast-changing regions of the world are already adjusting their behaviour to accommodate these (Pecl, et al. 2019). The fishing industry is constantly adapting to change – market demands, operational challenges, legislative reform, technology advancements, and certainly, climate change. Some examples are provided here to illustrate how industry could adapt to climate-driven risks in the fishery, and would be considered voluntary (i.e., not enforced by management).

Regional catch limits. Can be agreed across a fleet to allow for vulnerable populations to rebuild. While catch could be taken equally across the species distribution, industry may agree to constrain catches in some areas of the fishery without the need for formal closures or catch limits.

Gear modification. Can be an effective way of excluding non-target species or age-classes that are particularly vulnerable to climate change. These may be adopted across an entire fleet (e.g., increased mesh size) or used only by operators that work in certain parts of the fishery.

Changes to fishing effort. This can take many forms. Redistribution of effort across the area of the fishery is likely to occur as stocks shift in response to changed oceanic conditions. Industry may actually fish less days, or fish longer/harder on some days, if severe weather conditions mean there are less days when it is safe to fish.

Data collection programs. These are becoming more prevalent in Australia as the fishing industry and management agency establish co-management agreements. While this typically involves collecting traditional biological data to support stock assessments (length and age) it could also include routine collection of environmental data to support ecosystem modelling and forecasting (Souza, et al. 2023).

Switching target species may occur in response to a change in a stocks size or distribution. This may occur in a change in the species mix rather than complete species shifts.

Guidance notes – Step 2

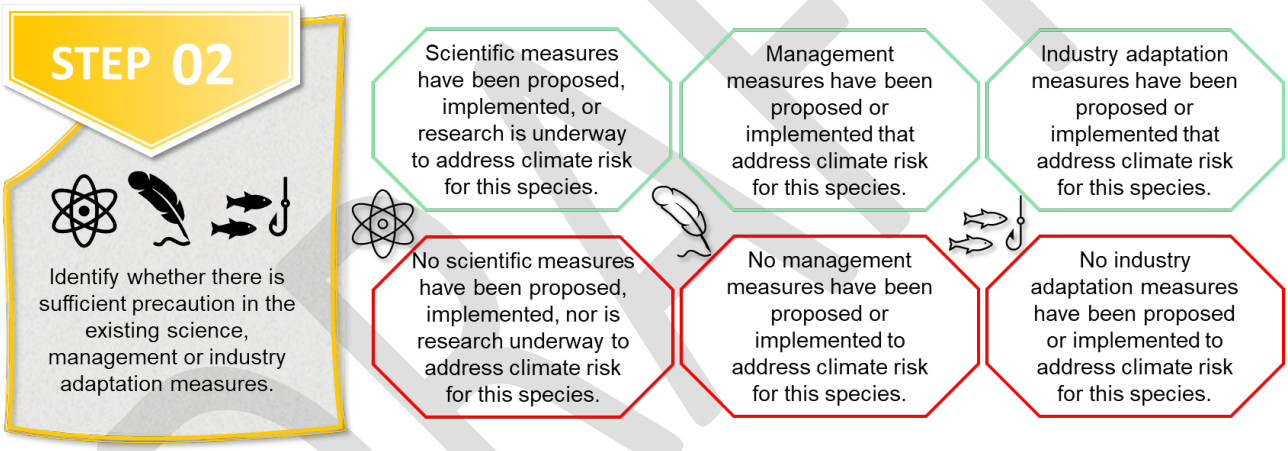

Figure 6 (Step 2) Review of existing science and management measures

The RAG should record the measures identified and how they translate to a reduction in risk for each species. This will not always be easily quantifiable, however, if there are instances where alternate scenarios have been forecast to understand their impact, this should be included. An example is provided at **Appendix A**.

Where a species is expected to benefit from climate change, the RAG and MAC should consider whether the arrangements are sufficiently responsive to potential productivity benefits. For example, can TACs be modified within season, or closures removed to allow full utilisation.

