**27th MEETING OF THE PZJA TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG 27)**

**10-11 December 2019 (9:00 AM – 5:00 PM)**

**TSRA Boardroom**
**Level 1 Torres Strait Haus**
**46 Victoria Parade, Thursday Island**

# DRAFT AGENDA

## 1 PRELIMINARIES

### 1.1 Welcome and apologies

The Chair will welcome members and observers to the 27th meeting of the RAG.

### 1.2 Adoption of agenda

The RAG will be invited to adopt the draft agenda.

### 1.3 Declaration of interests

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

### 1.4 Action items from previous meetings

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

### 1.5 Out-of-session correspondence

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

## 2 UPDATES FROM MEMBERS

### 2.1 Industry members

Industry members and observers will be invited to provide an update on matters concerning the Torres Strait TRL Fishery.

### 2.2 Scientific members

Scientific members and observers will be invited to provide an update on matters concerning the Torres Strait TRL Fishery.

### 2.3 Government agencies

The RAG will be invited to note updates from AFMA, TSRA and QDAF on matters concerning the Torres Strait TRL Fishery. AFMA will provide updates on the implementation of the Management Plan and draft Harvest Strategy for the TRL Fishery, management arrangements for the 2019-20 fishing season and delivery of the Compliance program.

### 2.4 PNG National Fisheries Authority

The RAG will be invited to note an update from the PNG National Fisheries Authority.

### 2.5 Native Title

The RAG will be invited to note an update from Malu Lamar (Torres Strait Islander) Corporation RNTBC.

## 3 RAG DATA SUB-GROUP MEETING

The RAG will be invited to discuss the outcomes of the first meeting of the TRLRAG Data Sub-Group held on 18 June 2019.

## 4 CATCH AND EFFORT ANALYSES FOR THE 2018-19 FISHING SEASON

The RAG will be invited to discuss TRL Fishery catch and effort data for the 2018-19 fishing season, including catch-per-unit-effort (CPUE) analyses to be presented by the CSIRO. This is to include consideration of changes to fishing behaviours during the 2018-19 fishing season as a result of the move to a quota management system.

## 5 RESULTS OF THE NOVEMBER 2019 PRE-SEASON SURVEY

The RAG will be invited to discuss the results of the November 2019 pre-season survey to be presented by the CSIRO.

## 6 RECOMMENDED BIOLOGICAL CATCH

The use of the eHCR as the basis of advice on a RBC is pending adoption of the revised Harvest Strategy by the PZJA. The RAG will be invited to provide advice on a recommended biological catch (RBC) for the TRL Fishery for the 2019-20 fishing season, based on estimates derived through the application of the empirical harvest control rule (eHCR).

## 7 PRELIMINARY STOCK ASSESSMENT RESULTS

The RAG will be invited to consider the preliminary results of the integrated stock assessment.

## 8 INTERACTIONS BETWEEN TRL FISHERY AND OTHER SPECIES

The RAG will be invited to discuss:

- impacts of removing the Western Line Closure in the Torres Strait Finfish Fishery, on the Torres Strait TRL Fishery;
- discarding of TRL in the Torres Strait Prawn Fishery.

## 9 FIVE-YEAR RESEARCH PLAN

The RAG will be invited to provide further advice on research priorities for the Torres Strait TRL Fishery for the next five funding years (2020/21 to 2024/25). This is to include consideration of matters raised by members out-of-session, including discussion of the priority of identified projects, identification of projects suitable for tactical funding in 2020/21 and new projects (models for managing/administering Traditional Inhabitant quota).

## 10 OTHER BUSINESS

The RAG will be invited to raise other business for consideration.

## 11 DATE AND VENUE FOR NEXT MEETING

The RAG will be invited to discuss a suitable date for the next meeting.

**The Chair must approve the attendance of all observers at the meeting. Individuals wishing to attend the meeting as an observer must contact the Executive Officer – Natalie Couchman (natalie.couchman@afma.gov.au)**

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARIES<br>Welcome and apologies | Agenda Item 1.1<br>For noting |

## RECOMMENDATIONS

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

## BACKGROUND

2. Apologies have been received from:
   a. Danielle Stewart (QDAF Member);
   b. Harry Nona (Traditional Inhabitant Member, Kaiwalagal).

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARIES<br>Adoption of agenda | Agenda Item 1.2<br>For decision |

**RECOMMENDATIONS**

1. That the RAG consider and **ADOPT** the agenda.

**BACKGROUND**

2. A draft agenda was circulated to members on 31 October 2019. No comments were received.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARIES<br>Declaration of interests | Agenda Item 1.3<br>For decision |

## RECOMMENDATIONS

1. 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 1.3a** and **1.3b**);
   b. **DETERMINE** whether the member may or may not be present during discussion of or decisions made on the matter which is the subject of the conflict;
   c. **ABIDE** by decisions of the 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 decisions made, on the matter which is the subject of the conflict.

## BACKGROUND

2. 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.
3. RAG members are asked to confirm the standing list of declared interests (**Attachments 1.3a** and **1.3b**) is accurate and provide an update to be tabled if it is not.
4. FMP1 recognises that members are appointed to provide input based on their knowledge and expertise and as a consequence, may face potential or direct conflicts of interest. Where a member has a material personal interest in a matter being considered, including a direct or indirect financial or economic interest; the interest could conflict with the proper performance of the member's duties. Of greater concern is the specific conflict created where a member is in a position to derive direct benefit from a recommendation if it is implemented.
5. When a member recognises that a real or potential conflict of interest exists, the conflict must be disclosed as soon as possible. Where this relates to an issue on the agenda of a meeting this can normally wait until that meeting, but where the conflict relates to decisions already made, members must be informed immediately. Conflicts of interest should be dealt with at the start of each meeting. If members become aware of a potential conflict of interest during the meeting, they must immediately disclose the conflict of interest.
6. Where it is determined that a direct conflict of interest exists, the forum may allow the member to continue to participate in the discussions relating to the matter but not in any decision making process. They may also determine that, having made their contribution to the discussions, the member should retire from the meeting for the remainder of discussions on that issue. Declarations of interest, and subsequent decisions by the forum, must be recorded accurately in the meeting minutes.

**TRLRAG Declarations of interests from most recent meetings**

| Name | Position | Declaration of interest |
|---|---|---|
| **Members** | | |
| Dr Ian Knuckey | Chair | Chair/Director of Fishwell Consulting Pty Ltd and Olrac Australia (electronic logbooks). Chair/member of other RAGs and MACs. Conducts various AFMA and FRDC funded research projects including FRDC Indigenous Capacity Building project. Nil interests in TRL Fishery and no research projects in the Torres Strait.<br>In 2019, delivered components of TSRA Induction Program for Traditional Inhabitant members on PZJA advisory committees.<br>Full declaration of interests provided at **Attachment 1.3b**. |
| Selina Stoute | AFMA Member | Nil. |
| Allison Runck | TSRA Member | Nil. TSRA holds multiple TVH TRL fishing licences on behalf of Torres Strait Communities but does not benefit from them. |
| Danielle Stewart | QDAF Member | Not applicable, will not be in attendance. |
| Dr Eva Plaganyi | Scientific Member | Lead scientist for PZJA funded TRL research projects conducted by CSIRO. |
| Dr Andrew Penney | Scientific Member | Research consultant (Pisces Australis), member of other AFMA RAGs (SPFRAG and SESSFRAG). Nil pecuniary or research interests in the Torres Strait. |
| Aaron Tom | Traditional Inhabitant Member | Traditional Inhabitant Gudumalulgal and TIB licence holder. |
| Les Pitt | Traditional Inhabitant Member | Traditional Inhabitant Kemer Kemer Meriam, TIB licence holder and runs an independent freezer facility on Erub Island. |
| Harry Nona | Traditional Inhabitant Member | Not applicable, will not be in attendance. |
| James Ahmat | Traditional Inhabitant Member | Traditional Inhabitant Maluialgal and TIB licence holder. |
| James Billy | Traditional Inhabitant Member | Traditional Inhabitant Kulkalgal, TIB licence holder, Coxwains holder and free diver. |
| Brett Arlidge | Industry Member | General Manager 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. |
| Dr Ray Moore | Industry Member | Torres Strait Master Fisherman licence holder and East Coast TRL Fishery licence holder. |

| | | |
|---|---|---|
| Natalie Couchman | Executive Officer | Nil. |
| **Observers** | | |
| Yen Loban | TSRA Board Member and TSRA Portfolio Member for Fisheries | To be declared. |
| Maluwap Nona | Malu Lamar (Torres Strait Islander) Corporation RNTBC | To be declared. |
| Joseph Posu | PNG National Fisheries Authority (NFA) | Nil. |
| Mark David | TRL Working Group Industry Member | Traditional Inhabitant Kulkalgal and TIB licence holder. |
| Robert Campbell | CSIRO | Nil pecuniary interests. Project staff for PZJA funded TRL research projects. |
| Judy Upston | CSIRO | To be declared. |
| Roy Deng | CSIRO | To be declared. |
| Kinam Salee | CSIRO | To be declared. |
| Lyndon Peddell | AFMA | Nil. |
| Tony Salam | Industry observer | To be declared. |
| Suzannah Salam | Industry observer | Torres Straits Seafood Pty Ltd (seafood buyer), partner is TIB licence holder. |

**Declaration of interests**
**Dr Ian Knuckey – February 2019**

**Positions:**

Director – Fishwell Consulting Pty Ltd

Director – Olrac Australia (Electronic logbooks)

Deputy Chair – Victorian Marine and Coastal Council

Chair / Director – Australian Seafood Co-products & ASCo Fertilisers (seafood waste)

Chair – Northern Prawn Fishery Resource Assessment Group

Chair – Tropical Rock Lobster Resource Assessment Group

Chair – Victorian Rock Lobster and Giant Crab Assessment Group

Scientific Member – Northern Prawn Management Advisory Committee

Scientific Member – SESSF Shark Resource Assessment Group

Scientific Member – Great Australian Bight Resource Assessment Group

Scientific Member – Gulf of St Vincents Prawn Fishery Management Advisory Committee

Scientific participant – SEMAC, SERAG

**Current projects:**

AFMA 2018/08 Bass Strait Scallop Fishery Survey – 2018 and 2019

FRDC 2017/069 Indigenous Capacity Building

FRDC 2016/116 5-year RD&E Plan for NT fisheries and aquaculture

AFMA 2017/0807 Great Australian Bight Trawl Survey – 2018

Traffic Project Shark Product Traceability

FRDC 2018/077 Implementation Workshop re declining indicators in the SESSF

FRDC 2018/021 Development and evaluation of SESSF multi-species harvest strategies

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARIES<br>Action items from previous meetings | Agenda Item 1.4<br>For Noting |

## RECOMMENDATIONS

1. That the RAG:
   a. **NOTE** the final meeting record for TRLRAG 26 held on 5 February 2019 (**Attachment 1.4a**).
   b. **NOTE** the progress against actions arising from previous meetings (**Attachment 1.4b**).

## BACKGROUND

*Meeting record*

2. The draft meeting record for TRLRAG 26 held on 5 February 2019 was provided out of session for comment on 5 March 2019. Comments were received from CSIRO.
3. The record was finalised out of session following the closure of the comment period and circulated to members on 18 March 2019. This included a track-change version showing the comments received. The final meeting record is provided at **Attachment 1.4a** for information.

*Actions arising*

4. Updates are provided on the status of actions arising from previous TRLRAG meetings and relevant TRLWG meetings at **Attachment 1.4b**.

# Torres Strait Tropical Rock Lobster Resource Assessment Group Meeting 26

Meeting Record

5 February 2019

Cairns

Note all meeting papers and record available on the PZJA webpage: www.pzja.gov.au

Australian Government

Australian Fisheries Management Authority

Box 7051, Canberra Business Centre, ACT 2610 / Ph (02) 6225 5555 / Fax (02) 6225 5500 / AFMA Direct 1300 723 621 afma.gov.au

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# Meeting participants

## Members

| Name | Position | Declaration of interest |
|---|---|---|
| Dr Ian Knuckey | Chairperson | Chair/Director of Fishwell Consulting Pty Ltd and Olrac Australia (electronic logbooks). Chair/member of other RAGs and MACs. Conducts various AFMA and FRDC funded research projects including FRDC Indigenous Capacity Building project. Nil interests in TRL Fishery and no research projects in the Torres Strait.<br>In 2019, will deliver components of TSRA Induction Program for Traditional Inhabitant members on PZJA advisory committees.<br>Full declaration of interests provided at **Attachment A**. |
| Ms Natalie Couchman | AFMA Executive Officer | Nil. |
| Ms Selina Stoute | AFMA member | Nil. |
| Mr Mark Anderson[#] | TSRA member (part of meeting only) | Nil. TSRA holds multiple TVH TRL fishing licences on behalf of Torres Strait Communities but does not benefit from them. |
| Ms Allison Runck[#] | TSRA member (part of meeting only) | Nil. TSRA holds multiple TVH TRL fishing licences on behalf of Torres Strait Communities but does not benefit from them. |
| Dr Andrew Penney | Scientific member | Research consultant (Pisces Australis), member of other AFMA RAGs (SPFRAG and SESSFRAG). Nil pecuniary or research interests in the Torres Strait. |
| Dr Éva Plagányi | Scientific member | Lead scientist for PZJA funded TRL research projects conducted by CSIRO. |
| Mr James Billy | Industry member | Traditional Inhabitant Kulkalgal, TIB licence holder, Coxwain holder and free diver. |
| Mr Les Pitt | Industry member | Traditional Inhabitant Kemer Kemer Meriam, TIB licence holder and independent freezer operator. |
| Mr James Ahmat | Industry Member | Traditional Inhabitant Maluialgal and TIB licence holder. |
| Dr Raymond Moore | Industry member | Torres Strait Master Fisherman licence holder and East Coast TRL Fishery licence holder. |
| Mr Daniel Takai | Industry member | Pearl Island Seafoods (seafood buyer), Tanala Seafoods (seafood buyer) and TIB licence holder. |

| Name | Position | Declaration of interest |
|---|---|---|
| Mr Brett Arlidge | Industry member | General Manager 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. |

## Observers

| Name | Position | Declaration of interest |
|---|---|---|
| Dr Robert Campbell | CSIRO | Nil pecuniary interests. Project staff for PZJA funded TRL research projects. |
| Dr Charlie Edwards | CSIRO | Project staff for PZJA funded TRL research projects conducted by CSIRO. |
| Mr Jerry Stephen | TSRA Deputy Chair, TSRA Member for Ugar and TSRA Portfolio Member for Fisheries | TIB licence holder and Native Title holder. |
| Mr Trent Butcher | Industry observer | TVH licence holder. |
| Ms Suzannah Salam^ | Industry observer | Torres Straits Seafood Pty Ltd (seafood buyer), partner is TIB licence holder. |

Notes:

# Departed the meeting at 11:00 am on Tuesday 5 December 2019. Replaced by Allison Runck as TSRA member.

^ Departed the meeting at 1:00 pm on Tuesday 5 December 2019.

# 1 Preliminaries

## 1.1 Welcome and apologies

1. The meeting was opened at 9:00 am on Tuesday 5 February 2019.
2. The Chairperson welcomed attendees to the 26th meeting of the Torres Strait Tropical Rock Lobster Resource Assessment Group (TRLRAG 26), including a welcome for new members, Mr James Ahmat (Industry Member and Traditional Inhabitant Maluialgal) and James Billy (Industry Member and Traditional Inhabitant Kulkalgal). The Chair acknowledged the Traditional Owners of the land on which the meeting was held and paid respect to Elders past and present.
3. Attendees at the RAG are detailed in the meeting participant tables at the start of this meeting record.
4. Apologies were received from:
    a. Ms Danielle Stewart, Queensland Department of Agriculture and Fisheries (QDAF) member;
    b. Mr Harry Nona, Industry member and Traditional Inhabitant Kaiwalagal;
    c. Mr Aaron Tom, Industry member and Traditional Inhabitant Gudumalulgal;
    d. Mr Joseph Posu, PNG National Fisheries Authority (NFA); and
    e. Mr Maluwap Nona, Invited Observer and Chairperson for Malu Lamar (Torres Strait Islanders) Corporation RNTBC (Malu Lamar).

## 1.2 Adoption of agenda

5. The draft agenda was adopted (**Attachment B**).

## 1.3 Declaration of interests

6. The Chair advised members and observers, that as provided in PZJA Fisheries Management Paper No. 1 (FMP1):
    a. Members and observers are to treat others with courtesy and respect that there may be different views expressed on issues. The RAG seeks to reach consensus on issues, but where this is not possible, the different views of members will be recorded in the meeting record.
    b. Material made available to members is generally public information. In some instances, members will have access to information that is confidential, however members will be advised accordingly.
    c. All members of the RAG must declare all real or potential conflicts of interest in Torres Strait TRL Fishery at the commencement of the meeting. Where it is determined that a direct conflict of interest exists, the RAG may allow the member to continue to participate in the discussions relating to the matter but not in any decision making process. The RAG 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.
7. Declarations of interests were provided by each meeting participant. These are detailed in the meeting participant tables at the start of this meeting record.

## 1.4 Action items from previous meetings

8. The RAG noted the status of actions arising from previous TRLRAG, and where relevant, TRL Working Group (TRLWG) meetings (**Attachment C**).

9. The RAG adopted the final meeting record for TRLRAG 25 held on 18-19 October 2018 as a true and accurate record of the meeting.

10. The RAG further discussed the following action items:

    a. Action item 7 – AFMA undertook to provide copies to relevant communities.

    b. Action item 8 – a TSRA Induction Program will be delivered to Traditional Inhabitant members on PZJA advisory committees in May 2019. The Chairperson noted that his company – Fishwell Consulting – will be delivering components of this Program. In addition, TSRA will be holding an initial induction workshop for Traditional Inhabitant members, to coincide with the upcoming TRL Working Group meeting in late February 2019.

    c. Action item 11 – regarding the conduct of surveys in PNG waters, the RAG discussed the need to ensure consistency across jurisdictions. CSIRO agreed to send information to PNG concerning the current survey design for the Protected Zone TRL Fishery, including details on current and historical survey sites. The AFMA member advised that PNG are currently compiling catch data from the last fishing season and will provide this data once completed. AFMA is also meeting regularly with the PNG NFA, concerning the management of the Protected Zone TRL Fishery, including a possible visit by the PNG NFA Managing Director to Canberra later in February 2019 and Australia-PNG bilateral meetings to be held on Thursday Island in March 2019.

| **Action** |
| --- |
| CSIRO to send information to PNG concerning the current survey design for the Protected Zone TRL Fishery, including details on current and historical survey sites. |

## 1.5 Out-of-session correspondence

11. The RAG noted out of session correspondence on RAG matters since the previous meeting.

# 2 Updates from members

## 2.1 Industry members

12. The RAG noted updates provided by industry members and observers on the performance of the Torres Strait TRL Fishery during 2017/18 and at the start of the 2018/19 fishing season:

    a. A TVH industry member advised that this season for the Torres Strait TRL Fishery has started well. Free diving catches during the two-month hookah closure (December 2018 to January 2019) have been higher than previous years. Weather conditions, however, for the hookah opening from 1 February have been very poor. Predominant sizes are 600-800 g and 800 g-1 kg. Unlike last season, operators are not seeing the larger 2+ lobsters at the start of the season. Catches in the PNG TRL Fishery are similar to the Torres Strait TRL Fishery. Catches in the QLD TRL Fishery are very poor. Another industry member suggested the poor QLD catches are likely due to the poor weather and may also be because the fishable size lobsters are in areas closed by the Great Barrier Reef Marine Park Authority.

    b. Another industry member advised that weather conditions are having a large impact on operations, including significant disruptions to logistic chains transporting lobsters to markets. The member also confirmed free diving catches during the two-month hookah closure have been higher than previous years. This seems to correspond with what would be expected based on results of the November 2018 pre-season survey.

    c. A Traditional Inhabitant industry member confirmed that since the opening of this season, fishers have observed a lot of 0+ lobsters on the grounds. The member advised this is unusual for the early part of the season and hopes it is an indicator for a good season

next year. The distribution of 1+ lobsters is more evenly spread across the eastern region than last season.

d. Another Traditional Inhabitant industry member advised that before the early closure of the Torres Strait TRL Fishery last season, some fishers did well around Kirkcaldie. During the early part of this season (December 2018), a lot of lobsters had soft shells and water temperatures were quite high with lobsters observed leaving shallower areas. Since January 2019, catches have been good. Predominant size has been greater than 1 kg.

e. An industry observer advised that the distribution of 1+ lobsters is more evenly spread across the TRL Fishery than last season. The observer confirmed weather conditions this season has had a large impact on operations. Conditions are currently severe with very poor visibility.

f. An industry member advised that catches around the Thursday Island bridge area this season have been very poor. Another industry member suggested this could be due to the poor visibility since the season start meaning fishers have not had a lot of opportunity to search for and catch lobsters in this area. Catches from the outer islands areas have been good.

g. Another industry observer noted that while weather conditions have been poor, the cooler water temperatures have been good for the lobsters. The observer also confirmed free diving catches during the two-month hookah closure have been higher than previous years. Prices have been fairly high from start of season, and it is expected that there will be a two week price boost, correlating with the dark moon to full moon celebrations for Chinese New Year.

