Australian Government

Australian Fisheries Management Authority

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP 41

TRLRAG 41

Tuesday 9 December 2025

9am – 5pm

Wednesday 10 December 2025

9am – 5pm

TSRA Boardroom, Thursday Island

Meeting Papers

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP 41 (TRLRAG 41)

Tuesday 9 December 2025 | 9am – 5pm

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TSRA Board Room | Thursday Island

DRAFT AGENDA v2

DAY 1 – Tuesday 9 December 2025			
Agenda item	**Action required**	**Presenter**	**Time allocated**
1 Preliminaries			
Welcome and apologies	**Noting**	**Chair**	**9am** 45 minutes
The Chair will welcome members and observers to the 41st meeting of the TRL RAG.			
Adoption of agenda	**Decision**	**Chair**	
The RAG will be invited to adopt the draft agenda.			
Declaration of interests	**Decision**	**Chair**	
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 advice made on the matter which is the subject of the conflict.			
Action items from previous meetings	**Noting**	**AFMA**	
The RAG will be invited to note the status of action items arising from previous meetings.			
2 Updates from members and observers • Traditional inhabitant and industry members • Scientific and economic members • Government agencies • Papua New Guinea National Fisheries Authority • Native title	**Noting**	**All members**	**945am** 45 mins
TRL RAG members and observers are invited to provide updates on matters relevant to the Torres Strait TRL fishery, including recent fishing conditions, research, management, compliance and native title matters, including updates on fishing patterns, behaviours, prices, and market trends for the 2024-25 season and the start of the 2025-26 season.			
Morning Tea (10:30am – 11am)			
Agenda item	**Action required**	**Presenter**	**Time allocated**
3 CLIMATE ADAPTATION	**Noting and Discussion**	**CSIRO/ AFMA**	**11am** 1 hour

The RAG is invited to note:

- the 2025 Climate and Ecosystem Status report for the TRL Fishery, presented by CSIRO;
- an update on the project "Modelling climate change impacts on key fisheries in the Torres Strait to co-develop adaptation and mitigation strategies" by CSIRO; and
- an update on AFMA's Climate Risk Framework (CRF) and its potential application in Torres Strait fisheries.

Lunch (12:00pm – 12:30pm)			
4 CATCH AND EFFORT ANALYSES FOR THE 2024-25 FISHING SEASON	**Noting and Discussion**	**Fishwell Pty Ltd**	**1230pm** 1 hour

The RAG will be invited to discuss TRL fishery catch and effort data for the 2024-25 fishing season, including catch-per-unit-effort (CPUE) analyses to be presented by Fishwell Pty Ltd.

5 RESULTS OF THE NOVEMBER 2025 PRE-SEASON SURVEY	**Noting and Discussion**	**Fishwell Pty Ltd**	**130pm** 2 hours

The RAG is invited to discuss the results of the November 2025 pre-season survey to be presented by Fishwell Pty Ltd.

Afternoon Tea (3:30pm – 4pm)			
6 RECOMMENDED BIOLOGICAL CATCH 2025-26	**Recommendation**	**AFMA**	**4pm** 30 minutes

Having regard to the information and results from agenda items 3, 4 and 5, the RAG will be invited to consider the outputs of the agreed eHCR and provide advice on a recommended biological catch (RBC) for the TRL Fishery for the 2025-26 fishing season.

DAY 2 – 10 December 2025			
Agenda item	**Action required**	**Presenter**	**Time allocated**
7 Research priorities	**Recommendation**	**AFMA**	**9am** 1 hour
The RAG will be invited to discuss and provide advice on research priorities for the TRL Fishery for the 2026/27 – 2031/32 five-year period.			
8 Other business	**Discussion**	**All members**	**10am** 30 minutes
The RAG will be invited to raise any other matters for consideration. There is no agenda paper for this item.			
9 Date and venue for next meeting	**Noting**	**Chair/ AFMA**	**1030am** 15 minutes
The RAG will be invited to discuss suitable dates for the next RAG meetings.			

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 – Georgia Bourke (fisheriesti@afma.gov.au)

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
PRELIMINARIES	Agenda Item 1 For NOTING and DECISION

RECOMMENDATIONS

1. That the RAG **NOTE** an acknowledgement of Traditional Owners, the Chair's welcome address, and any apologies received from members unable to attend.
2. That RAG members and observers:
    a. **DECLARE** all real or potential conflicts of interest in the Torres Strait Rock Lobster Fishery at the commencement of the meeting (**Attachments 1a and 1b**);
    b. **DETERMINE** whether the member may or may not be present during discussion of or recommendations made on the matter which is the subject of the conflict;
    c. **ABIDE** by decisions of the RAG regarding the management of conflicts of interest; and
    d. **NOTE** that the record of the meeting must record the fact of any disclosure, and the determination of the RAG as to whether the member may or may not be present during discussion of, or recommendations made, on the matter which is the subject of the conflict.
3. That the RAG consider and **ADOPT** the draft agenda, which was circulated to members on 22 October 2025.
4. That the RAG **NOTE** the status of actions arising since TRL RAG 38 (**Attachment 1c**).
5. That the RAG **NOTE** the final meeting record for TRLRAG 40 was circulated on 13 November 2025 and is available on the PZJA website.
6. **PROVIDE ADVICE** on any new key events to be added to the TRL Management History timeline (**Attachment 1d).**

BACKGROUND

7. As at 25 November 2025, apologies were received from:
    a. Thomas Holland, Traditional inhabitant member for Maluiligal; and
    b. Trent Butcher, Industry member.

Declarations of interest

8. Consistent with the *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.
9. RAG members are asked to confirm the standing list of declared interests (**Attachments 1a and 1b**) is accurate and provide an update to be tabled if it is not.

10. FMP1 recognises that members are appointed to provide input based on their knowledge and expertise and therefore, 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.
11. 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.
12. 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 recommendation 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 recommendations by the forum, must be recorded accurately in the meeting minutes.

Adoption of agenda

13. This meeting was noted by members at TRL RAG 40 (held on 2 October 2025) with a draft agenda circulated to members on 22 October 2025 and a revised agenda on 26 November 2025.

Actions arising

14. Updates are provided on the status of actions arising from previous TRLRAG meetings at **Attachment 1c**.

Meeting record

15. The final meeting record for TRLRAG 40 was circulated on 13 November 2025 and is available on the PZJA website.

TRL Management History Timeline

16. As an action arising from TRLRAG 14 (25-26 August 2015), AFMA and CSIRO were tasked with preparing a timeline of key events that have occurred in the Torres Strait Tropical Rock Lobster Fishery.
17. The timeline is intended to be a living document, to be updated as relevant management events in the fishery occur. AFMA proposed at TRLRAG 32 that this document be a standing agenda item under Preliminaries to be updated as required.
18. The RAG is asked to provide advice on any new key events to be added to the Management History timeline since the last RAG meeting (provided at **Attachment 1d**).

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Attachment 1a

TRLRAG Declarations of interests from most recent meetings

Name	Position	Declaration of interest
Members		
Dr Tim Ward	Chair	• Associate Professor in Fisheries Science, Institute Marine and Antarctic Studies, University of Tasmania • Chair, Tropical Rock Lobster Resource Assessment Group • Scientific member, AFMA Small Pelagic Fishery Resource Assessment Group • Scientific member, AFMA Sub-Antarctic Resource Assessment Group • Scientific member, Heard Island and McDonald Island Fishery Working Group • Independent Conservation Member, GAB Trawl Fishery Management Advisory Committee • Principal Investigator, AFMA Research Projects (Blue Mackerel DEPM, Scallop Harvest Strategy) • Scientific Advisor, Principal Investigator, Department of Natural Environment and Resources Tasmania (Sardine Fishery) • Independent Conservation Scientist, South Australian Marine Scalefish Management Advisory Committee Principal Investigator, FRDC Research Projects (various)
Dr Simon Delestang	Scientific Member	Provides research advice on numerous spiny lobster fisheries, both in Australian waters and overseas. No financial interests in any fishing operation or related industry.
Dr Laura Blamey (online)	Scientific Member	Contributes to other Torres Strait research projects that receive research funding, including Torres Strait climate change and fisheries project. No other interests in the fishery.
Mr Isaac Ghee	Traditional Inhabitant Member – Kemer Kemer Meriam	TIB licence holder.
Mr David Baragud	Traditional Inhabitant Member - Kulkalgal	TIB licence holder
Mr Patrick Mooka	Traditional Inhabitant Member – Guda maluylgal	Traditional Inhabitant Member, Guda maluylgal. Zenadth Kes Fisheries member.
Mr Thomas Holland	Traditional Inhabitant Member - Maluyilgal	Apology
Mr Graham Hirakawa	Traditional Inhabitant Member - Kaiwalalgal	TIB licence holder and employed by Torres Strait Seafoods as a TRL fish receiver/processor.

Attachment 1a

Mr Brett Arlidge	Industry Member	Director and CEO of MG Kailis Pty Ltd. MG Kailis Pty Ltd is a holder of 5 TVH licences. Seafood buyer from Torres Strait, QLD and PNG TRL fisheries.
Mr Trent Butcher	Industry Member	Apology
Mr Keith Brightman	TSRA Member	TSRA Fisheries Project Manager, TSRA holds multiple TVH TRL fishing license on behalf of Torres Strait Communities but does not benefit from them. No personal pecuniary interest.
Ms Jenny Keys (online)	QDAF Member	Queensland Fishery manager of East coast tropical rock lobster fishery, aquarium and coral fisheries. Nil interests.
Mr Ryan Murphy	AFMA Member	Employed by AFMA. Senior Manager for Torres Strait Fisheries. Nil interests.
Ms Georgia Bourke	Executive Officer	Employed by AFMA. Senior Management Officer for Tropical Rock Lobster Fishery. Nil interests.
Observers		
Mr Joseph Posu	PNG National Fisheries Authority	Works in the Fisheries Management Unit responsible for managing the prawn and lobster fisheries in the Western Province. No personal pecuniary interest in the fishery.
Mr Bonny Koke	PNG National Fisheries Authority	Works in the Fisheries Management Unit responsible for managing the prawn and lobster fisheries in the Western Province. No personal pecuniary interest in the fishery.
Dr Ian Knuckey	Fishwell Pty Ltd	See **Attachment 1b.**
Mr Quinten Hirakawa	TSRA	TSRA employee, TIB license holder with a TRL endorsement.
Ms Brooke D'Alberto	Australian Bureau of Agricultural Resource Economics and Sciences	Nil interests.
Mr Daniel Takai	Zenadth Kes Fisheries Ltd	CEO of ZKF. ZKF hold a carrier C licence.
Steph Brodie (online)	CSIRO	Scientist for PZJA funded TRL research projects conducted by CSIRO.
Daniel Corrie (online)	AFMA	Nil interests.
Dr Jonathon Smart	Fishwell Pty Ltd	To be declared.

Declaration of interests
Dr Ian Knuckey – August 2024

Ian Knuckey positions:

Director –	Fishwell Consulting Pty Ltd
Director –	Olrac Australia (Electronic logbooks)
Chair –	Northern Prawn Fishery Resource Assessment Group
Chair –	Tropical Rock Lobster Resource Assessment Group
Chair –	Victorian Rock Lobster and Giant Crab Assessment Group
Chair – Group	Victorian Central Zone Abalone Fisheries Resource Advisory
Chair – Committee	Gulf of St Vincent's Prawn Fishery MAC Research Scientific
Scientific Member –	Northern Prawn Management Advisory Committee
Scientific Member – Committee	Gulf of St Vincent's Prawn Fishery Management Advisory
Scientific Member –	Tropical Tuna Resource Assessment Group
Scientific Member –	SESSF Resource Assessment Group
Member –	The Geelong Agri Collective

Fishwell current projects:

AFMA 2022-mammal interactions,	Annual monitoring, reporting and assessment of SPF marine including effectiveness of mitigation measures
AFMA 2020-0807	Bass Strait Scallop Fishery Survey – 2024/ 25
FRDC 2019-027 GABTS	Improving and promoting fish-trawl selectivity in the SESSF and
FRDC 2018-021 strategies	Development and evaluation of SESSF multi-species harvest
Traffic Project	Shark Product Traceability
Sea Cucumber Ass. surveys.	Design and implementation of various sea cucumber dive
Australia Bay	Queensland Gulf of Carpentaria Developmental Fin Fish Trawl Fishery

Attachment 1c

Actions arising from previous TRL RAG meetings

#	Action Item	Meeting	Responsible Agency/ies	Status
1.	CSIRO to discuss potential survey with NFA	TRLRAG 33 (13-14 Dec 2022)	CSIRO/NFA	**Redundant. Suggest deletion.** As CSIRO are no longer the scientific research providers for the TRL project, AFMA suggests removing this action item from the list.
2.	Ben Liddell (AFMA Observer) to provide further information to CSIRO on two migrations of TRL in the year.	TRLRAG 33 (13-14 Dec 2022)	AFMA	**Redundant. Suggest deletion.** TRLRAG 35 agreed that no further analysis was required on the interaction between the TSP and TRL fisheries.
3.	The AFMA to discuss further with TSRA on how AFMA raises and addresses compliance issues and how this may be improved, Including the possibility of employing Torres Strait Islanders in compliance roles.	TRLRAG 35 (12-13 Dec 2023)	AFMA/TSRA	**Ongoing. Suggest deletion.** This is not a RAG specific issue. AFMA suggests removing this action item from the list as it pertains to work outside of the remit of the RAG.
4.	QDPI to report back to the RAG on the total catch from the 2023 Queensland TRL fishing season.	TRLRAG 38 (10-11 Dec 2024)	QDPI	**QDPI will provide an update at the meeting.**
5.	QDPI to report back to the RAG with more information on the jurisdiction and rational for the new TRL closure.	TRLRAG 38 (10-11 Dec 2024)	QDPI	**QDPI will provide an update at the meeting.**
6.	QDPI to follow up with written advice to TSRA regarding the participation of Torres Strait Islands in the CYSWG.	TRLRAG 38 (10-11 Dec 2024)	QDPI	**QDPI will provide an update at the meeting.**
7.	AFMA to follow up missing ‘hours fished’ field from TVH records.	TRLRAG 38 (10-11 Dec 2024)	AFMA	**Complete.**

Attachment 1d

Timeline of key events in the Torres Strait Tropical Rock Lobster Fishery[1]
Last updated November 2025

Commonly used acronyms and terms:

- **FMN** means Torres Strait Fisheries Management Notice.
- **FMI** means Torres Strait Fisheries Management Instrument.
- **LN** means Logbook Notice
- **PZJA** means Protected Zone Joint Authority.
- **TRL** means Tropical Rock Lobster.
- **TRL Fishery** means the Torres Strait Tropical Rock Lobster Fishery.
- **Instrument** means the *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018*
- **Management Plan** means the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018*

Time period	Topic/Keywords	Description
Late 1960's	Fishery development	Commercial fishing for TRL by the non-Traditional Inhabitant sector began in the Torres Strait
1970s-1980s	Fishery development	Traditional Inhabitant fishers begin to enter the fishery.
Dec-1978	Treaty, PNG	Torres Strait Treaty signed
Feb-1985	Legislation, regulations, PZJA	Torres Strait Treaty entered into force, *Torres Strait Fisheries Act 1984* and *Torres Strait Fisheries Regulations 1985* commenced and the PZJA is established
Feb-1985	Regulations	Under FMN 1: • Method restrictions introduced - only diving, collection by hand and use of spear permitted
Feb-1985	PNG, catch sharing	Agreement between PNG and Australia for the joint management of the TRL fishery concluded.

[1] This is intended to be a living document and is to be updated as key events happen.

Attachment 1d

Time period	Topic/Keywords	Description
Jul-1985	Regulations	Under FMN 9 (replaced FMN 1): • Method restrictions amended to introduce a time period within which the method restrictions are in place – only diving, collection by hand and use of spear permitted between 15 Jul-31 Oct
Jan-1986	Management arrangements	Introduction of prohibition on prawn trawlers taking TRL during the annual migration period (1 Jul-31 Oct) in order to reduce fishing pressure on the lobster population - in place until 1987, when all prawn trawlers were prohibited from taking TRL
Jun-1986	Regulations	Under FMN 12 (replaced FMN 9): • Method restrictions amended to change the dates between which methods are restricted – only diving, collection by hand and use of spear permitted between 1 July - 31 October only
Mar-1988	Regulations	Under FMN 19: • Introduction of prohibition on the take, processing or carrying of TRL by boats with a prawn endorsement
Jun-1988	Regulations	Under FMN 22: • Minimum size limit introduced - 100 mm tail length
Oct-1988	Regulations	Under FMN 24 (replaced FMN 12): • Method restrictions amended - only diving, collection by hand and use of spear permitted, no underwater breathing apparatus except hookah, no underwater mechanical propulsion • Introduction of exemption which can be sought for some method restrictions, specifically the use of underwater breathing apparatus and underwater mechanical propulsion • Traditional fishing bag limits introduced - 3 per person up to 6 per boat
October 1988	Management objectives	PZJA agrees to six key management objectives for the fishery: - To conserve the stock of tropical rock lobster - To maximise the opportunities for traditional inhabitants of both countries to participate, including by managing the fishery for tropical rock lobster as a dive fishery - To promote the dive fisheries for tropical rock lobster in Torres Strait - Encouragement and facilitation of participation by Australian traditional inhabitants for whom future expansion of the fishery should be reserved - Containment of the capacity of the existing commercially licensed fleet and elimination of entrepreneurial speculation and subsequent upgrading/replacement of commercially licensed dinghies with large boats

Attachment 1d

Time period	Topic/Keywords	Description
		- To minimise impact of any new management measures on existing operators.
March 1989	Traditional Inhabitant access, identification, definition	Tropical Rock Lobster Working Party agrees to Island Coordinating Council suggestion that "amnesty" Papua New Guineans be considered Traditional Inhabitants for fisheries management purposes. Following this, PZJA agrees to "measures to be used for identifying those Papuans resident in Torres Strait who should be treated as Australian traditional inhabitants for all fisheries management and enforcement purposes, including community fishing rights" in the fishery.
Aug-1989	Regulations	Under FMN 31 (replaced FMN 24): • No substantive changes to FMN 24
November 1989	PNG, catch sharing, cross-endorsement	Catch-sharing arrangements for the fishery agreed by PNG and Australia. 27 PNG lobster dinghies to be allowed to operate in Australian TSPZ waters, while Australian operations in PNG waters are precluded.
1989	Management arrangements, fishery surveys	Fishery independent surveys commence in the TRL Fishery
February 1990	PNG, catch sharing, cross-endorsement	Catch-sharing arrangements come into effect 15 February, but no PNG boats begin fishing.
Oct-1990	Regulations	Under FMN 34 (replaced FMN 22): • No substantive changes to FMN 22
1991-1992	Traditional Inhabitant access, identification, definition	PZJA establishes a working group to consider the involvement in PZJA fisheries of Torres Strait Islanders and Aboriginals living in the Northern Peninsula Area of Cape York and Australian citizens of Papua New Guinean origin.
June 1991	PNG, catch sharing, cross-endorsement	Cross-endorsements issued to 4 PNG mother ships with 18 dinghies on 14 June. PNG boats agreed to respect home reefs closures, not go ashore on Australian territory, and make no contact with Australian inhabitants, Australian vessels, or PNG traditional fishers.
Jun-1992	Native title	Mabo High Court decision recognises existence of native title (Aboriginal and Torres Strait Islander rights and interests to land and waters according to their traditional law and customs)

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Time period	Topic/Keywords	Description
1993	Community licensing	Concerns about the current licensing systems run by the PZJA and Queensland for community fishing begin to be raised by Island Coordinating Council. Concerns include that Traditional Inhabitants living outside the Island Coordinating Council area are excluded from obtaining licences, the administrative and financial burden placed on island councils by the systems, a lack of detailed information to inform fisheries management decisions, and the fact that island chairmen rather than individual fishers are legally responsible for any fishing violations.
February 1993	PNG, catch-sharing, cross-endorsement	New PNG catch-sharing arrangements commence on 15 February 1993 for a three-year period to 14 February 1996. Allow for cross-endorsement of 27 PNG dinghies and associated freezer boats. Nominations received for cross-endorsement of 3 PNG TRL freezer boats with 27 associated dinghies.
Oct-1993	Regulations	Under FMN 38 (replaced FMN 31): • Introduction of prohibition on taking TRL using hookah between 1 Oct-30 Nov • Traditional fishing bag limits amended - 3 without a boat, 3 with 1 person in a boat, 6 with more than 1 person in a boat • All other requirements remained unchanged - method restrictions
Dec-1993	Native title, legislation	*Native Title Act 1993* commences, legislating the framework for recognition of native title (including over maritime areas) in Australia following the High Court's Mabo decision. The Act covers the determination of whether native title exists, acts affecting native title, and compensation for acts affecting native title.
1994	Logbooks	Noted under LN 8: • Tropical Rock Lobster Logbook TRL02 implemented – voluntary, records frozen tails only
1994	Legislation, TSRA	Torres Strait Regional Authority established under the *Aboriginal and Torres Strait Islander Commission Act 1989*
April-June 1995	Single jurisdiction, licensing	PZJA establishes Task Force to investigate the feasibility of introducing single jurisdiction fisheries management and to advise on matters such as eligibility criteria for entry to the newly created fisheries. Investment warning is issued.
Jul-1995	Regulations	Under FMN 42 (amended FMN 38): • No changes to regulation of fishing provided under FMN 38. Amendments made to correct a drafting error that excluded several words from the section relating to bag limits for traditional fishing.
October 1996	Single jurisdiction, licensing,	PZJA endorses single jurisdiction (the management of all Torres Strait fisheries by the PZJA, rather than a division of responsibility between the PZJA and the Queensland government) and the Task Force's

Attachment 1d

Time period	Topic/Keywords	Description
	community licences, TIB licensing	recommendations for licensing reform. Due to opposition from Islander representatives, related to broader issues such as autonomy and the desire for a regional agreement for Islander control over Torres Strait waters, the implementation of these reforms was delayed and then boycotted until agreement was reached in 1999.
Mar-1997	Regulations	Under FMN 44 (amended FMN 38): • Method restrictions amended - only collection by hand, use of spear or other handheld implement permitted, no underwater breathing apparatus except hookah, no underwater mechanical propulsion
May-1997	Logbooks	Under LN 8: • Tropical Rock Lobster Logbook TRL03 implemented – both TRL02 and TRL03 mandatory for boats with freezing capacity, records both live and frozen tails
Apr-1998	Regulations	Under FMN 48 (replaced FMN 34): • Minimum size limits amended - 80 mm carapace length, 100 mm tail length
1999	Traditional Inhabitant access, identification, definition	PZJA agrees that children of “amnesty” Papua New Guineans be considered Traditional Inhabitants, following the 1989 decision to include “amnesty” people within the definition of Traditional Inhabitants.
July-December 1999	Single jurisdiction, licensing, community licences, TIB licensing	Islander representatives propose a series of principles to underlie community licensing, consistent with the previously proposed system.
Apr-2000	Single jurisdiction, licensing, community licences, TIB licensing	Following a meeting between the PZJA and Islander representatives, the Traditional Inhabitant Boat (TIB) licence is introduced for a one year trial period.
Nov-2001	Regulations	Under FMN 58 (replaced FMN 38, 42, 44, 48): • Introduction of fishery closure from 1 Oct-30 Nov (revoking previous prohibition on taking TRL using hookah between 1 Oct-30 Nov). Exemption from closure but bag limits apply - 3 without a boat, 3 with 1 person in a boat, 6 with more than 1 person in a boat

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Time period	Topic/Keywords	Description
		• Introduction of prohibition on taking or carrying of TRL while using, or in the possession of, hookah gear between 1 Oct-31 Jan • All other requirements remained unchanged - method restrictions, minimum size limits
2002	Legislation, TSRA, PZJA	*Torres Strait Fisheries Act 1984* is amended to make the Torres Strait Regional Authority Chairperson a member of the Protected Zone Joint Authority
Nov-2002	Latent effort, fishery participation	A 30% reduction in the number of tenders attached to each non-Traditional Inhabitant licence package was implemented, except where only 1 tender exists, in which case the tender will be entitled to continue working. This was done in order to reduce latent effort in the fishery and restrict expansion of effort by non-Traditional Inhabitant fishers. This arrangement was in place until 2011.
November 2002	Traditional Inhabitant access, Skehill report, management objectives	Skehill report – "A Fair Share of the Catch" – is delivered, evaluating Torres Strait fisheries and establishing an order of priority for their management. Recommends Traditional Inhabitants be given priority of access to the TRL Fishery.
Dec-2002	Regulations	Under FMN 62: • Introduction of prohibition of processing or carrying TRL meat removed from the shell on a boat. Exemption provided for traditional fishing.
Dec-2003	Latent effort	Cap on Traditional Inhabitant licences for boats greater than 6 m with a TRL Fishery endorsement – in place until 2006
2003	QLD East Coast Fishery	Size limit increased to 90mm carapace length and 115m tail length. Seasonal to be in place from 1 October to 31 January implemented.
Late 2003	Logbooks	Torres Strait Seafood Buyers and Processors Docket Book (TDB01) implemented – voluntary
Jun-2003	Logbooks	Under the *Torres Strait Fisheries Logbook Instrument No. 1*: • Tropical Rock Lobster Logbook TRL04 implemented – mandatory for all non-Traditional Inhabitant operators
Jan-2005	Management arrangements	Moon-tide hookah closures (a periodic closure on the use of hookah gear three days either side of the full or new moon each month during between Februrary and September) introduced – first implemented in 2005 as a way to reduce fishing effort to levels recorded in 2002. In 2013 the closures were removed following a buy-out

Attachment 1d

Time period	Topic/Keywords	Description
		of non-Traditional Inhabitant licences however were reintroduced in 2014 following agreement from both the sectors, and continue to date
Jul-2005	Management plan	PZJA agreed to create a plan of management to implement a quota management system in the fishery.
July 2005	Allocation	PZJA agrees to transition to initial 50:50 sectoral split in the fishery, brought about by government funded buyout, with a later goal of a 70:30 split between Traditional Inhabitants and non-Traditional Inhabitants, funded by an "open market and self-funded tender process".
2006	TAC	Notional total allowable catches implemented (notional as allocation had not yet been undertaken nor a management plan developed)
Mar-2006	Regulations	Under FMN 73 (replaced FMN 58, 62): • Introduction of fishery closure from 1-30 Nov (revoking previous fishery closure from 1 Oct-30 Nov). Exemption from closure for traditional fishing only but bag limits apply - 3 without a boat, 3 with 1 person in a boat, 6 with more than 1 person in a boat • Introduction of prohibition on carriage of diving equipment between 1900-0600 AEST. Exemption can be sought, but all diving equipment (face mask and fins) in possession of that person, or on board the boat, is stowed and secured during the prohibited hours. ES states that this was implemented in response to concerns that night diving may occur in the Fishery • All other requirements remained unchanged - method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions
April 2006	IAAP, allocation	PZJA agrees to create an Independent Allocation Advisory Panel (IAAP) to advise on the appropriate basis for the allocation of fishing concessions in the non-Traditional Inhabitant sector.
Sep-2006	Regulations	Under FMN 80 (replaced FMN 73): • Correction made to error in FMN 73 regarding the fishery closure, reinstated to 1 Oct-30 Nov. Exemption from closure for traditional fishing only but bag limits apply - 3 without a boat, 3 with 1 person in a boat, 6 with more than 1 person in a boat • All other requirements remained unchanged - method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions, prohibition on carriage of diving equipment between 1900-0600 AEST
Jun-2007	IAAP, allocation	PZJA agrees to final Independent Allocation Advisory Panel (IAAP) report and a sectoral catch share ratio of 35:65 between the Traditional Inhabitant and non-Traditional Inhabitant sectors as detailed in the 'Report to

Attachment 1d

Time period	Topic/Keywords	Description
		stakeholders on the data used to establish the historical catch ratios of the Community and non-community sectors'
Apr-2008	Buyback, structural adjustment	Australian Government buy-back of non-Traditional Inhabitant licences. 13 primary licences and 29 associated tenders removed from the TRL Fishery. Based on the provisional allocations associated with the 'bought-out' licences the sectoral catch share between the Traditional Inhabitant and non-Traditional Inhabitant sectors changed to 53.5:46.5.
2008	Conversion factor	TRL tail to whole weight conversion ratio (2.677) implemented
2009	Harvest strategy	Interim Harvest Strategy implemented for the TRL Fishery in response to the planned transition to a quota management system, laying out the biological objectives for the fishery and how this could be achieved.
Mar-2010	Environment	Torres Strait coral bleaching event
Aug-2011	Regulations	Under FMI 9 (replaced FMN 80): • Application of arrangements extended to PNG Treaty endorsed operators • All other requirements remained unchanged – method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions, prohibition on carriage of diving equipment between 1900-0600 AEST, fishery closure. FMI 9 was intended to amend an administrative oversight that had excluded cross-endorsed fishers from the provisions of FMN 80.
Apr-2012	Buyback, structural adjustment	Based on a further buy-out of one licence (1 primary and 1 tender) the sectoral catch share between the Traditional Inhabitant and non-Traditional Inhabitant sectors changed to 56.2:43.8
7-Aug-2013	Native title, sea claim	The High Court hands down decision regarding Torres Strait Sea Claim Part A. The decision overturned the Full Federal Court decision from March 2012 and found that the native title rights in the sea claim area include the right to take fish for commercial or trading purposes. This was found to be a non-exclusive right, and native title holders are still required to hold the appropriate licences and abide by the relevant laws and regulations.
2014	Fishery participation, Traditional Inhabitant access, 100% ownership	The Protected Zone Joint Authority acknowledges and supports the aspiration of Torres Strait Communities to own 100% of access to commercial Fisheries in the Australian area of the Torres Strait Protected Zone