Step 3: Determine the residual risk

Once the measures in Step 2 have been recorded, the RAG and MAC need to determine the residual risk ranking. Each residual risk ranking is associated with additional guidance (Figure 7) that should inform advice provided to the AFMA Commission at Step 4.

Guidance Notes – Step 3

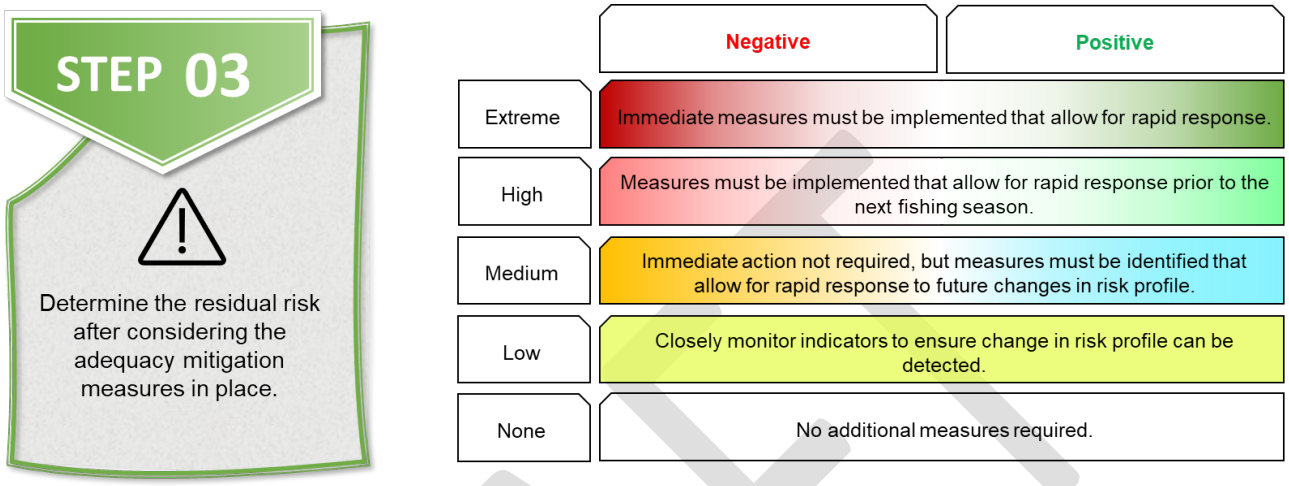

Figure 7 (Step 3) Residual risk analysis rankings and associated guidance

The risk profile can change where there are clear and demonstrable measures in place to mitigate or respond to the impacts of climate change for a species. The extent to which the risk changes is at the discretion of the RAG and MAC but should be supported by data or modelling where it is available. When providing advice to the AFMA Commission, there must be sufficient detail about how the measures identified at Step 2 are expected to take account of or mitigate the impacts of climate change. A detailed justification for each of the proposed measures will build confidence and facilitate informed decision-making by the AFMA Commission.

In some instances, it might be the case that research is underway, or measures have been proposed but are not yet implemented. In this case, the risk has not actually been treated, so the residual risk should remain the same.

If there are no measures identified in Step 2 that reduce the risk for a species, the original risk ranking will remain the same.

Some examples are provided at **Appendix B** to demonstrate how risk could be adjusted (or not) at Step 3 based on measure identified at Step 2.

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Step 4: Provide advice to the AFMA Commission

The RAG and MAC must provide advice to the AFMA Commission for each species to conclude the process. The advice can be simple for species assessed as low risk at Step 1 (where Steps 2-3 have been bypassed) and conclude that no additional measures are required. For species with higher risk rankings, advice to the AFMA Commission will be more detailed. In providing their advice, RAGs need to demonstrate and clearly articulate the reasons for that advice.

The intent of the Climate Risk Framework is to identify proportionate adjustments to mitigate climate risk. Some will be short-term measures, such as TAC reductions, while others will be longer-term, such as incorporating environmental variable in stock assessments.