13. The Independent Scientific Member noted that environmental and habitat data would give a better understanding the effects of climate and habitat changes on the TRL stock. The CSIRO Scientific Member noted that the annual survey collects such data, but not at a fine spatial scale. CSIRO is working with the TSRA to obtain better environmental data for the TRL Fishery, including sea surface temperature and tidal flows. The AFMA member noted that the RAG Data Sub-Group will evaluate data needs and gaps for the TRL Fishery, and if the need for better environmental data is identified, the group will be able to advise on the best method to capture this data.

## 2.2 Scientific members

14. The RAG noted that no additional scientific updates were required as all relevant topics were to be covered under other agenda items.

## 2.3 Government agencies

15. The RAG noted an update provided by the AFMA Executive Officer regarding management initiatives relevant to the TRL Fishery:

a. Australia-PNG catch sharing - AFMA and the PNG NFA met on 17 January 2018 to discuss preliminary catch sharing arrangements for the 2018/19 fishing season, as per the terms of the Torres Strait Treaty. Agencies will meet again in late February to agree on final arrangements, prior to the PZJA endorsing a final total allowable catch (TAC) for this season.

b. TRL Fishery Management Plan - AFMA has commenced the formal allocation process prescribed under the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Management Plan) and will be in contact with affected licence owners as the process progresses;

c. Management arrangements for the 2018/19 fishing season - AFMA wrote to all TRL Fishery licence holders prior to the start of the season providing details of key management arrangements for this season, including interim sectoral catch shares, interim TAC and moon-tide hookah closures.

d. Expiry of appointments for PZJA advisory committees – the appointment terms of members on PZJA consultative forums, excluding Traditional Inhabitant members, expire on 28 February 2019. AFMA will seek to have members' appointments extended until later in 2019, to allow time for a new appointment process to be completed.

16. The RAG noted an update provided by the TSRA member regarding TSRA activities relevant to the management of the TRL Fishery:

a. Acting CEO – the TSRA currently has an acting CEO, Ms Mary Bani.

b. Traditional Inhabitant member induction – the TSRA, through a number of providers, will deliver an Induction Program for Traditional Inhabitant members on PZJA advisory committees. The program is to be delivered at sessions in late February and May 2019. The Program will provide an overview of member roles and responsibilities and fisheries management principles as well as provide support to members in disseminating the outcomes of meetings to communities in a timely manner.

c. Independent entity – supporting the implementation of the Management Plan, the TSRA continues to progress the establishment of an independent entity to hold and manage Torres Strait fisheries assets on behalf of Torres Strait communities. With a target implementation date of 30 June 2020, there is a large schedule of work ahead to develop the supporting community arrangements.

## 2.4 PNG NFA

17. No update was provided as a PNG NFA representative was not in attendance.

## 2.5 Native Title

18. No update was provided as a Malu Lamar representative was not in attendance.

# 3 Catch summary for the 2018/19 fishing season

19. The RAG noted the reported landed catch for the Australian Torres Strait TRL Fishery for the 2018/19 fishing season is 32,553 kg (as of 29 January 2019). The AFMA member noted that, as per AFMA's Information Disclosure Policy, sectoral catches have been aggregated, as the data from the TVH sector is currently from less than 5 vessels. The Policy does allow more detailed fishing information to be disclosed where the information has or will be used to guide fishery management decisions, but that is not necessary at this time. AFMA will provide public monthly catch updates from February 2019, via the AFMA and PZJA websites, to assist industry in monitoring catch against interim sectoral split arrangements this season.

20. The RAG also noted that the PNG TRL Fishery opened 1 December 2018, with the use of hookah gear prohibited until 31 March 2019. The AFMA member advised that they are working closely with PNG to share catch data.

# 4 Final stock assessment and recommended biological catch

21. The RAG considered a presentation provided by Dr Robert Campbell, CSIRO Scientific Observer, detailing alternative analysis of the pre-season survey data using General Linear Models (GLMs):[1]

[1] Campbell R *et al.* 2018. *Extended Analysis of Pre-Season Survey Data to Calculate the Annual Index for 0+ Lobsters*. Paper presented to TRLRAG, February 2019, Cairns.

a. At the RAG meeting held on 11-12 December 2018 (TRLRAG 25), the RAG discussed a conflict in the stock assessment model between the November 2017 0+ survey index (which was very low relative to historical) and the 2018 1+ index (which was closer to average) and evidence suggesting the 2017 0+ index may be anomalous. The RAG agreed that the 2017 0+ index should be down-weighted appropriately rather than be excluded entirely. The down-weighting should be undertaken using an appropriate statistical methodology and not be applied arbitrarily. CSIRO explored a number of methodologies and the analyses of those are presented here.

b. In comparison to the present method used to calculate the 0+ index, the use of GLMs allows for additional factors which may influence the number of lobsters observed and counted during any survey transect to be taken into account. Factors for which data has been collected and included through the GLM analysis are:

   i. width and length of the survey transect - transect length was scaled (or standardised) to a 2000 $m^2$ area;

   ii. depth of the survey transect;

   iii. current speed (estimated value);

   iv. water visibility (estimated value);

   v. Southern Oscillation Index and phase of the moon for each sample site; and

   vi. team effect (e.g. diver experience) – as an experienced diver left the project after 2016, a question has been raised as to whether the absence of this diver during the past two years may have influenced the number of 0+ lobsters observed. This diver was involved in the survey since inception in 1989. Most other divers have been involved in at least 10 years of surveys. Team-1 included all two-person teams which included the experienced diver while Team-2 included all teams which did not include this diver.

c. Across all nine years, the strata having the highest average probability of observing at least one 0+ lobster is Mabuiag while the strata having the lowest probability is Kircaldie. The same is also found for the average number of 0+ lobsters observed within each strata.

d. Looking at all factors, the *Team* effect was the only factor found to have a significant effect on the probability of observing 0+ lobsters, with Team-1 having a 60% higher probability of observing 0+ lobsters. However, the CSIRO Scientific Member noted that these results are preliminary as the approach used to assess the *Team* effect was rather simple and further investigations should be undertaken to assess the possible influence of other divers. Also it was assumed that the *Team* effect does not vary between years and this should be tested in future analyses.

e. Compared to the present method used to calculate the 0+ index, the GLM approach raised the 0+ index value by 33.86% (on an already low index) and standard error (SE) by 84.45% (SE is the measure of confidence (certainty) in a value, with the stock assessment model giving higher SE values a lower weighting).

f. Finally, it was noted that it would be useful to add further explanatory variables to account for changes in the in-situ environment (e.g. water temperature) and, in particular, the habitat data which has been routinely collected during the surveying of each sampled site.

22. The RAG considered a presentation provided by Dr Andrew Penney, Independent Scientific Member, detailing research on the effects of seabed type on the abundance and distribution of the South African rock lobster, *Jasus lalandi*. Through GLM analysis, seabed type was found to be the biggest driver of abundance than any other factor (e.g. mining, environmental variables). A likely hypothesis is that seabed type has a similar effect on lobsters in the TRL Fishery and as such, the member recommended habitat data be included in any further GLM analysis undertaken by CSIRO.

23. The CSIRO Scientific Member advised that GLM analysis, including habitat data had been undertaken in 2013 – a copy to be provided to the RAG. This looked at the effect of habitat on 1+, but not 0+ lobsters. The RAG noted that the habitat data collected through surveys is a general characterisation only. Industry members noted that food sources have an important effect on TRL distribution (e.g. large aggregations of 1+ on shell beds (not a preferred habitat, but important food source).

**Action**

CSIRO to provide a copy of report concerning GLM analysis in 2013, to be circulated to the RAG for consideration.

24. The CSIRO Scientific Member noted the 0+ index is a secondary indicator as previous investigations have shown that this index is less reliable than the 1+ index, mainly due to the cryptic nature of recently-settled lobsters making them more difficult to survey. The GLM approach, as presented, is preliminary and further investigations need to be undertaken, before this approach is used to construct an annual abundance index for use in the stock assessment, including:
    a. counts by teams for each transect being paired (counts are not independent);
    b. team by year effect;
    c. changes in the in-situ environment variables (e.g. water temperature);
    d. habitat data – a Traditional Inhabitant Industry member noted that 0+ lobsters tend to use seagrass plains and shell beds for habitat.
25. The RAG noted that while this approach has only been used to construct an annual index for 0+ lobsters based on the pre-season surveys, the same approach could also be used to construct annual indices for the other age classes using both the mid-year and pre-season surveys. The RAG agreed that CSIRO should undertake further investigations to improve the GLM approach, and present the findings to the next meeting of the RAG.

**Action**

CSIRO to undertake further investigations to improve the GLM approach, and present the findings to the next meeting of the RAG.

26. The RAG considered a presentation provided by Dr Éva Plagányi, CSIRO Scientific Member, detailing alternative analysis of the pre-season survey data to reduce the conflict between the November 2017 0+ survey index and the 2018 1+ index:
    a. Summary of model - Age Structured Production Model (ASPMs), widely used approach for providing TAC advice with associated uncertainties. Model fits to all data including survey, catch, length frequency and standardised CPUE data and outputs a recommended biological catch (RBC). Incorporation of environmental correlates data is ongoing.
    b. Model reference case specifications
        i. Fix steepness h=0.7;
        ii. Fix hyper-stability parameters CPUE (TVH 0.75) (TIB 0.5);
        iii. Mid-year survey index – use index after applying mixture model to separate cohorts;
        iv. Preseason survey index – use as Reference MYO (mid-year only) series and same series as in November 2017 without the additional 5 sites added;
        v. CPUE TVH – Int1 standardised series;
        vi. CPUE TIB – Seller standardised series.
    c. 2018 1+ pre-season index - above the average and about three times the 2017 index.

d. 2018 1+ pre-season index per stratum - Mabuiag and Buru recorded their highest indices over the last 9 surveys. Warraber Bridge had a below average index. There is also a more even distribution across stratum, compared with 2017.

e. 2018 0+ pre-season index - three times the 2017 index, but not significantly different from 2006, 2007, 2015 and 2016 indices.

f. Conflict between model vs observed pre-season survey indices - the November 2017 0+ survey index (which was very low relative to historical) and the 2018 1+ index (which was closer to average). The TRLRAG 25 agreed that the 2017 0+ index should be down-weighted appropriately rather than be excluded entirely:

   i. model is sensitive to the inclusion or exclusion (or down-weighting) of the 2017 0+ index. 0+ index is less reliable than the 1+ index;

   ii. environmental anomalies may have influenced the distribution and timing of settlement, and hence the representativeness of the 2017 0+ index (noting that these animals were spawned in late 2016/early 2017 during a period of the hottest recorded sea surface temperatures).

g. Guiding principles (Francis 2011)

   i. don't let other data stop the model from fitting abundance data well; and

   ii. don't down-weight abundance data because they may be unrepresentative. Rather than down-weighting data sets, he recommends that alternative assessments be considered in which possibly unrepresentative data sets are excluded.

h. Additional variance (AV) approach – provides estimate for process error and can be applied to whole 0+ series or 2017 0+ only. CSIRO applied the approach to the whole 0+ series, as it is unlikely that there would be the same level of process error every year. This approach works by pairing data (0+ from one year and 1+ from the following year) and determining how well they correlate. An AV is then attributed to each 0+ and 1+ value corresponding to how well the 0+ and 1+ data correlates.

i. Results of revised model reference case with AV attributed – model adequately fits 1+ index. A higher SE associated with 0+ index means model gives much less weight to trying to fit 0+ index. The AV approach has had the largest effect on the 2016 and 2017 values, attributed to a lower number of survey sites and increased uncertainty.

27. The RAG noted that the GLM approach looks to account for effects that can be measured outside of the model, whereas the AV approach looks to account for effects that cannot be measured. The RAG noted that both approaches could be applied under the stock assessment.

**Recommendation**

Noting the further investigations to be undertaken by CSIRO to improve the GLM approach, the RAG recommended the revised model reference case with AV attributed – (g) AV Pars estimated no lower bound – be used to calculate the RBC for the 2018/19 fishing season and subsequent seasons.

28. The CSIRO Scientific Member noted that under the draft Harvest Strategy, the empirical harvest control rule (eHCR) is calculated differently. The eHCR applies a different weighting to the 0+ index, which takes into account a range of errors. Application of the GLM approach will change the indices that input to the eHCR, an important reason to undertake further investigations before it is applied. Application of the GLM approach would not require retesting of the eHCR.

29. The RAG considered a presentation provided by Dr Éva Plagányi, CSIRO Scientific Member, detailing updated results of the integrated stock assessment, based on the revised model reference case with AV attributed:

   a. Model vs observed CPUE - 2018 observed CPUE for both sectors slightly higher than corresponding model value in 2018. This is not a big difference, and a better understanding of changes to fishing power over time will help inform further analyses.

b. Model-estimated spawning biomass – the revised model provides a lower estimate of current spawning biomass of 46 per cent of $B_0$ (compared to 56 per cent under the previous reference case). This is above the limit reference point of 40 per cent. The model predicts the spawning biomass to rise to 92 per cent of $B_0$ in 2020.

c. RBC - the revised model calculates an RBC of 641 tonnes for the 2018/19 fishing season.

30. The AFMA Member confirmed that the reference contained in the agenda paper for this item, to a threshold biomass trigger ($B_{THRES}$ = 0.48) as a component of the interim Harvest Strategy, is a transcription error resulting from multiple iterations of the draft document over time. A threshold biomass trigger was proposed during the development of the draft Harvest Strategy, and used in Management Strategy Evaluation testing. However, the RAG did not agree for this to be a component of either the interim or draft Harvest Strategy.

**Recommendation**

Taking into account of the updated results of the integrated stock assessment, based on the revised model reference case with AV attributed, the RAG recommended an RBC of 641 tonnes for the TRL Fishery for the 2018/19 fishing season.

31. The RAG noted an update from the CSIRO Scientific Member concerning ongoing work to incorporate environmental effects data into the stock assessment model. The member will be attending a meeting in Norway in June concerning the effects of environmental variability on fisheries stocks, and will provide an update at the next RAG on the outcomes.

32. The RAG also noted calculations presented by the CSIRO Scientific Member concerning the additional costs ($187,300) of increasing the number of pre-season survey sites from the current 77 sites ($218,100 total cost) to 140 ($405,400 total cost). CSIRO to circulate cost-benefit paper to RAG.

**Action**

CSIRO to circulate cost-benefit paper to RAG.

# 5 RAG Data Sub-Group meeting

33. The RAG noted an update from Ms Natalie Couchman, Executive Officer, concerning arrangements for the upcoming RAG Data Sub-Group meeting:

a. at the RAG meeting held on 18-19 October 2018 (TRLRAG 24), the RAG recommended a sub-group of the RAG be established to examine and recommend improvements to be made to the collection and analysis of catch and effort data for the TRL Fishery;

b. the Sub-Group will be established for an initial term of 18 months, and will focus on issues concerning fishery dependent data inputs to the TRL Fishery assessment framework;

c. the Sub-Group will meet on an as needs basis, with the first meeting tentatively scheduled between 19-21 March or 17-18 April 2019, depending on attendees' availabilities;

d. the first meeting will undertake a review of the data needs for the TRL Fishery (e.g. data fields), and assessment on how these needs are currently being met and identify any improvements or gaps. It is envisaged that this will include recommendations on improvements to the TRL04 logbook and TDB02 catch disposal record;

e. a report will be provided to the RAG following each meeting. The RAG will be asked to consider each report, provide guidance on further work to be undertaken by the Sub-Group including an assessment of the ongoing need for the Sub-Group.

34. The RAG considered the draft terms of reference for the Sub-Group and agreed they should be sent out of session for further comment, noting the following changes:

a. scope to recommend improvements and refinements to fishery assessment methodology should be removed from the terms of reference;

b. the Sub-Group should not be limited to fishery dependent data, there should also be scope in the terms of reference for the Sub-Group to look at data inputs such as environmental correlates.

**Action**

Draft terms of reference for the RAG Data Sub-Group to be circulated out of session for member comment, prior to finalisation.

35. The RAG suggested, that in reviewing the data needs for the TRL Fishery, the Sub-Group should consider identifying which data fields are mandatory, voluntary, desirable and issues with each. The RAG agreed information on the use of dive-loggers to collect fishery dependent data in the Tasmanian Abalone Fishery should be made available to the Sub-Group for consideration in recommending improvements.

**Action**

Information to be provided to the Sub-Group on the use of dive-loggers to collect fishery dependent data in the Tasmanian Abalone Fishery.

36. The RAG confirmed nominations for the Sub-Group as follows: Ms Natalie Couchman; Ms Danielle Stewart; Dr Éva Plagányi; Dr Robert Campbell; Dr Andrew Penney; Mr Les Pitt; Mr James Billy; and Joseph Posu. Trent Butcher and Suzannah Salam also offered their nominations as observers.

# 6 Terms of reference for peer review of survey design

37. The RAG considered the draft terms of reference for an independent peer review of the TRL Fishery survey design, noting CSIRO's conflict of interest as the research provider responsible for conducting the surveys.

38. The Independent Scientific Member reinforced the need for the RAG to decide on, and clearly specify, either key questions, or objectives, to frame the review. The member presented a hierarchy of issues (below) the review could cover, noting that the broader the scope of the review, the more costly it will be, due to the technical expertise and time required to address the more complex questions:

    a. Potential for, or evidence of, bias in survey results:
        i. Survey design (site selection);
        ii. Survey implementation (diver effects);
        iii. Survey data analysis (GLM, spatial raising);
    b. Causes of mismatch between survey results and commercial CPUE:
        i. Has reduction in the number of sites contributed to potential bias, or just to increase in variance?
        ii. What are the likely causes of perceived survey:CPUE mismatch?
        iii. Do these indicate any likelihood of bias in survey results?
        iv. Is there any evidence for a shift in lobster distribution that could be contributing to CPUE mismatch, or resulting in survey bias?
        v. What data would be required to detect such shifts?
    c. Recommendations for improvement.