Attachment 1d

Time period	Topic/Keywords	Description
May-2014	Native title	Malu Lamar (Torres Strait Islander) Corporation is appointed as the Registered Native Title Body Corporate for the Sea Claim Area Part A.
Mar-2016	Environment	Torres Strait coral bleaching and sea cage mortality event
Oct-2016 to Oct-2017	Buyback, structural adjustment	Based on a further buy-out of three licences (3 primaries and 7 tenders) the sectoral catch share between the Traditional Inhabitant and non-Traditional Inhabitant sectors changed to 66.17:33.83
Jul-2017	Vessel monitoring	Vessel monitoring system (VMS) implemented – mandatory for primary boat and/or operating with a Carrier Boat License (Class A, B, or C). Vessels operating for freight shipping are exempt from installing VMS. Exemptions may also be provided for carrier vessels that are six meters or less in length.
Dec-2017	Logbooks	Torres Strait Fisheries Catch Disposal Record (TDB02) implemented – mandatory for all Torres Strait licence holders
10-Apr-2018	Management arrangements	Following a low Recommended Biological Catch, additional moon-tide hookah closures introduced covering all new and full moon periods for the remainder of the 2017-18 fishing season, in order to slow down fishing effort and provide the TIB sector with the longest possible fishing season, avoiding an early closure of the fishery.
27-Apr-2018	Management arrangements, hookah	Prohibition on the carriage and use of hookah gear for the remainder of the 2017-18 fishing season.
29-Jun-2018	Management arrangements, hookah	Federal Court of Australia order to revoke prohibition on the carriage and use of hookah gear – reverted to additional moon-tide hookah closures.
20-Jul-2018	Regulations	Under the TRL Management Instrument 2018 (replaced FMI 9): • Traditional fishing bag limits removed. Noted that PZJA does not have jurisdiction in relation to traditional fishing conducted by Traditional Inhabitants • Introduction of capacity to close the TRL Fishery early to commercial fishing, when the total allowable catch is reached • Introduction of capacity to prohibit the use of hookah gear (i.e. moon-tide hookah closures) during the hookah season (1 Feb-30 Sep)

Attachment 1d

Time period	Topic/Keywords	Description
		• All other requirements remained unchanged – method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions, prohibition on carriage of diving equipment between 1900-0600 AEST, fishery closure
31-Jul-2018	Management arrangements	TRL Fishery closed for the remainder of the 2017-18 fishing season due to total allowable catch being reached.
1-Dec-2018	Management plan	*Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* commenced
1-Dec-2018	Regulations	Under the TRL Management Instrument 2018 (amendment to Jul-2018 Instrument): • Ability to close the TRL Fishery early to commercial fishing revoked • Implementation of a split of the total allowable catch for the TRL Fishery between the Traditional Inhabitant (66.17% of the total allowable catch) and non-Traditional Inhabitant sectors – applied from 1 Dec 2017-30 Sep 2018 only • Introduction of capacity to close of the TRL Fishery to the Traditional Inhabitant sector once their part of the total allowable catch is reached – applied from 1 Dec 2017-30 Sep 2018 only • Provide for individual transferrable quota arrangements to be established for the non-Traditional Inhabitant sector via licence conditions – applied from 1 Dec 2017-30 Sep 2018 only • Provide for the operation of the proposed Management Plan should the quota allocation process be finalised before the start of the 2019-20 fishing season • All other requirements remained unchanged – method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions, prohibition on carriage of diving equipment between 1900-0600 AEST, fishery closure, moon-tide hookah closures
16-Sep-2019	Management plan, allocation	Quota units allocated under the Management Plan: • 662,016 quota units to the Torres Strait Regional Authority (TSRA) comprising: 562,000 to hold for the benefit of the traditional inhabitant sector; and 100,016 for the TVH licences it holds • 337,981 quota units to the remaining TVH principal licence holders
19-Nov-2019	Harvest strategy	PZJA adopts final Harvest Strategy for the TRL Fishery
1-Dec-2019	Management plan, management arrangements	TRL Fishery commences operation under a quota management system as per the Management Plan

Attachment 1d

Time period	Topic/Keywords	Description
Early 2020	Markets, price, export	• Live export market into China closed temporarily prior to 2020 Chinese New Year. • Prices in the fishery were down significantly, similar to lowest prices on record in 2002-03. • TVH boats in Torres Strait and QLD East Coast were forced to stop fishing. • Whole frozen product only purchased at reject prices. • COVID-19 impacts affect flights and freight routes from Australia to Asian markets
~ October 2020	Markets, export, Cadmium	China began to increase inspection levels and testing of cadmium in Australian live lobster at the point of entry in major Chinese ports, causing considerable delays while inspection and testing was being undertaken. This resulted in high mortality rates of lobster product (not Torres Strait product).
November 2020	Markets, export	China formally notified the DAWE of two instances of non-compliance of lobster shipments with detections of cadmium above the maximum levels set by the Chinese Government.
November 2020	Management Plan, allocation	The PZJA (meeting 36) agreed to amend the TRL Management Plan to provide the PZJA with additional time in which to commence a review of the allocation of quota units to the Traditional Inhabitant sector, to within 4 years of the Plan commencement.
December 2020	Markets, export	China banned the import of Australian lobster product
December 2020	Wildlife Trade Operation	On 4 December 2020 the TRL Fishery was re-accredited as an approved Wildlife Trade Operation (WTO) under the *Environment Protection and Biodiversity Conservation Act 1999*.
December 2023	Wildlife Trade Operation, LENS	In October 2023 the TRL Fishery was re-assessed under the *Environment Protection and Biodiversity Conservation Act 1999* and added to the List of Exempt Native Specimens (LENS). Coming into force on 4 December 2023, this allows extended export approval though to 4 December 2033.
April 2024	Cross-endorsement	For the first time in ten years, the first PNG licenced boats with Treaty Endorsements commenced their first cross-endorsed fishing trips in the Australian jurisdiction of the TRL fishery. The boats *FV Jupiter* and *FV Dinh Thang* undertook 4 and 5 fishing trips respectively, with their last trip of the season completed on 2 July 2024.
October 2024	Markets, export	Announcement that China would lift its four-year import ban on Australian rock lobsters. This did not address the specific protected species listing of Tropical Rock Lobsters.
December 2024/January 2025	Markets, export	Trade of Australian rock lobsters (excluding TRL) resumed in late December 2024 with shipments beginning in January 2025.

Attachment 1d

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
UPDATES FROM MEMBERS	Agenda Item 2 For NOTING

RECOMMENDATIONS

1. That the RAG **NOTE** updates provided by:
    a) Traditional inhabitant and industry members;
    b) Scientific members;
    c) Government agencies, including a written update from AFMA management (**Attachment 2a**);
    d) Papua New Guinea National Fisheries Authority (PNG NFA) representatives; and
    e) Native Title body representatives (if in attendance).

BACKGROUND

2. Verbal reports are sought from traditional inhabitant and transferrable vessel industry and scientific members under this item, with particular emphasis on market and export impacts to the current 2023-24 fishing season.
3. It is important that the RAG develops a common understanding of any strategic issues, including economic, fishing and research trends relevant to the management the TRL Fishery. This includes within adjacent jurisdictions. This ensures that where relevant, the RAG can have regard for these strategic issues and trends.
4. RAG members are asked to provide any updates on trends and opportunities in markets, processing and value adding. Industry is 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 in future.
5. Government agency members are asked to provide updates relevant to the TRL Fishery. Specific AFMA updates are provided in **Attachment 2a.**
6. AFMA has a standing invite for officials from the PNG National Fisheries Authority (NFA) and a Native Title Body representative to attend all PZJA advisory committee meetings. If in attendance, updates are welcome from these participants.

UPDATE FROM AUSTRALIAN FISHERIES MANAGEMENT AUTHORITY

ABARES fishery status report 2025

1. 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 stock and the economic status of fisheries managed, or jointly managed by the Australian Government (Commonwealth fisheries).
2. The latest ABARES Fishery Status Report 2025 (covering the performance of fisheries in 2024) have now been released. The reports assess all key commercial species from Commonwealth managed fisheries and examines the broader impact of fisheries on the environment, including on non-target species.
3. The ABARES website now has a new interactive dashboard that allows readers to filter and display stock status data from 1992 to 2024 at different levels including by stock, species group, fishery, year, or whether solely or jointly-managed by the Australian Government. The fishery status reports can be accessed on the ABARES website at:

https://www.agriculture.gov.au/abares/research-topics/fisheries/fishery-status

4. In summary, the TRL Fishery has been assessed for the 2024 period as outlined below.

Table 16.1 Torres Strait Tropical Rock Lobster Fishery – biological status

Stock	Fishing mortality 2023	Biomass 2023	Fishing mortality 2024	Biomass 2024	Comments
Tropical rock lobster (*Panulirus ornatus*)	Not subject to overfishing	Not overfished	Not subject to overfishing	Not overfished	Fishing mortality is less than the recommended biological catch. Spawning stock biomass is above the target reference point.

Australian Government priority to improve productivity growth

5. As requested by the Australian Government Treasurer and Minister for Finance, AFMA has provided advice to the Government on regulatory reform opportunities within fisheries that may contribute to improving Australia's productivity growth. The Government made clear that any suggested opportunities "should be concrete and tangible, have an identifiable implementation pathway, be able to be delivered within existing resources, and not compromise core regulatory objectives and protections". In preparing its advice AFMA consulted the Commonwealth Fisheries Association.
6. In addition to the initiatives AFMA has identified, the Government's prioritisation of improving productivity presents a broader opportunity for AFMA by reinforcing AFMA's desired approach to be innovative and responsive in the way it conducts its business. Without comprising AFMA's regulatory obligations, AFMA expects its MACs and RAGs to also consider opportunities to support productivity improvements when developing management advice.

Ministerial Statement of Expectations

7. The Minister for Agriculture, Fisheries and Forestry has issued AFMA her expectations of AFMA in managing Commonwealth fisheries. Ministerial Statements of Expectations (SOE) are issued by the responsible minister to a regulator to provide greater clarity about

government policies and objectives relevant to the regulator in line with its statutory objectives, and the priorities the minister expects it to observe in conducting its operations. Statements of Expectations are updated with every change in Minister.

8. The Minister's expectation reinforces the important of AFMA existing priorities and align with the Government's productivity agenda. In due course AFMA will reply to the Minister with it's Statement of Intent (SOI). A SOI outlines how the regulator intends to meet the SOE including how it will demonstrate progress.

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
CLIMATE ADAPTATION	Agenda Item 3 For Discussion and Advice

RECOMMENDATIONS

1. That the RAG:

   a) **NOTES** information in the draft 2025 Climate and Ecosystem Status Report for the Tropical Rock Lobster (TRL) Fishery (**Attachment 3a**), to be presented by Stephanie Brodie (CSIRO);

   b) **PROVIDES ADVICE** on any additional climate or ecosystem observations to be included in the final version of the report;

   c) **NOTES** that following a three-year iterative development and trial process, the Climate Risk Framework (CRF) was approved by the AFMA Commission in September 2025. AFMA will engage with the PZJA (including PZJA agencies) regarding the application of the CRF to Torres Strait fisheries.

KEY ISSUES

Climate and Ecosystem Status Reports

2. Climate and Ecosystem Status Reports are prepared by CSIRO for key Commonwealth and Torres Strait fisheries to support discussions on climate and environmental variables that may influence fisheries.

3. The draft 2025 Climate and Ecosystem Status Report for the TRL Fishery (**Attachment 4a**) incorporates readily accessible indicators and forecasts of environmental variables relevant to this fishery and is to be used as contextual information when considering stock assessments and recommending Total Allowable Catches (TACs). The 2025 report is the third status report for the TRL Fishery with the first developed in consultation with the TRLRAG in 2023. The information in the report is general and preliminary in nature, to support discussion and feedback on more relevant indicators and information. This report has, and will continue to be, refined over time based on RAG and Working Group (WG) feedback, and building upon relevant research as it becomes available.

Climate Risk Framework

4. AFMA has finalised the Climate Risk Framework (CRF) following an extensive development and trial process. This trial included the application of the draft Framework to the TRL Fishery. Endorsed by the AFMA Commission at its September 2025 meeting, the final CRF has been published alongside the Trial Implementation Report, which captures key outcomes and insights from its trial application across a range of AFMA-managed fisheries. The final CRF and Trial Implementation Report are available on the AFMA website at http://www.afma.gov.au/climate-change.

5. The CRF employs a four-step process designed to:
    a. Evaluate the overall risk to the species, integrating climate change impacts with the stock's biological status, using the best available information.
    b. Identify current science, management or industry measures that offer sufficiently robust responses to the full spectrum of climate change impacts, both positive and negative.
    c. Evaluate the impact of response measures identified at Step 2 and determine the residual risk remaining to the species.
    d. Where necessary, recommend to the AFMA Commission any additional measures needed to respond to climate change impacts.
6. The CRF will be progressively implemented across Commonwealth fisheries in the coming three years. AFMA will engage with the PZJA (including PZJA agencies) regarding the application of the CRF to Torres Strait fisheries.

BACKGROUND

AFMA's Climate Adaptation Program

7. Climate and Ecosystem Status Reports and the CRF are just two elements of AFMA's broader Climate Adaptation Program. The Program is implementing a range of measures to incorporate climate change information and risks into AFMA's decision-making frameworks, to ensure that management of fisheries is adaptive to the impacts of climate change. Other elements of the program are detailed below.

Regional and fishery summaries

8. A range of regional and fishery summaries are available on the AFMA website that provide information on expected impacts of climate change on AFMA-managed fisheries.

Climate Adaptation Handbook

9. In 2021, AFMA and CSIRO developed the Climate Adaptation 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.
10. 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. While this project was developed for Commonwealth fisheries, the process described in the handbook can be equally applied to fisheries managed by all jurisdictions, including Torres Strait fisheries, where the need is identified.

Supporting and promoting research

11. AFMA has been working with CSIRO and FRDC over a number of years to improve our understanding of climate impacts on AFMA-managed fisheries, including Torres Strait fisheries. In 2021, the Guidance on Adaptation of Commonwealth Fisheries management to climate change project (FRDC project 2016-059) was completed, providing key adaptation resources including climate sensitivity analyses and preliminary projections of

change under future climate change scenarios for all AFMA-managed fisheries. The key findings of this project have previously been considered by the RAG, and in summary include:

a. Climate sensitivity analyses – for selected species in Torres Strait fisheries, climate sensitivity assessments and biomass trajectories from species distribution models and various ecosystem models.

b. Regional projections for Northern Australia – predictions of a range of climate-related changes across Northern Australia.

12. The following projects relevant to Torres Strait fisheries are currently underway:

a. Funded by the TSRA and CSIRO, the 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. Updates will be provided to the RAG as the project progresses.

b. Funded by the FRDC, the Futures of Seafood project (FRDC project 2023-092) will update the modelling of climate change impacts undertaken as part of FRDC project 2016-059. The RAG will be updated as results become available.

13. A range of other projects have been undertaken in recent years which also examine the impacts of climate change on Torres Strait fisheries:

a. Climate variability and change relevant to key fisheries resources in the Torres Strait – a scoping study (AFMA project) – completed in 2020, this project compiled background information and reviewed 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), BDM, finfish, prawns, turtles and dugongs), and potential effects of climate change on these environmental drivers. The review informed the development of technical specifications for a data framework, needed to support further examination of the impacts of climate change on Torres Strait fisheries.

b. Assessing the vulnerability of Torres Strait fisheries and supporting habitats to climate change (AFMA project 2013/014) – completed in 2013, this project conducted a vulnerability assessment for 15 key species in Torres Strait fisheries.

c. An Integrated Management Strategy Evaluation (MSE) for the Torres Strait Rock Lobster *Panulirus ornatus* fishery[1] (AFMA project 2012/810) – completed in 2012, MSE was undertaken to integrate climate change into the TRL stock assessment.

d. Models of Intermediate Complexity of Ecosystems (MICE) have been applied to TRL in the Torres Strait and used in the following projects:

[1] 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.

(i) completed in 2018, Environmental drivers of variability and climate projections for the Torres Strait tropical lobster *Panulirus ornatus*[2] (AFMA project 2017/816).

(ii) completed in 2018, Decadal scale projection of changes in Australian fisheries stocks under climate change (FRDC project 2016-139).

e. TRL stock assessment model sensitivity analyses when explicitly incorporating climate change influences on survival and growth – presented to TRLRAG meetings, reports for AFMA project 2019/825[3] and Management implications of modelling fisheries recruitment.

[2] 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.

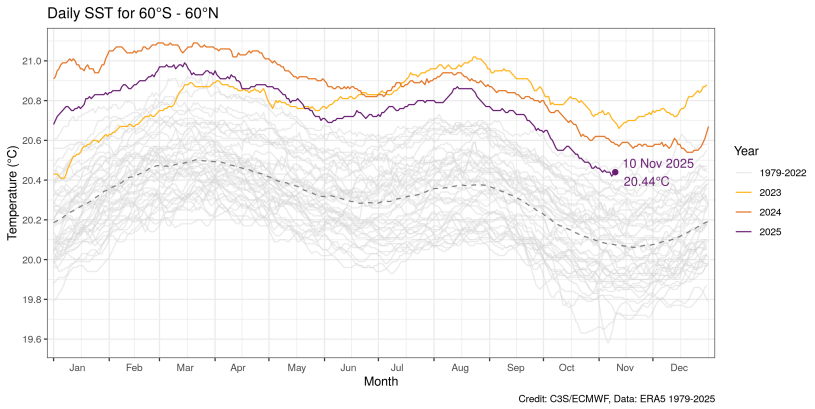
[3] Plagányi, É., Tonks, M., Murphy, N., Campbell, R., Deng, R., Edgar, S., Salee, K., Upston, J. (2020) Torres Strait Tropical Rock Lobster (TRL) Milestone Report 2020 on fishery surveys, CPUE, stock assessment and harvest strategy: AFMA Project R2019/0825. May 2020 Draft Final Report. 183 pp

Tropical Rock Lobster Fishery

November 26, 2025

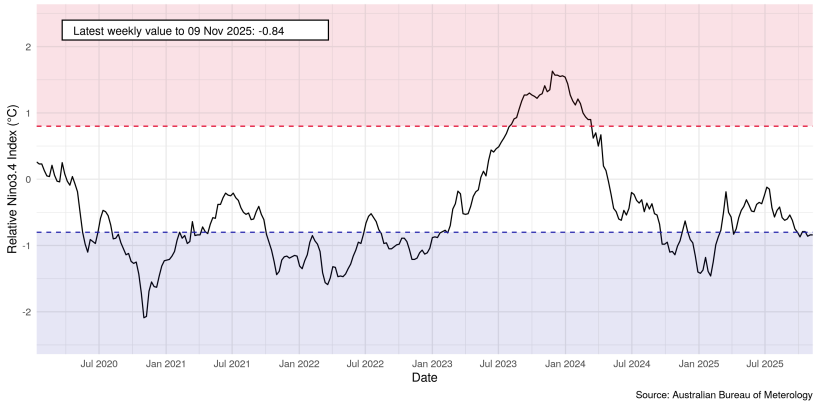
Historical Period

Climate Drivers: Sea Surface Temperature (SST)



Global Sea Surface Temperatures (SST) from 2023-2025 have been at record highs (*Copernicus*)[2]. Warmer waters can intensify extreme weather and disrupt marine ecosystems.

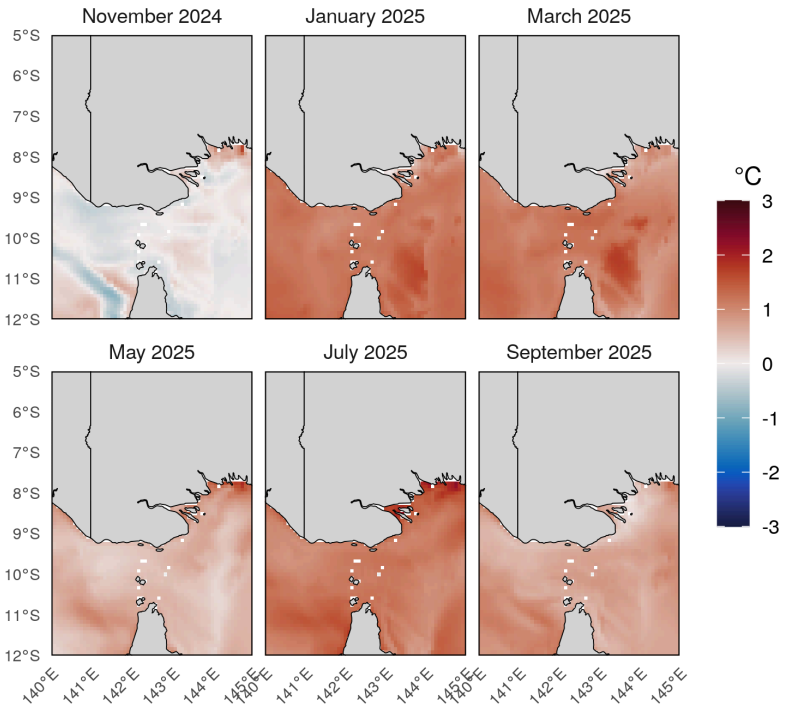
Climate Drivers: Nino3.4



ENSO is currently neutral. The relative Niño3.4 index (a new index) measures the oceanic component of ENSO. Recently, BOM has revised Niño3.4 to account for changes in global SST from global warming. As such, conditions during the 2024/2025 summer have been reclassified as La Niña (*BOM*)[1].

In the TS during La Niña conditions, trade winds strengthen, sea levels rise, rainfall and cloudiness increases, and waters can be warmer. These changes can influence TRL recruitment, as well as TRL habitat condition (e.g. seagrass and coral).

Regional Dynamics: SST Anomaly

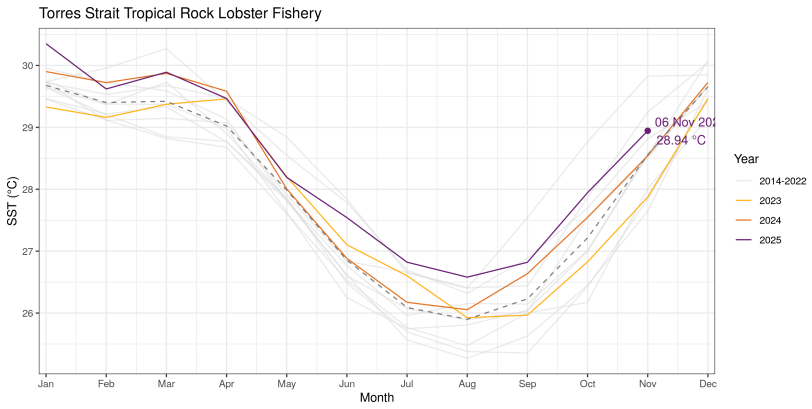


Source: CMEMS

Bi-monthly maps of SST anomalies, relative to 1993-2016[3]. SST has been above average for most of the year across the TS.

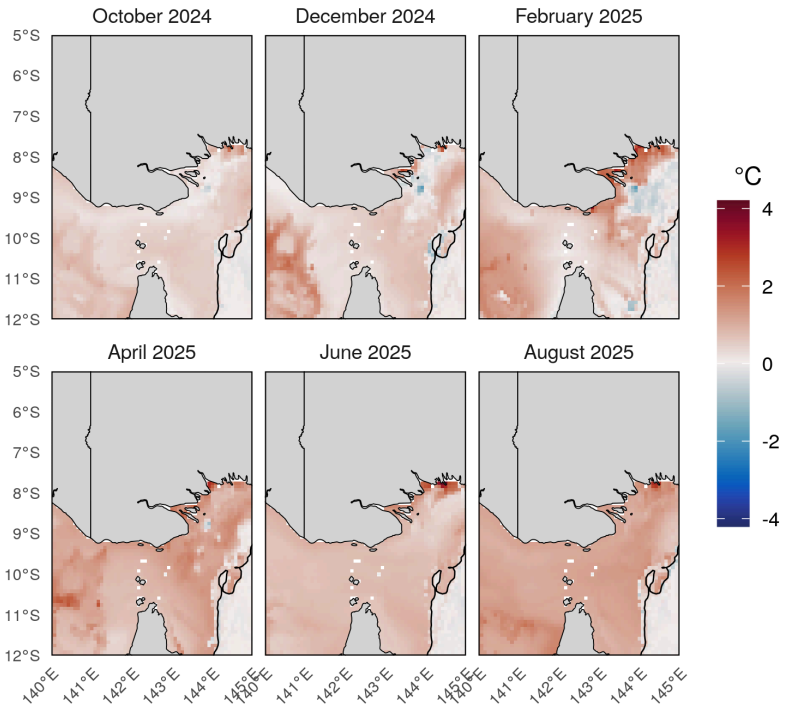
Marine heatwaves (sustained anomalously warm water) have also occurred over summer (*MHWtracker*)[4]. Coral bleaching occurred in 2024/2025, with 22% of the 23 TS reefs surveyed had medium bleaching or higher (*AIMS*)[5]. The impacts to TRL are not known.

Regional Dynamics: SST monthly timeseries



Timeseries of monthly averaged SST for example years 2014-2025[3]. Jan 2025 was the hottest SST in this time period, with temperatures across most months in 2025 higher than those seen in 2023 and 2024.

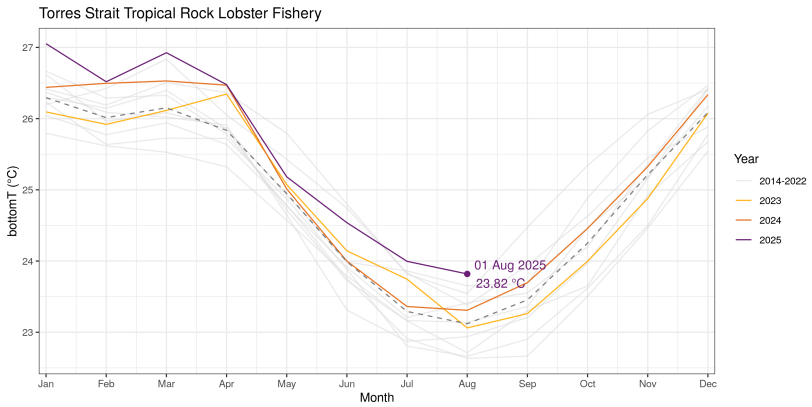
Regional Dynamics: Bottom Temperature Anomaly



Source: CMEMS, Climatology: 1993-2016

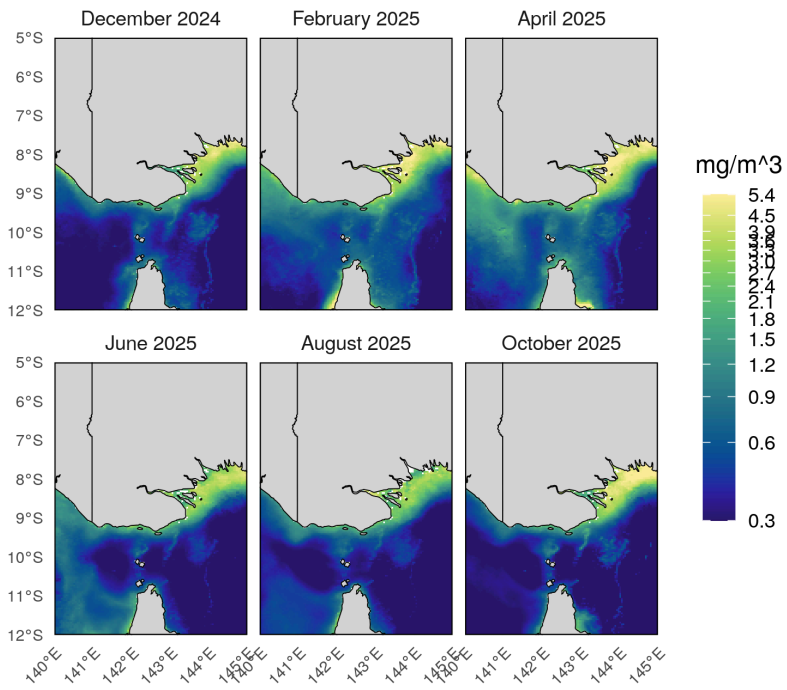
Bi-monthly maps of bottom temperature anomalies, with the 500 m contour shown in black[3]. The TS region has seen average to anomalously warm waters across the domain from Oct 2024-Aug 2025. Anomalies are relative to 1993-2016, and are from an ocean model which is subject to error. Patches of average and anomalously cool water can be seen in the Gulf of Papua and off the continental shelf. Bottom temperatures better reflect the temperatures that benthic habitats and species experience.

Regional Dynamics: Bottom temperature monthly timeseries



Timeseries of monthly averaged bottom temperature for example years 2014-2025[3]. Jan-Apr 2025 experienced the hottest temperatures seen in this time period.