Longer-term and more comprehensive adaptation plans are also being progressed by AFMA through the Climate Adaptation Program.

Guidance notes – Step 4

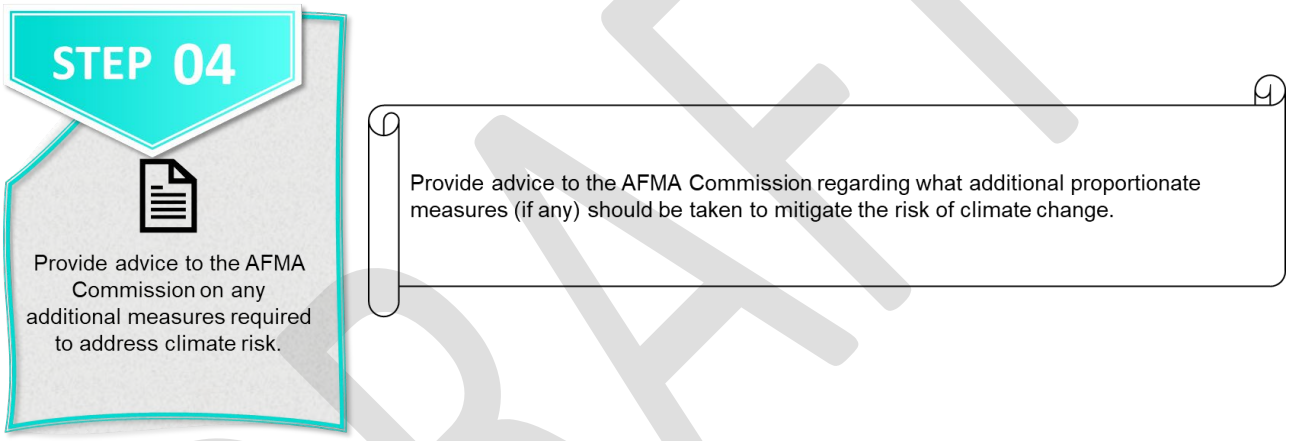

Figure 8 (Step 4) Providing advice to the AFMA Commission

A risk ranking of 'low' does not preclude the RAG or MAC from providing advice about additional measures, particularly where they are designed to reduce uncertainty or future-proof the fishery. This might include additional data collection or more frequent review of fishery indicators.

For any species with a residual risk ranking of medium or higher, the RAG and MAC must provide advice to the AFMA Commission regarding additional proportionate measures to mitigate risk to the species. For species with an extreme or high-risk ranking, particularly where the risk is associated with climate drivers, these should be tangible measures beyond application of the harvest strategy that are expected to mitigate risk.

An example is provided at **Appendix A** to demonstrate how Steps 1-4 should be recorded for each species.

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Appendix A

Species Assessment Report (Example)

Common Name	Southern Kraken
Species Name	*Piscis Fictitious*
Fishery	East Australian Squid Jig Fishery
Stock Assessment	Sverre (2022)

Step 1 – Consider risk to species based on climate risk and estimated stock status

Climate Risk	**High (Negative)** (Criteria 1) Atlantis modelling suggests that climate change has a major influence on the biomass and is contributing to a much lower biomass than would have occurred otherwise.
Stock Status Risk	**Low** (Category 1) The 2022 Tier 1 stock assessment estimated the 2023 biomass to be 44%B_0.
Overall Risk	**Medium (Negative)**

Step 2 – Identify whether there is sufficient precaution in the existing science or management setting

Science	A low recruitment scenario was used to project future catches on the basis that recruitment deviations are estimated to be below (albeit only slightly) the long-term average since 2012. Additional model sensitivities were explored: - Changing weighting on length and age data resulted in small changes to stock status estimates. - Doubling and halving weighting on the survey index resulted in large changes to total likelihood estimates but had minimal impact on stock status (41% and 49% of B_0). - All model sensitivities estimate the stock status to be at or above 40%B_0.
Management	No management measures have been proposed or implemented to respond to climate risk for this species.