39. The AFMA member advised that at the Torres Strait Scientific Advisory Committee meeting on 5-6 December 2018, it was agreed that the independent peer review of the TRL Fishery survey design will be considered for funding in 2019-20, however this project will be directly sourced from specific researchers due to the expected specialist service and relatively low cost

(approximately $20,000) . The RAG noted the scope of the review will need to match the available budget, and potential reviewers should be informed when asking to submit proposals.

40. The RAG agreed the draft terms of reference should be refined by the Chairperson and Independent Scientific Member out of session, taking into consideration the following changes suggested by the RAG. Members are to provide any additional changes to those below to the Executive Officer:
    a. any recommended improvements needed to preserve the long-term survey data series for the TRL Fishery;
    b. the terms of reference need to be phrased to ensure they do not indicate an assumption of bias in either the survey or CPUE data;
    c. the review should focus on the 1+ survey series;
    d. review should not revisit work that has already been undertaken e.g. CSIRO has previously conducted analyses on site reduction and variance, and this can be made available to reviewer;
    e. reviewer will be required to comply with data confidentiality requirements; and,
    f. if there is bias, is the cause environmental effects, or whole systematic changes to survey design over time.
41. The draft terms of reference will then be sent to the RAG for final consideration and recommendation on whether to proceed with the review.

**Action**

Draft terms of reference for the independent peer review of the TRL Fishery survey design to be refined by the Chairperson and Independent Scientific Member out of session, taking into consideration the changes suggested by the RAG and any additional changes received from members.

42. The RAG discussed potential researchers to undertake the review and agreed for members to send details of potential reviewers to AFMA for further consideration.

**Action**

Members to send details of potential reviewers to AFMA for further consideration.

# 7 Research pre-proposals for 2019/20

43. The RAG noted an update from Ms Natalie Couchman, Executive Officer, concerning research pre-proposals for 2019/20:
    a. as part of its 2019 funding round, the Torres Strait Scientific Advisory Committee (TSSAC) made an annual public call for research applications in late December 2018 to address research priorities identified for potential funding in 2019-20. Three scopes are relevant to the TRL Fishery:
        i. Climate variability and change relevant to key fisheries resources in the Torres Strait — a scoping study;
        ii. Measuring non-commercial fishing (indigenous subsistence fishing and recreational fishing) in the Torres Strait in order to improve fisheries management and promote sustainable livelihoods; and
        iii. Fishery independent survey, stock assessment, Harvest Strategy and recommended biological catch calculation for the TRL Fishery.
    b. Research funding is assessed in two stages by the TSSAC, through pre-proposals, then successful applications will be asked to submit full proposals. Pre-proposals are due 5 February 2019. Applicants will be advised in late March 2019 whether a full proposal should be submitted.

44. The RAG considered two pre-proposals, taking into account TSSAC's evaluation criteria. CSIRO declared a conflict of interest as applicants for both pre-proposals. The RAG determined that a direct conflict of interest existed and decided the CSIRO member and observers retire from the meeting for discussions on each pre-proposal. Prior to leaving the meeting the CSIRO member was asked to first explain the project proposals.

45. With CSIRO absent from the meeting, the RAG provided comments on each pre-proposal as follows:

    a. *Climate variability and change relevant to key fisheries resources in the Torres Strait* (Dr Leo Dutra, CSIRO):

        i. further details are requested on the range of research already being conducted in this area, including that being currently conducted by CSIRO, and how this project will complement this research without duplication;

        ii. clarification is requested on the benefit to the TRL Fishery from this project, particularly given work already undertaken/planned as part of the TRL Fishery survey, stock assessment and Harvest Strategy project.

    b. *Torres Strait TRL survey, stock assessment and Harvest Strategy* (Dr Éva Plagányi, CSIRO):

        i. a more detailed description of survey costs, in particular diver costs, is requested;

        ii. a more detailed and descriptive budget breakdown is requested against the different components of the project and milestones – by year by project component (e.g. data analysis, survey, stock assessment vs eHCR, ancillary (e.g. development of a tiered Harvest Strategy, RAG Data Sub-Group)).

        iii. exact number of survey sites to be confirmed.

# 8 Other business

46. Members did not raise any other business for consideration.

# 9 Date and venue for next meeting

47. Member considered a draft work plan for the TRLRAG and Working Group, noting the next RAG meeting is tentatively scheduled for August/September 2019, with exact dates to be confirmed out of session.

48. The meeting was closed in prayer at 5:30 pm on Tuesday 5 February 2019.

**Declaration of interests**
**Dr Ian Knuckey – February 2019**

**Positions:**

| | |
|---|---|
| Director – | Fishwell Consulting Pty Ltd |
| Director – | Olrac Australia (Electronic logbooks) |
| Deputy Chair – | Victorian Marine and Coastal Council |
| Chair / Director – | Australian Seafood Co-products & ASCo Fertilisers (seafood waste) |
| Chair – | Northern Prawn Fishery Resource Assessment Group |
| Chair – | Tropical Rock Lobster Resource Assessment Group |
| Chair – | Victorian Rock Lobster and Giant Crab Assessment Group |
| Scientific Member – | Northern Prawn Management Advisory Committee |
| Scientific Member – | SESSF Shark Resource Assessment Group |
| Scientific Member – | Great Australian Bight Resource Assessment Group |
| Scientific Member – | Gulf of St Vincents Prawn Fishery Management Advisory Committee |
| Scientific participant – | SEMAC, SERAG |

**Current projects:**

| | |
|---|---|
| AFMA 2018/08 | Bass Strait Scallop Fishery Survey – 2018 and 2019 |
| FRDC 2017/069 | Indigenous Capacity Building |
| FRDC 2016/116 | 5-year RD&E Plan for NT fisheries and aquaculture |
| AFMA 2017/0807 | Great Australian Bight Trawl Survey – 2018 |
| Traffic Project | Shark Product Traceability |
| FRDC 2018/077 | Implementation Workshop re declining indicators in the SESSF |
| FRDC 2018/021 | Development and evaluation of SESSF multi-species harvest strategies |

**26th MEETING OF THE PZJA TORRES STRAIT TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG 26)**

**Tuesday 5 February 2019 (9:00 AM – 5:00 PM)**

**Rydges Plaza Cairns (Corner Grafton & Spence Streets, Cairns)**

# DRAFT AGENDA

## 1 PRELIMINARIES

### 1.1 Welcome and apologies

The Chair will welcome members and observers to the 26th meeting of the RAG.

### 1.2 Adoption of agenda

The RAG will be invited to adopt the draft agenda.

### 1.3 Declaration of interests

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

### 1.4 Action items from previous meetings

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

### 1.5 Out-of-session correspondence

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

## 2 UPDATES FROM MEMBERS

### 2.1 Industry members

Industry members and observers will be invited to provide an update on matters concerning the Torres Strait TRL Fishery.

### 2.2 Scientific members

Scientific members and observers will be invited to provide an update on matters concerning the Torres Strait TRL Fishery.

### 2.3 Government agencies

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

### 2.4 PNG National Fisheries Authority

The RAG will be invited to note an update from the PNG National Fisheries Authority.

### 2.5 Native Title

The RAG will be invited to note an update from Malu Lamar (Torres Strait Islander) Corporation RNTBC.

## 3 CATCH SUMMARY FOR THE 2018/19 FISHING SEASON

The RAG will be invited to note TRL Fishery catch data for the 2018/19 fishing season to date.

## 4 FINAL STOCK ASSESSMENT AND RECOMMENDED BIOLOGICAL CATCH

The RAG will be invited to consider the final results of the integrated stock assessment. A final recommended biological catch (RBC) for the 2018/19 fishing season will be provided based on the integrated stock assessment.

## 5 RAG DATA SUB-GROUP MEETING

The RAG will consider arrangements for the upcoming data sub-group meeting.

## 6 TERMS OF REFERENCE FOR PEER REVIEW OF SURVEY DESIGN

The RAG will be invited to consider draft terms of reference for an independent peer review of the Torres Strait TRL Fishery survey design.

## 7 RESEARCH PRE-PROPOSALS FOR 2019/20

The RAG will be invited to consider relevant research pre-proposals for funding in 2019/20, submitted in response to the 2019 call for research.

## 8 OTHER BUSINESS

The RAG will be invited to raise other business for consideration.

## 9 DATE AND VENUE FOR NEXT MEETING

The RAG will be invited to discuss a suitable date for the next meeting.

**Action items from previous TRLRAG meetings**

| # | Action Item | Meeting | Responsible Agency/ies | Due Date | Status |
|---|---|---|---|---|---|
| 1. | AFMA to review the effectiveness of certain TIB licensing arrangements (in its 2016 licencing review) including:<br>• TIB licenses should share a common expiry date<br>• licences to last for longer than the current 12 month period. | TRLRAG14 (25-26 August 2015) | AFMA | 2017 | **Ongoing**<br>This item will be considered at the next meeting of the TRL Working Group scheduled for 19-20 February 2019, with a view to progressing during 2019. AFMA will provide further updates on this item once it has been considered and prioritised by the TRL Working Group and resourcing has been allocated. |
| 2. | AFMA and CSIRO prepare a timeline of key events that have occurred in the Torres Strait Tropical Rock Lobster Fishery (e.g. licence buy backs, weather events and regulation changes) and provide a paper to TRLRAG. | TRLRAG14 (25-26 August 2015) | AFMA<br>CSIRO | TRLRAG17 (31 March 2016) | **Ongoing**<br>AFMA to complete this action in 2019. |
| 3. | AFMA to liaise with Mr Pitt and Malu Lamar to provide agreed traditional names for the area around Erub. | TRLRAG23 (15 May 2018) | AFMA | | **Complete**<br>AFMA has liaised with Mr Pitt regarding this action. A map developed by the TSRA's Land and Sea Management Unit in consultation with PBCs, including Malu Lamar was developed in late 2018. A copy of this map was provided to CSIRO and the RAG at the meeting held on 11-12 December 2019. Further copies can be requested from the RAG Executive Officer as required. |

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| 4. | South Fly River studies to be provided for consideration at the next TRL and Finfish RAG meetings. | TRLRAG23 (15 May 2018) | AFMA | TRLRAG24 (18-19 October 2018) | **Ongoing**<br>Preliminary results of these studies was presented to TRLRAG24 held on 11-12 December 2018. A report detailing the findings of these studies is currently being finalised and will be provided to the RAG once available. |
| 5. | With regards to future TIB catch and effort analyses, CSIRO to explore the use of boat marks to improve location fished data extracted from the TDB02 CDR. | TRLRAG24 (18-19 October 2018) | CSIRO | 2019 | **Ongoing**<br>To be examined when the next analyses are undertaken. |
| 6. | CSIRO to provide information on a recent review of the survey design to the RAG for information. | TRLRAG24 (18-19 October 2018) | CSIRO | TRLRAG25 | **Ongoing**<br>A review of the Torres Strait TRL Fishery survey design by the U.S. National Park Service is not yet finalised for distribution. A copy will be provided to the RAG once finalised. |
| 7. | RAG members to provide comments on the CSIRO TRL age class poster. CSIRO to include a better image of the 2+ lobster on the poster. | TRLRAG24 (18-19 October 2018) | RAG<br>CSIRO | 2019 | **Completed**<br>Copies can be requested from CSIRO or AFMA. |
| 8. | The TRL RAG Chair to provide the TSRA with a copy of expected behaviours of RAG members to assist with the induction program for incoming PZJA forum members. | TRLRAG25 (11-12 December 2018) | RAG Chair | 2019 | **Completed** |
| 9. | CSIRO to investigate the length frequency conversion factors from the catch weight data provided by MG Kailis. | TRLRAG25 (11-12 December 2018) | CSIRO | 2019 | **Ongoing**<br>CSIRO to address when resources become available. This is a lower priority as the outcomes of this work will not affect the RBC calculations for the 2018/19 fishing season. |

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| 10. | CSIRO to calculate the cost of increasing the number of pre-season survey sites from the current 77 sites back to 140 for RAG industry members to consider. | TRLRAG25 (11-12 December 2018) | CSIRO | 2019 | **Completed**<br>To be considered under Agenda Item 4. |
| 11. | Considering assessment timelines, PNG NFA to provide CSIRO with a best estimate of PNG catches by mid-November. CSIRO to liaise closely with PNG regarding reporting timeframes and provision of catch data. In parallel, the RAG data sub-group to examine ways to adjust the stock assessment model to account for delayed catch data from PNG. | TRLRAG25 (11-12 December 2018) | PNG NFA<br>CSIRO<br>AFMA<br>RAG Data Sub-Group | 2019 | **Ongoing**<br>AFMA and CSIRO continue to liaise with PNG NFA with regards to the provision of catch and effort data for the PNG TRL Fishery.<br>RAG data sub-group yet to convene. Arrangements for this meeting to be considered under Agenda Item 5. |
| 12. | That the TRL RAG data subcommittee discuss which TVH CPUE series are the best to use within the model. | TRLRAG25 (11-12 December 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Not complete**<br>RAG data sub-group yet to convene. Arrangements for this meeting to be considered under Agenda Item 5. |
| 13. | MG Kailis to submit tissue samples from frozen TRL tails for trace metal analysis to better understand the impacts of dissolved contaminants from the Fly River run off on important fisheries species in the Torres Strait. | TRLRAG25 (11-12 December 2018) | MG Kailis | 2019 | **Completed**<br>A sample of PNG tails has been sent for testing. Test results expected February 2019. |
| 14. | CSIRO to circulate the final report from the Fly River study | TRLRAG25 (11-12 | CSIRO | 2019 | **Ongoing**<br>Preliminary results of these studies was presented to TRLRAG24 held on 11-12 December 2018. A report |

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| | to all RAG members once available. | December 2018) | | | detailing the findings of these studies is currently being finalised and will be provided to the RAG once available. |

**Relevant action items from previous TRLWG meetings***

| # | Action Item | Meeting | Responsible Agency/ies | Due Date | Status |
|---|---|---|---|---|---|
| 1. | Discard reporting and estimation be considered by the RAG (possibly by the RAG data subgroup) | TRLWG8 (8 November 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Not complete**<br>RAG data sub-group yet to convene. Arrangements for this meeting to be considered under Agenda Item 5. |
| 2. | RAG to consider the merit and options for improving the index of 0+ lobster abundance, through logbooks or other means. The Working Group noted that this would may be relevant to the RAG data sub-committee. | TRLWG8 (8 November 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Not complete**<br>RAG data sub-group yet to convene. Arrangements for this meeting to be considered under Agenda Item 5. |

*TRLWG actions not relevant to TRLRAG have not been included in the above.

**Attachment 1.4b**

**Action items from previous TRLRAG meetings**

| # | Action Item | Meeting | Responsible Agency/ies | Due Date | Status |
|---|---|---|---|---|---|
| 1. | AFMA to review the effectiveness of certain TIB licensing arrangements (in its 2016 licencing review) including:<br>• TIB licenses should share a common expiry date<br>• licences to last for longer than the current 12 month period. | TRLRAG14 (25-26 August 2015) | AFMA | 2017 | **Ongoing and recommend this action be transferred to the Working Group**<br>This item will be considered at the next meeting of the TRL Working Group scheduled for December 2019. If required by the RAG, AFMA will provide further updates on this item once it has been considered and prioritised by the TRL Working Group and resourcing has been allocated. |
| 2. | AFMA and CSIRO prepare a timeline of key events that have occurred in the Torres Strait Tropical Rock Lobster Fishery (e.g. licence buy backs, weather events and regulation changes) and provide a paper to TRLRAG. | TRLRAG14 (25-26 August 2015) | AFMA<br>CSIRO | TRLRAG17 (31 March 2016) | **Ongoing**<br>Draft timeline provided at **Attachment 1.4c** for comment. Further work to finalise to be undertaken in 2020. |
| 3. | South Fly River studies to be provided for consideration at the next TRL and Finfish RAG meetings. | TRLRAG23 (15 May 2018) | AFMA | TRLRAG24 (18-19 October 2018) | **Completed**<br>Preliminary results of these studies was presented to TRLRAG25 held on 11-12 December 2018. The final reports were circulated to the RAG out of session on 31 October 2019. |
| 4. | With regards to future TIB catch and effort analyses, CSIRO to explore the use of boat marks to improve location fished data extracted from the TDB02 CDR. | TRLRAG24 (18-19 October 2018) | CSIRO | 2019 | **Completed**<br>To be discussed under Agenda Item 4. |

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|---|---|---|---|---|---|
| 5. | CSIRO to provide information on a recent review of the survey design to the RAG for information. | TRLRAG24 (18-19 October 2018) | CSIRO | TRLRAG25 | **Completed**<br>A report on the review of the Torres Strait TRL Fishery survey design by the U.S. National Park Service was circulated to the RAG out of session on 18 March 2019. |
| 6. | CSIRO to investigate the length frequency conversion factors from the catch weight data provided by MG Kailis. | TRLRAG25 (11-12 December 2018) | CSIRO | 2019 | **Ongoing**<br>CSIRO to address when resources become available. This is a lower priority as the outcomes of this work will not affect the RBC calculations for the 2019-20 fishing season. |
| 7. | Considering assessment timelines, PNG NFA to provide CSIRO with a best estimate of PNG catches by mid-November. CSIRO to liaise closely with PNG regarding reporting timeframes and provision of catch data. In parallel, the RAG data sub-group to examine ways to adjust the stock assessment model to account for delayed catch data from PNG. | TRLRAG25 (11-12 December 2018) | PNG NFA<br>CSIRO<br>AFMA<br>RAG Data Sub-Group | 2019 | **Ongoing**<br>Throughout the 2018-19 fishing season, AFMA and CSIRO continued to liaise with PNG NFA with regards to the provision of catch and effort data for the PNG TRL Fishery. PNG NFA have provided data which is provided under Agenda Item 4 for discussion.<br>The PNG NFA did not attend to the RAG Data Sub-Group which met on 18 June 2019, and as such this matter was not discussed. To be placed on the agenda for the next meeting. |
| 8. | That the TRL RAG data subcommittee discuss which TVH CPUE series are the best to use within the model. | TRLRAG25 (11-12 December 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Ongoing**<br>The RAG Data Sub-Group met on 18 June 2019, however this item was not considered. A report from the Sub-Group will be considered under Agenda Item 3. This matter was not discussed. To be placed on the agenda for the next meeting. |
| 9. | MG Kailis to submit tissue samples from frozen TRL tails for trace metal analysis to better understand the impacts of | TRLRAG25 (11-12 December 2018) | MG Kailis | 2019 | **Ongoing**<br>MG Kailis to provide an update on this item at the meeting. |