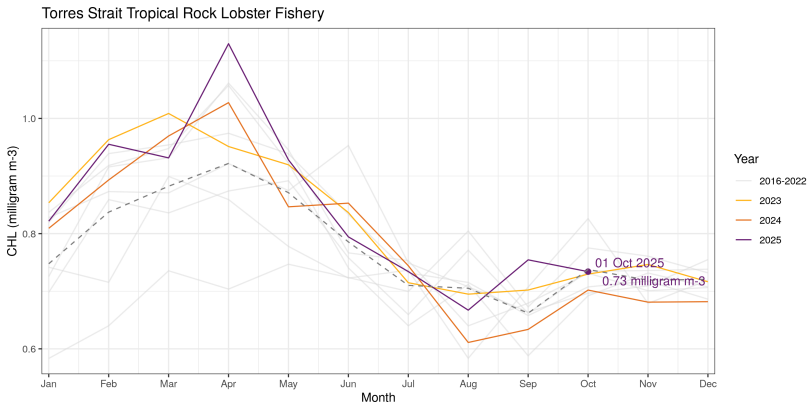
Regional Dynamics: Chlorophyll-a



Source: CMEMS

Bi-monthly maps of surface chlorophyll-a (log scale; mg/m3)[3]. Surface chl-a is a proxy for ecosystem productivity. Elevated surface chl-a persists along the coastal margin, particularly in the Gulf of Papua which likely reflects the Fly river outflow. Fly river outflow typically only influences the northern regions of the TS. Peaks in surface chl-a are notable during summer months, and also notable during April 2025.

Regional Dynamics: Chl-a monthly timeseries



Timeseries of monthly averaged chl-a for example years 2016-2025[3]. Chl-a has been above average for all months over the past year, with a notable peak in April 2025. Chl-a can indicate ecosystem productivity, such as food sources for TRL.

Observations

Observations are drawn from fishery stakeholder discussions at meetings of AFMA's resource assessment groups (RAGs) and working groups. Further details are provided in meeting minutes accessible on the AFMA website.

2025 observations

- To be discussed at RAG.

2024 observations

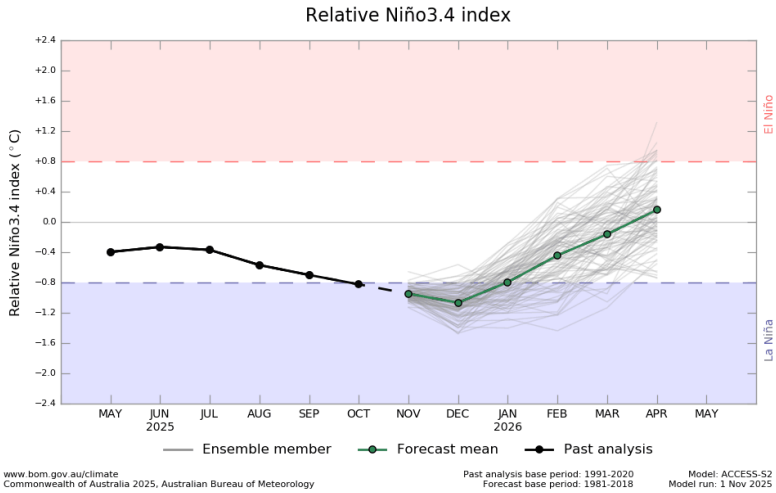
- Lobster are mobile and seen to readily move between different areas and depths.
- Lots of undersize lobsters seen in deeper waters in early December.
- Prolonged westerly flow of tidal currents have been seen. Typically, an easterly flow begins in ~October but westerly flows have been maintained until early December.
- Water temperatures are cooler than expected, and thought to coincide with low bait and finfish catch off Bramble Cay.

2023 observations

- Reports of sand incursion covering up seagrass.
- Reports of winds being different to normal.
- Recreational fishing observed to be higher in Oct-Nov.
- Fishing effort was low but reports of abundance being good in some areas. More smaller and medium sized lobsters observed.
- Lots of sponge grass around that prohibits lobster movement. Typically, early onset of westerlies helps clear habitat for lobsters.
- Shell habitat (Pinctada spp.) is considered good foraging grounds for lobsters.

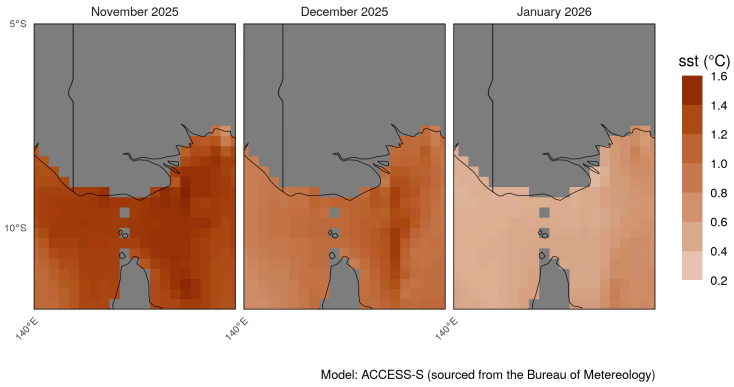
Future Outlook

Climate Drivers: Nino3.4



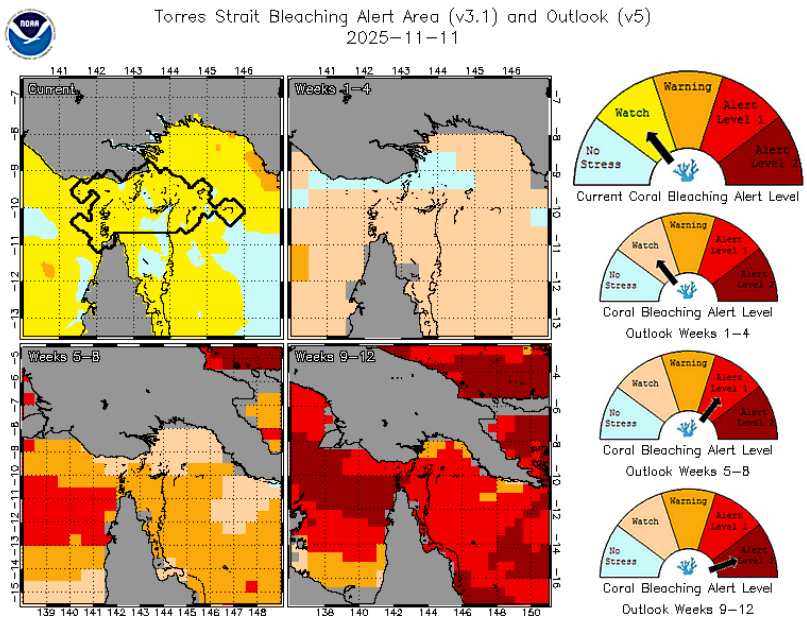
ENSO is currently neutral, with La Niña levels forecast to be met before returning to neutral levels in summer (*BOM ENSO*)[6].

Regional Dynamics: SST Anomaly



Forecasts of SST anomalies for the next three months indicate anomalously warm conditions across the region, with elevated temperatures decreasing from Nov-Jan (*BOM OceanT*)[7]. Forecasts are updated regularly.

Ecosystem: Coral bleaching alert



Coral Reef Watch has forecast a Bleaching Alert Level 2 by Feb 2026, but this is restricted to the western domain while alert level 1 is forecast for the east TS. Alert level 2 indicates a risk of reef-wide bleaching with mortality of heat-sensitive corals (*NOAA*)[8].

Sources:

(1) https://www.bom.gov.au/climate/enso/indices.shtml?bookmark=nino3.4

(2) https://pulse.climate.copernicus.eu/.

(3) Copernicus Marine Service.

(4) https://www.marineheatwaves.org/tracker.html.

(5) https://www.aims.gov.au/research-topics/environmental-issues/coral-bleaching/coral-bleaching-events

(6) http://www.bom.gov.au/climate/ocean/outlooks/?index=nino34

(7) http://www.bom.gov.au/oceanography/oceantemp/sst-outlook-map.shtml.

(8) https://coralreefwatch.noaa.gov/product/vs/gauges/torres_strait.php

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
CATCH AND EFFORT ANALYSES FOR THE 2024-25 FISHING SEASON	Agenda Item 4 For discussion and advice

RECOMMENDATIONS

1. That the RAG:
    a. **NOTE** the reported landed catch for the Australian Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) (**Attachment 4a**).
    b. **NOTE** the 2025 landed catch for the PNG TRL Fishery as reported by the PNG National Fisheries Authority (NFA) (**Attachment 4b**) and an update to the 2024 reported landed catch (**Attachment 4c**).
    c. **DISCUSS** and **PROVIDE ADVICE** on the catch, effort and catch per unit effort (CPUE) data analyses for the Australian TRL Fishery for the 2024-25 fishing season undertaken and presented by Fishwell Pty Ltd.

KEY ISSUES

Australian TRL Fishery catch

2. The Australian TRL Fishery fishing season runs from 1 December through to 30 September the following year. There is a prohibition on the use of hookah gear from 1 December through to 31 January the following year and periodically each month throughout the remainder of the season.
3. The reported landed catch for the Australian TRL Fishery for the 2024-25 fishing season is **378.27 tonnes**. All reported catches are from inside the Torres Strait Protected Zone (TSPZ) and Australia's declared outside but near area combined. The data is sourced from Torres Strait Fisheries Catch Disposal Record (TDB02) and electronic Catch Disposal Records (e-CDRs) and covers the Traditional Inhabitant Boat (TIB) and Transferable Vessel Holder (TVH) sectors.
4. 378.27 tonnes equates to **81.45 per cent of Australia's 464.4 tonne total allowable catch** (TAC) for the 2024-25 fishing season. This is a significant increase compared to the 2023-24 season (200.21 tonnes; 56% caught).
5. The **TIB** sector caught **221.36 tonnes** of TRL which equates to **72 per cent of the TIB TAC** and the **TVH** sector caught **156.91 tonnes** of TRL which equates to **99.97% per cent of the TVH TAC.**
6. A summary of the reported landed catch for the Australian TRL Fishery is provided at **Attachment 4a.**

PNG TRL Fishery catch

7. The PNG TRL Fishery fishing season runs from 1 January through to 31 December each year. There is a prohibition on the use of hookah gear in the waters of Western Province and Torres Strait from 1 December through to 31 March the following year.
8. The TAC for the PNG TRL Fishery in 2024, in PNG waters was 103.2 tonnes. The total reported catch of the PNG TRL Fishery from January – October 2025 is **62.42 tonnes**, with 52.1 tonnes taken from within PNG waters of the TSPZ and 10.3 tonnes taken from outside the TSPZ (**Attachment 4b**). This equates to around 60% of the PNG catch apportionment in PNG waters.
9. On 27 May 2025, AFMA received updated PNG TRL Fishery catch data for the 2024 fishing season (**Attachment 4c**). The RAG is invited to note the update to the reported catch total for the 2024 season.

Total reported commercial catch for the TRL stock

Area	Total (kg)	TAC (kg)	Remaining (kg)	% caught
Australian TRL Fishery (1 Dec 2024 – 30 Sept 2025)	378,270.58	464,400	86,129.42	81.45%
PNG TRL Fishery* (January – October 2025)	62,417.88	103,200	40,782.12	60.48%
catches inside the TSPZ	52,093.61			
catches outside the TSPZ	10,324.27			
PNG catch allocation within Australian waters	-	120,400	120,400	-
Total	**440,688.46**	**688,000**	**247,311.54**	**64.05%**

* Reported as at 28 November 2025.

Catch and catch per unit effort (CPUE) data analyses

10. The annual data summary to be presented by Fishwell Pty Ltd under this agenda item reviews the nominal and standardised catch per unit effort (CPUE) from the TIB and TVH sectors, as well as total catch from all sectors, the size-frequency information provided from a sub-sample of commercially caught TRL and the fishery-independent survey indices of 0+ and 1+ age lobsters. The data summary is used as an indicator to identify if catches correspond to the RBC, and to monitor CPUE (section 2.9 of the TRL Harvest Strategy).
11. The RAG is asked to consider the following catch and CPUE analyses Fishwell Pty Ltd has prepared for the 2024-25 fishing season and provide advice as appropriate.
12. These analyses will be presented by Fishwell Pty Ltd at the meeting. The total catch data and standardised CPUE indices for the TVH and TIB sectors are key inputs to the empirical harvest control rule (eHCR)).
13. Further analyses of the November 2025 pre-season survey data will be presented under **Agenda Item 5**.

Table 1. Reported landed catch (kilograms whole weight) of Tropical Rock Lobster (TRL) for the Australian Torres Strait TRL Fishery by month and sector for the 2024-25 fishing season.
Source: Torres Strait Fisheries Catch Disposal Records (TDB02) and electronic Catch Disposal Records as at 20 November 2025.

Month	Traditional Inhabitant Boat (TIB) sector	Transferable Vessel Holder (TVH) sector	Total (kg)
Dec-24	20,499.91	4,613.33	23,336.84
Jan-25	17,454.29		19,230.69
Feb-25	18,243.08	25,477.45	43,720.53
Mar-25	23,842.38	30,096.11	53,938.49
Apr-25	21,088.69	19,622.27	40,710.96
May-25	24,504.53	27,634.07	52,138.60
Jun-25	31,377.75	24,765.77	56,143.52
Jul-25	30,485.43	22,360.05	52,845.47
Aug-25	22,486.16	2,345.77	23,636.65
Sep-25	11,373.55		12,568.83
Total reported catch (kg)	**221,355.77**	**156,914.81**	**378,270.58**
TAC (kg)	**307,441.15**	**156,958.85**	**464,400**
Reported catch as a per cent of the TAC*	**72%**	**99.97%**	**81.45%**

[#] In accordance with AFMA's Information Disclosure policy (*Fisheries Management Paper 12*), catches by month have been aggregated for December 2024 and January 2025, as well as August and September 2025, as less than 5 boats operated in the Transferable Vessel Holder (TVH) sector. This data is sourced from raw Catch Disposal Records (TDB02) and electronic Catch Disposal Records, and may not account for data cleaning undertaken by Fishwell Pty Ltd during CPUE analysis.

Attachment 4b

Table 2. Reported landed catch (kilograms) of TRL for the PNG Torres Strait TRL Fishery by month and processed weight for the period Jan -October 2025
Source: PNG National Fisheries Authority reported as at 28 November 2025.

PNG Catch Total: Jan - Oct 2025				
MONTH	TAIL WEIGHT (KG)	TAIL CONVERSION (CF. 2.677)	WHOLE (KG)	GRAND TOTAL (KG)
JANUARY	883.20	2364.33	9379.60	11743.93
FEBRUARY	579.98	1552.61	10205.20	11757.81
MARCH	704.17	1885.06	5668.96	7554.02
APRIL	911.86	2441.05	7144.05	9585.10
MAY	850.69	2277.30	4712.49	6989.79
JUNE	328.39	879.10	4951.21	5830.31
JULY	141.88	379.81	1853.23	2233.04
AUGUST	128.70	344.53	1998.23	2342.76
SEPTEMBER	659.80	1766.28	2277.03	4043.31
OCTOBER	14.82	39.67	298.14	337.81
Grand Total	**5,203.49**	**13,929.74**	**48,488.14**	**62,417.88**

PNG Jurisdiction of the TSPZ: Jan - Oct 2025				
MONTH	TAIL WEIGHT (KG)	TAIL CONVERSION (CF. 2.677)	WHOLE (KG)	GRAND TOTAL (KG)
JANUARY	543.00	1453.61	6512.90	7966.51
FEBRUARY	479.18	1282.76	7318.18	8600.94
MARCH	603.40	1615.30	5230.95	6846.25
APRIL	698.06	1868.71	6012.65	7881.36
MAY	825.58	2210.08	4070.56	6280.64
JUNE	297.89	797.45	4837.41	5634.86
JULY	141.88	379.81	1853.23	2233.04
AUGUST	114.10	305.45	1998.23	2303.68
SEPTEMBER	646.80	1731.48	2277.03	4008.51
OCTOBER	14.82	39.67	298.14	337.81
Grand Total	**4,364.71**	**11,684.33**	**40,409.28**	**52,093.61**

PNG Waters outside but near TSPZ: Jan - Oct 2025				
MONTH	TAIL WEIGHT (KG)	TAIL CONVERSION (CF. 2.677)	WHOLE (KG)	GRAND TOTAL (KG)
JANUARY	340.20	910.72	2866.70	3777.42
FEBRUARY	100.80	269.84	2887.02	3156.86
MARCH	100.77	269.76	438.01	707.77
APRIL	213.80	572.34	1131.40	1703.74
MAY	25.11	67.22	641.93	709.15
JUNE	30.50	81.65	113.80	195.45
JULY	0.00	0.00	0.00	0.00
AUGUST	14.60	39.08	0.00	39.08
SEPTEMBER	13.00	34.80	0.00	34.80
OCTOBER	0.00	0.00	0.00	0.00
Grand Total	**838.78**	**2,245.41**	**8,078.86**	**10,324.27**

Table 3. Reported landed catch (kilograms) of TRL for the PNG Torres Strait TRL Fishery by month and processed weight for the Jan – Dec 2024.
Source: PNG National Fisheries Authority reported as at 27 May 2025.

PNG Jurisdiction of the TSPZ: Jan - Dec 2024				
Month (2024)	Tail weight (kg)	Tail wt converted to whole wt (C. factor 2.677)	Whole weight (kg)	Total Catch (kg)
JANUARY	287.5	769.6375	4,453.71	5,223.35
FEBRUARY	24.3	65.0511	4,537.60	4,602.65
MARCH	8.3	22.2191	2,125.00	2,147.22
APRIL	466.9	1249.8913	2,386.90	3,636.79
MAY	152.5	408.2425	4,675.70	5,083.94
JUNE	123.3	330.0741	15,022.00	15,352.07
JULY	130.3	348.8131	6,594.20	6,943.01
AUGUST	155.93	417.42461	11,477.80	11,895.22
SEPTEMBER	140.9	377.1893	9,735.10	10,112.29
OCTOBER	32.6	87.2702	263.30	350.57
NOVEMBER	19.7	52.7369	92.2	144.94
DECEMBER	153.8	411.7226	589.6	1,001.32
TOTAL	**1,696.03**	**4,540.27**	**61,953.11**	**66,493.38**

PNG Waters outside but near TSPZ: Jan - Dec 2024				
Month (2024)	Tail weight (kg)	Tail wt converted to whole wt (C. factor 2.677)	Whole weight (kg)	Total Catch (kg)
JANUARY	47.40	126.89	2,175.50	2,302.39
FEBRUARY	406.50	1,088.20	1,322.80	2,411.00
MARCH	11.30	30.25	1,665.70	1,695.95
APRIL	677.70	1,814.20	1,810.60	3,624.80
MAY	84.10	225.14	2,558.70	2,783.84
JUNE	14.40	38.55	6,816.30	6,854.85
JULY	23.80	63.71	2,424.70	2,488.41
AUGUST	22.40	59.96	11,416.30	11,476.26
SEPTEMBER	30.90	82.72	5,975.70	6,058.42
OCTOBER	165.30	442.51	274.50	717.01
NOVEMBER	35.80	95.84	83.50	179.34
DECEMBER	99.30	265.83	214.20	480.03
TOTAL	**1,618.90**	**4,333.80**	**36,738.50**	**41,072.30**

PNG Catch Total: Jan - Dec 2024				
Month (2024)	Tail weight (kg)	Tail wt converted to whole wt (C. factor 2.677)	Whole weight (kg)	Total Catch (kg)
JANUARY	334.90	896.53	6,629.21	7,525.74
FEBRUARY	430.80	1,153.25	5,860.40	7,013.65
MARCH	19.60	52.47	3,790.70	3,843.17
APRIL	1,144.60	3,064.09	4,197.50	7,261.59
MAY	236.60	633.38	7,234.40	7,867.78
JUNE	137.70	368.62	21,838.30	22,206.92
JULY	154.10	412.53	9,018.90	9,431.43
AUGUST	178.33	477.39	22,894.10	23,371.49
SEPTEMBER	171.8	459.91	15710.8	16,170.71
OCTOBER	197.9	529.78	537.8	1,067.58
NOVEMBER	55.5	148.57	175.7	324.27
DECEMBER	253.1	677.55	803.8	1,481.35
TOTAL	**3,314.93**	**8,874.07**	**98,691.61**	**107,565.68**

Torres Strait Tropical Rock Lobster Fishery – Summary of Catch and Effort Data pertaining to the 2025 Fishing Season (Dec-2024 to Sep-2025)

TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG)

MEETING 41, 9–10 December 2025

Agenda Item 4 – Attachment 4a

Introduction

This paper provides a summary of the catch and effort data pertaining to the Torres Strait Tropical Rock Lobster fishery during the 2025 fishing season which spans 1 December 2024 to 30 September 2025.

Catch Summary

The catch summary in Table 1 has been updated with 2025 season data. The TIB sector data were updated from TDB02 - the Torres Strait Catch Disposal Record (CDR), and TVH data were updated from the CDR for catches and the TRL04 Daily Fishing Log for effort data. PNG data were provided by PNG NFA via AFMA.

The TIB catch for 2024 has been updated since it was presented last year due to late fishing returns that were provided in early 2025 (Table 1). A large increase in catch occurred for the TIB and TVH sectors in 2025 at 378.4 t, which was the largest combined catch since 2019 (Table 1). The previous combined five-year average was 198.4 t for both sectors demonstrating the scale of this increase. The 2025 combined catch was an 80% increase to 2024 (210.3 t). Individually, catches increased by 70% for the TVH and 88% for the TIB from 2024 (Table 1).

The PNG TRL catch data are provided annually up until September each year, and hence a pre-agreed method is used to extrapolate the data to obtain a total catch estimate for the current year to represent the period December (of previous year) to November (current year). The method involves using the available catch data over January to September to calculate an average monthly catch which is then substituted for October and November. These extrapolated catches are then updated the following season once complete catch data are received from the PNG NFA (Table 1). The 2024 PNG total catch has been revised downwards based on updated catch totals provided by PNG. This yields a total PNG catch for 2024 of 107.6 t. The extrapolated catch for PNG in 2025 is 76.4 t (Table 1). This yields a total 2025 Tropical Rock Lobster catch (TIB, TVH and PNG) of 454.7 t (Table 1).

Table 1: Total annual catch (in tonnes) for each of the sectors. * Indicates updated values since the 2024 assessment.

SEASON	TIB	TVH	PNG DIVERS	PNG TRAWL	TOTAL
2001	52.0	79.9	173.0	5.4	310.3
2002	68.0	147.2	327.0	42.8	585.0
2003	123.0	358.8	211.0	5.4	698.2
2004	210.4	481.0	182.0	0.0	873.4
2005	367.6	549.0	228.0	0.0	1144.6
2006	140.5	135.4	142.0	0.0	417.9
2007	268.7	268.6	228.0	0.0	765.3
2008	185.7	100.4	221.0	0.0	507.1
2009	147.8	91.1	161.4	0.0	400.3
2010	140.0	282.6	292.8	0.0	715.4
2011	199.1	503.5	165.0	0.0	867.6
2012	142.4	387.3	173.7	0.0	703.4
2013	142.5	361.7	108.3	0.0	612.5
2014	198.8	273.2	151.4	109.8	733.2
2015	202.6	152.7	235.7	0.0	591.0
2016	267.1	243.0	248.0	0.0	758.1
2017	111.6	166.3	113.0	0.0	390.9
2018	127.4	134.1	156.4	0.0	417.9
2019	260.6	156.1	167.0	0.0	583.7
2020	216.3	143.2	126.4	0.0	485.9
2021	127.6	116.3	97.0	0.0	340.9
2022	150.1	139.7	88.8	0.0	378.6
2023	129.6	118.5	109.9	0.0	358.0
2024	117.8*	92.5	107.6*	0.0	318.0
2025	221.4	156.9	76.4	0.0	454.7

Effort Summary and nominal CPUE

The effort summary in Table 2 is updated from the same data sources as the catch summary. The effort unit for TVH is tender-shot day and TIB is crew day fished, adjusted from the original data source.

The fishing effort reported in 2024 was updated for both sectors in this report to account for additional catch and effort returns received after the December 2024 RAG meeting (Table 2). The 2024 TVH sector fishing effort was originally reported as 452 tender-days but has been updated down to 391 in this report despite additional records being received. This occurred becasue updates to the AFMA logbook data extract revealed some records were not correctly amalgamated into tender-shot-days in 2024, owing to a SHOT_ID database field that has changed through time. The new format of the data extract allowed for improved record amalgamation without need of this database field. Previously, several fishing records that had multiple product forms (tailed, whole, etc.)

reported were erroneously separated into individual fishing events. These have now been recombined accordingly, creating the reduction in effort days in 2024.

The effort in 2025 for the TVH and TIB sectors was 459 days and 2534 days, respectively. This equates to a 32% and 17% increase, respectively, relative to the previous season. However, the annual effort for the TVH was the second lowest on record and substantially lower than the long-term average of 2373 days (2004 – 2023) (Figure 1; Table 2). This reflects a general and long-term declining trend in effort from the TVH sector (Figure 1; Table 2).

Table 2: Effort for TVH (tender-shot days) and TIB (days fished).* Indicates updated values since the 2024 assessment.

SEASON	TVH	TIB
2004	5235	4823
2005	4393	8606
2006	2435	4791
2007	2869	7099
2008	1211	5787
2009	1308	4859
2010	2368	3715
2011	2668	3457
2012	2380	2330
2013	3008	288
2014	2910	2925
2015	2683	3217
2016	2654	2932
2017	2515	3100
2018	1506	3537
2019	1911	4530
2020	1267	2742
2021	1621	2962
2022	1352	3296
2023	1156	2433
2024	391*	1913*
2025	459	2534

The nominal catch rates for both TIB and TVH sectors increased substantially in 2025 and were the highest on record for both sectors. These results are considered in more detail through the TIB and TVH CPUE standardisation analyses (Attachment 4b and 4c respectively).

Figure 1: Annual effort trajectories for the TIB and TVH sectors

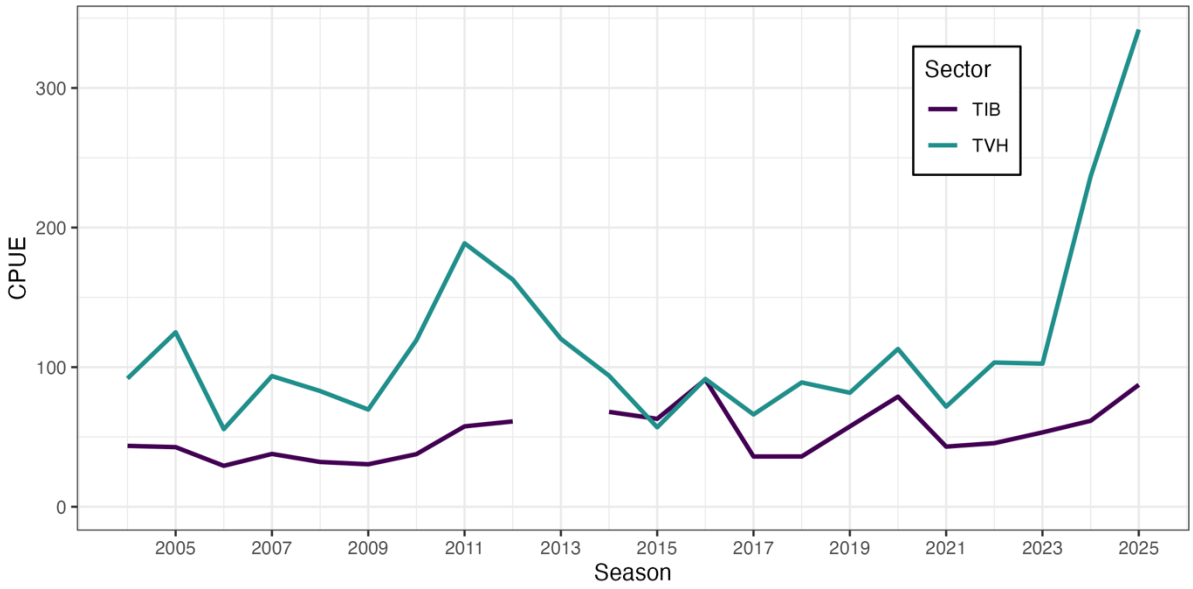


Figure 2: Annual catch per unit effort (nominal) for the TIB and TVH sectors. The 2013 CPUE is not shown for the TIB sector as it is anomalous given the low effort that season.

TIB CPUE Standardisation to Create an Annual Abundance Index for Torres Strait Rock Lobster – 2025 Update

TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG)

MEETING 41, 9–10 December 2025

Agenda Item 4 – Attachment 4b

Summary

Catch and effort data from the Traditional Inhabitant Boat (TIB) sector of the Torres Strait Rock Lobster Fishery spanning 2004 to 2025 were analysed to evaluate relative abundance. Data filtering procedures were applied to ensure data quality, producing 44,374 valid Vessel-Day-Seller (VDS) records. Generalised Additive Models (GAMs) were employed to standardise catch per unit effort (CPUE) and evaluate the influence of factors including Season, Month, Area, Fishing method, and Seller. The results revealed an upward trend in standardised catch rates from 2015 onwards, with marked variability in recent seasons attributable to heightened individual Seller influence - fewer Sellers were active in 2025 (54) relative to earlier years (> 200). The relative index of abundance estimated from standardised CPUE for the TIB sector was the highest on record in 2025 (49% above long-term average). This corresponds to a large density of 1+ Rock Lobster estimated in the 2024 survey.