Industry	Industry has implemented a voluntary move-on arrangement. If catches include large amounts of juvenile fish, vessels will steam 3nm and not return to the area for 48 hours.

Step 3 – Determine the residual risk after considering the adequacy of science and management measures in place

Residual Risk	Low **(Negative)**
Comments	Implementing the low recruitment scenario takes account of a potential shift in productivity and resulted in a lower TAC, allowing recovery towards the target reference point. While no specific management measures have been implemented (beyond a reduction to the TAC) additional industry move-on agreements should provide a level of protection to younger cohorts. The next stock assessment is scheduled for 2025 which will provide an opportunity to review the indicators and effectiveness of these measures.

Step 4 – Provide advice to the AFMA Commission on any additional measures required to respond to climate risk

Recommendation	The RAG and MAC are satisfied that the measures are proportionate to the risk identified for this species. No additional measures are required. The stock assessment will go ahead as scheduled in 2025 and the RAG will monitor fishery indicators.

Appendix B

Residual Risk Examples

Extreme → Medium (Negative): A species is ranked extreme (negative) risk because it was recently assessed as depleted (using a robust stock assessment) and is considered high risk from climate change. The stock assessment parameters were updated to include a revised estimate of natural mortality, and a low recruitment scenario was used to project biomass under various catch scenarios. A bycatch TAC was implemented based on catches that are expected to allow recovery, and a series of targeted closures were implemented to ensure total mortality is constrained. Recent catch and effort data suggests that total mortality is sufficiently low to allow recovery. This species' risk ranking could be reduced to medium because there are a number of science and management measures in place, and there is data to show total mortality has been constrained. The RAG and MAC might consider additional measures such as species-specific monitoring to closely monitor range shift and ensure spatial closures remain effective.

Medium → Low (Negative): A species is ranked medium (negative) risk because it was recently assessed as being just above the limit reference point (using an empirical stock assessment) and is considered medium risk from climate change. The default reference period in the stock assessment was adjusted and is now based on a period considered to be comparable with current environmental conditions. The RBC is based on fishing mortality that is expected to allow recovery, however, this species is primarily caught as a byproduct species, and it is unclear whether total mortality can be constrained to this level. This species could be ranked as 'low' risk and the RAG should continue to monitor total mortality.

High → High (Negative): A species is ranked as high (negative) risk because it was recently assessed as being just above the limit reference point (using an empirical stock assessment) and is considered high risk from climate change. The index of abundance has declined over the last two assessments, the estimate is considered uncertain, and the TAC is almost fully utilised. The RAG has recommended that an alternative and more robust stock assessment is pursued, and data collection has commenced. While data collection has commenced, it will be several years before the stock assessment is expected to yield results. This species should remain at high risk, and the RAG and MAC should consider additional measure to ensure risk is mitigated until a more robust assessment is available.

High → Medium (Positive): A species is ranked as medium (positive) risk because it is expected to benefit from climate change and was recently assessed as being well above the target reference point – approaching virgin biomass. The estimate of spawning biomass is derived from estimates of daily egg production (survey) and species-specific fecundity. Adult reproductive parameters used in the assessment are based on research conducted approximately 15 years ago, and there is evidence to suggest that fecundity will increase due to recent and future expected environmental conditions. The RAG and MAC may consider a short-term increase to the TAC to promote fishing and support data collection that will enable revisions to life-history parameters. Stock status should be closely monitored.