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| | dissolved contaminants from the Fly River run off on important fisheries species in the Torres Strait. | | | | |
| 10. | CSIRO to circulate the final report from the Fly River study to all RAG members once available. | TRLRAG25 (11-12 December 2018) | CSIRO | 2019 | **Completed**<br>Preliminary results of these studies was presented to TRLRAG25 held on 11-12 December 2018. The final reports were circulated to the RAG out of session on 31 October 2019. |
| 11. | CSIRO to send information to PNG concerning the current survey design for the Protected Zone TRL Fishery, including details on current and historical survey sites. | TRLRAG26 (5 February 2019) | CSIRO | Prior to TRLRAG27 | **Completed**<br>In mid-2019, CSIRO provided additional information to PNG concerning the current survey design. |
| 12. | CSIRO to provide a copy of report concerning GLM analysis in 2013, to be circulated to the RAG for consideration. | TRLRAG26 (5 February 2019) | CSIRO | Prior to TRLRAG27 | **Completed**<br>Report was circulated to the RAG out of session on 31 October 2019. |
| 13. | CSIRO to undertake further investigations to improve the GLM approach, and present the findings to the next meeting of the RAG. | TRLRAG26 (5 February 2019) | CSIRO | TRLRAG27 | **Ongoing**<br>CSIRO to provide an update on this item at the meeting. |
| 14. | CSIRO to circulate cost-benefit paper to RAG. | TRLRAG26 (5 February 2019) | AFMA | Prior to TRLRAG27 | **Completed**<br>Paper was circulated to the RAG out of session on 18 March 2019. |
| 15. | Draft terms of reference for the RAG Data Sub-Group to be circulated out of session for member comment, prior to finalisation. | TRLRAG26 (5 February 2019) | AFMA | March 2019 | **Completed**<br>Draft terms of reference were circulated to the RAG out of session for comment on 18 March 2019. No comments were received. The RAG Data Sub-Group |

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| | | | | | met on 18 June 2019. A report from the Sub-Group will be considered under Agenda Item 3. |
| 16. | Information to be provided to the Sub-Group on the use of dive-loggers to collect fishery dependent data in the Tasmanian Abalone Fishery. | TRLRAG26 (5 February 2019) | AFMA | 17 April 2019 | **Completed**<br>The RAG Data Sub-Group met on 18 June 2019, where this issue was considered. A report from the Sub-Group will be considered under Agenda Item 3. |
| 17. | Draft terms of reference for the independent peer review of the TRL Fishery survey design to be refined by the Chairperson and Independent Scientific Member out of session, taking into consideration the changes suggested by the RAG and any additional changes received from members. | TRLRAG26 (5 February 2019) | Chairperson<br>Independent Scientific Member<br>AFMA | April 2019 | **Completed**<br>Provided for discussion under Agenda Item 9. |
| 18. | Members to send details of potential reviewers to AFMA for further consideration. | TRLRAG26 (5 February 2019) | RAG members | April 2019 | **Completed**<br>Request was circulated to the RAG out of session on 18 March 2019. No responses were received. |

**Relevant action items from previous TRLWG meetings***

| # | Action Item | Meeting | Responsible Agency/ies | Due Date | Status |
|---|---|---|---|---|---|
| 1. | Discard reporting and estimation be considered by the RAG (possibly by the RAG data subgroup) | TRLWG8 (8 November 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Ongoing**<br>The RAG Data Sub-Group met on 18 June 2019, where this issue was considered. A report from the Sub-Group will be considered under Agenda Item 3. |

**Attachment 1.4b**

| # | Action Item | Meeting | Responsible Agency/ies | Due Date | Status |
|---|---|---|---|---|---|
| 2. | RAG to consider the merit and options for improving the index of 0+ lobster abundance, through logbooks or other means. The Working Group noted that this would may be relevant to the RAG data sub-committee. | TRLWG8 (8 November 2018) | AFMA<br>RAG Data Sub-Group | 2019 | **Ongoing**<br>The RAG Data Sub-Group met on 18 June 2019, where this issue was considered. A report from the Sub-Group will be considered under Agenda Item 3. |

*TRLWG actions not relevant to TRLRAG have not been included in the above.

**Attachment 1.4c**

## Timeline of key events in the Torres Strait Tropical Rock Lobster Fishery[1]

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*

| Date | Description | Source |
|---|---|---|
| 1960 | Commercial fishing for TRL by the non-Traditional Inhabitant sector began in the Torres Strait | i |
| Dec-1978 | Torres Strait Treaty signed | ii |
| Feb-1985 | Torres Strait Treaty entered into force, *Torres Strait Fisheries Act 1984* and *Torres Strait Fisheries Regulations 1985* commenced and the PZJA is established | iii |
| Feb-1985 | Under FMN 1:<br>• Method restrictions introduced - only diving, collection by hand and use of spear permitted | iii |
| Jul-1985 | Under FMN 9 (replaced FMN 1):<br>• Method restrictions amended – only diving, collection by hand and use of spear permitted between 15 Jul-31 Oct | iii |
| Jan-1986 | Introduction of prohibition on prawn trawlers taking TRL during the annual migration period (1 Jul-31 Oct) - in place until 1987 | iv |

[1] This is a draft document and is to be updated as key events happen. Additional work is planned to update this document to reference key licensing changes that have affected access to the TRL Fishery and to provide further details of the rationale behind changes to management controls.

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| Jun-1986 | Under FMN 12 (replaced FMN 9):<br>• Method restrictions amended – only diving, collection by hand and use of spear permitted between 1 Jul-31 Oct only | iii |
| Mar-1988 | Under FMN 19:<br>• Introduction of prohibition on the take, processing or carrying of TRL by boats with a prawn endorsement | iii |
| Jun-1988 | Under FMN 22:<br>• Minimum size limit introduced - 100 mm tail length | iii |
| Oct-1988 | Under FMN 24 (replaced FMN 12):<br>• Method restrictions amended - only diving, collection by hand and use of spear permitted, no underwater breathing apparatus except hookah, no underwater mechanical propulsion<br>• Introduction of exemption which can be sought for some method restrictions, specifically the use of underwater breathing apparatus and underwater mechanical propulsion<br>• Traditional fishing bag limits introduced - 3 per person up to 6 per boat | iii |
| Aug-1989 | Under FMN 31 (replaced FMN 24):<br>• No substantive changes to FMN 24 | iii |
| 1989 | Fishery independent surveys commence in the TRL Fishery | v |
| Oct-1990 | Under FMN 34 (replaced FMN 22):<br>• No substantive changes to FMN 22 | iii |
| Jun-1992 | Mabo High Court decision | vi |
| Oct-1993 | Under FMN 38 (replaced FMN 31):<br>• Introduction of prohibition on taking TRL using hookah between 1 Oct-30 Nov<br>• 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<br>• All other requirements remained unchanged - method restrictions | iii |
| Dec-1993 | *Native Title Act 1993* commences | iii |
| 1994 | Noted under LN 8:<br>• Tropical Rock Lobster Logbook TRL02 implemented – voluntary, records frozen tails only | iii |

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| 1994 | Torres Strait Regional Authority established under the *Aboriginal and Torres Strait Islander Commission Act 1989* | iii |
| Jul-1995 | Under FMN 42 (amended FMN 38):<br>• No substantive changes to FMN 38 | iii |
| Mar-1997 | Under FMN 44 (amended FMN 38):<br>• 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 | iii |
| May-1997 | Under LN 8:<br>• Tropical Rock Lobster Logbook TRL03 implemented – both TRL02 and TRL03 mandatory for boats with freezing capacity, records both live and frozen tails | iii |
| Apr-1998 | Under FMN 48 (replaced FMN 34):<br>• Minimum size limits amended - 80 mm carapace length, 100 mm tail length | iii |
| Apr-2000 | Traditional Inhabitant Boat (TIB) licence introduced | vii |
| Nov-2001 | Under FMN 58 (replaced FMN 38, 42, 44, 48):<br>• 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<br>• Introduction of prohibition on taking or carrying of TRL while using, or in the possession of, hookah gear between 1 Oct-31 Jan<br>• All other requirements remained unchanged - method restrictions, minimum size limits | iii |
| 2002 | *Torres Strait Fisheries Act 1984* is amended to make the Torres Strait Regional Authority Chairperson a member of the Protected Zone Joint Authority | iii |
| Nov-2002 | 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 – arrangement in place until 2011. | viii |
| Dec-2002 | Under FMN 62:<br>• Introduction of prohibition of processing or carrying TRL meat removed from the shell on a boat. Exemption provided for traditional fishing | iii |

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| Dec-2003 | Cap on Traditional Inhabitant licences for boats greater than 6 m with a TRL Fishery endorsement – in place until 2006 | ix |
| Late 2003 | Torres Strait Seafood Buyers and Processors Docket Book (TDB01) implemented – voluntary | vii |
| Jun-2003 | Under the *Torres Strait Fisheries Logbook Instrument No. 1*:<br>• Tropical Rock Lobster Logbook TRL04 implemented – mandatory for all non-Traditional Inhabitant operators | iii |
| Jan-2005 | Moon-tide hookah closures 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 of non-Traditional Inhabitant licences however were reintroduced in 2014 following agreement from both the sectors, and continue to date | x |
| Jul-2005 | PZJA agreed to implement a plan of management | xi |
| 2006 | Notional total allowable catches implemented | xii |
| Mar-2006 | Under FMN 73 (replaced FMN 58, 62):<br>• 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<br>• 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<br>• All other requirements remained unchanged - method restrictions, prohibition of processing or carrying TRL meat, minimum size limits, hookah gear restrictions | iii |
| Sep-2006 | Under FMN 80 (replaced FMN 73):<br>• 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<br>• 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 | iii |
| Jun-2007 | 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 | xiii |

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| | stakeholders on the data used to establish the historical catch ratios of the Community and non-community sectors' | |
| Apr-2008 | 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. | xiv |
| 2008 | TRL tail to whole weight conversion ratio (2.677) implemented | xii |
| 2009 | Interim Harvest Strategy implemented for the TRL Fishery | xii |
| Mar-2010 | Torres Strait coral bleaching event | xv |
| Aug-2011 | Under FMI 9 (replaced FMN 80):<br>• Application of arrangements extended to PNG Treaty endorsed operators<br>• 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 | iii |
| Apr-2012 | 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 | xvi |
| 7-Aug-2013 | 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 | vi |
| 2014 | The Protected Zone Joint Authority acknowledges and supports the aspiration of Torres Strait Communities to own 100% of commercial Fisheries in the Australian area of the Torres Strait Protected Zone | xvii |
| May-2014 | Malu Lamar is appointed as the Registered Native Title Body Corporate for the Sea Claim Area Part A. | xviii |
| Mar-2016 | Torres Strait coral bleaching and sea cage mortality event | xv |
| Oct-2016 to Oct-2017 | 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 | xix |
| Jul-2017 | 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. | xx |

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| Dec-2017 | Torres Strait Fisheries Catch Disposal Record (TDB02) implemented – mandatory for all Torres Strait licence holders | xx |
| 10-Apr-2018 | Additional moon-tide hookah closures introduced covering all new and full moon periods for the remainder of the 2017-18 fishing season. | xxi |
| 27-Apr-2018 | Prohibition on the carriage and use of hookah gear for the remainder of the 2017-18 fishing season. | xxi |
| 29-Jun-2018 | Federal Court of Australia order to revoke prohibition on the carriage and use of hookah gear – reverted to additional moon-tide hookah closures. | xxi |
| 20-Jul-2018 | Under the Instrument (replaced FMI 9):<br>• Traditional fishing bag limits removed. Noted that PZJA does not have jurisdiction in relation to traditional fishing conducted by Traditional Inhabitants<br>• Introduction of capacity to close the TRL Fishery early to commercial fishing, when the total allowable catch is reached<br>• Introduction of capacity to prohibit the use of hookah gear (i.e. moon-tide hookah closures) during the hookah season (1 Feb-30 Sep)<br>• 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 | xxi |
| 31-Jul-2018 | TRL Fishery closed for the remainder of the 2017-18 fishing season due to total allowable catch being reached. | xxi |
| 1-Dec-2018 | Management Plan commenced | iii |
| 1-Dec-2018 | Under the Instrument (amendment to Jul-2018 Instrument):<br>• Ability to close the TRL Fishery early to commercial fishing revoked<br>• 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<br>• 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<br>• 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 | iii |

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| | • 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<br>• 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 | Quota units allocated under the Management Plan:<br>• 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<br>• 337,981 quota units to the remaining TVH principal licence holders | [xxi] |
| 19-Nov-2019 | PZJA adopts final Harvest Strategy for the TRL Fishery | [xxi] |
| 1-Dec-2019 | TRL Fishery commences operation under a quota management system as per the Management Plan | [iii] |

[i] History of Torres Strait Commercial Fisheries accessible on the Torres Strait Regional Authority (TSRA) website at www.tsra.gov.au
[ii] Accessible on the Department of Foreign Affairs and Trade (DFAT) website at https://dfat.gov.au
[iii] Accessible on the Federal Register of Legislation (FRL) website at www.legislation.gov.au
[iv] Records for Protected Zone Joint Authority (PZJA) meetings and out-of-session decisions for 1986-87, accessible by contacting the PZJA Executive Officer
[v] PZJA annual report for 1989/90, accessible by contacting the PZJA Executive Officer
[vi] Accessible on the High Court of Australia website at www.hcourt.gov.au
[vii] *A Guide to Management Arrangements for Torres Strait Fisheries* (June 2004), accessible on the PZJA website at www.pzja.gov.au
[viii] Records for PZJA meetings and out-of-session decisions for 2002-2011. PZJA decision records from 2009 onwards are accessible on the PZJA website at www.pzja.gov.au. PZJA decision records prior to 2009 are accessible by contacting the PZJA Executive Officer
[ix] Records for PZJA meetings and out-of-session decisions for 2003-2006, accessible by contacting the PZJA Executive Officer
[x] Records for PZJA meetings and out-of-session decisions for 2005-2019. PZJA decision records from 2009 onwards are accessible on the PZJA website at www.pzja.gov.au. PZJA decision records prior to 2009 are accessible by contacting the PZJA Executive Officer
[xi] PZJA Meeting 18 record, accessible by contacting the PZJA Executive Officer
[xii] TRLRAG meeting records for 2006-2019. TRLRAG meeting records from 2013 onwards are accessible on the PZJA website at www.pzja.gov.au. TRLRAG meeting records prior to 2013 are accessible by contacting the TRLRAG Executive Officer
[xiii] PZJA Meeting 21 record, accessible by contacting the PZJA Executive Officer
[xiv] PZJA Meeting 22 record, accessible by contacting the PZJA Executive Officer
[xv] Personal communication with Darren Dennis
[xvi] TRLWG Meeting 6 papers (Agenda Item 4.1), accessible on the PZJA website at www.pzja.gov.au
[xvii] PZJA Meeting 23 record, accessible on the PZJA website at www.pzja.gov.au

[xviii] Accessible on the Office of the Registrar for Indigenous Corporations website at www.oric.gov.au

[xix] *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018*, accessible on the Federal Register of Legislation (FRL) website at www.legislation.gov.au

[xx] Accessible on the PZJA website at www.pzja.gov.au

[xxi] Accessible on the PZJA website at https://www.pzja.gov.au/the-fisheries/torres-strait-tropical-rock-lobster-fishery

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARIES<br>Out-of-session correspondence | Agenda Item 1.5<br>For noting |

**RECOMMENDATIONS**

1. That the RAG **NOTE** the correspondence sent out-of-session since the last TRLRAG meeting held on 5 February 2019.

**BACKGROUND**

2. The following correspondence was circulated out-of-session since the last TRLRAG meeting held on 5 February 2019 (TRLRAG 26). Copies of this correspondence can be requested at any time from the TRLRAG Executive Officer.

| Date | Item |
|---|---|
| 11+12-Feb-19 | AFMA circulated a research pre-proposal for out-of-session consideration and advice. |
| 5-Mar-19 | AFMA circulated the draft meeting record for TRLRAG 26 held on 5 February 2019, seeking comment from members. |
| 14-Mar-19 | AFMA circulated offer for extension of appointments (ending 30 June 2019), to non-Traditional Inhabitant members on the TRLRAG, or until letters of offer can be made. |
| 18-Mar-19 | AFMA circulated the final meeting record for TRLRAG 26 held on 5 February 2019, and updates concerning actions arising from previous TRLRAG meetings. |
| 9-Apr-19 | AFMA circulated notice seeking applications for non-Traditional Inhabitant memberships on the TRLRAG. |
| 9-Apr-19 | AFMA circulated a letter inviting comments from all Torres Strait licence holders on draft harvest strategies for the TRL and Beche-de-mer (BDM) Fisheries and removal of the 'western line closure' in the Finfish Fishery. Members were also advised that PZJA has agreed to commence a review of how Developmental Permits are used for training purposes in all Torres Strait fisheries. |
| 18-Apr-19 | AFMA circulated catch watch report. |
| 26-Apr-19 | AFMA circulated, for information, the final report from the Australia-PNG Fisheries Committee Bilateral meeting held on 4 March 2019. |
| 26-Apr-19 | AFMA circulated three research proposals for out-of-session consideration and advice. |
| 14+17-May-19 | AFMA circulated catch watch report. |

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| 2-Aug-19 | AFMA emailed all RAG members seeking availability for TRLRAG 27 proposed to be held on 26 September 2019 in Cairns. |
| 26-Aug-19 | AFMA circulated letters of offer for three-year appointments (ending 30 June 2022), to non-Traditional Inhabitant members on the TRLRAG. |
| 27-Aug-19 | AFMA emailed all RAG members seeking availability for TRLRAG 27 proposed to be held on 9 October 2019 in Cairns/Thursday Island. Confirmed not enough members were available for the previously proposed dates. |
| 11-Sep-19 | AFMA confirmed not enough members were available for the proposed dates for TRLRAG 27 to be held on 9 October 2019 in Cairns/Thursday Island. |
| 16+17-Sep-19 | AFMA circulated two items for out-of-session consideration and advice:<br>- Outcomes of the draft TRL Harvest Strategy consultation; and<br>- Rolling Five Year Research Plan 2020/21 to 2024/25. |
| 17-Oct-19 | AFMA circulated summary of comments received on the two out-of-session items and next steps. |
| 18-Oct-19 | Ian Knuckey (Chair) emailed all RAG members requesting items to be placed on the agenda for TRLRAG 27 (in response to comments received on the two out-of-session items). |
| 10-Oct-19 | AFMA emailed all RAG members seeking availability for TRLRAG 27 proposed to be held on 10-11 December 2019 on Thursday Island. |
| 23-Oct-19 | AFMA confirmed dates for TRLRAG 27 to be held on 10-11 December 2019 on Thursday Island. |
| 31-Oct-19 | AFMA circulated the draft agenda for the TRLRAG 27 meeting to be held on 10-11 December 2019 on Thursday Island. |
| 31-Oct-19 | AFMA circulated updates concerning actions arising from previous TRLRAG meetings. |
| 22-Nov-19 | AFMA circulated a letter to TRL Fishery licence holders advising of the adoption of the TRL Harvest Strategy, determination of an interim TAC of 200,000 kgs and moon-tide hookah closures for the 2019-20 fishing season. |

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| UPDATES FROM MEMBERS<br>Industry members | Agenda Item 2.1<br>For noting |

**RECOMMENDATIONS**

1. That the RAG **NOTE** updates provided by industry members.

**BACKGROUND**

2. Verbal reports are sought from industry members under this item.
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 is able to 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 also asked to contribute advice on economic and market trends where possible.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 26<br>10-11 December 2019 |
|---|---|
| UPDATES FROM MEMBERS<br>Scientific members | Agenda Item 2.2<br>For noting |

**RECOMMENDATIONS**

1. That the RAG **NOTE** updates provided by scientific members.

**BACKGROUND**

2. Verbal reports are sought from scientific members under this item.
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 is able to have regard for these strategic issues and trends.
4. 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.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| UPDATES FROM MEMBERS<br>Government agencies | Agenda Item 2.3<br>For noting |

**RECOMMENDATIONS**

1. That the RAG:
   a. **NOTE** the updates provided by the Australian Fisheries Management Authority (AFMA) and Queensland Department of Agriculture and Fisheries (QDAF) below;
   b. **NOTE** a verbal update will be provided by the Torres Strait Regional Authority (TSRA).