Selection of TIB Data for CPUE Analysis

Catch and effort data for the TIB sector are less complete than for the TVH sector and are reported through catch disposal records (CDRs). These have changed through time and records are now reported in the TDB02 docket book. Substantial previous work has been undertaken to comprehend the characteristics of both the TDB01, TDB02 Docket-Book and TRL04 Logbook data in order to identify catch records that should be allocated to the TIB sector of the fishery (Campbell et al., 2019; Campbell & Pease, 2017). These analyses have created a cleaned dataset of catch and effort records that are updated annually by cleaning additional years data as needed. Only the two most recent years of AFMA catch and effort data is cleaned each year, following the cessation of the fishing season in September. This data is then appended to the cleaned data from past years. The penultimate year of the timeseries (2024 in this instance) is also reanalysed to include any late returns not received in time for inclusion at the December RAG meeting. During the data cleaning process, all records were amalgamated so that each record represents a vessel-tender shot day, where multiple processed forms (tailed, whole or unknown) can be reported.

Methods for standardising CPUE for the TIB sector have been established in previous stock assessment reports and presented annually at TRLRAG meetings to inform the eHCR calculations. Most recently, results up to an including 2024 were presented by Parker et al. (2025). This analysis applied this same methodology to clean the AFMA catch disposal records, apply consistent data

filtering rules and standardise CPUE using a suite of Generalised Additive Models (GAMs), including a preferred model previously chosen by the TRLRAG for use in the eHCR.

To establish an appropriate data structure for analysis, the sampling data filtering rules applied by Parker et al. (2025) were applied here. An update to the CDR data extract occurred in 2025 and it was apparent that some of the previous filtering steps needed historically were not necessary in 2025. The steps applied in this assessment included:

1. The TIB data were aggregated across vessel-symbol, date and seller-name. When the vessel-symbol or seller-name was null these fields were designated 'Unknown'. Data were restricted to the seasons 2004 to 2025.
2. Vessel-Day-Seller records (VDS) records were additionally removed when any of the number of fishers, the number of days fished, the number of methods, the area fished, and the Seller-Home were not unique or remained unknown (i.e., not recorded). Records linked to the TRL04 logbook (Not applicable in 2025) or with zero catch were also removed. This produced 53,034 retained VDS-records.
3. Subsequently, VDS records were retained only when they met all of the following criteria: a. the month was not October or November, b. the fishing method was either 'Hookah diving', 'Free diving', 'Lamp fishing' or some combination of these three methods (termed 'Mixed'), c. the number of fishers was between 1 and 3, d. the number of days fished was between 1 and 9, e. the recorded catch weight was between 1kg and 500kg.
4. Additionally, the records for the 2013 season were removed owing to the limited number of records for this season relative to all other seasons. The limited number for 2013 resulted from many fields on the TDB-01 Docket-Book that season being left blank.

This procedure yielded 45,177 VDS records selected for analysis.

Methods

Generalised Additive Models (GAMs)

Consistent with prior years, multiple GAMs were applied to estimate an annual standardised relative index of abundance. Comprehensive technical specifications for the TIB CPUE standardisation process, including the data preparation, are documented in Campbell et al. (2019) and Parker et al. (2025). These methods have been consistently applied in this assessment.

Model fitting was performed using the R package `mgcv` (Wood, 2017; Wood & Wood, 2015). Categorical fitting was applied to all effects except for the southern oscillation index (SOI), which received continuous smooth fitting via cubic regression splines applied using the `s()` function specified as `s(SOI,k = 3, bs = "cr")`. A Gamma distribution with a log-link function was applied. The effort measure for the TIB data was designated as days-fished. The CPUE corresponding to each GAM record was subsequently defined as the mean weight of lobsters captured per day-fished, i.e.:

CPUE = (Whole Weight of Lobster Captured) / (Number of Days Fished)

A data weighting approach outlined by Campbell (2004) has been previously applied to account for unbalanced sampling that often occurs for fishery dependent data and can bias CPUE abundance

indices. These methods were applied here and included in each of the GAMs as a data weighting. Four GAMs were applied using different model structures.

Main Effects Model

To assess the contribution of individual main effects within the GAM, initial analyses used the following model structure without interactions among main effects:

Model-1: Main effect:

CPUE = Intercept + Season + Month + Area-Fished + 'Fishing-Method' + 'Proportion-Tails' + SOI + 'Moon-Phase'
/ distribution = gamma, link = log

Where:

a) Season contains 21 levels: 2004-2012, 2014-2025
b) Month contains 10 levels: December–to-September
c) Area-Fished corresponds to the Seller-Home and contains 12 levels
d) Fishing-Method contains 4 levels: (1) Hookah, (2) Free Diving, (3) Lamp Fishing, and (4) mixed methods
e) Proportion-Tails contains 5 levels: (1) <20%, (2) 20-40%, (3) 40-60%, (4) 60-80%, and (5) ≥80%
f) SOI represents the monthly Southern Oscillation Index value
g) Moon-Phase contains 30 levels: days elapsed since the most recent full moon

Interaction Models

A secondary analysis series investigated whether incorporating interactions among the primary spatial-temporal effects enhanced model data fit. Three models have previously been examined in past assessments but only one has been considered recently (Parker et al., 2025), which was maintained in this assessment:

Model-2: Int-1:

CPUE = Intercept + Season + Month + Month * Area + 'Fishing-Method' + 'Proportion-Tails' + SOI + Moon
/ distribution = gamma, link = log

Seller Models

An additional model set was included to incorporate the "Seller" effect; this model has previously been adopted by the TRLRAG as the default for input to the eHCR. Categorical fitting was applied to all effects except for SOI, which received continuous smooth fitting via cubic regression splines.

Seller:

CPUE = Intercept + Season + Month + Area-Fished + 'Fishing-Method' + 'Proportion-Tails' + SOI + 'Moon-Phase' + Seller
/ distribution = gamma, link = log

Where:

a) Seller contains 353 levels

Seller – Int:

CPUE = Intercept + Season + Month + Month * Area + 'Fishing-Method' + 'Proportion-Tails' + SOI + Moon + Seller
/ distribution = gamma, link = log

The * symbol denotes main effect interaction. Interactions were incorporated to account for situations where resource distribution varies by season across areas and months.

Each GAM's results were used to construct an annual abundance index using the Season model term which provides the estimated change in Tropical Rock Lobster density for each year when accounting for all other variables. A relative annual abundance index was calculated by scaling the indices, so their cross-season mean equalled 1.

Results of bridging analysis

A bridging analysis was undertaken as this was the first year that CPUE standardisation was undertaken by Fishwell Consulting. Therefore, it was important to demonstrate consistency in methodology across providers given the TVH Standardised CPUE is an input to the eHCR. This bridging analysis included a multi-step process:

1. Apply data filtering rules to the cleaned logbook data used in 2024 (Parker et al., 2025)
2. Fit GAMs to these data and compare results between assessments
3. Update the data for 2024 (due to late records received) and re-fit GAMs

Data filtering performed in step 1 resulted 44,383 records (2004 – 2024), which was nine records more than the past assessment. Some minor differences remained in some seasons for the nominal CPUE series (Figure 1). However, these differences were minor and considered insignificant (Figure 1).

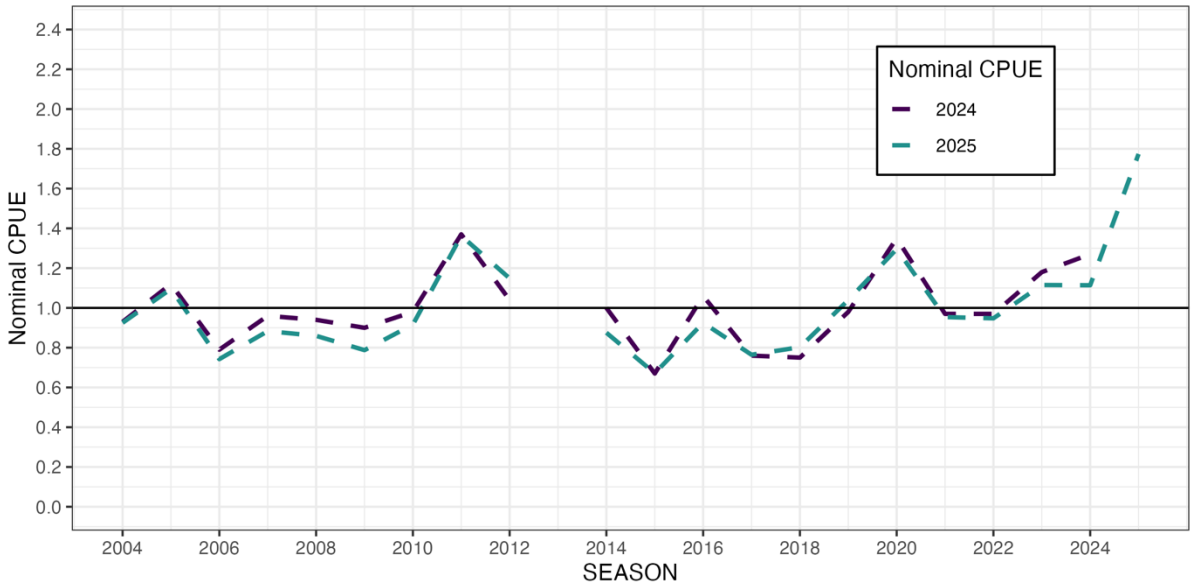


Figure 1: Comparison of Nominal relative indices (raw CPUE) for the TIB calculated in 2024 (Parker et al. 2025) and 2025 (this assessment).

The results from the 'Seller' GAM (selected for use in the eHCR), demonstrated small but insignificant differences between the GAM applied by Parker et al. (2025) and the '2024 (updated)' GAM applied in this assessment that used the same data (Figure 2). The same difference occurred when the '2024 (updated with new data)' GAM was applied, as there were no new records included in this dataset once data-filtering was completed (Figure 2). The cause of the minor differences between the current and past assessment remains unclear but given their small magnitude these were considered insignificant.

Overall, the results show that previous methods have been appropriately re-applied and yielded similar results to past assessments.

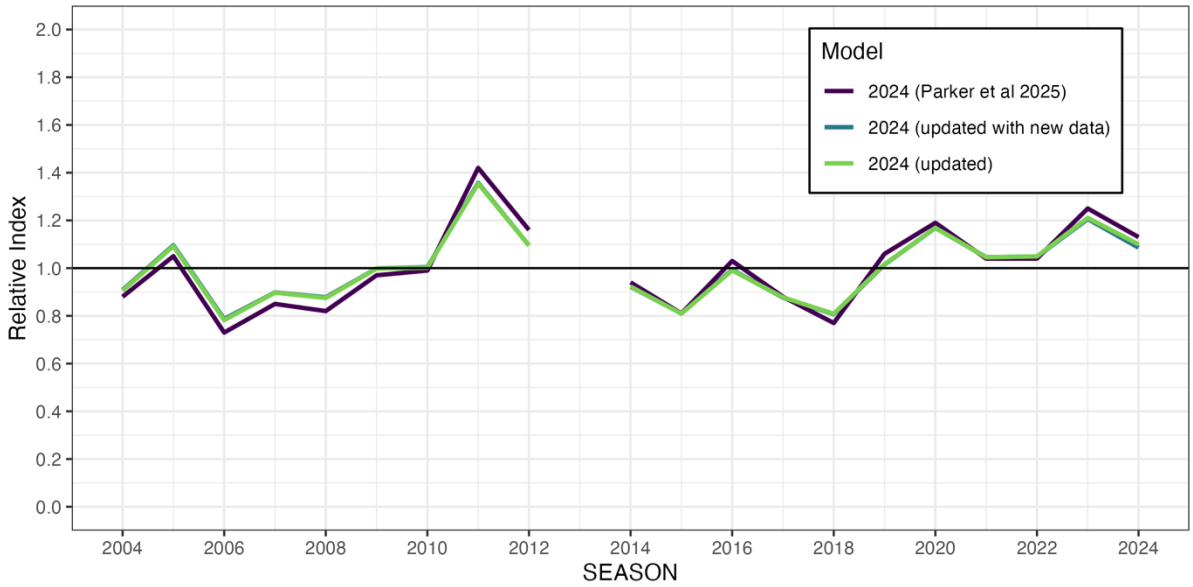


Figure 2: Comparison of the 'Seller' GAM fits for 2024. The dark purple line are the results published in Parker et al (2025). The green line is this same model re-fit in this assessment. The blue line uses data updated this assessment which matched the previously cleaned and filtered data applied in the past assessment.

Results of Annual Abundance Indices

The relative indices fit to data from 2004 – 2025 differed from model other depending on whether the term 'seller' was included (Figure 3). However, all models followed the same trend through time, with the 'Seller' and 'Seller-Int M*A' models fluctuating less.

The 'Seller' model (selected for use in the eHCR) estimated abundance at 49% above the long-term average (Table 1; Figure 3). Relative to the nominal index, the standardised CPUE followed similar patterns but exhibited less variability, (Figure 3). Overall, the annual relative CPUE index fluctuates around the long-term mean of 1, displaying a slight increasing trend 2015 – 2025 (Figure 3).

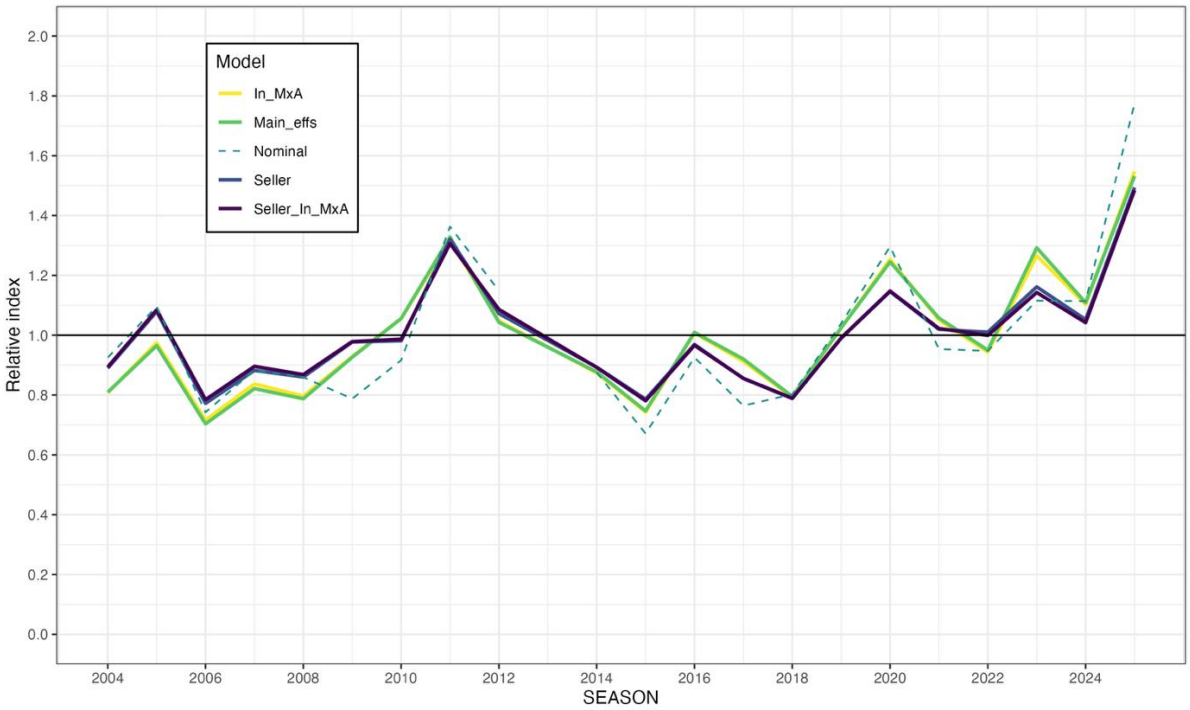


Figure 3: The relative abundance indices for the TIB sector, estimated from standardised CPUE for the Main effect, interaction, and seller GAMs from 2004 – 2025.

Table 1: Relative abundance indices based on standardised CPUE data for the TIB fishery. Note, each index is scaled so that the mean of the index over all years is equal to 1. The model "Seller" has previously been adopted by the TRLRAG as the default for input to the eHCR. Note the CPUE is not calculated in 2013 due to low levels of effort.

SEASON	Nominal	Main	Int M*A	Seller	Seller- Int M*A
2004	0.93	0.81	0.81	0.89	0.89
2005	1.10	0.97	0.97	1.08	1.08
2006	0.74	0.70	0.72	0.77	0.78
2007	0.88	0.82	0.84	0.88	0.90
2008	0.86	0.79	0.80	0.86	0.87
2009	0.79	0.93	0.93	0.98	0.98
2010	0.92	1.06	1.06	0.98	0.99
2011	1.36	1.33	1.32	1.32	1.31
2012	1.15	1.04	1.05	1.07	1.09
2013					
2014	0.88	0.88	0.87	0.89	0.89
2015	0.67	0.75	0.74	0.79	0.78
2016	0.93	1.01	1.01	0.97	0.97
2017	0.76	0.92	0.91	0.86	0.86
2018	0.80	0.80	0.79	0.79	0.79
2019	1.04	1.02	1.02	0.99	0.99
2020	1.30	1.25	1.25	1.15	1.15
2021	0.95	1.06	1.05	1.02	1.02
2022	0.95	0.95	0.94	1.01	1.00
2023	1.12	1.29	1.27	1.16	1.14
2024	1.11	1.11	1.10	1.05	1.04
2025	1.77	1.53	1.55	1.49	1.48
Mean	1		1	1	1

Seller was the model term that had the greatest effect on Rock Lobster abundance, accounting for more than half of the explained deviance (Table 2). Season was the second most influential variable (14.89%), following by Area (9.37%) (Table 2). This demonstrates that a significant fishing operation effect exists in the analysis and that incorporating for 'Seller' in the analysis is important. Whether or not this effect is due to heterogenous catchability across fishing operations, or differences in how sellers record and report effort is unknown. Improved measures of effort such as hours fished rather than days fished may improve these indices as CPUE estimates would become more precise.

Table 2: Model statistics for the main effects of the GLM applied to TIB data.

Term	df	F	p-value	ChiSq	% Deviance explained
SEASON	20	98.46	<0.0001	1969.23	14.89
MONTH	9	68.49	<0.0001	616.43	4.38
FISHING-METHOD	3	127.17	<0.0001	381.50	7.02
AREA	11	23.75	<0.0001	261.26	9.37
SELLER	352	23.72	<0.0001	8350.04	53.1
PROPTAIL	4	347.05	<0.0001	1388.19	7.25
MOON	29	13.77	<0.0001	399.33	3.52
s(SOI)	2	18.18	<0.0001	36.29	0.47

The high CPUE estimated for the TIB sector in 2025 likely indicates a large increase in legal size lobsters in this season. Pre-recruitment surveys are undertaken annually that estimate the density of 1+ year old Rock Lobsters across the fishery. Given that commercial catches are dominated by two- and three-year-old Rock Lobsters, the previous year's survey estimate should provide a reliable indicator of relative legal-sized biomass for the following season. Figure 4 shows the TIB CPUE and the 1+ recruitment survey estimates on a relative scale, with one year lag plotted for the survey (thus the 2024 estimate is plotted at 2025). The higher survey estimate of 1+ Rock Lobsters in 2024 supports the high CPUE seen in 2025. A similar CPUE has occurred for the TVH sector which has a stronger annual correlation with the 1+ survey estimate from the previous seasons. This relationship is weaker between the TIB and 1+ survey estimates, but the corresponding result from the TVH sector provides multiple lines of evidence that legal sized Rock Lobster abundance was high in 2025.

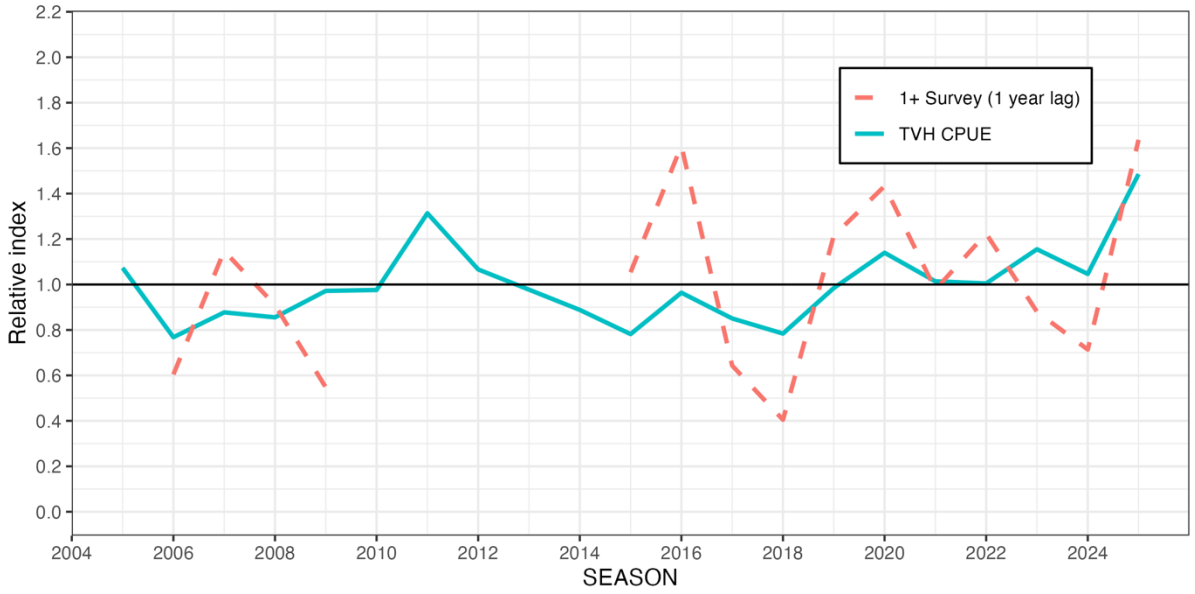


Figure 4: A comparison of the TIB standardised CPUE and 1+ recruitment survey estimates on a relative scale. A one-year lag has been applied to the recruitment survey estimates to visually show their relationship.

As noted in previous assessments (e.g. Campbell et al., 2019; Parker et al., 2025), the effort measure used for the TIB sector (days fished) is far less precise than the measure for the TVH sector (hours fished). The coarseness of the TIB effort measure has likely led to a less responsive CPUE series given that a day's effort can be more subjective (as day lengths can differ with respect to fishing effort) in comparison to hours fished. Nevertheless, the increased abundance of Rock Lobsters estimated using the TIB CPUE data is consistent with the TVH CPUE estimates for 2025 and aligns with the high 1+ densities that occurred in 2024 survey. Therefore, the TIB catch and record can provide a useful series of abundance, despite its potential to be hyperstable given that lack of a precise effort measure.

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TVH CPUE Standardisation to Create an Annual Abundance Index for Torres Strait Rock Lobster – 2025 Update

TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG)

MEETING 41, 9–10 December 2025

Agenda Item 4 – Attachment 4c

Summary

Catch-per-unit-effort (CPUE) standardisation was performed for the Transferable Vessel Holder (TVH) sector using the Torres Strait Tropical Rock Lobster Fishery's Daily Fishing Logs. This dataset encompasses more than three decades (1994-2025) with over 100,000 documented catches. Lobster relative abundance was modelled across different regions, time periods, fishing operations and methods. Standardised CPUE indices were estimated by applying General Additive Models (GAMs) to the dataset. A bridging analysis was undertaken to demonstrate the consistent application of previously established methods. Three model configurations were evaluated that incorporated different levels of interaction among Season, Month, and Area. The results revealed year-to-year variability in lobster abundance without a distinct long-term pattern throughout the time series. Specific factors such as vessel and region significantly influenced CPUE calculations. The 2025 standardised CPUE index was the highest on record (88% above long-term average), following a large 1+ abundance estimate from the 2024 pre-season survey.

TVH Data

Daily Fishing Log records (TRL04) from the Torres Strait Tropical Rock Lobster Fishery are used to report catch and effort in the TVH sector. AFMA-sourced logbook information encompasses more than 100,000 individual catch entries for the TVH Tropical Rock Lobster operation across 32 seasons spanning 1994 through 2025. Multiple shots (maximum of four) can occur per vessel-day, with each shot comprising as many as eight tenders. Catches for each tender are logged by fishing method (hookah, free diving, or unspecified) and processing status (whole, tailed, or unknown). Data aggregation was performed such that individual records represented Tropical Rock Lobster harvests for distinct combinations of vessel-day, shot, tender, and fishing method. This process yielded 78,618 records from 1994 to 2025.

These 78,618 catch records were examined according to season and month, fishing method, catch processing condition, and location. The analyses focused on the 8-month period from February through September, as remaining months showed negligible recorded effort and were therefore omitted (refer to Campbell et al. (2019) and Campbell and Pease (2017) for further details). Following methods outlined by Campbell et al. (2019) and used in subsequent applications (e.g. Parker et al., 2025), areas with little fishing effort were amalgamated or removed. Therefore, MSE-areas 201 and 202 were merged and relabelled as area 101, while areas 401, A0 and A99 were removed.

Methods

Methods for standardising CPUE for the TVH sector have been established in previous stock assessment reports and presented annually at TRLRAG meetings to inform the eHCR calculations. Most recently, results up to an including 2024 were presented by Parker et al. (2025). This analysis applied this same methodology to clean the AFMA logbook records, apply consistent data filtering rules and standardise CPUE using a suite of Generalised Additive Models (GAMs), including a preferred model previously chosen by the TRLRAG for use in the eHCR.

The results and information presented in this report are intentionally structured similar to past reports (i.e., Parker et al., 2025) so as to be familiar to the TRLRAG. Comprehensive technical specifications (which were followed in the current analyses) are presented in Campbell et al. (2019) and Parker et al. (2025). These have consistently applied and checked in throughout this analysis.

Data processing

Only the two most recent years of AFMA logbook data is cleaned each October and November, following the cessation of the fishing season in September. This data is then appended to the cleaned data from past years. The penultimate year of the timeseries (2024 in this instance) is also reanalysed as it is possible for late returns to occur and these need to be included. There were an additional 17 records for 2024 included in this year's analysis. During the data cleaning process, all records were amalgamated so that each record represents a vessel-tender shot day, where multiple processed forms (tailed, whole or unknown) can be reported. Established data filtering rules are then applied to the entire time series:

1. Records without an area are removed
2. Fishing records in January, October, November and December are removed
3. Records with fishing hours outside of 0.5 - 12 hours are removed.
4. Zero catch records are removed.
5. Nominal CPUE that is greater than 150kg per hour on a vessel-tender shot day is removed.
6. Vessels (identified by vessel name and vessel symbol) with records in three or fewer fishing seasons or with 50 or fewer total vessel-tender shot days are removed.

After data filtering, 58,506 records remained for inclusion in the CPUE standardisation.

Generalised Additive Models (GAMs)

Model fitting was performed using the R package `mgcv` (Wood, 2017; Wood & Wood, 2015). Categorical fitting was applied to all effects with the exception of the southern oscillation index (SOI), which received continuous smooth fitting via cubic regression splines applied using the `s()` function specified as `s(SOI,k = 3, bs = "cr")`. A Gamma distribution with a log-link function was applied. The effort measure for the TVH data was designated as hours-fished-per-day. The CPUE corresponding to each GAM record was subsequently defined as:

CPUE = (Whole Weight of Lobster Captured) / (Number of Hours Fished)

A data weighting approach outlined by Campbell (2004) has been previously applied to account for unbalanced sampling that often occurs for fishery dependent data and can bias CPUE abundance indices. These methods were applied here and included in each of the GAMs as a data weighting. Four GAMs were applied using different model structure.

Main Effects Model

To assess the contribution of individual main effects within the GAM, initial analyses used the following model structure without interactions among main effects:

Model-1: Main effect:

CPUE = Intercept + Season + Month + Area + Vessel + 'Fishing-Method' + Proportion of Catch Landed as Tails + Southern Oscillation Index (SOI) + Moon-Phase / distribution = gamma, link = log

Where:

a) Season contains 32 levels: 1994-2025
b) Month contains 8 levels: February–September
c) Area contains 11 levels
d) Vessel contains 48 levels
e) Fishing-Method contains 3 levels: (1) Hookah, (2) Free Diving, (3) Unknown
f) Proportion-Tails contains 5 levels: (1) <20%, (2) 20-40%, (3) 40-60%, (4) 60-80%, (5) ≥80%
g) SOI represents the monthly Southern Oscillation Index value
h) Moon-Phase contains 30 levels: days elapsed since the most recent full moon

Interaction Models

A secondary analysis series investigated whether incorporating interactions among the primary spatial-temporal effects enhanced model data fit. The following three models were specifically examined:

Model-2: Int-1:

CPUE = Intercept + Season + Month + Month * Area + Vessel + 'Fishing-Method' + 'Proportion-Tails' + SOI + Moon / distribution = gamma, link = log

Model-3: Int-2:

CPUE = Intercept + Season * Month + Season * Area + Month * Area + Vessel + 'Fishing-Method' + 'Proportion-Tails' + SOI + Moon / distribution = gamma, link = log

Model-4: Int-3:

CPUE = Intercept + Season * Month * Area + Vessel + 'Fishing-Method' + 'Proportion-Tails' + SOI + Moon / distribution = gamma, link = log

The * symbol denotes main effect interaction. Interactions were incorporated to account for situations where resource distribution varies by season across areas and months.