Attachment 3.1a

Guiding principles and key fishery attributes – factors that helped shape the development of the Torres Strait Spanish Mackerel Harvest Strategy	
Recommended	Consistency with the Commonwealth Fisheries Harvest Strategy Policy and Guidelines (HSP, 2018). This is consistent with objectives of the *Torres Strait Fisheries Act 1984* (the Act).
	Have regard for traditional knowledge and the ability of communities to manage fishery resources locally, through acknowledging and incorporating customary and traditional laws, recognising; Malo Ra Gelar, Gudumalulgal Sabe, Maluailgal Sabe, Kulkalgal Sabe.
	Recognise commercial fishing by traditional inhabitants is important for local employment, economic development and for the passing down of traditional knowledge and cultural lore. Enough fish need to be left in the water for future fishers to make money and to protect the traditional way of life, livelihoods and cultural values. Spanish mackerel are a shared resource important for subsistence, commercial, traditional, charter and recreational sectors. Shared stock under the Torres Strait Treaty with PNG, stock to be shared if PNG nominate to do so.
	TACs should vary according to stock status (up and down): • If biomass decreases be cautious. Stock is not to go below the limit; • If biomass is increasing be conservative; 'bank' fish.
	Having regard for the current stock size (B_{31}) and that B_{60} is not quickly achieved (possibly greater than 12 years) without significant reductions in catch which may in turn cause significant economic and social impacts on the Fishery, a shorter-term target reference point is first required.
	Torres Strait Spanish mackerel stock are assumed separate from other regional stocks. They have limited mixing with the Queensland East Coast and the Gulf of Carpentaria stocks (see Buckworth et al. 2007 and Newman et al. 2009).

	There is potential for variations in availability and abundance of Spanish mackerel in the Fishery, due to their movement, schooling and aggregation patterns for feeding and spawning, recruitment and mortality.
	Spanish mackerel are a shared resource important for subsistence, commercial, traditional, charter and recreational sectors.

Operational objectives What we want the harvest strategy to achieve.	
Recommended	Maintain the stock at (on average), or return to, a target biomass point (B_{TARG}) equal to a stock size that aims to protect the traditional way and life and livelihood of traditional inhabitants and is biologically and economically acceptable.
	Maintain stocks above the limit biomass level (B_{LIM}), or an appropriate proxy, at least 90 per cent of the time.
	Reduce fishing levels if a stock is below B_{TARG} but above B_{LIM}.
	Implement rebuilding strategies, if the stock moves below B_{LIM}.

Indicators Indicators provide information on the state of the stock and how the stock is doing against agreed reference points (reference points are addressed below and are a specified level of these indicators)	
Recommended	Biomass – Catch and effort data from daily fishing logbooks is used as a proxy for abundance in the stock assessment model which is used to calculate biomass of the stock as a proportion of unfished biomass (B_0).

Requires further development	Fishing mortality (B) based indicators. The stock assessment model can estimate a level of F to move the stock towards the target.

Reference points A reference point is a specified level of an indicator used as a basis for managing a stock or fishery. Reference points will generally be based on indicators of either the total or spawning stock size (biomass) or the amount of harvest (fishing mortality). Reference points show where we want (target) and don't want (limit) the stock levels in the fishery to be.		
Recommended	Unfished biomass (B_0) = B_{1940} = 100%.	The year 1940 is considered the start of the commercial operations in the Fishery. The unfished biomass B0 therefore is the model-estimate of spawning stock biomass in 1940.
	Target (B_{TARG}) reference point = B_{48}	B_{48}[8] is the default target (a proxy for B_{MEY} - biomass at maximum economic yield) in the Commonwealth HS Policy. FFRAG supported the B48 target reference point and outlined the following rationale for adopting this value. FFRAG noted that the most recent assessment update was estimating B MSY for the stock as being close to the Commonwealth Harvest Strategy Policy of B40 which is a commonly accepted indicator in fisheries as a target reference point for maintaining a level of biomass (not catches) focused on maximising sustainable harvest (yield) from the fishery.

[8] Comm HSP: The target reference point for key commercial fish stocks is the stock biomass required to produce maximum economic yield from the fishery (BMEY). For multispecies fisheries, the biomass target level for individual stocks may vary in order to achieve overall maximum economic yield from the fishery. In cases where stock-specific BMEY is unknown or not estimated, a proxy of 0.48 times the unfished biomass, or 1.2 times the biomass at maximum sustainable yield (BMSY), should be used. Where BMSY is unknown or poorly estimated, a proxy of 0.4 times unfished biomass should be used. Alternative target proxies may be applied provided they can be demonstrated to be compliant with the policy objective.