**AFMA UPDATE**

*Compliance outcomes for the 2018-19 fishing season*

2. AFMA took over the Torres Strait Fisheries Domestic Compliance Program on 1 July 2018 from the Queensland Fishing and Boating Patrol. To increase capacity in this area, AFMA has since recruited a third officer to assist with the increase in work load in delivering both domestic and foreign compliance functions. Darwin and Canberra based officers have also assisted with targeted operations as required.
3. AFMA fisheries officers, with the support of the Australian Border Force, Royal Australian Navy, Queensland Water Police and the Torres Strait Rangers, have delivered the following during July – November 2019:
   a. conducted 7 at-sea patrols with 31 boats inspected;
   b. 25 ports / freight hubs visits;
   c. 28 fish receiver premises inspected within the Torres Strait Protected Zone and adjacent areas;
   d. monitored catch reporting and seafood movements through the Torres Strait on a regular basis. In the course of doing so, catches not landed to a fish receiver prior to shipment and taken by unlicensed fishermen have been identified. A number of consignments have either been detained pending further investigation and / or seized where evidence supports such an action.
4. A number of formal warnings were issued where appropriate for relatively minor breaches. Two matters were referred to the Commonwealth Director of Public Prosecutions (CDPP) for consideration, with a further two current matters are pending.
5. In addition, AFMA have also conducted a number of stakeholder / community / one on one meetings aimed at increasing education and awareness of compliance related issues and foster voluntary compliance with fisheries regulations.
6. To better target priority risks in Torres Strait fisheries, AFMA have established a specialised multi-disciplinary Compliance Risk Management Team (CRMT). Priority risks include quota evasion and failure to report interaction/retention of protected or prohibited species.
7. Further details are contained in AFMA's *National Compliance and Enforcement Program* document accessible on the AFMA website at: https://www.afma.gov.au/domestic-compliance. This document explains AFMA's compliance program priorities and objectives for the 2019-20 financial year (FY) and performance in the 2018-19 FY.

*Sea surface temperatures*

8. Sea surface temperatures (SSTs) are currently below the coral bleaching threshold. The Australian Institute of Marine Science (AIMS) monitors sea surface temperatures to identify the risk of bleaching events. Data and reports can be accessed on the AIMS website at https://weather.aims.gov.au/#/overview

9. Since 1970 the SST in the Coral Sea has consistently been above the long term average (data from 1900 to 2017).

10. The El Nino event from 2015-2016 was more intense than previous events in recent history. The impacts to the TRL Fishery include increased mortality of cage-held lobsters and increasing coral mortality that may result in a reduction of suitable habitat. The influences on the larval phases of TRL are poorly understood.

11. SST information is also monitored by some fishers. If there is a spike in temperature the TRL held in cages or tanks will be monitored more closely (2 to 3 times a day) and they will be tailed or frozen whole if they are weak or not a suitable grade for live product.

12. AFMA, through AIMS, will continue to monitor SSTs this season.

*Management arrangements for the 2019-20 fishing season*

13. A letter was sent to all Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) licence holders on 22 November 2019 (**Attachment 2.3a**). The letter details key management arrangements that will apply for the 2019-20 fishing season, including arrangements for the setting of total allowable catches (TACs) each season under the Harvest Strategy, moon-tide hookah closures and catch sharing arrangements between Australia and Papua New Guinea (PNG).

*Management Plan for the TRL Fishery*

14. On 26 November 2018, having considered outcomes of consultation, the Protected Zone Joint Authority (PZJA) decided to determine the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Management Plan) and to amend the *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018* (the Instrument). AFMA wrote to all TRL Fishery licence holders on 28 November providing notification of these decisions and key management arrangements for the 2018-19 fishing season.

15. On 16 September 2019, Senator the Hon Jonathon Duniam, Assistant Minister for Forestry and Fisheries, allocated quota units in the TRL Fishery in accordance with the Management Plan (**Attachment 2.3b**). Assistant Minister Duniam allocated:

    a. 662,016 quota units to the TSRA comprising:

        i. 562,000 to hold for the benefit of the traditional inhabitant sector; and

        ii. 100,016 for the TVH licences it holds.

    b. 337,981 quota units to the remaining TVH principal licence holders.

16. The TRL Fishery will operate under a quota management system from 1 December 2019 (the start of the 2019-20 fishing season). A copy of the Management Plan and the Guide to the Management Plan, as well as links to information about quota management systems, can be found on the PZJA website at www.pzja.gov.au.

*Review of TRL quota unit allocation to the Traditional Inhabitant sector*

17. The Management Plan requires the PZJA to review the allocation of quota units to the Traditional Inhabitant (TIB) sector within two years of the Management Plan commencement (30 November 2020). At the commencement of the quota system on 1 December 2019, the TSRA will hold quota units on behalf of the Traditional Inhabitant sector.

18. Separate to the allocation review to be undertaken by the PZJA, the TSRA is working with stakeholders to establish an independent, non-profit entity to manage community-owned

commercial fishery assets under the Fisheries Regional Ownership Framework project (FROF project). TSRA is working to have the entity established by 1 July 2020.

19. Without excluding other options, in undertaking the review the PZJA may consider the following options in accordance with s17(2) of the Management Plan:
    a. allocating quota units to a non-government legal entity that represents Traditional Inhabitants;
    b. allocating quota units to individual Traditional Inhabitants directly; and
    c. a combination of the options above.
20. The PZJA has a policy and procedural framework for the allocation of fishing concessions – FMP 2 (**Attachment 2.3c**). The policy, among other things, states that the recommended basis of allocation will be developed at arms-length from PZJA agencies. The policy approach is to establish and seek advice from an independent allocation advisory panel (IAAP). An IAAP process was convened to inform the PZJA on the allocation of TRL quota units to non-traditional (TVH) licence holders.
21. The intention of using an IAAP process is to ensure and assure stakeholders that their views and issues are being properly heard by independent experts that do not have preconceptions about the end outcome.
22. An IAAP would be required to consult widely with stakeholders and seek necessary expert advice. Subject to approval by the PZJA, the IAAP would be required to release its draft report for public comment.
23. At its meeting on 19 November 2019 the PZJA agreed in principle that the review of allocation be undertaken by an IAAP, in accordance with the PZJA's FMP 2 and directed the PZJA Standing Committee to provide draft Terms of Reference (ToR) for an IAAP, including its membership and process to the PZJA by April 2020 so that PZJA can confirm this in principle decision. The PZJA also agreed to commence the allocation review following the completion of the TSRA's FROF project, anticipated by 30 June 2020.
24. It will be necessary to ensure the IAAP is set up to appropriately assess the Torres Strait context as well as remain independent. Specific issues that the ToR will need to consider include composition (including the most appropriate means to ensure that detailed advice is available from native title and community interests), and method of consultation. The ToR will also need to specify the specific allocation questions that PZJA would like answered, including the basis for allocation to potentially different stakeholder groups (i.e. such as existing full-time and part-time commercial fishers, compared to casual/lifestyle fishers).
25. Unlike allocation models based on the allocation of entitlements to individual persons, a future allocation may be to an entity that holds quota on behalf of individuals. Such an entity may require regulatory oversight to:
    a. protect the intent of the allocation;
    b. ensure consistency with the PZJA's acknowledgment and support for the aspirations of 100 per cent ownership of Torres Strait fisheries by Torres Strait Islander and Aboriginal Traditional Owners;
    c. ensure, if relevant consistency with relevant PZJA licensing policies such as unlimited entry for Traditional Inhabitants;
    d. ensure Traditional Inhabitant interests are protected by ensuring affected persons have adequate rights of legal appeal; and
    e. ensure consistency with the *Torres Strait Fisheries Act 1984*.
26. In making its recent decision the PZJA also agreed that the IAAP appointed to undertake the TRL review, also consider and recommend an allocation model for the allocation of quota units to Traditional Inhabitants under the *Torres Strait Finfish Fishery Management Plan 2013* using the same basis provided for under s17(2) of the Management Plan.

*PNG-Australia catch sharing arrangements*

27. AFMA and the PNG National Fisheries Authority (NFA) met on 10 October 2019 to agree on a process for finalising catch sharing arrangements for the 2019-20 fishing season. AFMA and the PNG NFA will meet again in January 2020, to agree on the global TAC and catch sharing arrangements for the 2019-20 fishing season. Australia's final TAC will equate to Australia's share of the global TAC, as agreed with PNG. Further details on the expected timeline is provided at **Attachment 2.3d**.

28. At its meeting held on 19 November 2019, the PZJA agreed that, subject to further consultation with stakeholders, the preferred arrangement for utilising Australia's cross-endorsement allocation within PNG's waters is to not seek cross-endorsement but rather pursue a preferential entitlement arrangement under Article 25 of the Treaty. In effect this means, Australia will seek to take a proportion of PNG's cross-endorsement allocation within Australian waters equivalent to Australia's cross-endorsement allocation in PNG's waters. Conversely, PNG would be entitled to take Australia's cross-endorsement catch allocation in PNG's waters. Under such an arrangement, Australia's cross-endorsement allocation would be shared across all Australian licence holders in both sectors of the TRL Fishery.

29. Initial advice regarding the future utilisation of Australia's cross-endorsement allocation within PNG's waters will be sought from the PZJA TRL Working Group meeting to be held on 12 December 2019. Broader consultation with stakeholders, including licence holders, with be undertaken over the coming fishing seasons.

*Developmental Permits*

30. At its meeting on 1 April 2019, the PZJA agreed to commence a review of how Developmental Permits are used for training purposes in all Torres Strait Fisheries. AFMA wrote to all Torres Strait fisheries licence holders on 8 April 2019 advising of this decision.

31. The TSRA is leading the review. The PZJA agreed it will not consider any further applications for training under Developmental Permits until new arrangements are established, following the review.

32. At its meeting on 8 October the PZJA agreed to release a draft policy for public comment. TSRA are now making preparations for the public consultation process.

*Legislative amendments update*

33. As per previous updates, AFMA is continuing to progress draft amendments to the *Torres Strait Fisheries Act 1984* (the Act) and *Torres Strait Fisheries Regulations 1985* (the Regulations) as resources and priorities permit. The purpose of the amendments is to provide improvements to the efficiency and effectiveness of fisheries administration in the Torres Strait. In the past 12 months, AFMA have experienced delays to the project due to the Federal Election, competing Australian Government legislative priorities and limited internal resources.

34. Details of the proposed amendments have been provided in previous meeting papers. At its meeting on 8 October the PZJA agreed to further amendments to the Act and Regulations. A complete list of the proposed amendments is provided at **Attachment 2.3e**.

*Strategic assessment update*

35. On 20 December 2017, the TRL Fishery was declared by the then Delegate of the Minister for the Environment and Energy, Ilse Kiessling, as an approved Wildlife Trade Operation (WTO) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) until 18 December 2020.

36. Approval under the EPBC Act is:

    a. necessary to legally export commercially wild caught seafood from Australia; and

    b. subject to conditions which require ongoing work by the PZJA.

37. At the time of the last the approval, 4 conditions were applied to the TRL Fishery. A summary of these conditions and an update on the relevant management actions is outlined the table below:

| WTO Condition | Update |
|---|---|
| Operation of the Torres Strait Tropical Rock Lobster Fishery will be carried out in accordance with management arrangements in force under the *Torres Strait Fisheries Act 1984*. | The PZJA managed the TRL Fishery in accordance with management arrangements in force under the *Torres Strait Fisheries Act 1984*. |
| The Torres Strait Protected Zone Joint Authority to inform the Department of the Environment and Energy of any intended material changes to the Torres Strait Tropical Rock Lobster Fishery management arrangements that may affect the assessment against which *Environment Protection and Biodiversity Conservation Act 1999* decisions are made. | AFMA provided regular updates to the Department of the Environment and Energy during 2018 and 2019, concerning the implementation of the Management Plan. |
| The Torres Strait Protected Zone Joint Authority to produce and present reports to the Department of the Environment and Energy annually as per Appendix B of the Guidelines for the Ecologically Sustainable Management of Fisheries - 2nd Edition. | AFMA is preparing a report to the Department of the Environment and Energy as per requirements and will submit this by the end of 2019. |
| The Torres Strait Protected Zone Joint Authority to implement a strategy to manage the risks of overfishing and localised depletion in the fishery.<br><br>This may include data collection and analysis protocols to manage risks, triggers and/or limits for managing harvest, and should also account for all sources of stock mortality, including commercial, recreational, Traditional and illegal harvest. | The Harvest Strategy for the TRL Fishery was adopted by the PZJA at its meeting held on 19 November 2019. The Harvest Strategy sets out the objectives for the TRL Fishery, how the Fishery is to be monitored, what data should be collected, and rules for determining a recommended biological catch (RBC) and the global TAC each fishing season, including accounting for all sources of stock mortality. |

*Independent review of the EPBC Act*

38. The second independent review of the EPBC Act has been commissioned as part of a requirement that the EPBC Act is reviewed at least once every ten years. The review is being undertaken by Professor Graeme Samuel. To support the review a discussion paper has been developed and released for public comment outlining 26 questions for stakeholders to answer to inform the review. Submissions on this review are due by 14 February 2020 ahead of exploration of reform options and a draft report being produced by June 2020. More information is available at: www.epbcactreview.environment.gov.au

*ABARES fishery status report*

39. Each year, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) compiles fishery status reports which provide an independent assessment of the biological status of fish stocks and the economic status of fisheries managed, or jointly managed, by the Australian Government (Commonwealth fisheries).

40. The ABARES Fishery Status Reports 2019 (covering the performance of fisheries in 2018) was released in September 2019. 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.

41. In summary, the TRL Fishery has been assessed for the 2018 period as follows:

| **Status** | **2017** | | **2018** | | **Comments** |
|---|---|---|---|---|---|
| **Biological status** | **Fishing mortality** | **Biomass** | **Fishing mortality** | **Biomass** | |
| Tropical rock lobster (*Panulirus ornatus*) | Not subject to overfishing | Not overfished | Not subject to overfishing | Not overfished | Closure of the fishery in 2018 restricted fishing mortality levels to $F_{TARG.}$ Spawning stock biomass in 2018 was above the limit reference point but below the target reference point. Spawning stock biomass is expected to increase in 2019 and fluctuate widely around the target. |
| **Economic status** | Net economic returns in the fishery are uncertain, although positive economic improvements may have occurred in the 2017–18 fishing season as a result of gross value of production increasing faster than effort. | | | | |

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

*Australian National Audit Office (ANAO) audit*

43. On 29 May 2019, the ANAO tabled its report on the performance audit of the coordination arrangements of Australian Government agencies operating in the Torres Strait. The audit examined whether Australian Government agencies operating in the Torres Strait have appropriate governance arrangements to support the coordination of their activities; and the coordination arrangements are effective in supporting Australian Government activities in the Torres Strait.

44. Australian Government agencies subject to the audit included AFMA, the Department of Agriculture and Water Resources, the Department of Foreign Affairs and Trade, the Department of Home Affairs and the TSRA.

45. Overall, the report concludes that “the coordination arrangements of key Australian Government entities operating in the Torres Strait are largely effective in supporting Australian Government activities”.

46. Two AFMA recommendations were made, specifying that AFMA work with the TSRA and QDAF to;

    a. finalise the PZJA annual reports for the 2015-16, 2016-17 and 2017-18 financial years and implement a process to ensure that future annual reports are published in a timely manner; and

    b. keep the PZJA website up to date.

47. A more detailed summary of the ANAO outcomes relevant for AFMA is provided at **Attachment 2.3f**.

48. The full audit report can be found on the ANAO website at: https://www.anao.gov.au/work/performance-audit/coordination-arrangements-australian-government-entities-operating-torres-strait

*US Import Restrictions*

49. Provisions under the US *Marine Mammal Protection Act 1972* (MMPA) will require harvesting nations importing seafood into the US to meet minimum standards for fisheries management with regard to interactions with marine mammals when it comes into force on 1 January 2022.

50. The DAWR has been coordinating submissions to the US National Marine Fisheries Service (NMFS), on behalf of all Australian fisheries exporting to the US, highlighting the level of recorded interactions and regulatory measures to prevent and monitor interactions with marine mammals.

51. Information provided by export countries will be used by the US to classify fisheries as either 'exempt' or 'export' fisheries under the US rule. Fisheries will be classified 'exempt' where the US determines there is a remote likelihood of, or no known incidental mortality and serious injury of marine mammals in the course of commercial fishing operations. Australia is seeking 'exempt' status. If Australian fisheries are classified as 'export' fisheries, Australia will seek to demonstrate that marine mammal mitigation measures are comparable to that of the US.

**QDAF UPDATE**

52. On 1 September 2019, QDAF introduced a range of changes to their fisheries regulations. Key changes for harvest fisheries included:

    a. Aligning the southern and northern recreational possession limit for TRL to 5 for all Queensland waters.

    b. Hammerhead sharks and white teatfish are now a no-take species for recreational fishers.

    c. Sea cucumber and tropical rock lobster are 2 of 9 identified priority black-market species and therefore have a two times possession limit enforced for boats.

    d. Vessel tracking requirements will apply to all commercial fishing vessels (primaries & tenders) from 1 January 2020. Harvest symbols included are A1, A2, B1, D, J1 and R.

    e. Land based commercial harvest fishing licence operations must display a sign.

53. Further details are provided in **Attachment 2.3g** and on the QDAF website at https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/fisheries-reforms

54. A second round of regulatory changes are proposed to be implemented in late 2019. Proposed changes that will affect the Queensland East Coast TRL Fishery include:

    a. Change of commercial harvest fishing licences to commercial fishing boat licences.

    b. Requirement for 1 boat mark to be allocated to one commercial fishing boat licence.

    c. Replace existing nominee requirements with a commercial fisher licence (CFL to be issued at no cost for the first 12 months).

    d. Amend the payment of commercial fishing fees from 'in arrears' to 'in advance'.

    e. Primary vessel length = Up to 25m.

    f. Tender vessel length = Up to 10m.

    g. Maximum number of tender vessels to use = Up to 8.

h. Fisheries legislation to remove provisions regarding tender attendance rules to primary vessels and therefore default to AMSA rules.

i. Separation of fishing authority and quota allocations.

j. Standardisation of quota reporting requirements for all quota managed fisheries.

Australian Government
Australian Fisheries Management Authority

File reference: DOC19/30851

22 November 2019

Dear Torres Strait Tropical Rock Lobster Fishery licence holder

**Management Arrangements for the 2019-20 Fishing Season**

The 2019-20 fishing season for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) will commence on 1 December 2019. This letter details some key management arrangements that will apply this season.

**Total Allowable Catch**

On 19 November 2019, Senator the Hon. Jonathon Duniam determined a total allowable catch (TAC) of 200,000 kilograms of tropical rock lobster (TRL) in the Australian waters of the TRL Fishery for the 2019-20 fishing season. This was agreed as an interim TAC by the Protected Zone Joint Authority (PZJA) at their meeting on 19 November 2019 and will apply for the fishing season commencing 1 December 2019. 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 Papua New Guinea (PNG) have been taken into account. Any increase in the TAC is expected to be determined by the end of February 2020.