In prior years, the more sophisticated models ("Model-3: Int-2" and"Model-4: Int-3") with more complex interactions were presented. However, convergence could not be achieved when fitting these models to the present dataset, presumably due to inadequate data for supporting such complex interaction structure, as effort notably declined in 2024 and 2025.

Each GAM's results were used to construct an annual abundance index using the Season model term which provides the estimated change in Tropical Rock Lobster density for each year when accounting for all other variables. A relative annual abundance index was calculated by scaling the indices, so their cross-season mean equalled 1.

Results of bridging analysis

A bridging analysis was undertaken because this was the first year that CPUE standardisation was undertaken by Fishwell Pty Ltd. Therefore, it was important to demonstrate consistency in methodology across providers given the TVH Standardised CPUE is an input to the eHCR. This bridging analysis included a multi-step process:

1. Apply data filtering rules to the cleaned logbook data used in 2024 (Parker et al., 2025)
2. Fit GAMs to these data and compare results between assessments
3. Update the data for 2024 (due to late records received) and re-fit GAMs

Data filtering performed in step 1 resulted 53,401 records (1994 – 2024), which matched the same number of records from the past assessment. Some minor differences remained in some seasons for the nominal CPUE series (Figure 1). However, these differences were minor and considered insignificant (Figure 1).

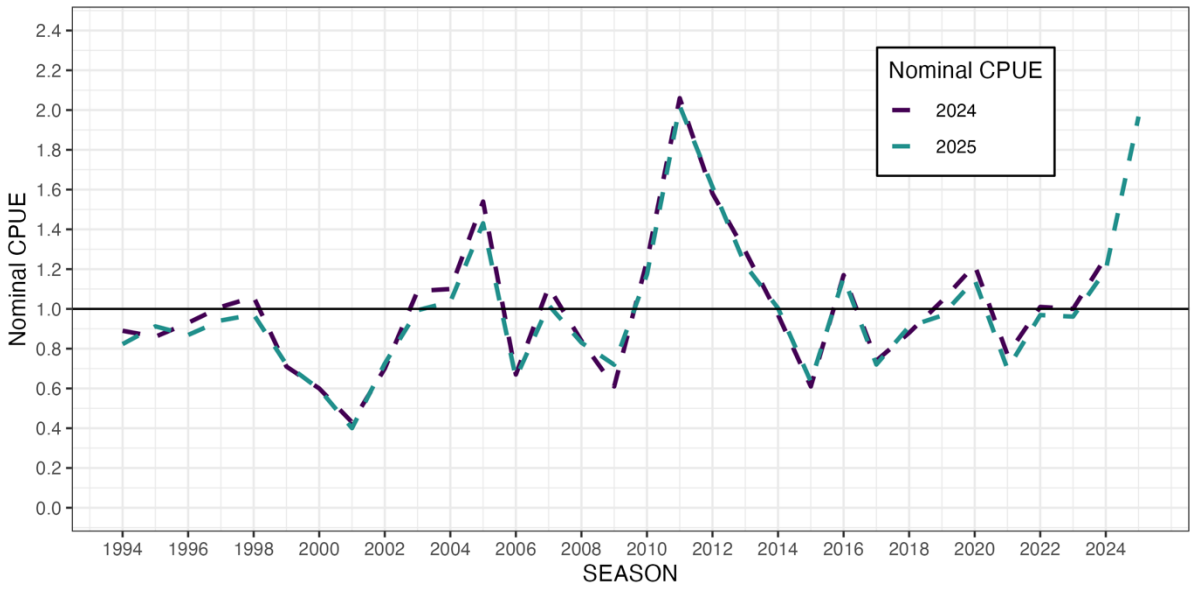

Figure 1: Comparison of Nominal relative indices (raw CPUE) for the TVH calculated in 2024 (Parker et al. 2025) and 2025 (this assessment).

The results from the 'Model-2: Int-1' GAM (selected for use in the eHCR), demonstrated small but insignificant differences between the GAM applied by Parker et al. (2025) and the '2024 (updated)' GAM applied in this assessment and used the same data (Figure 2). A slightly larger difference occurred when the '2024 (updated with new data)' GAM was applied (Figure 2). This data had three differences to the previous data: 1) Additional catch returns that were received late were included, 2) a correction to the moon phase variable for 2024 was applied, and 3) the data weighing approach of Campbell (2004) was updated given the inclusion of new data. The difference between past and present analyses is likely driven by the data weighting applied, as this approach upweights strata (year, month and area) with fewer records. The lowest number of records occurred in 2024 (452

tender shot days) and therefore it's probable that the additional data in this year influenced the final results.

Overall, the results show that previous methods have been appropriately re-applied by Fishwell and yielded similar results to past CSIRO analyses.

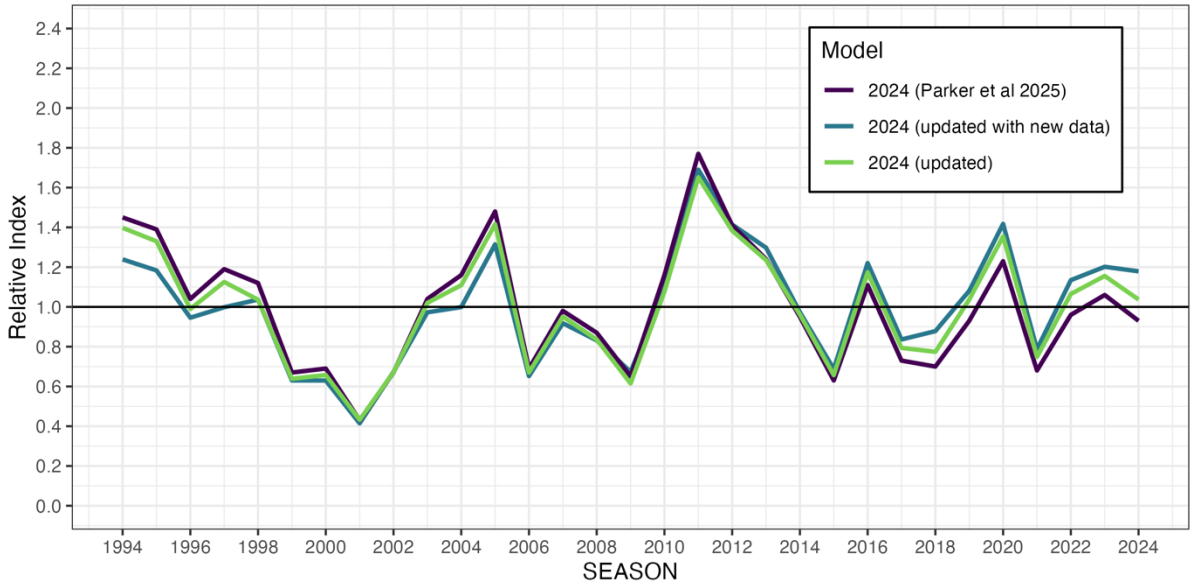

Figure 2: Comparison of the 'Model-2: Int-1' GAM fits for 2024. The dark purple line are the results published in Parker et al (2025). The green line is this same model re-fit in this assessment. The blue line uses data updated this assessment with new records that were submitted late.

Results of Annual Abundance Indices

The relative indices fit to data from 1994 – 2025 were similar between the main effects GAM and the 'Model-2: Int-1' GAM that is used in the eHCR (Figure 3). Both models showed that 2025 had the highest index on record, at 88% above the long-term average (Table 1; Figure 3). Relative to the nominal index, the standardised CPUE followed similar patterns but exhibited less variability, notably in 2012 and 2013 when the previous highest CPUEs occurred (Figure 3). Overall, the annual relative CPUE index fluctuates around the long-term mean of 1, without displaying a clear directional trend over the time series. Both successfully applied GAMs provided almost identical results with only minor differences in some years (Table 1).

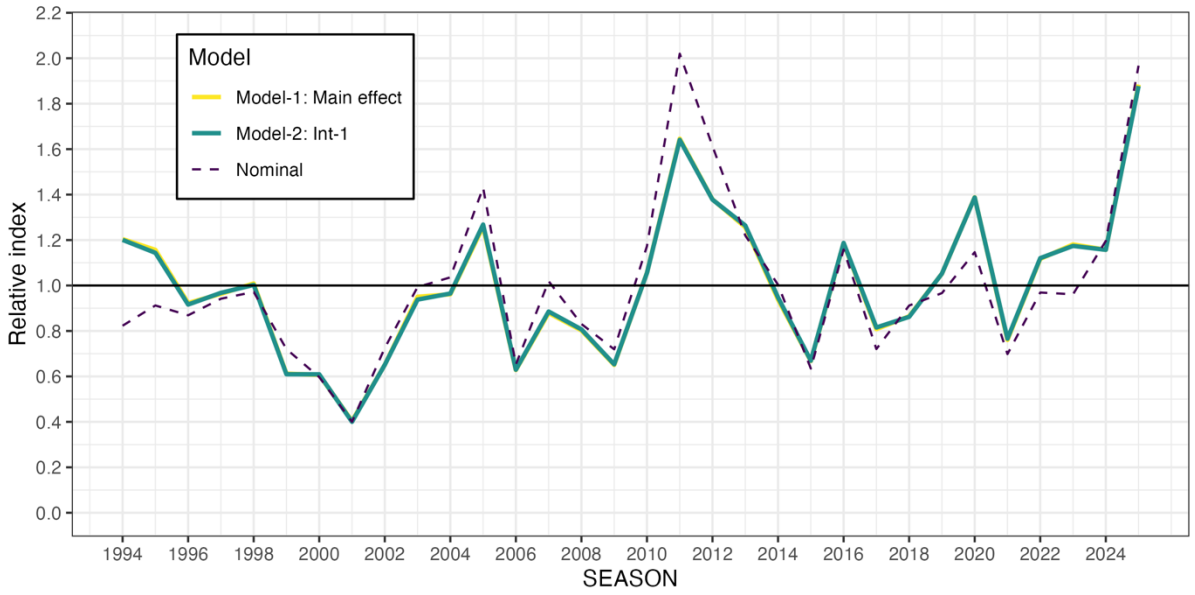

Figure 3: The relative abundance indices for the TVH sector, estimated from standardised CPUE for the Main effect and 'Model-2: Int-1' GAMs from 1994 – 2025.

Table 1: Relative abundance indices based on standardised CPUE data for the TVH fishery. Note, each index is scaled so that the mean of the index over all years is equal to 1. The model "Int-1" has previously been adopted by the TRLRAG as the default for input to the eHCR.

Season	Nominal	Model-1: Main effect	Model-2: Int-1
1994	0.82	1.20	1.20
1995	0.91	1.16	1.14
1996	0.87	0.92	0.92
1997	0.94	0.96	0.97
1998	0.97	1.01	1.00
1999	0.72	0.61	0.61
2000	0.60	0.61	0.61
2001	0.40	0.40	0.40
2002	0.73	0.65	0.65
2003	0.99	0.95	0.94
2004	1.04	0.96	0.96
2005	1.43	1.26	1.27
2006	0.65	0.63	0.63
2007	1.02	0.88	0.89
2008	0.83	0.80	0.81
2009	0.72	0.65	0.65
2010	1.17	1.06	1.06
2011	2.02	1.65	1.64
2012	1.61	1.38	1.38
2013	1.22	1.26	1.26
2014	1.00	0.94	0.95
2015	0.63	0.67	0.67
2016	1.16	1.19	1.19
2017	0.72	0.81	0.82
2018	0.91	0.86	0.86
2019	0.97	1.05	1.05
2020	1.15	1.39	1.39
2021	0.70	0.76	0.77
2022	0.97	1.12	1.12
2023	0.96	1.18	1.17
2024	1.20	1.16	1.16
2025	1.97	1.88	1.88
Mean	1	1	1

Season was the model term that had the greatest effect on Rock Lobster abundance, accounting for more than half of the explained deviance (Table 2). Vessel was the second most influential variable (26.05%), following by Area (12.86%) (Table 2). Both of these effects are typically important in CPUE standardisation, and indicate here that: 1) there is varying efficiency between fishing operations; and, 2) Rock Lobster densities likely vary spatially, which is substantiated in the annual surveys. The remaining variables have minor explanatory effects by comparison (< 10% combined), with moon phase having the largest remaining effect of 4.27 % (Table 2).

Table 2: Model statistics for the main effects of the GLM applied to TVH data.

Term	df	F	p-value	ChiSq	% Deviance explained
SEASON	31	284.75	<0.001	8827.25	51.95
MONTH	7	52.84	<0.001	369.86	1.13
AREA	10	183.71	<0.001	1837.10	12.86
VESSEL	47	88.11	<0.001	4141.05	26.05
FISHING-METHOD	2	17.44	<0.001	34.89	0.4
PROPORTION TAILs	4	63.09	<0.001	252.37	1.17
MOON	29	25.50	<0.001	739.60	4.27
s(SOI)	3	27.44	<0.001	54.38	2.16

The high CPUE estimated for the TVH sector in 2025 likely indicates a large increase in legal size lobsters in this season. Pre-recruitment surveys are undertaken annually that estimate the density of 1+ year old Rock Lobsters across the fishery. Given that commercial catches are dominated by two- and three-year-old Rock Lobsters, the previous year's 1+ survey estimate should provide a reliable indicator of relative legal-sized biomass for the following season. Figure 4 shows the TVH CPUE and the 1+ pre-season survey estimates on a relative scale, with one year lag plotted for the survey (thus the 2024 estimate is plotted at 2025). This shows a strong correlation between previous year's survey estimate and the TVH CPUE values indicating that: 1) both time-series are aligned and provide valuable information on cohort strength; and, 2) the high CPUE estimated in 2025 was to be expected based on the high 2024 1+ survey estimate (Plagányi et al., 2025).

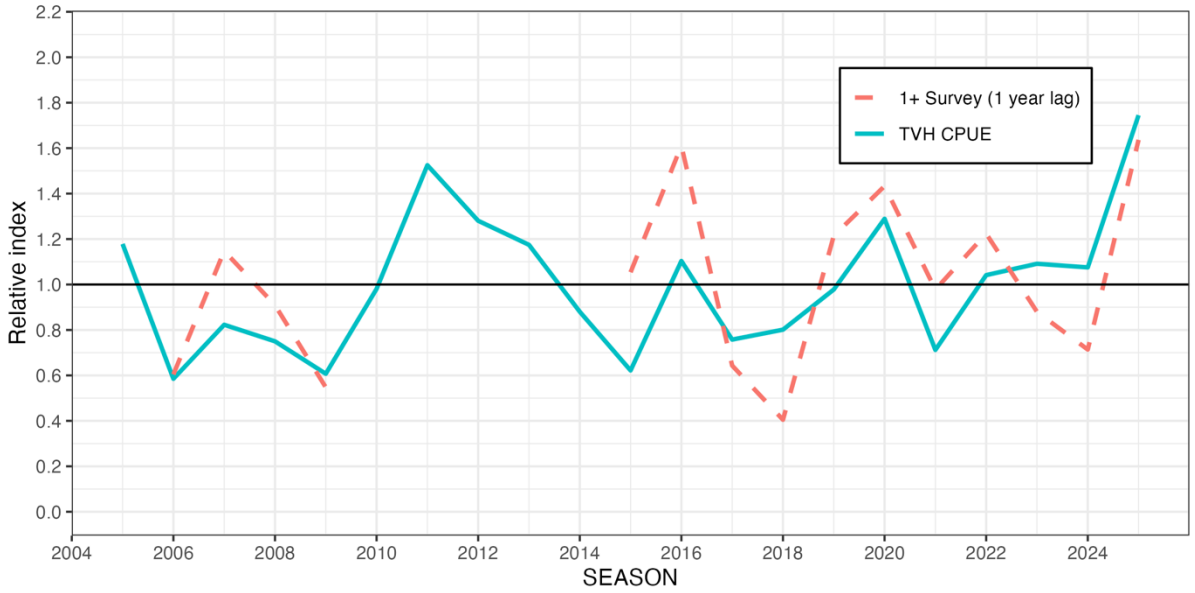

Figure 4: A comparison of the TVH standardised CPUE and 1+ recruitment survey estimates on a relative scale. A one year lag has been applied to the recruitment survey estimates to visually show their relationship.

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TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
RESULTS OF THE NOVEMBER 2025 PRE-SEASON SURVEY	Agenda Item 5 For DISCUSSION and ADVICE

RECOMMENDATIONS

1. That the RAG:
    a) **DISCUSS** and **PROVIDE ADVICE** on the results of the November 2025 pre-season survey to be presented by Fishwell Pty Ltd at the meeting.
    b) **NOTE** that in accordance with the TRL Harvest Strategy, under section 2.10 Decision Rules, if in any year the pre-season survey 1+ index is 1.25 or lower (average standardised number of 1+ age lobsters per survey transect) it triggers a stock assessment.

KEY ISSUES

2. Fishwell Pty Ltd as the new scientific service provider conducted the annual pre-season survey from 20-31 October 2025, aboard the survey vessel '*Cossack Pearl*'. A total of 77 sites were surveyed with counts of 0+, 1+ and 2+ lobsters recorded together with accompanying information on substrate and biota to provide for comparison with previous surveys undertaken by CSIRO. The amount of seabed biota (plants and some selected animals) and substrate type was also recorded at each survey site. Length frequency data was collected from captured TRL.
3. The survey team consisted of Stephen Lloyd (skipper), Torres Strait Islanders and Milton Miskin and James Makaki (professional divers), and Nawrie Kepa (dory driver).
4. The pre-season survey data is a key data input (with a 70 per cent weighting) in the empirical harvest control rule (eHCR)[1], and the integrated stock assessment when it is run (every three years under the TRL Harvest Strategy).
5. The results of the November 2025 pre-season survey will be presented by Fishwell Pty Ltd at the meeting. The RAG will be asked to review the analysis and results presented by Fishwell Pty Ltd and where relevant provide advice on the findings and/or need for further analysis.
6. Of relevance, section 2.10 Decision Rules of the Harvest Strategy provides that:
    - **If in any year the pre-season survey 1+ index is 1.25 or lower (average standardised number of 1+ age lobsters per survey transect) it triggers a stock assessment.**

[1] At the time of writing, the PZJA Standing Committee had recommended the PZJA agree to implement the 'Osprey Rule' as the revised eHCR under the TRL Harvest Strategy.

BACKGROUND

7. Each year in November, an independent scientific pre-season survey is undertaken to determine the relative abundance and size of lobsters in the Torres Strait, together with an assessment of the habitat. Benchmark fishery-independent surveys conducted by CSIRO (1989 and 2002) identified regions of lobster habitat within the TRL Fishery area. This allowed scientists to design ongoing annual population surveys using a few randomly selected sites, with the number of sites commensurate with the subregion area and lobster abundance.

8. Fishery-independent surveys have been conducted in the Fishery since 1989. Historically (1989-2014 and 2018), mid-season (July) surveys focused on providing an index of abundance of the spawning (age 2+) and juvenile (age 1+) lobsters. Mid-season surveys have been replaced with pre-season (November) surveys (2005-2008; 2014 to current) which focus on providing an index of recruiting (age 1+) lobsters as close as possible to the start of the fishing season to support the change to a quota management system and setting of a TAC. Pre-season surveys also provide indices of recently-settled (age 0+) lobsters, which may become useful depending on how reliable they are, as they allow forecasting of stock one year in advance and are used in the eHCR.

9. The 2025 preseason survey is a key annual output as part of the three-year AFMA funded project "*Fishery independent survey, stock assessment, and Recommended Biological Catch calculations for the Torres Strait Tropical Rock Lobster Fishery 2025/26-2027/28*". which was supported by TRLRAG 39 and the Torres Strait Scientific Advisory Committee (TSSAC).

Results of the Torres Strait Tropical Rock Lobster 2025 Pre-Season Population Survey

TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP

MEETING 41, 9–10 December 2025

Agenda Item 5 - Attachment 5a

Background

The Torres Strait Tropical Rock Lobster (TRL) fishery-independent survey provides the primary fishery-independent measure of abundance and remains the cornerstone of the annual assessment process. The survey produces two long-running indices—0+ (recent settlers) and 1+ (recruiting lobsters)—which have been central to TRL stock assessment for more than two decades. With a 10% and 70% weighting respectively, these indices form the highest-weighted component of the empirical harvest control rule (eHCR) and are essential for tracking stock condition and cohort progression.

2025 marked the first year in which the survey was delivered under a new provider arrangement, transitioning delivery from CSIRO to Fishwell Pty Ltd. A significant amount of work occurred prior to, and during, survey delivery to ensure compatibility with the historical timeseries and to maintain a consistent index of abundance. This paper outlines the methods used and presents the provisional 2025 survey results.

Methods

A substantial preparatory phase was undertaken to ensure the 2025 survey preserved continuity with the long-term dataset and produced abundance indices fully comparable with those generated in previous years. The design, field execution, diver protocols, equipment, and data-processing approach were all aligned as closely as possible to the previous CSIRO-led methodology.

Ensuring continuity with the established survey design

Extensive review of historical survey reports, field manuals, and data structures was undertaken to replicate the established methodology. This included:

- copying survey layout, transect placement, and operational procedures from previous years
- maintaining the established set of fixed transects across the major reef systems
- ensuring the duration, width, and behaviour of each transect dive matched the historical protocol
- using the same rules for habitat characterisation, depth recording, and size-frequency measurement

The intention was to ensure that the 2025 indices would sit seamlessly within the long-term time-series.

Vessel selection and use of highly experienced local crew

To support this continuity, a survey vessel was chartered specifically for its suitability for TRL survey work. Key considerations included:

- a skipper with more than 50 years of commercial TRL diving experience
- crew with long histories in the Torres Strait and deep familiarity with local grounds, tidal patterns, and reef structures
- a vessel layout and operations optimised for safe, efficient dory deployment and diver support

This local knowledge was fundamental to maintaining survey consistency, ensuring accurate way-pointing, and supporting safe operations across a wide range of reef conditions.

Diving equipment and dory suitability

The chartered vessel was equipped with:

- dedicated diving compressors
- hookah systems appropriate for survey diving
- dories of the right size, freeboard and manoeuvrability for transect work
- GPS and communication equipment to maintain consistent transect start/end positions

The platform and equipment were selected to provide conditions replicating the previous CSIRO survey arrangements as closely as possible.

Engagement of Torres Strait Islanders in survey delivery

Consistent with the commitment made in the Expression of Interest and with the intent of strengthening local participation, Torres Strait Islanders were engaged as:

- members of the diving team
- dory drivers
- tenders supporting diver deployment and retrieval

Their local knowledge, practical skill, and connection to the sea country where the surveys occur enhanced both the accuracy and cultural integrity of the survey.

Diver pairing and survey execution

Each transect was completed by a pair of divers, consisting of:

- one scientific diver (responsible for count accuracy, consistency, data recording, and transect and count protocol adherence), and
- one experienced TRL commercial diver (bringing strong detection skills and species-recognition expertise).

This pairing structure ensured both methodological consistency and local efficiency *within* each transect, helping to match the style, speed, and search patterns used in earlier surveys. All transects followed established timing, search width and behavioural protocols to preserve comparability with the long-term index.

Divers recorded:

- counts of all lobsters observed by size class (0+, 1+, 2+)
- sex (where identifiable)
- habitat features
- depth

During each transect dive, divers also captured samples of tropical rock lobsters specifically for biological measurement. These animals were brought to the mother vessel where they were sexed, weighed, and their moult state and tail width was recorded. Tail width (TW) was measured using Vernier callipers placed across the widest point of the second abdominal segment. This anatomical location provides a consistent and robust size metric for *Panulirus ornatus* and is the long-standing standard used in TRL surveys.

Use of GoPro footage for verification and habitat sampling

To further strengthen methodological robustness and create an auditable record, each diver wore a GoPro camera mounted on their mask. The footage is used to:

- verify transect counts
- confirm search behaviour, transect coverage and lobsters observed
- review any questionable or ambiguous observations
- provide a more quantitative and permanent record of benthic composition, substrate type and biota coverage
- support future improvements in habitat modelling, site classification and benthic mapping

The use of GoPro's introduces an additional independent verification tool not available in earlier surveys while still preserving the underlying abundance metrics.

Data processing, screening and index derivation

Survey logs were cross-checked against GPS positions, dive durations and video recordings. Habitat classifications were standardised, and a full data-cleaning process was applied to remove incomplete or anomalous records.

Transect densities were calculated by standardising counts to area searched. Indices for 0+ and 1+ were derived as average densities across all survey sites, following the same aggregation approach used historically.

The Survey abundance indices provides a standardised measure of lobster density within the survey area and is calculated separately for the 0+ and 1+ age classes. For each age class, raw counts are adjusted to account for the timing of each survey dive relative to lobster migration and life-history processes, including mortality, emigration, and settlement. Indices are further standardised to the effective area surveyed, scaled to a full transect area of 2,000 m^2.

These abundance indices serve as key inputs to the empirical Harvest Control Rule (eHCR), with the 1+ age class contributing the majority of the weighting (70%). Indices are summarised at both the whole-of-region level and by individual strata to capture spatial variability across the Torres Strait.

Step 1: Correcting lobster counts for full transects

The total count of lobsters (*N*) for each age class represents the number of individuals recorded along a full transect measuring 500 m in length and 4 m in width (2,000 m^2 in total). This includes both lobsters that were caught and those that were only observed by both divers on a paired transect. When

a transect could not be completed (i.e., a partial transect), typically due to bottom-time limitations or challenging diving conditions, the observed lobster count (*N*) for each age class (*i*) was scaled to the equivalent of a full transect using the following equation:

$$N_i = (c_i + m_i) \times \frac{2{,}000}{T_l \, x \, T_w} \quad (1)$$

where

c_i: Number of lobsters of age class *i* caught

m_i: Number of lobsters of age class *i* observed but not caught

T_l: Transect length (in meters)

T_w: Transect width (in meters)

Step 2: Standardising transect lobster counts for survey timing

Lobster abundance in each age class within the Torres Strait survey area changes throughout the year due to life-cycle processes such as settlement, mortality, and emigration. Because surveys are carried out on slightly different dates each year, lobster counts from each transect were adjusted according to the calendar day on which they were sampled. This standardisation enables reliable comparisons of abundance across years and between seasons (mid-year and pre-season).

Age-specific rates are applied to adjust each transect lobster count to a common reference date, 30 June. In effect, each observed count is scaled to the estimated abundance for that age class that would have occurred on that reference day.

The resulting date-standardised lobster counts represent the estimated number of lobsters per age class on 30 June of that year for a full transect. For this adjustment, a scaling parameter of 1.15 is applied to 0+ and 1+ lobsters, and a combined emigration/mortality rate of 0.81 is used for 2+ lobsters, following the original estimates from Pitcher et al. (1997). Given the rapid growth of 0+ and 1+ lobsters and the substantial mortality/emigration of 2+ lobsters, this method accounts for inter-annual variation in survey timing, including whether pre-season surveys occur early or late in November.

Date-standardised lobster counts (*Nc*) per age class were calculated using the following equations:

$$Nc_{Age\ 0+} = e^{1.15 \times (\frac{cd-180}{365})} \times N_{Age\ 0+} \quad (2)$$

$$Nc_{Age\ 1+} = e^{1.15 \times (\frac{cd-180}{365})} \times N_{Age\ 1+} \quad (3)$$

$$Nc_{Age\ 2+} = e^{0.81 \times (\frac{cd-180}{365})} \times N_{Age\ 2+} \quad (4)$$

where *cd* is calendar day.

Step 3: Calculating the abundance index per stratum

After transect counts were standardised to the common reference date, the corrected lobster counts were aggregated to provide a stratum-level estimate of abundance. For each stratum and age class, the abundance index was calculated as the mean of all date-corrected transect counts (Nc; Equations

2–4). Because each corrected count reflects the estimated number of lobsters present within a standardised transect area of 2,000 m² on 30 June, averaging across transects provided a consistent measure of lobster density within each stratum.

This approach ensures that differences in survey timing, transect length, and local variability in observed counts are accounted for before combining data at the stratum level. The resulting abundance indices therefore represent comparable, spatially aggregated estimates of lobster density for each age class and survey year.

Step 4: Calculating the survey-wide abundance index

Because the seven survey strata differ in surface area (Table 1), the stratum-level abundance indices must be area-weighted to obtain an overall abundance index for the entire survey region. For each TRL age class, the survey-wide abundance index is calculated by multiplying the abundance index of each stratum by its proportional contribution to the total survey area (Table 1) and then summing these weighted values. This weighting ensures that strata with larger spatial extent contribute proportionally more to the overall abundance estimate than smaller strata.

The survey-wide abundance index (AI) for age class *i* was therefore calculated using the following equation:

$$AI_i = \sum_{s=1}^{7} (AI_{i,s} \times p_s) \quad (5)$$

where

$AI_{i,s}$: Abundance index for age class *i* in stratum *s*

p_s: Proportional contribution of stratum *s* to the total survey area (Table 1)

Table 1. Surface area and proportional contribution of each surveyed stratum to the total survey area. These values were used for calculating the Ref_2024 abundance index.