		Noting identified uncertainty in our data and stock assessment model there is a need to be precautionary and apply a 'buffer'. Traditional owners have also advised an objective for the fishery is to have a target biomass level that supports good catch rates. For these two reasons, a multiplier is applied to set the target biomass at a higher level than B MSY. It was noted in other fisheries this may be considered as a B MEY target reference point or proxy (to maximise economics from harvest taken) but in this fishery, B MEY is unable to be calculated without reliable price data from catches. The RAG agreed that a 20 per cent buffer would be applied to B MSY in order to set B TARG (1.2 times B MSY of B40 = B48), though consideration (based on QDAF experience) was given to alternative multipliers given work undertaken by Pascoe et al. to estimate the best proxy economic target reference point in data-poor fisheries. FFRAG considered comparisons of costs to revenue ratios and appropriate multipliers from the research but noted that the examples were not comparable with the Torres Strait Finfish Fishery. It was noted that a desktop study could be funded to calculate this optimum B MSY: B MEY point noting that setting a biomass level that is high will trade off available harvest and the number of boats active in the fishery.
	Limit reference point (B_{LIM}) = B_{20}	B_{LIM} is the spawning biomass level below which the ecological risk to the stock is unacceptable and the stock is defined as 'overfished'. This is an agreed level which we do not want the stock to fall below. B_{20} is the default limit proxy in the Commonwealth HS Policy[9].
Requires further development	Long term B TARG = B_{60}	Further analysis and advice is required on the suitability of B60 as a long-term B TARG, in comparison to other target biomass levels above B_{MSY} having regard for the biology of the species and performance of the Strategy in meeting its objectives.

[9] Comm HSP: All stocks must be maintained above their biomass limit reference point (BLIM) at least 90 per cent of the time. Where information to support selection of a stock-specific limit reference point is not available, a proxy of 0.2 times unfished biomass should be used.

		Stakeholders have recommended that the Strategy ensures enough fish are left in the water to support commercial fishing but also protect the traditional way of life and livelihoods of traditional inhabitants. Advice to date is that a higher target biomass level (referring to 60%), would increase catch rates and improve profits in the fishery over other lower reference points, such as B_{48}. RAG advice on the suitability of B_{60} against other possible higher target biomass levels is necessary. There are likely to be trade-offs between medium-term returns from the fishery (significantly reduced TAC) and longer-term returns (more fish in the water meaning less cost to catch and therefore higher returns. Also, there would be more fish in the water for other users). Quantitative analysis and/or evidence from comparable fisheries may enable more evidence-based advice and decision making on the longer-term target.

Decision Rules (*also called Harvest Control Rules*) These rules are designed to maintain and/or return the stock to the target reference point.		
Recommended	If stock falls below the limit reference point (B_{LIM}).	The Fishery is closed (all commercial fishing for Spanish mackerel is to cease) and subject to a rebuilding strategy. The nature of the rebuilding strategy will be determined on the basis of the stock assessment (to be applied immediately) and the rate of recovery (i.e. number of years to achieve a biomass greater than B_{LIM}).
	Re-opening the Fishery[10]	Following closure of the Fishery, the Fishery can only be re-opened when a stock assessment determines the Fishery to be above the biomass limit reference point.

[10] Comm HSP: Once a stock has been rebuilt to above the limit reference point with a reasonable level of certainty, it may be appropriate to recommence targeted fishing in line with its harvest strategy, which will continue to rebuild the stock towards its target reference point.