Under this TAC, the value of each quota unit and available catch for each TRL Fishery sector is outlined in the table below. All weights are provided in unprocessed weight in kilograms.

| TRL Fishery sector | TAC (kilograms) | Number of quota units | Value of each quota unit (kilograms) | Available catch per sector (kilograms) |
|---|---|---|---|---|
| Traditional Inhabitant Boat (TIB) licence holders | 200,000 | 662,016* | 0.200 | **132,403.2** |
| Transferable Vessel Holder (TVH) licence holders | | 337,981 | | **67,596.2** |

* Held by the Torres Strait Regional Authority (TSRA).

**Harvest Strategy for the TRL Fishery**

The TRL Harvest Strategy was adopted by the PZJA at their meeting on 19 November 2019 and sets out the objectives for the Fishery, how the Fishery will be monitored, what data should

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be collected, and rules for the determination of a global TAC each season. The Harvest Strategy will be used in the 2019-20 fishing season to determine the global TAC for the Fishery.

A further explanation of how TACs are determined for the TRL Fishery, how catch is shared between Australia and PNG, and how each sector's catches will be managed for the 2019-20 fishing season, is provided in **Enclosure A** to this letter.

**Moon-Tide Hookah Closures**

At their meeting held on 26 November 2018, the PZJA reaffirmed existing management controls currently applied to the TRL Fishery, to be implemented under the *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018* (the Instrument) and licence conditions. This includes periodic closures to the use of hookah gear for three days either side of the full or new moon each month based on the largest difference between high and low tides.

For the purpose of subsection 13(2) of the Instrument, I provide notice that the use, possession or control, on a boat, of hookah gear to take, process or carry TRL will not be permitted during the 2019-20 fishing season during the moon-tide hookah closure periods shown in the calendar (dated 13 November 2019) provided in **Enclosure B** to this letter. The first scheduled moon-tide hookah closure period starts on 6 February 2020.

These moon-tide hookah closures are in addition to the hookah closure period from 1 December and 31 January each fishing season. Free-diving, lamp fishing and traditional fishing are permitted during all hookah closure periods.

As always, licence holders should familiarise themselves with all management arrangements that apply in the TRL Fishery prior to the commencement of fishing. Further information can be found on the PZJA website at www.pzja.gov.au or by contacting AFMA.

Should you have any questions concerning the matters covered in this letter, please contact the AFMA Thursday Island office on 07 4069 1990 or FisheriesTI@afma.gov.au. If you would also like to receive future management updates by email or SMS please contact the AFMA Thursday Island office to update your contact details.

Yours sincerely

Wez Norris

Chief Executive Officer

**Enclosures**

A Additional information regarding management arrangements for the Torres Strait Tropical Rock Lobster Fishery 2019-20 fishing season

B TRL Fishery moon-tide hookah closures for the 2019-20 fishing season (dated 13 November 2019)

**Enclosure A**

**Additional information regarding management arrangements for the Torres Strait Tropical Rock Lobster Fishery 2019-20 fishing season**

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## How much can I catch?

The 2019-20 fishing season for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) will open from 1 December 2019 until 30 September 2020, or until available quota units have been caught.

### If you are fishing under a TIB licence

- 662,016 quota units, with a value of **132,403.2 kilograms** of TRL is available to be caught by Traditional Inhabitant Boat (TIB) licence holders. This is an **interim amount only** and 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 Papua New Guinea (PNG) have been taken into account. AFMA will write to all TRL Fishery licence holders when this happens.
- When this amount has been caught, TIB licence holders will no longer be permitted to fish commercially in the TRL Fishery (unless the total allowable catch (TAC) has been increased – see above).
- TIB licence holders will be provided with a notice by the Commonwealth Minister for Fisheries when this occurs.
- The mandatory Fish Receiver System (catch disposal records) will be used to account for catches by TIB licence holders against the TIB sector's quota holdings (held by the Torres Strait Regional Authority (TSRA) in trust).
- If a TRL is tailed, a weight conversion factor of 2.677 will be applied. This means that if an individual lands 1 kilogram of tailed TRL, 2.677 kilograms of TRL will be deducted from the uncaught quota amount.
- AFMA will monitor the catches of TIB licence holders against the TIB sector's quota holdings, and provide regular catch reports throughout the season to TRL Fishery licence holders on the remaining catch that is available to be taken. These reports will be made available on the Protected Zone Joint Authority (PZJA) website at www.pzja.gov.au and also sent to TRL Fishery licence holders by email and SMS where licence holders have these details registered with AFMA.
- Licence holders will also be able to check the catches of the TIB sector against the TIB sector's quota holdings at any stage by contacting the AFMA Thursday Island office on 07 4069 1990 or FisheriesTI@afma.gov.au.

## If you are fishing under a TVH licence

- 337,981 quota units, with a value of **67,596.2 kilograms** of TRL, have been allocated to individual Transferable Vessel Holder (TVH) licence holders. These quota units are only available to be fished by the individual that holds them. This is an **interim amount only** and 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 taken into account. AFMA will write to all TRL Fishery licence holders when this happens.
- Prior to the start of each fishing season, each TVH licence holder will receive an extract of the Register detailing the number and value of the quota units held by the individual.
- When all the quota units (including any leased units) held by a TVH licence holder have been caught, the licence holder will no longer be permitted to fish commercially in the TRL Fishery.
- It is the responsibility of each TVH licence holder to monitor their catches against the quota units that they hold.
- The Fish Receiver System (catch disposal records) will be used to account for TVH licence holders' catches against their quota unit holdings.
- If a TRL is tailed, a weight conversion factor of 2.677 will be applied. This means that if an individual lands 1 kilogram of tailed TRL, 2.677 kilograms of TRL will be deducted from the individual's uncaught quota amount.
- AFMA will provide regular catch reports detailing the total catch by the TVH sector (not individual catches). These reports will be made available on the PZJA website at www.pzja.gov.au and also sent to TRL Fishery licence holders by email and SMS where licence holders have these details registered with AFMA.
- TVH licence holders will also be able to check their quota holdings at any stage throughout the season by registering for GOFish, AFMA's e-licensing system. Licence holders can do this by contacting the AFMA Licensing team on 02 6225 5555 or licensing@afma.gov.au.

### What is a Harvest Strategy?

The Harvest Strategy for the TRL Fishery was adopted by the PZJA at their meeting held on 19 November 2019, and will be used to determine the global TAC for the 2019-20 and future fishing seasons.

The Harvest Strategy sets out the objectives for the TRL Fishery, how the Fishery is to be monitored, what data should be collected, and rules for determining a recommended biological catch (RBC) and the global TAC each fishing season. Having a harvest strategy in place provides transparency for stakeholders (fishers, traditional owners, communities, scientists and managers) about how the Fishery will be managed into the future.

More information on harvest strategies for Torres Strait fisheries, including the TRL Fishery, can be found on the PZJA website at www.pzja.gov.au.

**What is a TAC and how is it set?**

The figure below provides an explanation of how the TAC for the TRL Fishery is set prior to the start of each fishing season and increased to the final amount.

**TRL Fishery survey conducted by CSIRO (in November)**

*The survey estimates the total number of tropical rock lobster (TRL or kaiar) in the water*

⇩

**Australian TRL Fishery opens on 1 December under a 200,000 kg Australian TAC**

*A TAC (total allowable catch) of 200,000 kilograms is set for the Australian TRL Fishery, in the interim, until catch sharing arrangements for the season can be agreed between Australia and PNG*

⇩

**TRL Resource Assessment Group (TRLRAG) provides advice on a RBC**

*A RBC (recommended biological catch) is the total amount of kaiar that can be sustainably taken out of the water, in the area of the Torres Strait Protected Zone, by all fishers (commercial, traditional, recreational) each season, while leaving enough in the water to breed for future seasons*

⇩

**TRL Working Group provides advice on a global TAC**

*A global TAC is the total amount of kaiar that can be sustainably taken out of the water, in the area of the Torres Strait Protected Zone, by both Australian and PNG commercial fishers each season*

⇩

**Global TAC endorsed by the Protected Zone Joint Authority (PZJA)**

⇩

**Australia and PNG agree on the global TAC and how it is to be shared, including cross-endorsement**

*Global TAC to be shared between Australia and PNG as per the terms of the Torres Strait Treaty*

⇩

**Australian TAC is increased**

*The TAC for the Australian TRL Fishery is increased from the initial amount to the final amount, which is equal to Australia's share of the global TAC as agreed between Australia and PNG*

**How does quota work?**

On 16 September 2019, 999,997 quota units were granted under the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Management Plan):

- 662,016 quota units (or 66.20%) were allocated to the TSRA comprising:
  - 562,000 to hold for the benefit of the TIB sector; and
  - 100,016 for the TVH licences it holds.
- 337,981 quota units (or 33.79%) were allocated to the remaining TVH principal licence holders.

The total number of quota units is fixed and will not change from fishing season to fishing season. However the amount of catch that may be taken against each quota unit will change as the TAC changes each fishing season.

Once a TAC is determined, the amount that each quota is worth will be calculated. This is done by dividing the TAC (in kilograms) by the total number of quota units (999,997). The result of this calculation is the weight value in kilograms of unprocessed TRL that can be taken for each quota unit held.

For example, if the TAC was 500,000 kilograms, then:

*Quota unit value* *= TAC ÷ total number of quota units*

*= 500,000 kilograms ÷ 999,997*

***= 0.500 kilograms***

There are enough quota units to allow the trading of either small or large amounts of quota. The table provided in the covering letter shows the TAC for the 2019-20 fishing season, the value of each quota unit and available catch for each sector.

A Guide to the Management Plan, as well as links to information about quota management systems, can be found on the PZJA website at www.pzja.gov.au.

**How do Australia and PNG share TRL?**

The *Torres Strait Treaty* recognises the rights of both Australia and PNG to commercial fisheries in the area of the Torres Strait Protected Zone (TSPZ). The TSPZ is an area in the Torres Strait that includes both Australian and PNG waters. These rights include the right of Australia and PNG to fish in the waters of the other country. This practice is known as cross-endorsement and involves both countries nominating an agreed number of commercial fishing boats to fish an agreed share of the TAC. This share is usually 25% of the other country's TAC apportionment, unless otherwise agreed.

With regards to the commercial catch of TRL, each year Australia and PNG:

- Agree on the global TAC and how it is to be apportioned between Australian and PNG waters.
    - Generally, it is agreed that 85% of the global TAC is to be taken in Australian waters and 15% of the global TAC is to be taken in PNG waters. This is based on the agreed distribution of TRL in the area of the TSPZ.

For example, if the global TAC was 500,000 kilograms, then:

| | |
|---|---|
| *Australia's apportionment of the global TAC* | *= 85% of the global TAC* |
| | *= 85% of 500,000 kilograms* |
| | *= 0.85 x 500,000 kilograms* |
| | ***= 425,000 kilograms*** |
| *PNG's apportionment of the global TAC* | *= 15% of the global TAC* |
| | *= 15% of 500,000 kilograms* |

*= 0.15 x 500,000 kilograms*

***= 75,000 kilograms***

- Agree on cross-endorsement allocations and preferential entitlement.
    - Under Article 23(4), each country is entitled to fish for 25% of the other country's TAC apportionment in the waters of the other country, unless otherwise agreed.
    - Under Article 25 of the Treaty, where Australia and/or PNG does not itself propose to take all the TAC to which it is entitled, either in its own area of waters or that of the other country, the other country will have preferential entitlement to that share. This must be agreed between Australia and PNG.

For example, if the global TAC was 500,000 kilograms, then:

| | |
|---|---|
| *Australia's cross-endorsement allocation in PNG waters* | *= 25% of PNG's 15% share of the global TAC*<br>*= 25% of 75,000 kilograms*<br>*= 0.25 x 75,000 kilograms*<br>***= 18,750 kilograms*** |
| *PNG's cross-endorsement allocation in Australian waters* | *= 25% of Australia's 85% share of the global TAC*<br>*= 25% of 425,000 kilograms*<br>*= 0.25 x 425,000 kilograms*<br>***= 106,250 kilograms*** |

At their meeting held on 19 November 2019, the PZJA agreed that, subject to further consultation with stakeholders, the preferred arrangement for utilising Australia's cross-endorsement allocation within PNG's waters is to not seek cross-endorsement but rather pursue a preferential entitlement arrangement under Article 25 of the Treaty. In effect this means, Australia will seek to take a proportion of PNG's cross-endorsement allocation within Australian waters equivalent to Australia's cross-endorsement allocation in PNG's waters. Conversely, PNG would be entitled to take Australia's cross-endorsement catch allocation in PNG's waters. Under such an arrangement, Australia's cross-endorsement allocation would be shared across all Australian licence holders in both sectors of the TRL Fishery.

Initial advice regarding the future utilisation of Australia's cross-endorsement allocation within PNG's waters will be sought from the PZJA TRL Working Group meeting to be held on 12 December 2019. Broader consultation with stakeholders, including licence holders, with be undertaken over the coming fishing seasons.

Australian Government | TSRA www.tsra.gov.au | Australian Government Department of Agriculture | Australian Government Australian Fisheries Management Authority | Queensland Government | TORRES STRAIT PZJA PROTECTED ZONE JOINT AUTHORITY

## Torres Strait Tropical Rock Lobster Fishery Moon-Tide Hookah Closures for the 2019-20 Fishing Season* (13 November 2019)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dec-19** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | ○ 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | ● | 27 | 28 | 29 | 30 | 31 |
| **Jan-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | ○ 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | ● | 26 | 27 | 28 | 29 | 30 | 31 |
| **Feb-20** | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | ○ 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | ● | 25 | 26 | 27 | 28 | 29 | | |
| **Mar-20** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | ○ 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | ● | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Apr-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | ○ 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | ● | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| **May-20** | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
| | 1 | 2 | 3 | 4 | 5 | 6 | ○ 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | ● | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Jun-20** | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | |
| | 1 | 2 | 3 | 4 | 5 | ○ 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | ● | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| **Jul-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
| | 1 | 2 | 3 | 4 | ○ 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | ● | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Aug-20** | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon |
| | 1 | 2 | 3 | ○ 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | ● | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Sep-20** | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | |
| | 1 | ○ 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | ● | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | |
| **Oct-20** | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
| | 1 | ○ 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | ● | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Nov-20** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | |
| | ○ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ● | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | ○ 30 | |

* The 2019-20 fishing season runs from 1 December 2019 through to 30 September 2020.

**KEY**

- ● New Moon
- ○ Full Moon
- Fishery closure (commercial fishing not permitted)
- Hookah closure (use of hookah gear not permitted)
- Moon-tide hookah closure (use of hookah gear not permitted)

Attachment 2.3b

Australian Government
Australian Fisheries Management Authority

REF:DOC19/25972

15 October 2019

Dear TRL Fishery Licence Holder

**Torres Strait Tropical Rock Lobster Fishery Management Plan**

I am writing to inform you that, on 16 September 2019, Senator the Hon Jonathon Duniam, Assistant Minister for Forestry and Fisheries, allocated quota units in the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) in accordance with the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Plan). In making this decision, Assistant Minister Duniam has allocated:

- 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.

Further details on quota unit holdings can be found in the Torres Strait Public Licence Register on the PZJA website at www.pzja.gov.au

From 1 December 2019, the start of the next fishing season, the TRL Fishery will operate under a quota management system. In addition to prescribing the quota allocation process, the Plan allows for the Commonwealth Minister to determine a total allowable catch (TAC) before the start of each fishing season (and increase the TAC subject to catch sharing arrangements with PNG) and for quota units to be traded, either for a single fishing season or permanently. The Plan also provides a formula for calculating the kilogram value of a quota unit.

A copy of the Plan and the Guide to the Plan, as well as links to information about quota management systems, can be found on the PZJA website at www.pzja.gov.au

AFMA will write to all TRL Fishery licence holders before the start of the next fishing season to provide more information concerning the TAC and moon-tide hookah closures.

If you have any questions regarding the Plan, or matters relating to the TRL Fishery, please contact the AFMA Thursday Island office on 07 4069 1990 or FisheriesTI@afma.gov.au. If you would like to be informed of future management arrangements by email or SMS, please contact the AFMA Thursday Island office to update your contact details.

Yours sincerely

Selina Stoute
Manager, Torres Strait Fisheries

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P 02 6225 5555
F 02 6225 5500

**Darwin**
PO Box 131
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F 08 8942 2897

**Thursday Island**
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Thursday Island QLD 4875
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# PROTECTED ZONE JOINT AUTHORITY

# FISHERIES MANAGEMENT PAPER No. 2

# (PZJA FMP No.2)

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# GUIDELINES FOR THE FORMATION OF ALLOCATION ADVISORY PANELS FOR THE ALLOCATION OF FISHING CONCESSIONS IN TORRES STRAIT PROTECTED ZONE JOINT AUTHORITY FISHERIES WHERE FISHERIES MANAGEMENT ARRANGEMENTS CHANGE SIGNIFICANTLY

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**April 2006**

Prepared by the Australian Fisheries Management Authority
on behalf of the Protected Zone Joint Authority

# Contents

# 1. Purpose

This Draft Fisheries Management Paper sets out the Torres Strait Protected Zone Joint Authority (PZJA) policy and a procedural framework for the allocation of fishing concessions where a decision has been taken to significantly change the basis of management arrangements in existing fisheries.

For example, when a move is made from:

1. a non transferable input control system to a transferable unitised input control system; or
2. an input control system to an output control system (individual transferable quota).

This draft paper does not apply to development of fisheries management arrangements for new fisheries. Separate arrangements will be utilised in that instance.

# 2. Introduction

The PZJA is responsible for monitoring the condition of designated fisheries within the Torres Strait Protected Zone (TSPZ) and for the formulation of policies and plans for their management. The PZJA has regard to the rights and obligations conferred on Australia by the Torres Strait Treaty, in particular the protection of the traditional way of life and livelihood of the traditional inhabitants, including their traditional fishing.

The PZJA is established under the Torres Strait Fisheries Act 1984 (the Act).

The purpose of this draft paper is to provide policy guidance and procedural frameworks for the allocation of fishing concessions where fishery management arrangements are proposed to be changed.

# 3 The PZJA's approach

### 3.1 The legislative objectives

The objectives to be pursued in the administration of the Act include:

1. To have regard to the rights and obligations conferred on Australia by the Torres Strait Treaty and in particular pay regard to the traditional way of life and livelihood of traditional inhabitants, including their rights in relation to traditional fishing.

Other objectives to be pursued by the PZJA are implied under the Act and by other commonwealth Acts and international treaties to which Australia is a signatory and include but are not limited to the following:

2. Keeping constantly under consideration the condition of the fishery;
3. Formulating policies and plans for the good management of the fishery; and
4. For the purposes of the management of the fishery:
    a. Exercising the powers conferred it under Part V of the Act
    b. Co-operating and consulting with other authorities (including Joint Authorities established under the *Fisheries Act* 1952 or the *Fisheries Management Act* 1991) in matters of common concern.

### 3.2 The Torres Strait Treaty objectives

The common objectives of the Torres Strait Treaty with regards to commercial fisheries are as follows:

1. The commercial utilisation of fisheries in the TSPZ are not to prejudice achievements outlined in the Treaty with regard to traditional fishing.
2. Treaty Parties shall cooperate in the conservation, management and optimum utilisation of Protected Zone commercial fisheries.
3. Treaty Parties shall, where appropriate, negotiate subsidiary conservation and management arrangements in respect of any individual Protected Zone commercial fishery.
4. Treaty Parties shall share the allowable catch of the Protected Zone commercial fisheries in accordance with provisions outlined in Article 23, 24 and 25 in the Treaty.