Stratum	Surface area (km²)	Proportional survey area incl. Buru	Proportional survey area excl. Buru
Buru	1,689	0.194	-
Mabuiag	1,394	0.160	0.199
Kircaldie Rubble	961	0.110	0.137
TI bridge	2,924	0.336	0.417
Warraber Bridge	744	0.086	0.106
South-East	893	0.103	0.127
Reef edge	93	0.011	0.013

Alternative scenarios for calculating the survey-wide abundance index

To account for the effects of differences in spatial coverage and survey design on the TRL survey-wide abundance index, the same alternative scenarios evaluated in 2024 were also applied in 2025. These scenarios reflect differences in site inclusion, survey history, and whether the Buru stratum is included or excluded.

The following four scenarios were used to calculate the TRL abundance index for the entire survey area:

1. **All sites surveyed**

This scenario uses all 77 sites surveyed in 2025 and applied the stratum surface areas as revised in 2024 (Table 2.1). It represents the full spatial coverage of the current survey design.

2. **All sites excluding Buru (Ex. Buru)**

This scenario includes all surveyed sites except those located in the Buru stratum, again using the revised stratum surface areas. It is reported to evaluate the sensitivity of the abundance index to the omission of Buru.

3. **Mid-year only (MYO) sites**

This scenario is based on the 74 sites consistently surveyed during mid-year surveys. It provides a long-term, comparable time series by using only those sites common to both the historical mid-year surveys (conducted between 1989 and 2018) and the pre-season surveys undertaken since 2008.

4. **Reference 2024 sites (Ref2024)**

This scenario includes the same 77 sites that have been surveyed in each of the four years up to 2024 and the current year (2025), using the revised stratum surface areas. It offers a consistent recent baseline for year-to-year comparisons by holding site selection constant across the recent period.

Results

Survey coverage

All 77 transects were surveyed (Fig. 1, Table 2). Average distance per site in the 2025 survey was 491 m, representing 98% of the total planned survey distance. This is comparable to the 2021 and 2022 survey when 99% and 97% of the total distance respectively (Table 2).

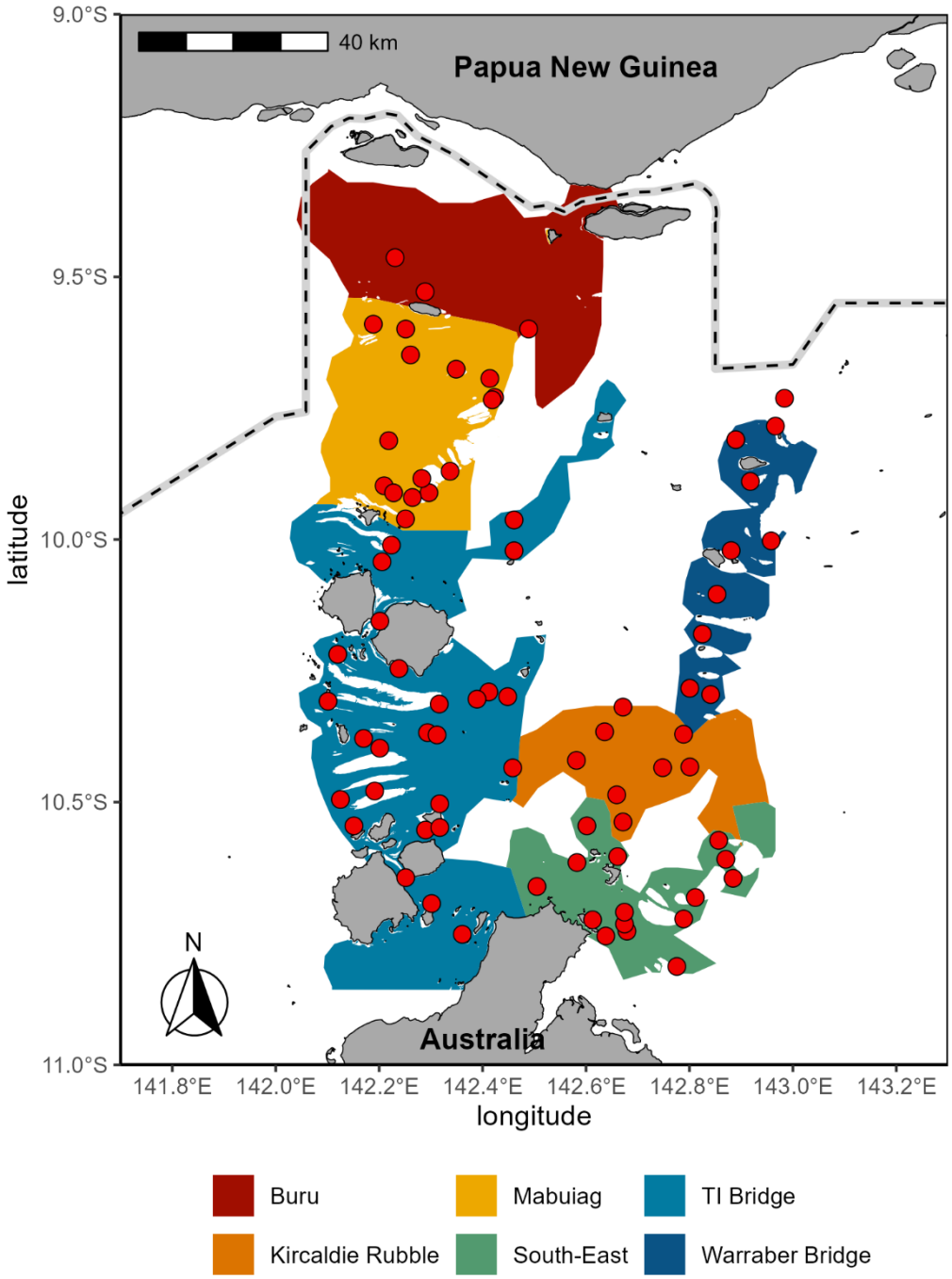


Figure 1. Sites surveyed during the 2025 TRL survey.

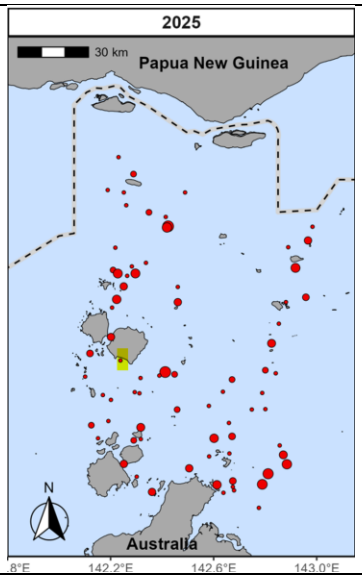
Table 2. Total number of dive sites sampled, average distance swum per site, and percentage of total distance sampled (compared to only complete transects) during the last five pre-season surveys (including all sites).

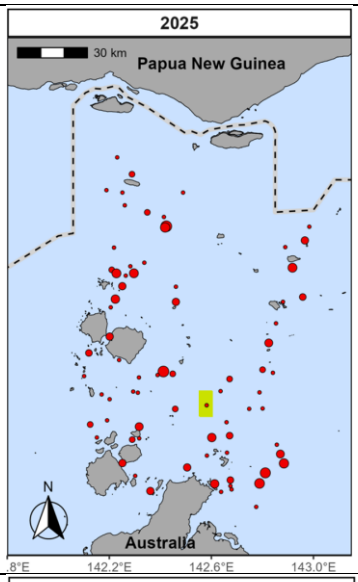
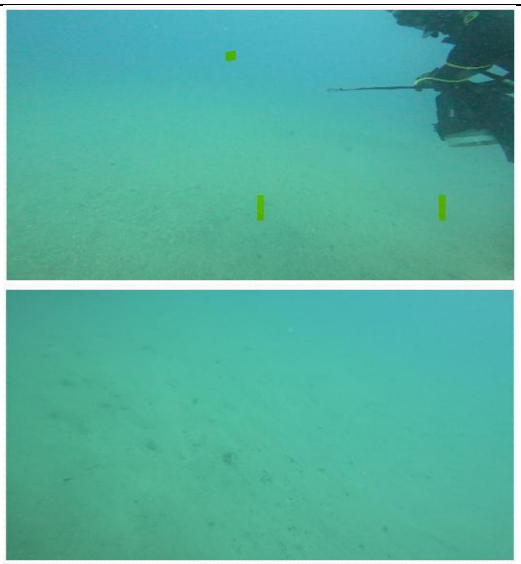
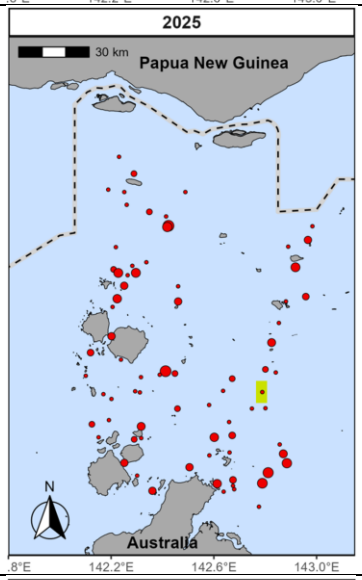
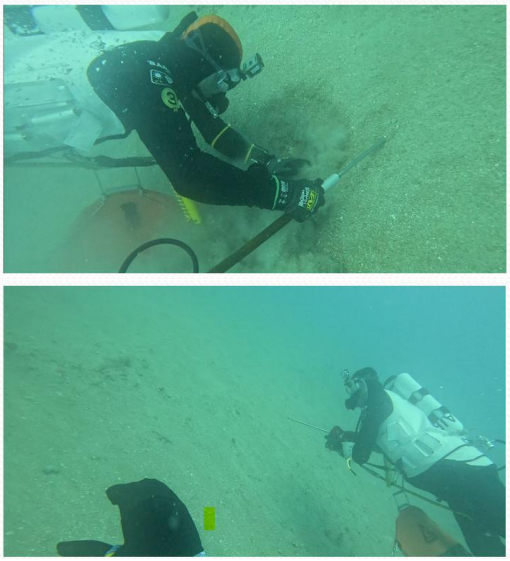
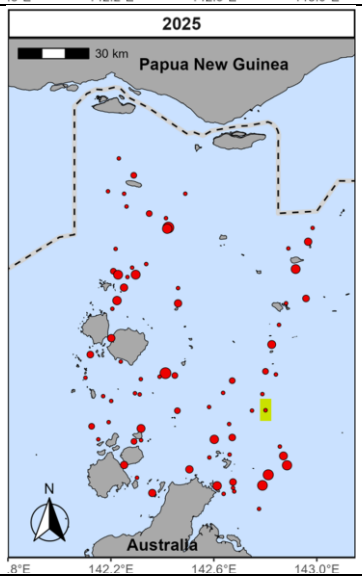
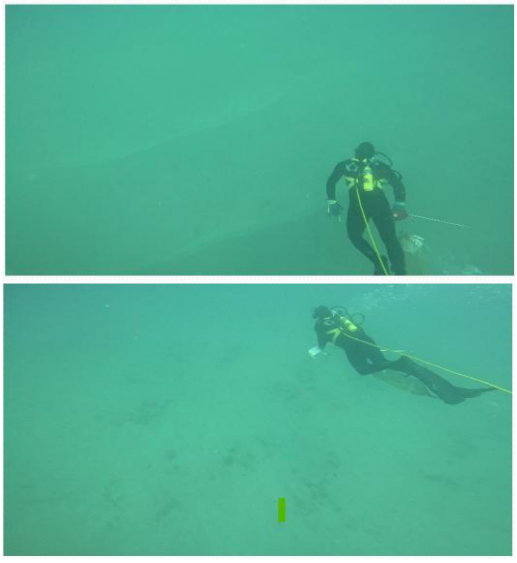
Year	Total # sites	Average distance (m) per site	% Total distance sampled
2021	77	495	99
2022	77	485	97
2023	77	480	96
2024	77	442	88
2025	77	491	98

Sand incursions

Sand incursions were recoded from several sites. There were 23 of 77 sites with 90% or more sandy substrate. At some of those sites, it was clear that the incursion was recent with the observed biota half buried, and in which sand was so loose that an arm was easily pushed elbow deep into it, or the sand was built up in waves. Examples of those are shown below:

Table 3. Examples of sand incursions.

Site (% sand)	Location	Screen grabs
431 (100%)		

911 (95%)		
N960 (100%)		
1112 (85%)		

Empty structures – ledges and sink holes

TRLs aggregate of structures including ledges and sink holes. TRLs were observed on these structures during the 2025 survey, however there were many of these structures that the experienced TRL divers expected to find TRLs, however many of these were empty. Examples of those are shown below:

Figure 2. Examples of structures that were expected to hold TRLs but did not.

0+ TRL abundance index

Index value:	0.27
Relative to 2024:	36% lower
Position in long-term time series:	0 percentile

In 2025, the age-0+ TRL survey abundance index estimated under the Ref2024 scenario was slightly lower than the 2024 estimate (0.42) and was the lowest recorded since 2005, falling below even the 2017 index (0.40; Fig. 3). The 2025 point estimate was also below the long-term (2005–2024) pre-season average (1.78; Fig. 3). The variance associated with the 2025 index was relatively small compared with surveys conducted from 2018 to 2023 and was comparable to the variability observed in 2017 and 2024 (Fig. 3).

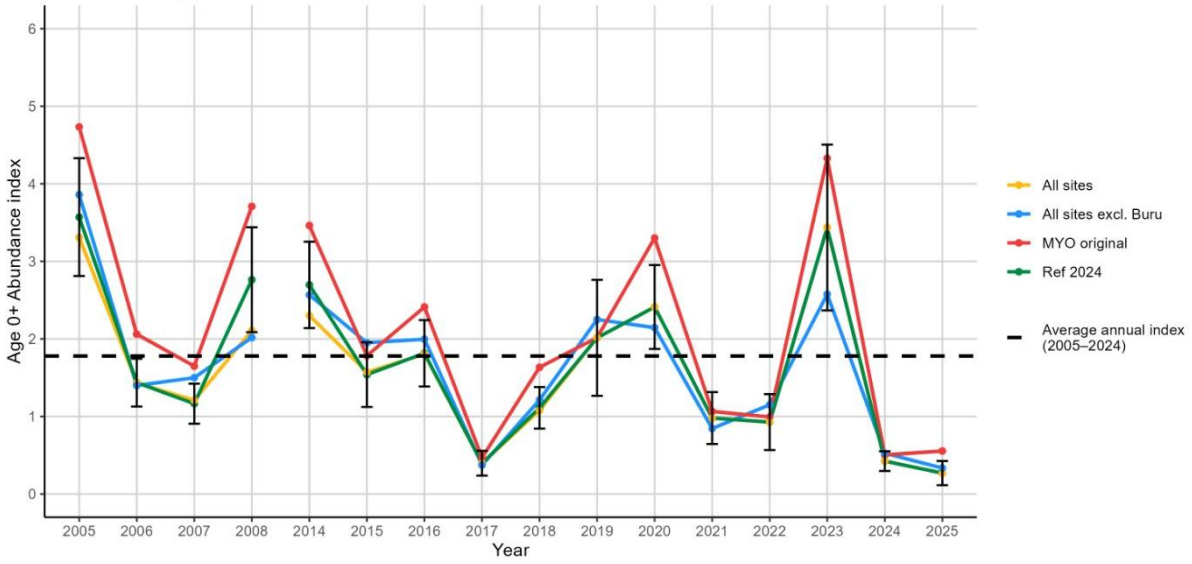


Figure 3. Age-0+ abundance index for Torres Strait tropical rock lobster (TRL, P. ornatus) under the four alternative scenarios. Vertical black lines indicate standard errors for the Ref2024 scenario , and the black dashed line shows the long-term mean age-0+ abundance index for 2005–2024 under the Ref2024 scenario.

0+ TRL spatial patterns

Highest 0+ stratum density: Mabuiag (1.57; north-west)

Lowest 0+ stratum density: Not observed in Buru (north-west), TI Bridge (south-west), South-East, and Kircaldie Rubble (south-east)

Spatial shifts from previous years: Unlike previous years, not observed in TI Bridge (south-west)

Unlike age-1+ lobsters, which typically occur in higher densities in the eastern part of the survey area, age-0+ settlement remains concentrated in the west (Fig. 4 and Fig. 5). In 2025, the highest abundance of age-0+ TRL was recorded in the western stratum, Mabuiag, with some variability among sites (Fig. 6). Low abundances were recorded in the eastern stratum, Warraber Bridge, and in the Reef Edge stratum, both of which showed little between-site variability (Fig. 6). For all three of these strata, the 2025 abundance indices were below long-term averages. No age-0+ TRL were observed in the remaining strata (Fig. 6).

Historically, age-0+ TRL have been recorded in Mabuiag during every pre-season survey, and this stratum has shown the highest abundance in 10 of the 16 survey years and the second highest in 3 years (Fig. 7; full data not shown). Age-0+ lobsters have also been consistently present, though generally in lower densities, in the Reef Edge (12 of 16 years) and Warraber Bridge strata (14 of 16 years; data not shown). In contrast, 2025 was the first year with no age-0+ lobsters observed in the TI Bridge or South-East strata (Fig. 7; full data not shown). TI Bridge has historically shown high recruitment, with the highest age-0+ density in 3 of the 16 years and the second highest in 7 years (data not shown). The Buru stratum has shown large fluctuations over time, but no age-0+ TRL were recorded there in 2025 (Fig. 7; full data not shown). Age-0+ lobsters are not regularly found in Kirkaldie Rubble (6 of 16 years), and none have been recorded in this region in the past nine survey years (Fig. 7; full data not shown).

Overall, these survey results indicate substantial spatial and temporal variability in age-0+ settlement. The low density recorded in 2025 mirrors the similarly low levels observed in 2024 and represents a sharp decline from the high abundance observed in 2023 (Fig. 3).

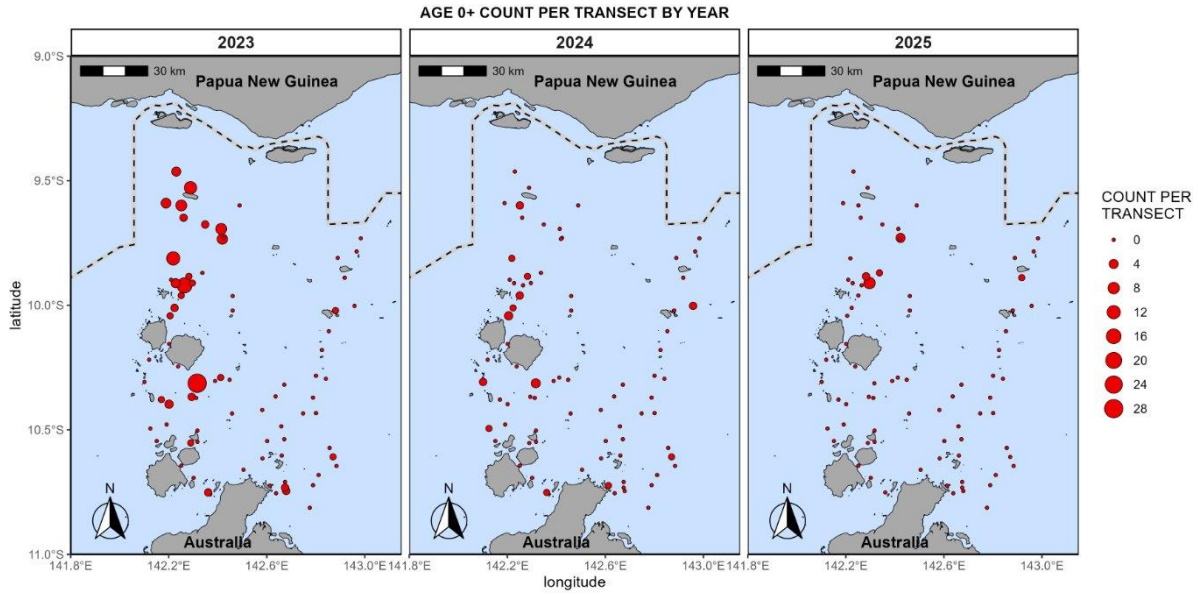


Figure 4. Age-0+ counts of Torres Strait tropical rock lobster (TRL, P. ornatus) per transect for all sites (n = 77) surveyed annually from 2022 to 2024.

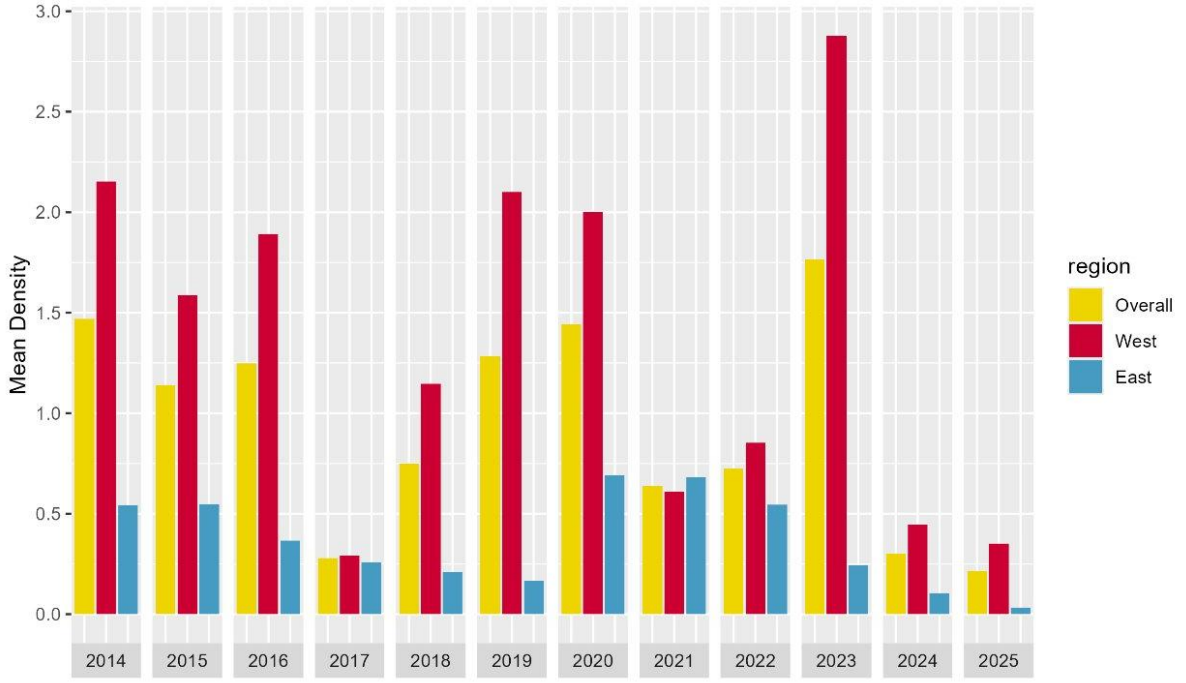


Figure 5. Mean age-0+ density (number of individuals per full transect area of 2,000 m^2) of Torres Strait tropical rock lobster (TRL, P. ornatus) for the overall survey area, and separately for the western and eastern regions.

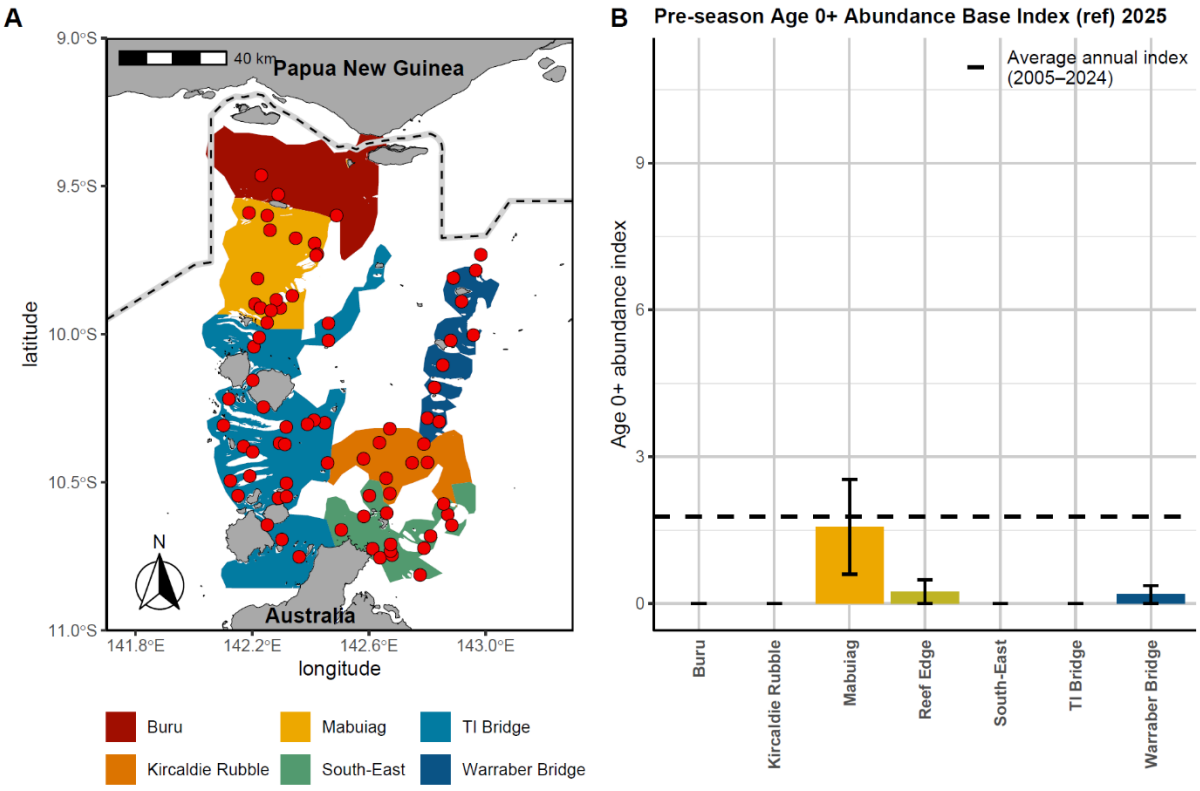


Figure 6. (A) Map of the Torres Strait survey area with strata (regions) sampled during the annual tropical rock lobster (TRL, P. ornatus) pre-season surveys shown in different colours. (B) The 2025 age-0+ TRL abundance index per stratum, calculated under the Ref2024 scenario. Vertical black lines indicate standard errors, and the black dashed line shows the mean abundance index for 2005–2024 under the Ref2024 scenario. Note that the 'Reef Edge' stratum is not shown on the map, as it is habitat-defined rather than geographically defined, and its sites occur throughout the survey area.

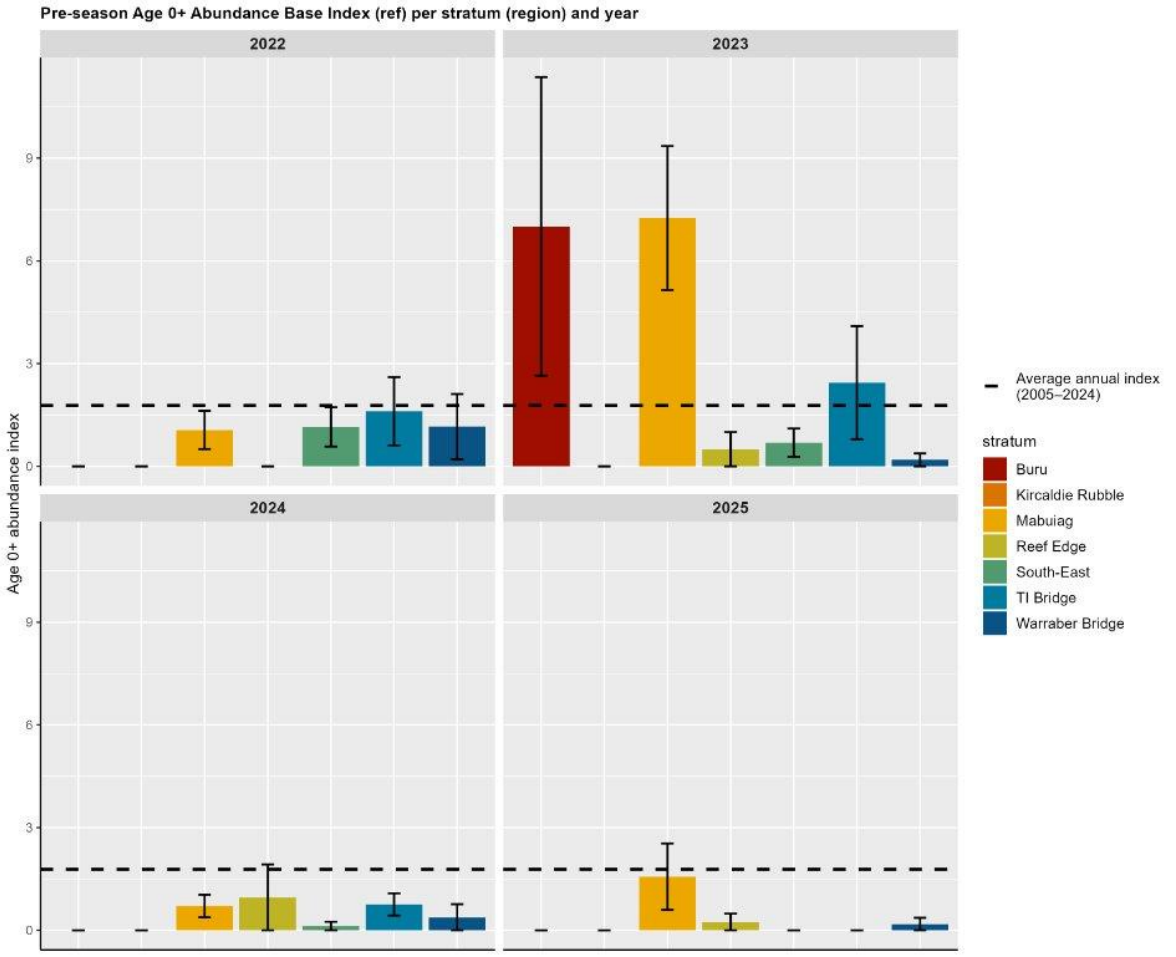


Figure 7. Age-0+ abundance indices of Torres Strait tropical rock lobster (TRL, P. ornatus) across years and strata, calculated under the Ref2024 scenario. Vertical black lines indicate standard errors, and the black dashed line shows the mean abundance index for 2005-2024 under the Ref2024 scenario.