Requires further development	If the stock is above the limit reference point but below the target reference point.	The RBC is to be set at level that allows for the stock to build towards the target. Importantly the decision rule can be designed to build the stock at different rates (e.g. the number of years for the stock to build to the target reference point or the rate of building near the target or limit).
Requires further development	If stock is overfished (below B_{LIM})	Consistent with the Commonwealth HS policy the FFRAG and FFWG have recommended that commercial fishing for Spanish mackerel should cease if the stock falls below B_{LIM}. Further FFRAG discussion and advice is sought to consider additional decision rules and actions required to guide rebuilding and to trigger any necessary reviews of the HS, noting the HS should be designed to avoid the stock breaching the limit. FFRAG are to note and discuss the HS policy requirements to be included in the Spanish Mackerel HS if the stock falls below $B_{LIM:}$ a) that targeted commercial fishing for Spanish mackerel will cease b) a rebuilding strategy will be developed to build the stock above B_{LIM} with a reasonable level of certainty c) if B_{LIM} is breached while the fishery is operating in line with HS, the HS must be reviewed. Further advice to be sought on: a) A process to understand how the stock has rebuilt above B_{LIM} with certainty in the absence of commercial fishing e.g. model projections. b) whether a decision rule with a lower level of fishing pressure would be appropriate if the stock is above but close to B_{LIM}. FFRAG noted that four years would likely be the minimum possible recovery time (based on biology of the animal) to rebuild the stock back above B LIM and the existing model could be used to forecast how the stock would respond with zero catches if closed to commercial fishing.

Requires further development	Utilisation related Decision Rules (desired fishing intensity) noting a fishery may have indicators and reference points including spawning stock size (biomass) or the amount of harvest (F or fishing mortality i.e. utilisation of the resource).	Decision rules have yet not been established for harvest related performance metrics such as future 'target' catches or 'target' catch rates desired by industry per primary vessel or per TIB dory day. Given that limited catch and effort data has only recently become available from TIB sector, the HS focus has been on agreeing biomass-based reference points and decision rules. Additionally, at recent FFRAG/FFWG meetings, with regard to considering various longer-term target biomass reference points, industry expressed a strong preference for management to focus on building the biomass back to BTARG in the coming years, before exploring any other scenarios.
Requires further development	Precautionary increases to total allowable catches.	Stakeholders recommended that if the stock assessment outcomes suggested increases in the TACs, these increases should only occur slowly through some kind of change limiting rule, noting that an increased TAC would likely not affect the TIB sector with the low present level of utilisation. Stakeholder advised a preference for 'banking' these fish to contribute to the biomass and future catch rates rather than harvesting this extra stock. At a previous FFRAG/WG meeting a number of challenges were identified with applying a change limiting rule for possible TAC increases. Instead the RAG/WG placed priority on examining different building rate scenarios which may achieve this desired precautionary outcome. FFRAG are asked to confirm this approach and provide advice on how to progress change-limiting rules if necessary.

Monitoring and assessment cycle	
Recommended	Based on the most recent estimate of the stock status (0.31 times unfished biomass) and declining biomass (and CPUE) trend, a stock assessment should be performed annually until the biomass is estimated to be above B_{40}.

Requires further development	Future FFRAG advice is sought on: a) An appropriate assessment cycle when the stock is above B40 and/or methods for evaluating future assessment cycles. b) Likely data needs to support monitoring stock performance under the Strategy over time. c) Standard procedures for applying the decision rules to the stock assessment outcomes, and, any other minimum stock assessment scenarios, and/or, sensitivities. FFRAG noted that although other options balancing risk and cost might be considered, given the decline in catch rates, transitional nature of the fishery, lack of fishery independent monitoring and suggestions of environmental influences on the fishery, there is a strong rationale to conduct yearly stock assessments for Spanish mackerel. FFRAG considered that examining CPUE in intervening years between full assessments (as an alternative) would be possible as an indicator of stock health but running a full assessment using the model would be more cost effective - given that running CPUE standardisations alone does require time and resources and the accepted full model can be run. FFRAG recommended that until MSE testing had been conducted, and the stock could be demonstrated to be at or above B40 (as a B MSY proxy), yearly stock assessments are required.