### 3.3 The objectives established by PZJA specialist working group

In February 2005, a specialist group consisting of senior officials from PZJA Agencies was formed, to determine options for resolving the issue of resource allocation in the TRL and Finfish Fisheries. The group recognised four principle stakeholder groups as having legitimate access to fisheries resources in Australia's jurisdiction of the TSPZ.

- Traditional fishers of the Torres Strait and PNG;
- Papua New Guinea commercial fishers;
- Traditional Inhabitant commercial (community) fishers; and
- Non-Traditional Inhabitant commercial fishers.

A set of principles were adopted by the specialist group to account for the intentions of the Treaty and the Act. The principles establish a hierarchy for assessing the relative merits of resource allocation options. The principles in order of importance are:

1. Protection of the fishery resource;
2. Protection of the traditional way of life and livelihood of Traditional Inhabitants;
3. Enhancing economic and employment opportunities for Traditional Inhabitants; and
4. Enhancing economic and employment opportunities for non-Traditional Inhabitants, and in a more general sense enhancing economic and employment opportunities within the Torres Strait region.

### 3.4 Changes to fisheries management arrangements

The PZJA may deem it necessary to implement new management arrangements for PZJA Fisheries for the effective pursuit of objectives outlined in the Torres Strait Treaty and relevant legislation. Management changes are also driven by external processes, such as the mandatory accreditation of all fisheries under the *Environment Protection and Biodiversity Conservation Act 1999.* Changes may include movement in the level of input controls, including sustainability reductions made over a given time frame. Similarly, the PZJA may determine it to be necessary to move to either unitised input controls or output controls (quota management systems).

## 4. Allocation of fishing concessions

The fishing concessions that exist in a fishery at the time that management arrangements are proposed to change, are the only concessions that will be taken into account under any allocation that may be required by the move from one management regime to another.

It should be recognised that, in pursuing the Torres Strait Treaty and legislative objectives relevant to the PZJA, there will be instances where it is not possible to design an allocation formula that will have absolutely no impact on the relative economic position of individual operators.

From a legal, ethical and fisheries management perspective, the PZJA will explicitly endeavour to minimise any adverse differential economic impacts on individual operators. A body of legal case history in relation to allocation of fishing concessions has been established both in Australia and overseas which demonstrates that allocations of fishing concession resulting in a significant and differential economic impact on individual operators (which cannot be balanced against fisheries management objectives) not in the best interest of any of the parties nor the fishery and are clearly challengeable.

Therefore, the PZJA's approach to allocation of fishing concessions is based on the premise that, in making any management changes, the PZJA will ensure that:

1. such changes are consistent with and support the pursuit of the Torres Strait Treaty and legislative objectives relevant to the PZJA; and
2. any differential economic impacts of allocations on individual fishing concession holders are minimised unless there are reasons, justifiable with respect to the Torres Strait Treaty and legislative objectives relevant to the PZJA, that dictate otherwise.

### 4.1 Appeals Against Allocation

The AAP will provide advice to the PZJA for decision. The PZJA will consider the advice supplied by the AAP in making decision's relevant to allocation of fishing concessions.

Affected persons wishing to appeal decisions made by the PZJA should do so under a Administrative Decisions Judicial Review (ADJR) as established under the Administrative Decisions (Judicial Review) Act 1977.

#### 4.1.1 Statutory Management Plans

If decisions are made through Statutory Management Plans, then under section 15A(13) of the Torres Strait Fisheries Act 1984 and the Administrative Appeals Tribunal Act 1975, affected persons may appeal such decisions through the Administrative Appeals Tribunal (AAT).

## 5 Independent Allocation Advisory Panel

Experience provided by the Australian Fisheries Management Authority (AFMA) suggests that operators will have greater confidence in allocation outcomes where they result from an independent assessment of the fishery and individual circumstances. A central principle in the development of a fair and credible allocation system is that it has been based on an independent assessment. In order to achieve this, the recommended basis of allocation will be developed at arms length from PZJA Agencies and the PZJA.

In relation to PZJA fisheries, an independent Allocation Advisory Panel (AAP) will be established to provide advice to the PZJA on the catch ratio between commercial sectors within a defined fishery, or between defined fisheries (intersectoral allocation); and/or the most appropriate allocation system within a defined fishery, or between defined fisheries (intersectoral allocation); and/or in any other appropriate circumstances.

The AAP would be established under s40(7) of the Act which provides scope for the PZJA to establish advisory committees, consisting of such persons as it thinks fit, to provide information and advice to the PZJA. The AAP is advisory in nature, in much the same manner as the Torres Strait Fisheries Management Advisory Committee (TSFMAC) and relevant Fisheries Working Group's (FWG's). Any decisions in relation to allocation are made by the PZJA in accordance with its responsibilities under the Act. To facilitate this process, the Australian Government Department of Agriculture Fisheries and Forestry (DAFF) will provide administrative support to the AAP. PZJA Agencies will provide information and briefing material to the AAP as requested/required by the AAP.

### 5.1 Membership

An AAP will comprise from one to three members. The actual number of members will be determined by the PZJA on a case-by-case basis depending on the issues to be addressed, consideration of the breadth of expertise which is both being sought and is available, and the cost-effectiveness of the process. Members will be engaged under s40(7) of the Act.

PZJA Agencies will seek nominations for membership of the AAP from appropriately qualified persons. Nominations will be considered by the PZJA when they determine membership of an AAP.

A member or members may be a retired judge, or other qualified member of the legal profession with experience in administrative law, and/or an economist and/or an independent member of the fishing industry who is not associated with the fishery in relation to which the allocation process is being undertaken, and/or a fisheries scientist. Where it is determined that a panel should comprise two or more persons one of those persons will be a Presiding Member. Unless otherwise specified by the PZJA, the Presiding Member will be a retired judge or other qualified member of the legal profession.

Some of the information so provided to AAP members will be provided as “commercial in confidence” and members of the AAP must consent to follow accepted rules of confidentiality.

#### 5.1.1 Traditional Inhabitant representation (observer)

As requested by the TSRA, the PZJA will consider the addition of one extra member to an AAP to act as an observer on behalf of the Torres Strait Traditional Inhabitants. In such case, the Traditional Inhabitant observer will act as an advisor to AAP members on relevant indigenous issues, but will not share in the production of recommendations for the PZJA.

The Traditional Inhabitant observer will be bound by the same confidentiality agreements that apply to other AAP members.

### 5.2 Terms of reference

Specific terms of reference will be established for each AAP formed by the PZJA. In general an AAP will advise the PZJA on:

1. The most appropriate basis for allocation of fishing concessions in a fishery or between fisheries (intersectoral allocation), in accordance with this Draft Fisheries Management Paper; and is
2. To identify and include in that allocation system any exceptional circumstance which the AAP considers should be taken into account.

In undertaking these tasks, the AAP will be required to:

1. Consult with relevant parties and any person/s or organisations with appropriate knowledge or experience;
2. Identify the data necessary to support the allocation system determined in terms of reference 1 and 2 and the most cost effective and appropriate methods of collection and verification of that data;
3. Explain and justify the recommended allocation system to the PZJA stakeholders;
4. Provide advice to PZJA agency officers appearing as witnesses before tribunals or courts in any challenge to the recommended allocation system if implemented;
5. Maintain full records of all activities undertaken by the panel; and
6. Ensure all information provided to the panel is publicly available.

### 5.3 Brief

To enable the AAP to consider allocation in or across a particular fishery/s, PZJA Agencies will provide the AAP with a brief which includes, but is not limited to:

1. this Fisheries Management Paper
2. any other policy papers relevant to the allocation being considered;
3. factual details of the fishery/s;
4. factual details of existing/historical management arrangements in the fishery/s;
5. factual details of existing fishing concessions; and
6. factual details of any past commitments made (whether by press release, correspondence or other written communication).

### 5.4 AAP Process

#### 5.4.1 Consultation

A key component of determining the most appropriate allocation system in a particular fishery or fisheries are the consultative processes which are undertaken with operators, Traditional Inhabitants, and others with an interest in the fishery/s. Whilst the level and actual process of consultation may vary according to the fishery or specific circumstances, as a general rule the AAP will consult widely with relevant parties and any person/s or organisations with appropriate knowledge, experience or expertise as appropriate.

Where necessary, the AAP may obtain advice or input from relevant legal, economic or statistical experts, provided the costs are available in the AAP budget or have been agreed to by the PZJA.

#### 5.4.2 Reporting requirements

The PZJA will establish an agreed timeframe by which the AAP is to have identified an appropriate allocation system for the fishery for which a change in management arrangements is proposed. The AAP will provide draft, and subsequently final, advice to the PZJA on a preferred allocation system in accordance with that agreed timetable.

The PZJA will consider the draft advice (and provide any comments to the AAP on that advice) within an agreed timeframe of receiving the draft.

#### 5.4.3 Administrative support

DAFF will provide administrative support to the AAP as necessary. If requested, PZJA Agencies will provide assistance to the AAP in generating alternative allocation outcomes.

#### 5.4.3 Funding

In deciding to form an AAP for a specific purpose, the PZJA will also consider the level of funding required for the AAP to meet its Terms of Reference. The PZJA will provide the agreed budget to the Presiding Member when the AAP is formed. Due to cost sharing issues, any variances to the AAP budget will require PZJA consideration.

**Attachment 2.3d**

**Expected timeline for finalising a total allowable catch (TAC) for the Australian Torres Strait Tropical Rock Lobster Fishery (TRL Fishery)**

**Key:**

Scientific assessment and advice
PNG-Australia agreement
Administrative step for Australia

| Steps | Description | Indicative timeline |
|---|---|---|
| Agree timeline and process | AFMA CEO and PNG NFA Director General to meet to agree on process for agreement on catch sharing arrangements for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) for the coming fishing season. | 10 October 2019 |
| PNG and Australian catch and effort data compiled | Australian and PNG catch and effort data are compiled[1]. | By 31 October 2019 |
| Pre-season scientific survey | Survey data are collected and used to update TRL survey abundance indices used to calculate a recommended biological catch (RBC)[2]. Survey must be conducted in November to provide comparable results overtime and the most accurate estimate of annual lobster recruitment into the fishery. | 10-23 November 2019 |
| Australian start of season TAC determined | Minister to determine a 200 tonnes start of season[3] TAC for the Australian TRL Fishery for the 2019-20 fishing season, as per section 13 of the *Torres Strait Fisheries (Quotas for Tropical Rock LOobster (Kaiar)) Management Plan 2018* (the Plan)[4]. Start of season TAC based on advice received from TRLRAG and TRLWG in October-November 2018. TAC to apply to Australian TRL Fishery only. | 19 November 2019 |

[1] These data are provided to CSIRO to update catch per unit effort indices used to calculate a recommended biological catch for the coming fishing season.
[2] A RBC is the total amount of TRL that can be sustainably taken out of the water by all fishers (commercial, traditional, recreational) each season, while leaving enough in the water to breed.
[3] The Australian TRL Fishery fishing season runs from 1 December each year to 30 September the following year.
[4] The Plan is accessible online at https://www.legislation.gov.au/Details/F2018L01645

| | | |
|---|---|---|
| RBC calculation | CSIRO to use empirical Harvest Control Rule (eHCR) to calculate a RBC.<br>Every three years (starting in 2019), CSIRO to update and run the stock assessment model to evaluate the performance of the eHCR. Preliminary stock assessment results are usually available within 4-5 weeks of the pre-season scientific survey. | Late November through to early December 2019 |
| TRL Resource Assessment Group (TRLRAG) and TRL Working Group (TRLWG) advice[5] | TRLRAG to review the survey results, CPUE analyses and application of the eHCR. Advice provided on a final RBC.<br>TRLWG to review TRLRAG advice. Advice provided on a final global TAC[6].<br>Every three years (starting in 2019), TRLRAG and TRLWG to consider preliminary results of stock assessment. Advice provided on finalising the assessment. | 10-12 December 2019 |
| PZJA agreement to final global TAC | PZJA to review TRLRAG and TRLWG advice and agree to final global TAC. | January 2020 (date of PZJA meeting to be confirmed) |
| Agree final global TAC, shares of the TAC, cross-endorsement apportionments and any preferential entitlements | AFMA CEO and PNG NFA Director General to meet to agree, as per the terms of the Torres Strait Treaty, on:<br>- a final global TAC as per article 23(2);<br>- shares of the final global TAC as per article 22(1) (e.g. 15%:85% split);<br>- cross-endorsement apportionments as per articles 23(4) and 25;<br>- preferential entitlement to any unfished cross-endorsement apportionments as per article 25.<br>An exchange of letters is required to formalise the agreement. | By 31 January 2020 |
| Australian final TAC determined | Minister to determine a final TAC for the Australian TRL Fishery for the 2019-20 fishing season, as per section 14 of the Plan. TAC to apply to Australian TRL Fishery only. | By 29 February 2020 |

[5] Officers from PNG NFA are invited to attend all PZJA advisory forums.
[6] A global TAC is the total amount of TRL that can be sustainably taken out of the water by both Australian and PNG commercial fishers each season.

| | | |
|---|---|---|
| TRLRAG advice | Every three years (starting in 2019), TRLRAG to review the final stock assessment results. Advice provided on the need to review the eHCR and conduct a stock assessment in subsequent years, as per Harvest Strategy rules. | February/March 2020 (date of TRLRAG meeting to be confirmed) |
| If relevant, submit any formal requests for cross-endorsement | PNG and/or Australia to provide formal request to the other Party seeking cross-endorsement pursuant to article 26 of the Torres Strait Treaty. Request to include:<br>- a copy of the licence/s for which a Treaty endorsement is sought[7];<br>- a copy of any licence conditions in force for the licence/s;<br>- boat particulars;<br>- details for payment of applicable fees.<br>It will take approximately 6 weeks for Australia to complete the domestic processes to issue a Treaty endorsement/s[8]. | By 31 March 2020 |

[7] For PNG licence/s, each licence needs to be current at the time of the formal request, valid for the period for which a Treaty endorsement is sought and have the same details as that written in the formal request, and valid in PNG for the same fishery as it is proposed to operate in Australian waters.
[8] Australia's domestic process include requirements to undertake native title notification pursuant to sub-sections 24HA(2) and (7) of the Commonwealth *Native Title Act 1993*, which takes a minimum of 1 month, and to seek approvals to issue a Treaty endorsement/s.

**Attachment 2.3e**

**Proposed amendments to the *Torres Strait Fisheries Act 1984* and *Torres Strait Fisheries Regulations 1985***

| Amendment | Status as at 25 November 2019 |
|---|---|
| **Proposed amendments to the *Torres Strait Fisheries Act 1984* (the Act)** | |
| Capacity to require catch reporting across all licence holders | Policy approval granted by PZJA, further policy approval to be sought before drafting can commence. |
| Capacity to provide electronic licensing and monitoring to licence holders | |
| Capacity to delegate the powers to grant and vary scientific and development permits | |
| Capacity to simplify the renewal of fishing licences | |
| Capacity to delegate powers to contracted service providers | |
| Provide for the grant of a licence without specifying a boat in the licence* | |
| Provide for a class of licence that authorises the taking of fish as well as the processing and carrying of fish taken with the use of another boat* | |
| Impose logbook requirements via the determination of a legislative instrument, exercisable by a delegate of the PZJA* | |
| **Proposed amendments to the *Torres Strait Fisheries Regulations 1985* (the Regulations)** | |
| Provide simplified legislative authority for the collection* and disclosure of information, to be exercised by a person exercising powers or performing functions under the Act | Drafting has commenced, further drafting required. |
| Implementation of Fisheries Infringement Notices | |
| Allow licences (fish receivers, carrier and processing, fishing without boat) to be granted for up to five years duration* | |
| Update provisions concerning the detention of illegal foreign fishers to be brought in line with analogous provisions of the *Migration Regulations 1994** | |
| Prescribe a condition that all licence holders must comply with any relevant plan of management* | |

*Additional proposed amendment approved by the PZJA at its meeting on 8 October 2019.

Australian Government
Australian Fisheries Management Authority



# *Coordination Arrangements of Australian Government Entities Operating in Torres Strait*

Published 29 May 2019

Australian National Audit Office
Auditor-General Report No. 41 2018-19
Performance Audit

https://www.anao.gov.au/work/performance-audit/coordination-arrangements-australian-government-entities-operating-torres-strait

# Summary of ANAO outcomes for AFMA

## Background

In 2018, the Australian National Audit Office (ANAO) conducted a performance audit on the coordination arrangements of Australian Government Entities Operating in the Torres Strait. The audit examined whether Australian Government agencies operating in the Torres Strait have appropriate governance arrangements to support the coordination of their activities, and that the coordination arrangements are effective in supporting Australian Government activities in the Torres Strait.

The audit examined the coordination arrangements of five Australian Government entities operating in the Torres Strait including the Torres Strait Regional Authority (TSRA), the Department of Foreign Affairs and Trade (DFAT), the Department of Agriculture and Water Resources (DAWR), the Department of Home Affairs, represented by the Australian Border Force (ABF) and the Australian Fisheries Management Authority (AFMA). This document provides a brief summary of key ANAO outcomes relevant for AFMA.

## Rationale for undertaking the audit

Australia recognises the Torres Strait region as a sensitive and important zone because:

- the scattered islands represent stepping stones between PNG and Australia and is often referred to as 'the closest thing Australia has to a land border'. The close distance of PNG has immigration, customs and biosecurity implications;
- the region supports critical fisheries habitats and ecosystem resources; and
- the region is an international shipping route with difficult waters.

In 2010, a Senate Inquiry into Torres Strait by the Foreign Affairs, Defence and Trade Reference Committee documented key issues associated with health, biosecurity, law and order and border protection, relating primarily to the shared border with PNG and the operation of the Treaty. The committee's report stressed the importance of achieving effective whole-of-government cooperation and coordination between government entities.

## Overall Audit Conclusions

1. The report concludes that the coordination arrangements of key Australian Government entities operating in Torres Strait are largely effective in supporting Australian Government activities.
2. The business rules are effective for the implementation of biosecurity and fisheries legislation, and support the application of the Treaty provisions and the coordination of activities in Torres Strait. The business rules are not fully effective for the implementation of immigration and customs legislation in

the context of the Treaty. This impacts on the capacity of entities to coordinate their activities and to develop a shared understanding of immigration and customs rules applicable in the region.

3. The governance structures and joint activities are largely effective to support cross-entity coordination. However, key policy decisions made by the Torres Strait Joint Advisory Council (JAC) are not adequately documented, and the risks associated with the impacts of a changing strategic and operational environment on the Treaty operation have not been analysed. The Protected Zone Joint Authority (PZJA) annual reports and website are not up-to-date.
4. The key systems and assets support the coordination of Australian Government entities' operations in Torres Strait. An important project to improve telecommunications in Torres Strait is progressing.

## AFMA Specific Conclusions

### *Business Rules*

The business rules, combined with the legislation, applying to fisheries in Torres Strait are comprehensive and fit-for-purpose, but some key governance documents are not up-to-date.

### *Governance Structures and Joint Activities*

Through the PZJA, the consultative framework is largely effective to support and coordinate the decision making process of the range of entities involved in Torres Strait fisheries. Some of the actions agreed following the 2009 review of the PZJA's administrative arrangements are still to be completed, and the PZJA's annual reports and website are not up-to-date.

### *System and assets*

No specific comments relating to the management of fisheries in the Torres Strait.