1+ TRL abundance index

Index value:	2.19
Relative to 2024:	74% lower
Position in long-term time series:	7th percentile

For the Ref2024 scenario, the estimated 2025 abundance index for age-1+ lobsters was markedly lower than the 2024 estimate (8.37) and only marginally higher than the lowest value in the time series (2.07), which occurred in 2017 (Fig. 8). The 2025 point estimate was below the long-term pre-season average (2005–2024; 5.11; Fig. 8). The variance associated with the 2025 index was comparatively low relative to the indices calculated for surveys conducted between 2018 and 2024 and was similar to the variability observed for the 2017 index.

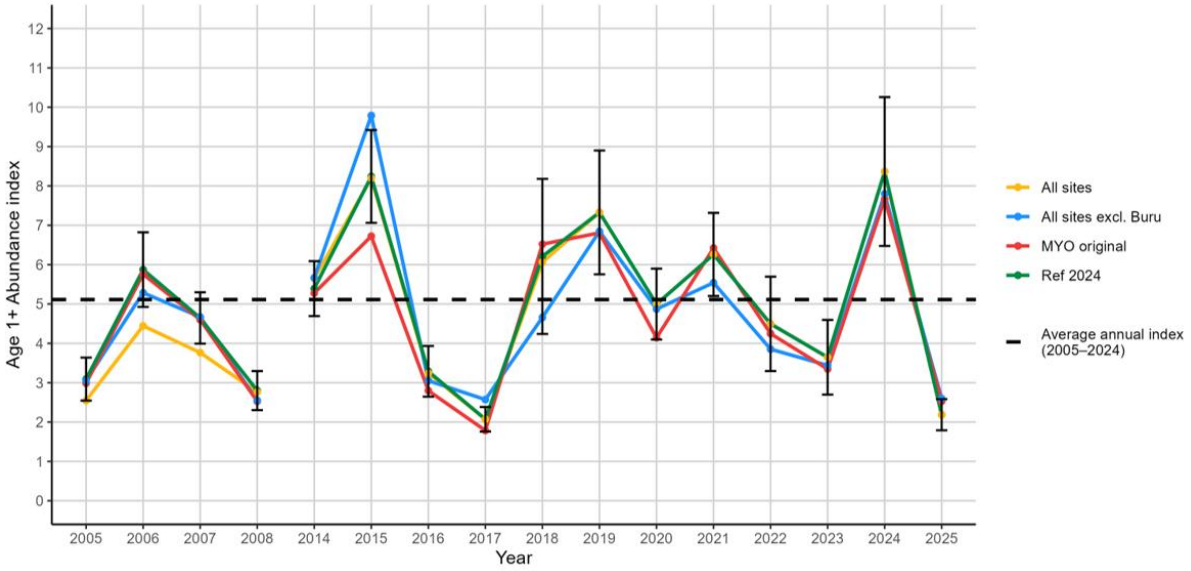


Figure 8. Age-1+ abundance index for Torres Strait tropical rock lobster (TRL, P. ornatus) under the four alternative scenarios. Vertical black lines indicate standard errors for the Ref2024 scenario, and the black dashed line shows the long-term mean age-1+ abundance index for 2005–2024 under the Ref2024 scenario.

1+ TRL spatial patterns

Highest 1+ stratum density: South-East (4.13) and Mabuiag (3.80; northwest)

Lowest 1+ stratum density: Buru (0.49; north-west) and Kircaldie Rubble (0.54; south-east)

Spatial shifts from previous years: Similar abundance west and east, while historically higher abundance in east

In 2025, the spatial distribution of age-1+ TRL was broadly similar to that observed in 2023–24, but overall counts were markedly lower than in 2024 (Fig. 9). Consistent with the previous two years, sites in the southeast continued to show relatively high age-1+ densities compared with other regions (Fig. 9). The lowest, often zero, transect counts occurred in the north-west, south-west, and central-east areas (Fig. 9). The particularly low abundance in the central-east contrasts with the relatively high counts recorded there in 2024 and may be related to the sand incursions observed during the 2025 survey (oval in Fig. 9). Historically, aside from 2018, substantially higher numbers of age-1+ lobsters have been recorded per transect in the eastern survey area compared with the west (Fig. 10). In 2025, however, mean densities were comparable between the two regions (Fig. 10). Naturally, densities of age-1+ TRL vary both spatially across the survey area and temporally across years, as shown by the long-term record of pre-season transect counts.

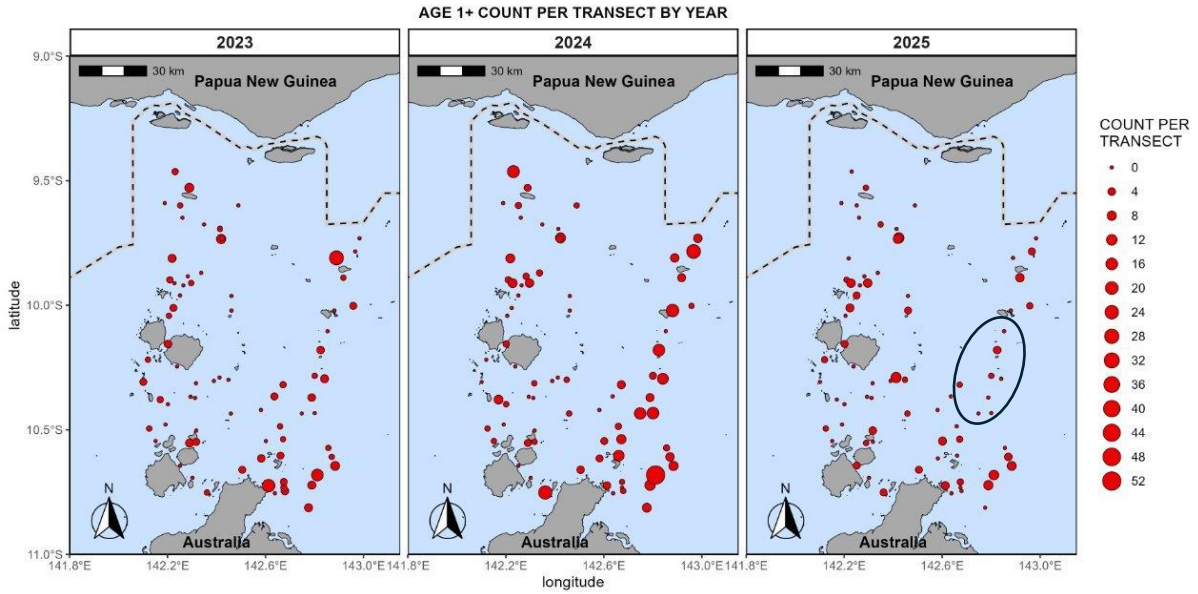


Figure 9. Age-1+ counts of Torres Strait tropical rock lobster (TRL, P. ornatus) per transect for all sites (n = 77) surveyed annually from 2022 to 2024. The oval highlights the area where sand incursions were observed during the 2025 pre-season survey.

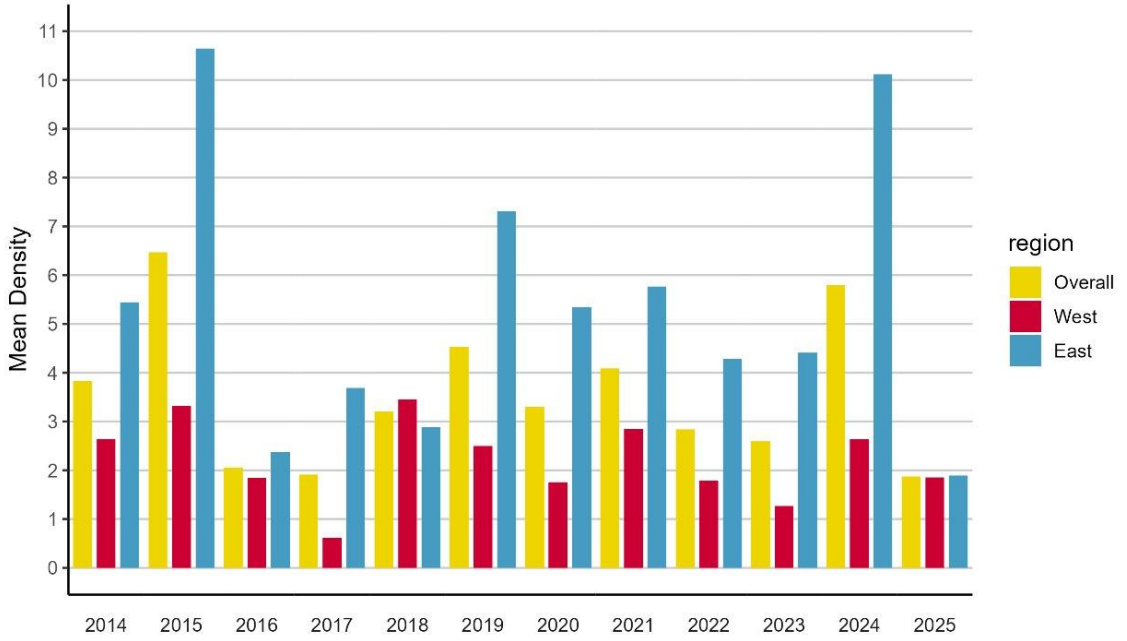


Figure 10. Mean age-1+ density (number of individuals per full transect area of 2,000 m^2) of Torres Strait tropical rock lobster (TRL, P. ornatus) for the overall survey area, and separately for the western and eastern regions.

In 2025, the age-1+ TRL abundance index varied across survey strata (Fig. 11), indicating that recruitment to the fishery occurs broadly across the region. The 2025 age-1+ point estimates were below the long-term average in all strata (Fig. 11). Compared with previous years, transect counts for age-1+ TRL were generally less variable between sites within most strata, as indicated by smaller standard errors (Fig. 12). Mabuiag and TI Bridge were the main exceptions.

The highest abundance of recruiting lobsters in 2025 occurred in the South-East stratum, followed by Mabuiag (Fig. 11). Historically, the South-East index has been the most consistently above average, exceeding the long-term mean in 12 of the 16 pre-season surveys conducted between 2005 and 2025 (data not shown). In contrast, the Mabuiag index has been substantially lower than the South-East index in most years (14 of 16) and below the historical average in 12 of 16 years.

In 2022–2024, TI Bridge consistently recorded the lowest abundance of recruiting lobsters. However, in 2025 the lowest values were instead observed in the Buru and Kircaldie Rubble strata (Fig. 11, Fig. 12). The Buru index has typically been below average (10 of 16 years), whereas the Kircaldie Rubble index has been below average in fewer years (7 of 16; data not shown).

The relatively low 2025 indices at Kircaldie Rubble and Warraber Bridge may reflect habitat changes, including sand incursions observed during the survey, which could influence settlement. Variation in local currents may also affect settlement patterns. More broadly, the low abundance of age-1+ lobsters in 2025 is likely linked to the low density of age-0+ lobsters observed in 2024.

Overall, these results highlight substantial spatial and temporal variability in age-1+ TRL abundance across the Torres Strait survey area.

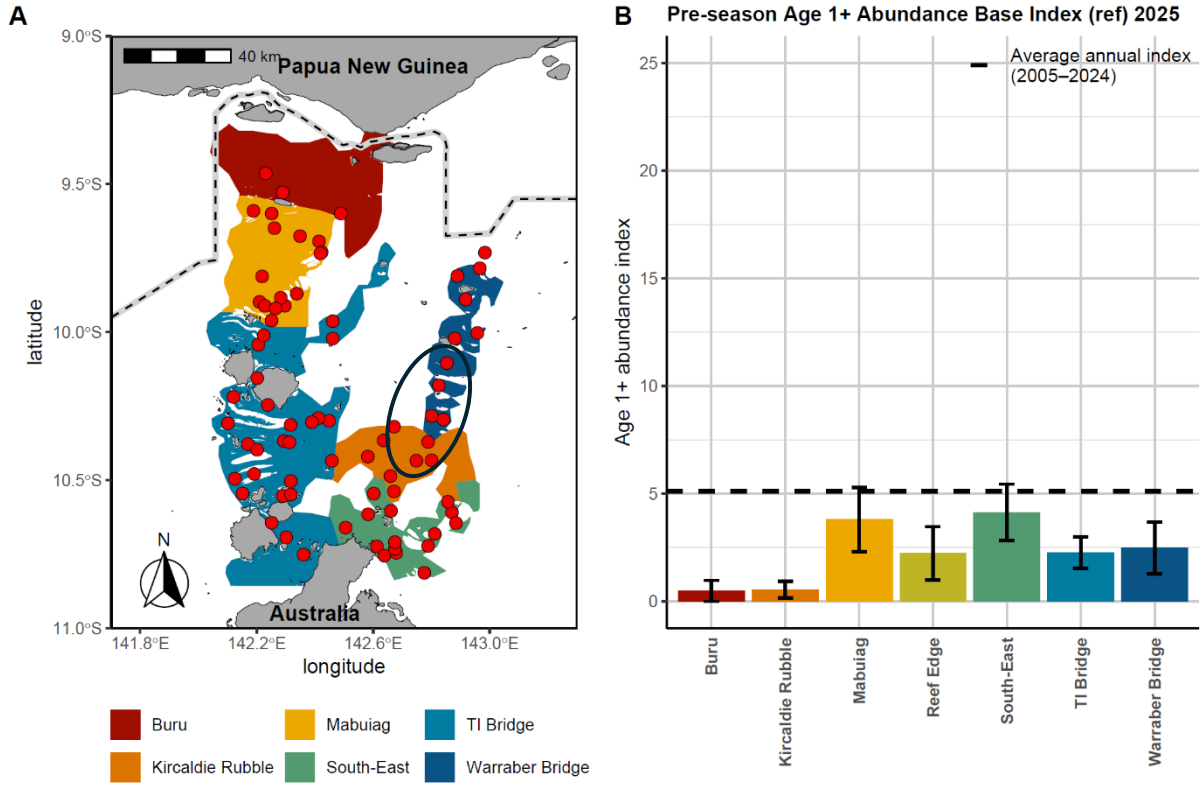


Figure 11. (A) Map of the Torres Strait survey area with strata (regions) sampled during the annual tropical rock lobster (TRL, P. ornatus) pre-season surveys shown in different colours. (B) The 2025 age-1+ TRL abundance index per stratum, calculated under the Ref2024 scenario. Vertical black lines indicate standard errors, and the black dashed line shows the mean abundance index for 2005–2024 under the Ref2024 scenario. Note that the 'Reef Edge' stratum is not shown on the map, as it is habitat-defined rather than geographically defined, and its sites occur throughout the survey area. The oval highlights the area where sand incursions were observed during the 2025 pre-season survey.

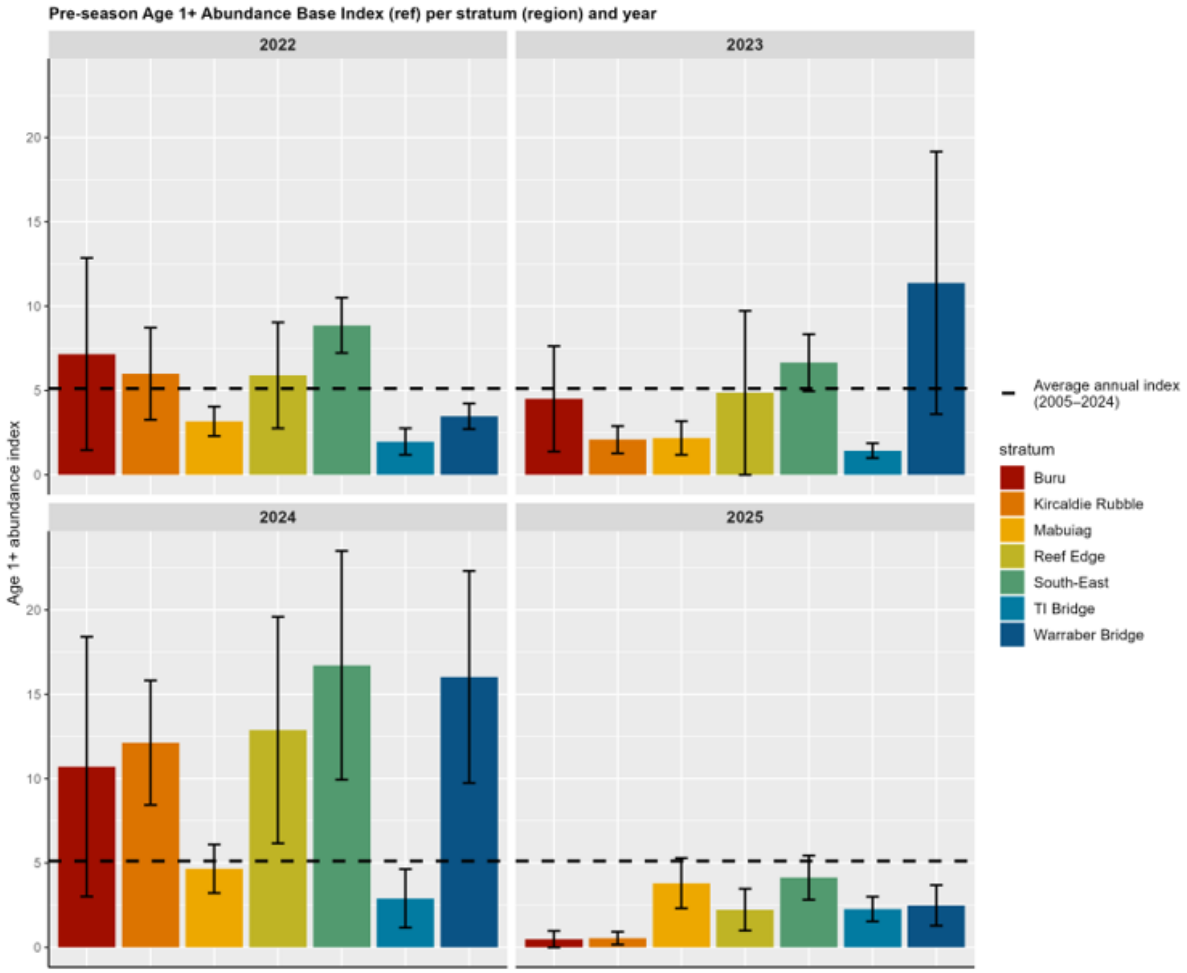


Figure 12. Age-1+ abundance indices of Torres Strait tropical rock lobster (TRL, P. ornatus) across years and strata, calculated under the Ref2024 scenario. Vertical black lines indicate standard errors, and the black dashed line shows the mean abundance index for 2005-2024 under the Ref2024 scenario.

Size-frequency structure

During previous pre-season and mid-year surveys, lobsters have been sampled for sex determination and tail-width measurements (Table 4). During the 2025 pre-season survey, 99 lobsters were measured. Most sampled individuals had a tail width between 38 and 60 mm (Fig. 13), representing the recruiting (1+) cohort. The modal tail width for this cohort in 2025 was approximately 50 mm, around 2 mm below the historical modal size (Fig. 14).

In contrast to previous years, when a distinct peak at 18-24 mm indicated the presence of age-0+ lobsters, no such peak was observed in 2025 (Fig. 13, 14). However, there was a relatively high number of lobsters with tail widths between 27 and 29 mm (Fig. 13, Fig. 15). Overall, compared with results from 2021-2023, the 2025 data suggest a low proportion of recently settled lobsters (< 32 mm tail width; Fig. 14, Fig. 15).

The mean tail width of measured lobsters in 2025 was 49.7 mm, slightly lower than the 2024 mean (51.8 mm) but higher than in 2023 (42.3 mm). The comparatively low mean in 2023 was driven by a high proportion of age-0+ sampled that year (Fig. 14).

As in previous years, the tail-width distributions of males and females were similar (Fig. 14).

Table 4. Number of Torres Strait tropical rock lobster (TRL, P. ornatus) measured during each pre-season survey by area (North or South). Observed sex ratio, number of locations where lobsters were measured, and total number of locations surveyed are also shown.

Year	# Meas. lobster	Sex ratio (M/F)	# Meas. lobster North	# Meas. lobster South	# Sites with meas. lobster	# Sites surveyed
2005	302	1.14	101	201	84	154
2006	395	1.09	177	218	105	189
2007	327	1.21	102	225	95	188
2008	216	0.88	97	119	72	148
2014	436	1.12	149	287	92	130
2015	440	0.86	69	371	56	78
2016	130	0.69	52	78	49	77
2017	109	0.76	8	101	36	77
2018	171	0.99	78	93	57	82
2019	250	0.81	80	168	59	77
2020	179	0.81	59	120	53	76
2021	174	1.20	58	116	51	77
2022	124	0.97	48	76	45	77
2023	132	1.28	68	64	46	77
2024	162	1.02	47	115	40	77
2025	99	0.98	48	51	32	77

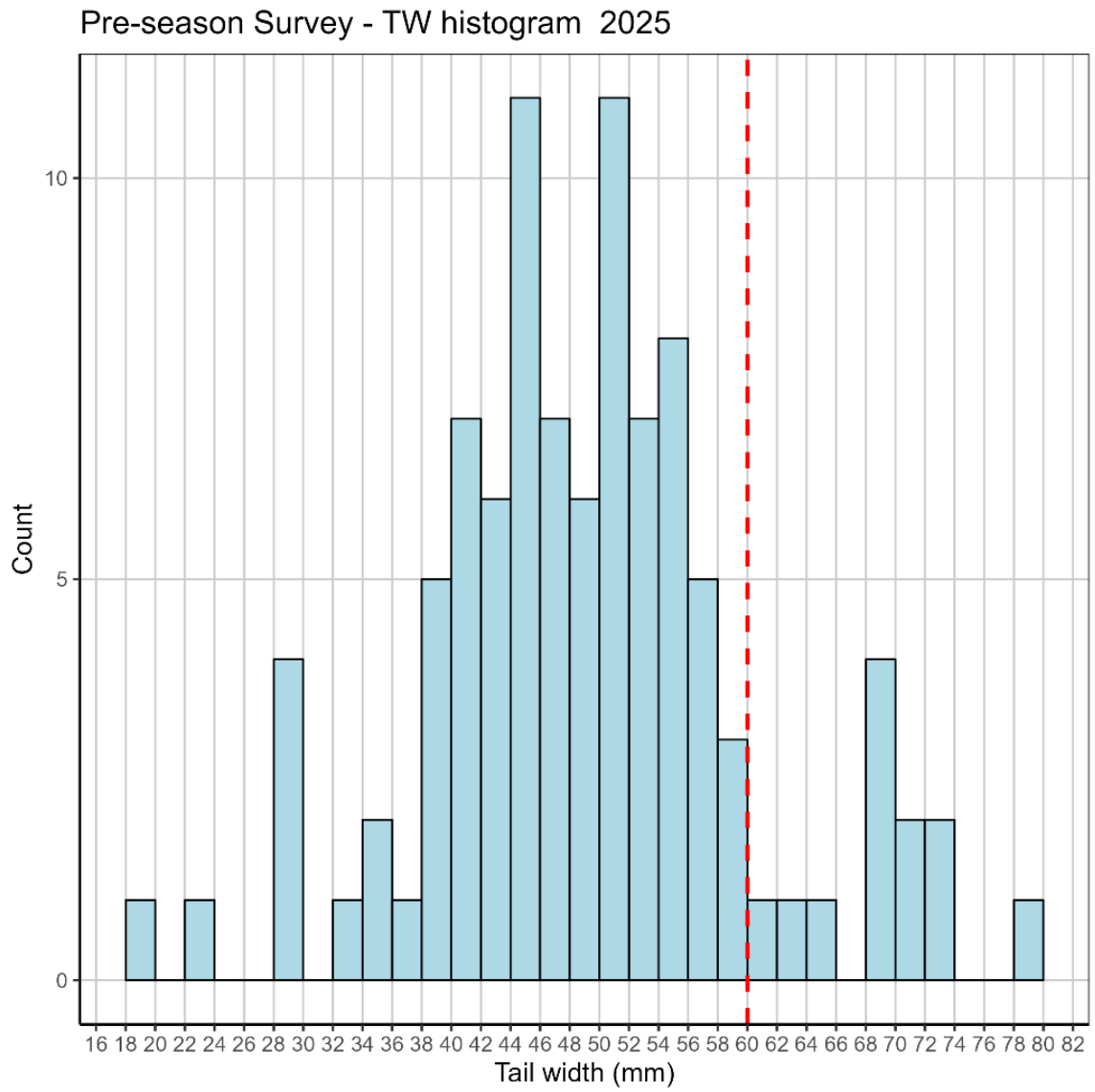


Figure 13. Length-frequency distribution of Torres Strait tropical rock lobster (TRL, P. ornatus) sampled during the 2025 pre-season survey. Note: 60 mm tail width ≈ 90 mm carapace length, which is the minimum legal size for commercially caught lobsters.

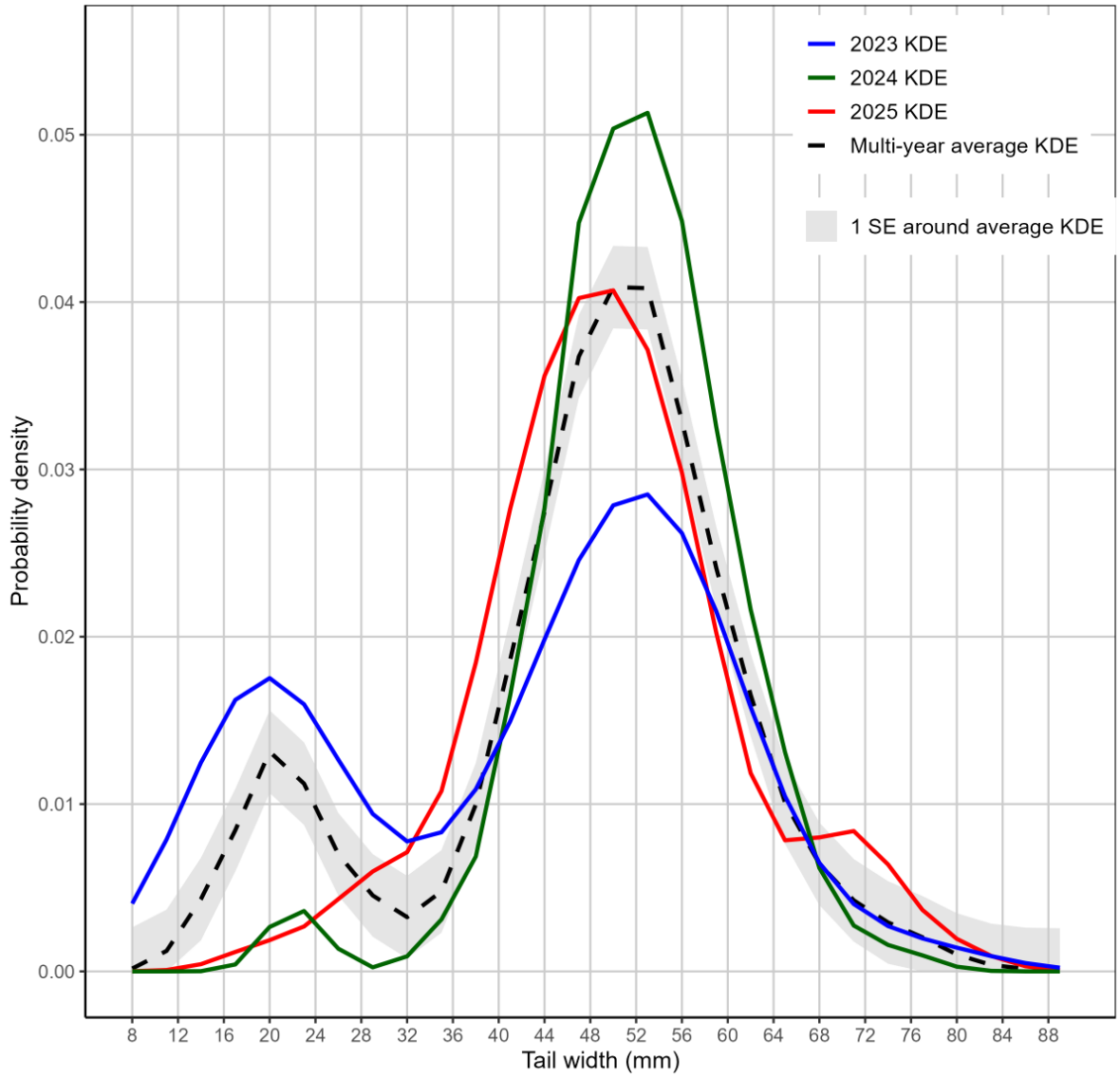


Figure 14. Kernel density estimates (KDE) of tail width for Torres Strait tropical rock lobster (TRL, P. ornatus) sampled during the 2023-2025 pre-season surveys. The black dashed line shows the combined (average) KDE across all pre-season surveys years, and the grey shaded area indicates one standard error on either side of the combined model. Note: The y-axis shows probability density, meaning the bar heights are scaled so that the total area equals 1, allowing direct comparison of distributions across years.

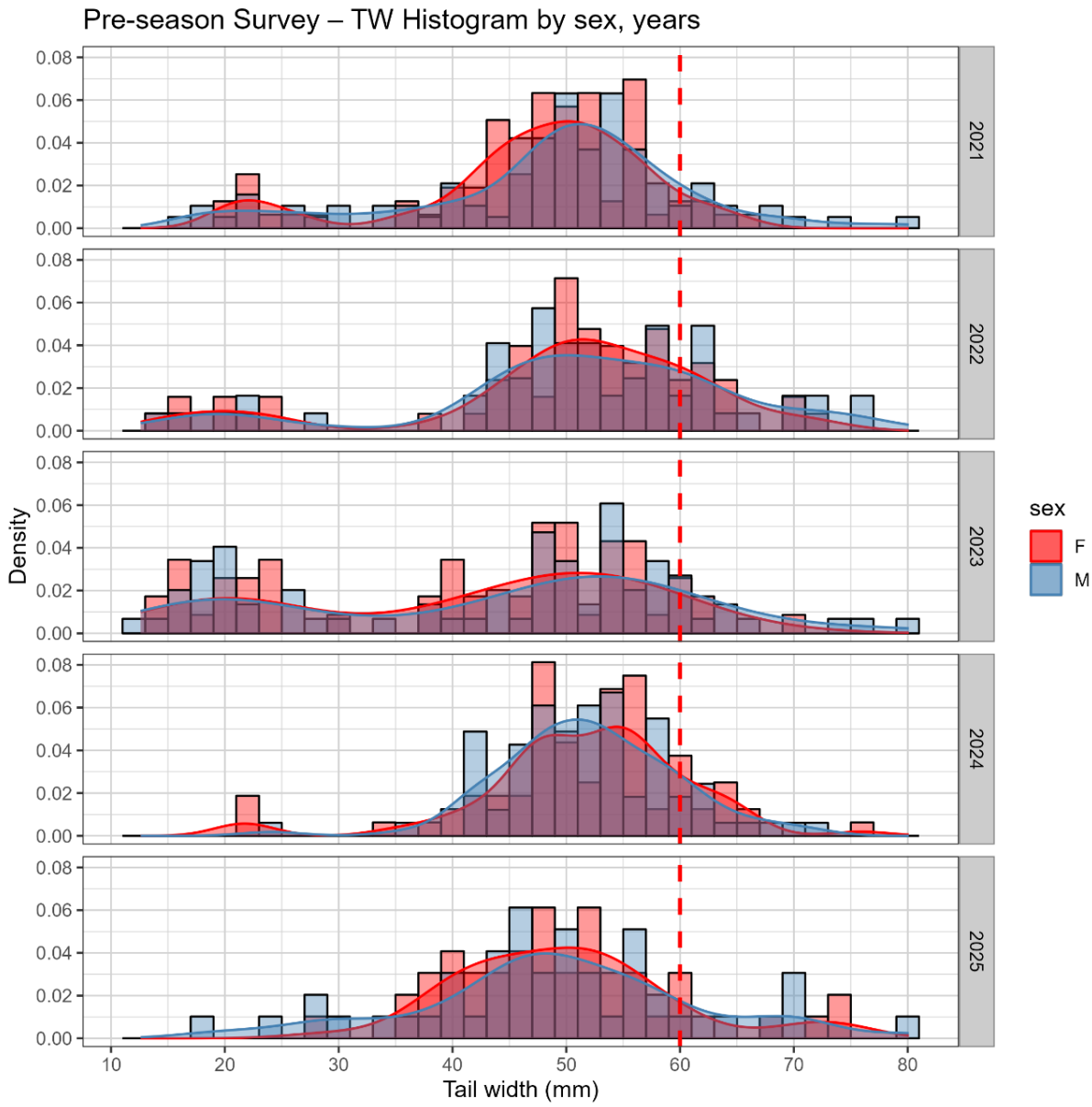


Figure 15. Density distributions of Torres Strait tropical rock lobster (TRL, P. ornatus) tail width, separated by sex, sampled during the 2021-2025 pre-season surveys. The red dashed line indicates the legal minimum size for males (90 mm CL ≈ 60 mm tail width). Note: The y-axis shows probability density, meaning the bar heights are scaled so that the total area equals 1, allowing direct comparison of distributions across years.

Concluding remarks

Overall, the 2025 pre-season survey indicates low abundance across both 0+ and 1+ TRL. Age-0+ settlement fell to its lowest level since 2005 and was below long-term averages across all strata, with recruitment largely confined to Mabuiag and minimal or absent in most other regions. These low settlement levels in 2024–25 were reflected in the 2025 1+ abundance index, which was markedly reduced from 2024, only slightly above the historical minimum, and below the long-term mean in every stratum. Although the spatial patterns for 1+ lobsters were broadly consistent with recent years, densities were uniformly low, and habitat changes such as sand incursions may have contributed to reduced settlement in some eastern strata.

Length-frequency data support these findings. Only 99 lobsters were measured in 2025, with most individuals falling within the 38–60 mm tail-width range characteristic of the recruiting cohort. The modal tail width (≈50 mm) was slightly below the historical average, and the absence of the typical 18–24 mm peak indicates very limited age-0+ settlement. Although a small increase in lobsters with 27–29 mm tail width was observed, the overall proportion of recently settled lobsters (<32 mm) remained low compared with 2021–2023. Mean tail width (49.7 mm) was slightly lower than in 2024 and consistent with the reduced age-0+ contribution. Male and female size distributions remained similar to previous years.

Together, these results demonstrate pronounced spatial and temporal variability in recruitment and highlight a recent downturn across two consecutive cohorts, following the unusually high 0+ abundance first recorded in the 2023 survey, and then transitioning to one of the highest 1+ abundance indices during the 2024 survey.

Literature Cited

Pitcher CR, Dennis DM, Skewes TD (1997) Fishery-independent surveys and stock assessment of Panulirus ornatus in Torres Strait. *Marine and Freshwater Research* **48**(8), 1059-1067. [In English] doi: 10.1071/Mf97199

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
RECOMMENDED BIOLOGICAL CATCH	Agenda Item 6 For DISCUSSION and ADVICE

RECOMMENDATIONS

1. That the RAG:
    a. **NOTE** on 19 November 2025, Senator Julie Collins determined a total allowable catch (TAC) of 200,000 kilograms of TRL in the Australian waters of the TRL Fishery for the 2024-25 fishing season.
    b. **NOTE** the climate and ecosystem status report as presented under **Agenda Item 3**;
    c. **NOTE** the RAG agreed standardised Catch Per Unit Effort (CPUE) indices for the TIB and TVH sectors as discussed under **Agenda Item 4**;
    d. **NOTE** the pre-season survey indices for 1+ recruiting lobsters and 0+ recently settled lobsters as presented under **Agenda Item 5**.
    e. **NOTE** that in considering the advice from TRLRAG 40 and TRLWG 17 on 2-3 October 2025, the PZJA Standing Committee recommended that the PZJA agree to implement the 'Osprey Rule' as the revised empirical Harvest Control Rule (eHCR) under the TRL Harvest Strategy. It is expected that the PZJA will formalise their decision by the time TRLRAG 41 meets.
2. **PROVIDE ADVICE** on a Recommended Biological Catch (RBC) estimate derived through the application of the recommended revised eHCR, the 'Osprey Rule', for the 2025-26 TRL Fishing season, having regard to:
    a. the discussions and outputs from Agenda Items 3, 4 and 5; and
    b. the decision rules of the TRL Harvest Strategy.

KEY ISSUES

3. The RAG is being asked to provide advice on an RBC for the 2025-26 fishing season, having regard to:
    a. The observations of fishers and discussion by the RAG on climate and ecosystem conditions, as discussed under **Agenda Item 3**.
    b. The application of the Osprey Rule eHCR, with RAG agreed data inputs discussed under agenda items 4 and 5, and
    c. in accordance with the TRL Harvest Strategy decision rules, namely:
        (i) section 2.10 Decision Rules of the TRL Harvest Strategy which provides that if in any year the pre-season survey 1+ index is 1.25 or lower (average standardised number of 1+ age lobsters per survey transect) it triggers a stock assessment.

(ii) section 2.11 Decision Rule Scenarios of the TRL Harvest Strategy which provides that under Scenario 1 or 2, if the pre-season trigger has not been triggered, the RAG should consider whether the eHCR RBCs remain within the ranges tested by management strategy evaluation (MSE).

BACKGROUND

Revised eHCR

4. After extensive management evaluation (MSE) testing, and consultation with the TRL RAG, TRL Working Group and other stakeholders, the PZJA Standing Committee at their meeting on 15 October 2025, recommended the PZJA implement the Osprey Rule as the revised eHCR under the TRL Harvest Strategy.

5. The Osprey eHCR formula uses a statistic that measures the relative performance of the fishery based on the following data inputs:

    - the pre-season survey index of abundance of juvenile recruiting 1+ lobsters (70 per cent weighting);
    - the pre-season survey index of abundance of newly recruited 0+ lobsters (10 per cent weighting);
    - the standardised CPUE index from the TVH sector (10 per cent weighting); and
    - the standardised CPUE index from the TIB sector (10 per cent weighting).

TAC setting process

6. Under subsection 13 of the TRL Management Plan, the Minister must determine a TAC for the TRL Fishery prior to the start of a fishing season. In making a TAC determination, the Minister must:

    a. consult with any advisory committee that the PZJA has established under subsection 40(7) of the *Torres Strait Fisheries Act 1984*, to provide advice relating to the TRL Fishery; and

    b. have regard to Australia's obligations under the Torres Strait Treaty.

7. Under section 13 the Minister may also consider the views of any person with an interest in the TRL Fishery or the ecologically sustainable use of the TRL Fishery and take into account the amount of TRL taken in the TRL Fishery as a result of other fishing, such as traditional fishing or recreational fishing.

8. Subsection 14 provides for the Minister to determine an increase to the TAC for a fishing season. Subsections 8-11 prescribe how a TAC is to be administered, including the issuing of a notice when the TAC for the Traditional Inhabitant sector has been reached.

9. Further background on the TAC setting process, how catch is shared between Australia and PNG, and how each sector's catches will be managed for the 2025-26 fishing season is provided in the Tropical Rock Lobster Fishery Management Arrangements Booklet 2025-26 available from the PZJA website.

Setting the start of 2025-26 season TAC

10. At its meeting on 18-19 October 2018, the TRLRAG advised that the start of season catch limit should cover 1 December through to the end of February, and be based on the maximum annual catch amount for the period 2005-2018, being 200 tonnes. This is to

minimise the risk that the limit could artificially constrain fishing effort, particularly in a year of high TRL abundance.

11. The RAG also advised that if needed, an additional 100 tonnes be added to the start of season catch limit amount, to account for catches from PNG.
12. It was further agreed that the start of season catch limit be overridden in seasons where the TRL stock abundance is exceptionally low and the final RBC is likely to fall below the start of season catch limit or where overridden by the Harvest Strategy decision rules. In such cases, the use of the start of season catch limit should not be used in subsequent seasons until reviewed by the TRLRAG.
13. Accordingly, on 19 November 2025, the Minister determined start of season TAC of 200,000 kgs (unprocessed weight) for the 2025-26 fishing season under section 13 of the TRL Management Plan.
14. It is expected that the TAC will be increased once the outcomes of the scientific assessment process and the TAC sharing arrangements under the Treaty between Australia and PNG have been considered. Any increase in the TAC is expected to be determined by the end of February 2026.

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
Research Process and Priorities	Agenda Item 7 For DISCUSSION

RECOMMENDATIONS

1. That the RAG **DISCUSS** the research priorities for inclusion in the 2026/27-2030/31 Torres Strait Tropical Rock Lobster Fishery rolling Five Year Research Plan (**Attachment 7a**) and **RECOMMEND** priorities and their order for inclusion in the plan.
2. That the RAG **NOTE**:
    a. That the currently funded three-year TRL project "Fishery independent survey, stock assessment, and Recommended Biological Catch calculations for the Torres Strait Tropical Rock Lobster Fishery 2025/26-2027/28", is the Fishery's agreed highest 'essential' research priority, as recommended by the RAG; and
    b. The updated TSSAC Fisheries Strategic Research Plan 2025 – 2029 (**Attachment 7b**) and associated research processes.

KEY ISSUES

TSSAC Research Funding Process

3. Research projects are vital to ensuring Torres Strait fisheries are managed in line with best practice fisheries management, and current science and data for each fishery.
4. Limited funding is available each year, with AFMA historically contributing around $420,000 each year to the Protected Zone Joint Authority fisheries research budget. In recent years TSRA has committed additional funding of around $225,000 a year towards PZJA fisheries research. The recent baseline Government budget has been around $625,000 annually for all PZJA fisheries research.
5. Additional funding can also be sought from other bodies such as the Fisheries Research and Development Corporation (FRDC), when needed, and when projects align with FRDC objectives.
6. The Torres Strait research prioritisation and funding process is guided by the five-year Torres Strait Strategic Research Plan (SRP) (**Attachment 7b**). The SRP was updated in 2025 and specifies 8 research priorities that the PZJA intend to pursue in Torres Strait fisheries during a five-year period.
7. The TSSAC requires a rolling five-year research plan (which is updated annually) for each Torres Strait fishery, which is developed by AFMA through guidance of the RAG and Working Group. The research priorities within the fishery plans must fit into the themes identified in the SRP.

8. Each year the TSSAC prioritises the research priorities across all fisheries, and invites applications for funding for a limited number of projects, depending on the available research budget predicted for that year.

Research priorities for the TRL Fishery

9. The RAG last reviewed the Torres Strait TRL Fishery rolling Five Year Research Plan in July 2024, and the 2025/26-2029/30 plan was presented to and supported by the TRL Working Group. The Working Group did not identify any new research priorities or changes to existing priorities.

10. AFMA consider the highest 'essential' priority for the fishery remains the need to undertake **fishery independent surveys, stock assessment, harvest control and Recommended Biological Catch** (RBC) work.

11. This work was recommended for funding again from 2025-2028 (three-year contract) under a new research provider (Fishwell consulting).

12. Although research funding is fairly limited outside of several currently funded multiyear Torres Strait research projects (**Attachment 7c**), it is useful to maintain a complete list of essential and desirable research for each fishery (**Attachment 7a**). If any of these priorities become critical, TSSAC and AFMA as the TSSAC secretariat can explore options for additional funding.

13. AFMA Management is of the view that the most recent (2025/26-2029/30) Torres Strait TRL Fishery rolling Five Year Research Plan still captures the key research needs for the TRL Fishery, and could be used again for the 2026/27-2030/31 plan, however welcomes any suggested updates or changes.

BACKGROUND

14. The TRLRAG discussed the following points when developing the existing five-year research plan for the TRL fishery in 2024:

    a. There are several projects already underway or scheduled for funding which will address some of the identified research priorities. There projects are already funded through TSRA, however the TRLRAG suggested their inclusion in the plan for visibility. These include:

        (i) TSRA's WAPIL project which will contribute to **understanding fisher behaviour**

        (ii) *CSIRO's Modelling climate change impacts on key fisheries resources in the Torres Strait to co-develop adaptation and mitigation strategies*, which will contribute to **understanding connectivity, environmental drivers and adaptation strategies.**

    b. The RAG also noted:

        (i) that the significance of climate change across all Torres Strait fisheries, including TRL, warrants having it listed as its own priority. This item was separated out from understanding connectivity and placed as a higher priority.

(ii) The highest ‘essential’ priority for the fishery remains the need to undertake **fishery independent surveys, stock assessment, harvest control and Recommended Biological Catch** (RBC) work.

(iii) Undertaking an update to the 2007 **Ecological Risk Assessment (ERA)** for the TRL Fishery remains an essential priority.

(iv) **Improvement of data collection** (to be pursued by the TRL RAG data sub-group) remains an essential priority.

(v) **Impact and mitigation of climate change effects in Torres Strait fisheries** is an essential priority, noting the CSIRO project on this will benefit all Torres Strait fisheries, including TRL.

(vi) **Understanding fisher behaviour**, including capturing information on the impacts of COVID-19 on things like effort levels, spatial effort distribution and economically driven changes in behaviour in the fishery, remain essential priorities.

(vii) **Understanding connectivity, environmental drivers and adaptation strategies** is desirable rather than essential, as climate change has been separately identified as a priority and is higher than understanding connectivity implications between jurisdictions.

(viii) **Understanding changes to fishing power** and a **science peer review** remain desirable.

Attachment 7a Overview of recent research needs identified or discussed at previous TRLRAG and TRLWG meetings with an update on current status.

Research need	Detail	TRLRAG and WG Prioritisation	Status	Comments/Questions
Impact of climate change on Torres Strait fisheries		**Essential** (as per TRLRAG 36 advice)	Funded by TSRA. CSIRO will present an overview of the project under Agenda Item 3.	Will contribute to the TRL Fishery's priority of **understanding connectivity, environmental drivers and adaptation strategies.**
Fishery surveys, stock assessment, harvest control rules and recommended biological catch (RBC)	• Monitor ongoing changes in the fishery and update or develop fishery performance indicators as required. • Recommend a recommended biological catch (RBC) annually for each season. • Every third-year update and implement the long-term stock assessment. • Conduct a pre- season survey in November each year, including seabed habitat monitoring. • Facilitate data sharing with PNG.	**Essential, priority 1** (as per TRLRAG 36 advice)	**Currently funded** under AFMA Research Project (2024-0820) until the end of 2027/28.	Needs to be scoped for a new project for 2025/26 onwards Project cost is $1,193,418 over 3 years.
Understanding connectivity, environmental drivers and adaptation strategies	• Understanding of migration of different age classes of lobsters between, and within, jurisdictions (e.g. PNG, QLD East Coast and Torres Strait). • Understanding of recruitment connectivity between, and within, jurisdictions, including key areas of larval release within each jurisdiction. • Management implications of movement and recruitment connectivity between, and within, jurisdictions. • Understanding large scale environmental perturbations and their impacts on lobster recruitment, availability and aggregations.	**Essential, priority 2** (as per TRLRAG 36 advice)	Currently unfunded and requires an indicative cost estimate if there is a need to fund in the next 2 years.	Industry could be engaged to undertake a discrete tagging project of 0+ (recently settled) and 1+ (juvenile) lobsters to examine movement from the East Coast into the Torres Strait. Useful to help better understand any potential disparity between pre-season survey data, and the fishery catch data, noting that the most recent tagging study is over 30 years old. The currently-funded climate project work led by CSIRO will provide greater insights into the available environmental information, and advice on what information should be collected to develop downscaled climate effects models for TS fisheries.
Improvement of data collection	• Improved monitoring of commercial catch and effort in all sectors of the fishery. • Estimate of non-commercial take of TRL.	**Essential, priority 3** (as per TRLRAG 36 advice)	There is no TRL RAG data sub group planned at this stage. Competing management priorities have meant the sub-group has not	The RAG has supported the continuation of the data sub-group as a means to progress options for addressing ongoing fishing dependent data needs for the fishery.

Research need	Detail	TRLRAG and WG Prioritisation	Status	Comments/Questions
	• Alternative monitoring techniques of effort, for example GPS tracking.		progressed since its first meeting in 2019.	The funding for RAG data sub-groups is to be sourced from the AFMA TRLRAG budget.
Understanding fisher behaviour and **Understanding changes to fishing power through time**	• Understanding the drivers and incentives in determining fishing behaviour in all sectors. • Understanding fishing behaviour under output controls: the impact of ITQs or competitive quota on the fishery (including social impacts); the extent and impact of discard mortality; the effect of changing market preferences on fishing behaviour under output controls; the extent of value adding e.g. moving to live product, targeting different sizes; the extent of high grading under output controls. • Work should also include capturing information on the impacts of COVID-19 on the fishery to ensure that analysis of fishery data is accounting for potential 'COVID noise'. • Commencing initial conversations with industry now, to capture qualitative information on fishing activities, would be a useful approach. Understanding changes in fishing behaviour and power over time (e.g. changes to the size of engines, use of GPS, gear, areas fished, time fished, experience of divers), to inform the standardisation of CPUE data.	**Desirable, priority 2** (as per TRLRAG 36 advice)	TSRA is currently funding the related WAPPIL project. The PZJA Standing Committee is also due to consider the next steps in the TIB quota allocation review at their next meeting. TRL Data Sub-group to progress once progress on improving data collection has been made – funding for sub-group meetings to be sourced from RAG budget	TRL Data Sub-group should commence initial conversations with industry and collection of qualitative data, with a view to developing a structured quantitative survey over time. Following initial qualitative data collection, more specific resources can be dedicated towards the project to develop a representative and structured annual fishing power survey. This will be better facilitated when face-to-face stakeholder engagement is more feasible, allowing for trusted relationships with industry to be built up over time.
Understanding connectivity, environmental drivers and	• Understanding of migration of different age classes of lobsters between, and within, jurisdictions (e.g. PNG, QLD East Coast and Torres Strait). • Understanding of recruitment connectivity between, and within, jurisdictions, including key	**Essential, priority 2** (as per TRLRAG 36 advice)	Currently unfunded and requires an indicative cost estimate	Industry could be engaged to undertake a discrete tagging project of 0+ (recently settled) and 1+ (juvenile) lobsters to examine movement from the East Coast into the Torres Strait.

Attachment 7a

Research need	Detail	TRLRAG and WG Prioritisation	Status	Comments/Questions
adaptation strategies	areas of larval release within each jurisdiction. • Management implications of movement and recruitment connectivity between, and within, jurisdictions. • Understanding large scale environmental perturbations and their impacts on lobster recruitment, availability and aggregations.			Useful to help better understand any potential disparity between pre-season survey data, and the fishery catch data, noting that the most recent tagging study is over 30 years old. The currently-funded climate project work led by CSIRO will provide greater insights into the available environmental information, and advice on what information should be collected to develop downscaled climate effects models for TS fisheries.
Ecological risk assessment (ERA)	• Conduct an update to the 2007 ERA for the TRL Fishery.	**Essential** (as per TRLRAG 36 advice)	Not budgeted for in 2026/27	TRLRAG 29 agreed that because the Fishery is based on a single species, collected by hand, there is unlikely to be any significant change in the ecological risk factors relating to the TRL fishery since the last ERA was undertaken in 2007.
Science peer review	Consistent with AFMA's best practice *Guidelines for quality assurance of Australian fisheries research and science information* (the Guidelines), a peer review be conducted of the TRL Fishery survey design.	**Desirable, priority 3** (as per TRLRAG 36 advice)	This project is currently estimated to cost between $60,000 - $80,000 depending on final scope. The Chair and independent scientific member agreed to finalise the Terms of Reference for the review out-of-session (TRL RAG 29)	Original driver for this research need may be now less important.
Mid-year survey	Conduct mid- year survey, as required under the Harvest Strategy for the TRL Fishery.	To be conducted only if requirement to undertake a mid-year survey is triggered under the Harvest Strategy – indicative cost $110,000 with in-kind contribution from CSIRO	n/a	Unless triggered under the Harvest Strategy for the TRL Fishery, this project is not a priority for the TRL Fishery.

Torres Strait Scientific Advisory Committee

Strategic Research Plan 2024–2028

For more information about TSSAC and our research in the Torres Strait, visit the PZJA website at pzja.gov.au or contact the AFMA Torres Strait Fisheries team on (07) 4069 1990 or torresstraitresearch@afma.gov.au.

Who we are

The Torres Strait Scientific Advisory Committee (TSSAC) is a Protected Zone Joint Authority (PZJA) advisory committee providing advice to the PZJA on use of research funds for Torres Strait fisheries research.

TSSAC includes members from the Australian Fisheries Management Authority (AFMA), the Torres Strait Regional Authority (TSRA), Fisheries Queensland, the Torres Strait Islander industry, and the scientific community.

What we do

TSSAC provides advice and recommendations in prioritising research across all Torres Strait fisheries.

AFMA, as the secretariat of the committee, assesses milestone reports and advises on the use of funds to ensure research projects are achieving expected outcomes.

Our objectives

- **Develop research priorities** for Torres Strait fisheries in conjunction with resource assessment groups, management advisory committees and working groups, addressing the PZJA's management objectives.
- Review and **provide advice on individual fishery research plans** for Torres Strait fisheries.
- **Advise** the PZJA on allocating research funds.
- **Engage and inform** representatives of Torres Strait communities about proposed research and project outcomes.

Strategic research themes

Any research recommended by TSSAC for funding will help the PZJA achieve the objectives of the Act.

Undertake scientifically robust surveys, assessments and targeted scientific projects, which may include Traditional Ecological Knowledge, for risk-based management of fisheries resources, including the direct and indirect impacts of fishing on stocks and the broader ecosystem.	Understand the relationship between fishing pressures and stock structures in the Torres Strait alongside other jurisdictions (such as Queensland and Papua New Guinea) and the implications for stock assessment and management.	Identify and assist in developing resources and the optimal use of existing resources.	Develop cost effective approaches for data capture, storage, and analysis to improve fisheries assessments.	Address the effects of climate change on Torres Strait fisheries through adaptation pathways for management, for the fishing industry and communities.	Understand what influences participation in commercial fishing by Traditional Inhabitants and explore ways to promote better engagement in under-utilised fisheries.	Identify opportunities to increase economic, cultural, and social benefits arising from Torres Strait fisheries.	Develop, review, and advance harvest strategies to streamline decision making processes, optimise economic return, and instil confidence in management practices.

Key enablers

AFMA provide secretariat support to TSSAC including organising meetings, managing research contracts and project milestones, linking research teams with Torres Strait community representatives, and publishing final project reports on the PZJA website.

The communication of research outcomes to non-scientific audiences include summary documents on project outcomes and implications for fisheries management, and these are published online and provided to relevant Torres Strait stakeholders.

PZJA continues to facilitate greater involvement of Torres Strait Islanders in fisheries research and management through capacity development and collaborative approaches in research projects.

Research objectives

This plan responds to the complex research needs for Torres Strait fisheries where the management environment pursues sustainability objectives alongside social, economic, and cultural objectives.

Research carries high costs. In an economic environment of competing funding pressures there is a reliance on PZJA advisory committees for strategic planning to deliver the best long-term return on research investment.

There are significant social objectives in managing Torres Strait fisheries and returns on investment may need to be assessed differently to a typical western economic value model. Assessing the value of research against broader objectives will assist the PZJA pursue the social objectives of the Act, alongside the more routinely measured economic and environmental objectives.

Australian Government | TSRA www.tsra.gov.au | Australian Government Department of Agriculture, Fisheries and Forestry | Australian Government Australian Fisheries Management Authority | Queensland Government

Attachment 7c

Committed Torres Strait Scientific Advisory Committee (TSSAC) funds for multi-year projects 2024/25 – 2027/28

Key

FUNDED

Project Title	**Cost per year**		
	2025/26	**2026/27**	**2027/28**
FIS, stock assessment, Harvest Strategy and Recommended Biological Catch calculation for the Torres Strait TRL Fishery	$456,887	$373,452.20	$434,177.70
Finfish Fishery: Coral Trout and Spanish Mackerel Biological Sampling 2021-2024	$203,448	$189,997	$199,646[1]
TSPF tiger prawn stock assessment update	$2,400		
Climate change project (Funded by TSRA)	$177,980	$29,202	
Total cost for all contracted projects (excluding Climate Change)	**$621,200**	**$529,499**	**$638,210**
Predicted available research budget[2] (excluding Climate Change)	**$621,200** $621,000 AFMA[3] TBC TSRA[4]	**$645,000** $420,000 AFMA $225,000 TSRA	**$645,000** $420,000 AFMA $225,000 TSRA
Available remaining funds or shortfall (factoring in TRL, Spanish Mackerel and CKMR projects ongoing and assuming available research budget moving forward)	**$0**	**~$115,000**	**~$5,000**

[1] This is a three year project which has been given funding approval for two years. The third year progressing is dependent on a review of the survey design by the RAG and recommendations.
[2] This is an estimate of the minimum expected budget, noting sometimes PZJA agencies find additional funding for critical research above this amount. Further this amount is not guaranteed as a minimum.
[3] Assumed Government budget allocation
[4] Estimate of an annual ongoing TSRA contribution

TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) Thursday Island	MEETING 41 9-10 December 2025
DATE AND VENUE FOR NEXT MEETINGS	Agenda Item 9 For DISCUSSION

RECOMMENDATIONS

1. That the RAG **DISCUSS** a date and a venue for the next meeting noting proposed meeting dates in the table below alongside key agenda items.

Proposed Date	Key agenda items
8-9 December 2026	TRLRAG (meeting 42) - Consider results of the November 2026 pre-season survey - Consider CPUE analyses for the 2025-26 fishing season - Consider the recommended biological catch (RBC) estimates derived through the application of the empirical harvest control rule (eHCR) under the TRL Harvest Strategy and provide advice on a RBC for the 2026-27 fishing season