## Recommendations for AFMA

The audit recommends the Australian Fisheries Management Authority work with the Protected Zone Joint Authority's other member entities, the Torres Strait Regional Authority and Queensland Department of Agriculture and Fisheries, to:

a) finalise the Protected Zone Joint Authority annual reports for the 2015–16, 2016–17 and 2017–18 financial years and implement a process to ensure that future annual reports are published in a timely manner; and

b) keep the Authority's website up-to-date.

Additionally, the audit recommended that DFAT establish and maintain a central register of policy decisions made by the Torres Strait Joint Advisory Council (JAC) and ensure that the register is accessible to stakeholders, including Australian Government entities, operating in Torres Strait.

As a member of the JAC, the AFMA Executive has agreed to the publication of JAC outcomes on the DFAT website.

## Summary audit response from AFMA

On 11 April 2019, the AFMA CEO provided the following response to the Auditor-General for Australia:

*AFMA has extensive responsibilities in managing Commonwealth fisheries resources in the Torres Strait and works to deliver on these in cooperation with a number of Commonwealth and other agencies.*

*AFMA has considered the proposed audit report and accepts that timely finalisation of Protected Zone Joint Authority annual reports and regular updating of the Authority's website will enable stakeholders to be better informed about fisheries management issues and actions. Together with other PZJA member agencies, AFMA will also continue to work towards further integration and coordination of fisheries in the Torres Strait.*

## Audit Findings relevant for AFMA

**Table 1. Summary of audit findings under each area examined relevant for AFMA.**

| Area Examined | Summary Conclusion | Audit Findings |
|---|---|---|
| Business Rules | The business rules, combined with the legislation, applying to fisheries in Torres Strait are comprehensive and fit-for-purpose, but some key governance documents are not up-to-date. | While a range of business rules exist, some of them were developed a number of years ago (in one instance, 2004), and it is difficult to establish whether the documents are up-to-date, due to the absence of a version history and date of next review. For example, a number of changes to the consultative structure of the PZJA have occurred since *Fisheries Management Paper No. 1*, which plays a key role in the administration of the Torres Strait fisheries, was endorsed in 2008. The Standing Committee, which has been presiding over and providing recommendations to the PZJA since 2010, is not included in prescribed arrangements set out in *Fisheries Management Paper No 1*. A revised Paper was developed by AFMA in 2015, but was not endorsed by the PZJA.<br>**AFMA should review its guidance documents to verify that they are up-to-date, and include the document version history and date of next review.**<br>The large body of documents that supports the regulation of fisheries, in particular fisheries management instruments and notices, also guides the work of entities involved in Torres Strait fisheries, including fishers. Over the years, a large number of these documents have been issued, with, in most cases, the most recent revoking a previous one. The PZJA website includes a list of the notices and instruments, however the list available as at March 2019 had not been updated since October 2013, and included legislative instruments that are no longer current.<br>For example, *Fisheries Management Instrument No. 15* dated March 2017 revokes *Fisheries Management Notice No. 64* dated December 2002 and prohibits the taking, processing or carrying of sea cucumber in the area of the Torres Strait Sea Cucumber Fishery. However *Fisheries Management Notice No. 64* is still accessible from the PZJA website and marked as 'current'.<br>**AFMA, as the Commonwealth entity responsible for the day-to-day administration of the PZJA, should ensure that the list of the current fisheries management notices and instruments effective in Torres Strait on the PZJA website is up-to-date.** Up-to-date information would assist stakeholders, such as fishers and communities, to operate more effectively in Torres Strait. |
| Governance Structures and Joint Activities | Through the PZJA, the consultative framework is largely effective to support and coordinate the decision | In 2008 the PZJA participating entities commissioned a review of the PZJA administrative arrangements. The *Review of Torres Strait Protected Zone Joint Authority Fisheries Administration Arrangements* was completed in 2009 and concluded that the PZJA was unnecessarily process driven, |

| Area Examined | Summary Conclusion | Audit Findings |
|---|---|---|
| | making process of the range of entities involved in Torres Strait fisheries. Some of the actions agreed following the 2009 review of the PZJA's administrative arrangements are still to be completed, and the PZJA's annual reports and website are not up-to-date. | with an insufficient focus on achieving outcomes. The review made 17 recommendations, from which the PZJA developed seven actions to be implemented (see appendix A).<br>The 2009 review noted that achieving 'an integrated and coordinated approach to the management of fisheries in Torres Strait is quite a challenge'. While the majority of actions have been completed, several items were still in progress as at March 2019:<br>• The TSRA to be responsible for managing the sustainable take of turtle and dugong by traditional inhabitants (Action 1a): AFMA advised that this action was in progress, and legislative change, subject to cross-jurisdictional agreement, was required.<br>• AFMA to be delegated with day-to-day operational decisions consistent with the *Torres Strait Fisheries Act 1984* (Action 3b): while delegations to the AFMA CEO are in place, AFMA advised it has chosen not to exercise these delegations in all instances, to ensure decisions are supported by the PZJA. For example, the setting of total allowable catch limits under licence conditions is still approved by the PZJA.<br>• Terms of reference were drafted in 2015 but not endorsed as at March 2019 (Action 4). As documented at paragraph 2.38, the PZJA Standing Committee is not included in prescribed arrangements set out in *Fisheries Management Paper No 1*. AFMA advised it will continue to seek Standing Committee agreement to Terms of Reference during 2019.<br>• Action 5, which aimed at achieving improved administrative processes and communication between PZJA committees and working groups, is still in progress. While meetings (face to face or via teleconference) are conducted regularly, improvements are still needed to the PZJA decision-making process and to provide longer lead times for consideration of meeting documents.<br>• AFMA to progress legislative amendments to the Torres Strait Fisheries Act that further streamline management arrangements (Action 7): AFMA advised that a suite of legislative amendments had been agreed by the PZJA in May 2017 but had yet to be approved by the Minister for Agriculture and Water Resources before introduction to Parliament. Given this parliamentary delay, AFMA advised that the Standing Committee had developed a further tranche of proposed legislative amendments for consideration by the PZJA soon after the Federal election in 2019.<br><br>**Timely publication of the PZJA annual reports and updating of the PZJA website**<br>Under the Torres Strait Fisheries Act, the PZJA is required to present an annual report to the |

| Area Examined | Summary Conclusion | Audit Findings |
|---|---|---|
| | | Australian Parliament as soon as practicable after 30 June each year. The annual report must document the activities of the PZJA and on the condition of the fisheries.<br>In 2014 and 2015, the Senate Rural and Regional Affairs and Transport Legislation Committee noted the time taken between the end of the financial year and the date that the PZJA provided its report to Parliament. On both occasions the Committee encouraged the PZJA to provide reports in a more timely fashion. |
| Systems and assets | No AFMA specific comments | |

## Appendix A

**Table 2. Agreed actions by the PZJA following the 2009 review.**

| Action | Description |
|---|---|
| 1. One management agency | a) The TSRA to be responsible for managing the sustainable take of turtle and dugong by traditional inhabitants.<br>b) One agency responsible for the day-to-day administration of Torres Strait commercial fisheries. AFMA to undertake this role in consultation with PZJA agencies.<br>c) AFMA and Fisheries Queensland to work out the timing and resources for the transfer of licensing and compliance functions to AFMA. |
| 2. Consultation | A revised consultation model to be employed that improves the level of consultation with Torres Strait Islanders at the community level. |
| 3. Decision making and delegations | a) The PZJA to retain (not delegate) the decision making capacity for strategic matters such as new legislation or legislative amendments (including management plans), resource allocation decisions, determining harvest strategies and significant policy amendments.<br>b) AFMA to be delegated with day to day operational decisions consistent with the Torres Strait Fisheries Act 1984.<br>c) AFMA to report annually to the PZJA on delegated responsibilities. |
| 4. Standing Committee | Terms of reference to be developed for the PZJA Standing Committee. |
| 5. PZJA | a) AFMA to provide secretarial services to PZJA.<br>b) The PZJA to meet a minimum of twice every three years. |
| 6. Bi-lateral arrangements with PNG | a) AFMA to be responsible for maintaining bi-lateral relationships with PNG National Fisheries Authority and for organising the annual catch sharing and formal bi-lateral meeting.<br>b) PNG to be invited to attend the annual PZJA meeting as an observer. |
| 7. Long-term | c) Review whether Queensland retains a role in the PZJA including the implications of any withdrawal.<br>d) AFMA to progress legislative amendments to the Torres Strait Fisheries Act that further streamline management arrangements. |

Source: Richard Stevens, *Review of Torres Strait Protected Zone Joint Authority Fisheries Administration Arrangements*, Discussion Paper, 22 June 2009.

# Changes to fishing rules in Queensland

September 2019

## Fish for the future

Queensland's new fisheries regulations start 1 September 2019. A number of changes have been made to recreational, charter and commercial fishing rules to ensure we have fish for the future.

**Please note**: Queensland Boating and Fisheries Patrol will not immediately issue fines for non-compliance with these changes. Over the next few months the focus will be on education and awareness. Our website, recreational fishing app and recreational fishing guides are being updated to reflect the new rules.

### Changes to fishing rules for all sectors

#### Size limits

- Pearl perch minimum legal size limit increased from 35 cm to 38 cm
- King threadfin minimum legal size limit increased from 60 cm to 65 cm on the east coast
- Single minimum legal size limit of 60 cm for Mary River cod and Murray cod, and Murray cod maximum size limit of 110 cm removed
- Clarified in the regulations that the size limit for giant queenfish in the Gulf of Carpentaria applies to all fishers

#### Closures

- New seasonal closure for snapper and pearl perch – 15 July to 15 August each year
- New closed waters that prohibit take of black jewfish within 200 m from the Hay Point and Dalrymple Bay coal terminals
- Standardised start and end times for the majority of fishery closures – midnight to midnight

#### Other

- Mulloway and scaly jewfish must be kept whole while on board a vessel
- Black jewfish will become a no-take species for all sectors when the total allowable commercial catch is reached

### Changes to recreational fishing rules

#### Possession limits

- Mud crab possession limit reduced from 10 to 7
- Boat limits for nine priority black-market species will be two times the possession limit – mud crab, prawns, snapper, black jewfish, barramundi, shark, Spanish mackerel, sea cucumber and tropical rock lobster (these boat limits do not apply to charter fishers)
- Pearl perch possession limit reduced from 5 to 4
- Tropical rocklobster possession limit of 5 applies in all Queensland waters
- Blue swimmer crab possession limit reduced from no limit to 20
- Mollusc and gastropod (including pipis) possession limit reduced from 50 to 30

- General possession limit of 20 introduced for all species without a prescribed possession limit (excluding some bait species)
- No possession limit for the following bait species – southern herring, common hardyhead, Australian sardine, Australian anchovy, silver biddy, saltwater yabby, soldier crab and non-regulated worms (e.g. mangrove worms)
- Possession limit of 50 introduced for certain bait species – mullet (excluding diamondscale, sea and freshwater mullet), cuttlefish or squid (excluding tiger squid), smooth-clawed rock crab and yellowtail pike
- Hammerhead shark and white teatfish are now no-take species
- Oyster possession limit clarified in the regulations – a person must eat oysters (excluding pearl oysters) on the spot where they are taken (pearl oysters can be taken away from the site but they must be the correct size)
- Australian bass possession limit in stocked impoundments increased from 2 to 5
- Clarified in the regulations that a possession limit of 50 applies to the Cribb Island worm (formerly known as blood worm)
- Mary River cod possession limit of 1 in stocked impoundments expanded to include Wyaralong Dam, Ewen Maddock Dam, Caboolture River Weir, Robina Lakes, Lake Kurwongbah, Enoggera Reservoir and Lake Manchester

### Closures

- Tinana Creek and its tributaries upstream of Teddington Weir wall closed to all forms of fishing
- Murray cod seasonal closure changed to 1 August to 31 October each year
- New waters closed to line fishing (or possession of a fishing line) from 1 August to 31 October in the following locations:
  - Coomera River (upstream of defined boundary)
  - Albert River (upstream of defined boundary)
  - Running Creek
  - Christmas Creek
  - Stanley River (upstream of defined boundary)
  - Mary River (upstream of defined boundary, excluding Baroon Pocket Dam, Borumba Dam and Lake MacDonald)

### Gear requirements

- Recreational crab apparatus and freshwater traps must now be marked with the surname and address of the person **using** the apparatus

## Changes to charter fishing rules

- Offshore charter fishers now permitted to use trot lines to take spanner crabs
- Snapper and pearl perch extended in-possession limit removed

## Changes to commercial fishing rules

### Trawl

- New management regions established in the East Coast Trawl Fishery (replacing the existing Northern and Southern Regional Waters):
  - Southern Inshore Trawl Region
  - Southern Offshore Trawl Region
  - Central Trawl Region
  - Northern Trawl Region
- Extended winter no-take of scallop by a month to 1 May and 30 November in the Southern Inshore and Southern Offshore trawl regions
- Introduced a scallop effort cap in the Southern Inshore Trawl Region of 118 635 units (if effort reaches the cap between 1 December and 24 April scallop will become no take)

- Introduced strip closures to protect small prawns in the Southern Offshore Trawl Region between 2 November and 1 March in the following areas:
  - Stradbroke Island
  - Caloundra to Moreton Island
  - Fraser Island

### Spanner crab

- Spanner crab dilly maximum limit increased from 45 to 75 if 2 crew are on board (all boats may carry up to 10 extra dillies on board to replace lost/damaged dillies during a trip)
- Spanner crab fishery quota year adjusted to run from 1 July to 30 June each year
- Number of C2 fishery symbols limited to those currently in existence (consistent with limited entry in all other Queensland fisheries)

### Snapper and pearl perch

- Total allowable commercial catch limits established for snapper (42 tonnes) and pearl perch (15 tonnes)
- Take of snapper using commercial net gear is now prohibited
- Snapper and pearl perch must be kept whole while on board a vessel

### Vessel tracking

- Vessel tracking requirements amended to apply to all commercial fishing vessels (not including charter) from 1 January 2020 – fisheries that require vessel tracking from 1 January 2020 are D, A1, A2, R, B1, J1, M2, T5, T6, T7, T8 and T9

### Licensing

- Limited entry nature of commercial fisheries clarified in the regulations
- Payment of commercial fishing fees amended from ‘in arrears’ to ‘in advance’ – no changes to fees as part of this administrative change (it will be just like paying your car or boat registration)
- Clarified the purposes for which a General Fisheries Permit may be issued in the regulations.
- A tender vessel must be nominated as the primary vessel against a commercial fishing boat licence before the vessel can used (i.e. tender operating solely) in any fishery
- All commercial fishers must display details of their commercial fishing boat licence or commercial harvest fishing licence on a sign adjacent to their land-based commercial fishing operation
- A person applying for a commercial fisher licence must be at least 18 years of age and possess knowledge of fisheries legislation to the extent it applies to commercial fisheries

### Other

- Clarified in the regulations that commercial fishers digging for bloodworms must put any disturbed or removed seagrass in an upright position back in the same location

**Please note**: As part of the fisheries reform process, further regulatory changes are expected to be considered before the end of the year.

## More information

For more information on the changes, visit **fisheries.qld.gov.au** or call **13 25 23**.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| UPDATES FROM MEMBERS<br>PNG National Fisheries Authority | Agenda Item 2.4<br>For noting |

**RECOMMENDATIONS**

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

**BACKGROUND**

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

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| UPDATES FROM MEMBERS<br>Native Title | Agenda Item 2.5<br>For noting |

**RECOMMENDATIONS**

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

**BACKGROUND**

2. On 7 August 2013 the High Court of Australia confirmed coexisting Native Title rights, including commercial fishing, in the claimed area (covering most of the Torres Strait Protected Zone). This decision gives judicial authority for Traditional Owners to access and take the resources of the sea for all purposes. Native Title rights in relation to commercial fishing must be exercisable in accordance with the *Torres Strait Fisheries Act 1984*.
3. Traditional Owners and Native Title representative bodies have an important role in managing Torres Strait fisheries. It is important therefore that the RAG keep informed on any relevant Native Title issues arising.
4. AFMA has extended an invitation to Malu Lamar to attend this meeting as an observer and is investigating longer term arrangements for representation in consultation with PZJA agencies.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| RAG DATA SUB-GROUP MEETING | Agenda Item 3<br>For discussion and advice |

## RECOMMENDATIONS

1. That the RAG:
    a. **CONSIDER** the report from the first meeting of the RAG Data Sub-Group held on 18 June 2019 (**Attachment 3a**).
    b. **CONSIDER** the items proposed for discussion at the next meeting of the RAG Data Sub-Group and **PROVIDE ADVICE** on any additional issues concerning fishery dependent data inputs to the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) assessment framework that require consideration by the Sub-Group.
    c. **CONSIDER** and **PROVIDE ADVICE** concerning the utility of a data plan for the TRL Fishery, noting if this approach is recommended, a draft data plan will be provided for discussion at the next meeting of the RAG Data Sub-Group, prior to RAG consideration.

## KEY ISSUES

*Report from the first meeting of the TRLRAG Data Sub-Group*

2. The TRLRAG Data Sub-Group first met on 18 June 2019. A report from the meeting is provided at **Attachment 3a**. The Sub-Group considered a range of issues identified by the RAG and provided advice on improvements and refinements to the fishery dependent data currently collected as well as additional fishery dependent data required to improve the assessment and management of the TRL Fishery.
3. A summary of the Sub-Group's recommendations on each issue is detailed in **Table 1** below. Further details concerning discussions are provided in the meeting report. In making their recommendations, the Sub-Group agreed further consideration needs to be given to:
    a. The TDB02 CDR is used to collect data from all Torres Strait fisheries. Any changes to this CDR to meet data needs for the TRL Fishery, need to be compatible with the data needs of other fisheries.
    b. Whether any of the recommendations will result in a break in the CPUE series.
4. The Sub-Group also encouraged the PZJA to implement logbook requirements for the TIB sector as a priority, noting significant delays in delivering this commitment to date.

**Table 1.** Summary of the recommendations from the TRLRAG Data Sub-Group meeting held on 18 June 2019.

| Description of issue | Short-term recommendations | Long-term recommendations |
|---|---|---|
| **Effort data - time spent fishing**<br>• 'Number of days' is a crude measure of effort and does not indicate different fishing activities | **TRL04 logbook**<br>• Add a field to capture "Dive Time Underwater" per diver, per tender.<br>• Amend existing field "Total Hours Fishing" to "Total Hours Searching" and update instructions to describe "Total | • Legislative amendments to the *Torres Strait Fisheries Act 1984* to require the TIB sector to |

| Description of issue | Short-term recommendations | Long-term recommendations |
|---|---|---|
| (e.g. active fishing, searching, steaming)<br>• CDR instructions provide for the 'duration of fishing trip' to be recorded. This is already captured through the 'start and end dates' field<br>Example: it is current common practice for fishers to round-up to whole days | Hours Searching" as time spent in a tender away from the primary boat, but not time spent underwater.<br>**TDB02 CDR**<br>• Amend Part B Voluntary Fishing Effort and Area section to better capture time spent searching, and dive time underwater in hours.<br>• Amend instructions to define "time spent searching" as time in hours spent in a dinghy or tender looking for a waypoint or site to dive.<br>• Amend instructions to define "dive time underwater" as time in hours between the first and last dives of each day. | complete TRL04 logbooks.<br>• Consider technology that records fine scale data on time spent underwater e.g. dive watches. |
| **Effort data - number of fishers** | **TDB02 CDR**<br>• Amend the "Number of fishers" field to read "number of divers". | Nil |
| **Spatial data**<br>• Fishers are reluctant to disclose the areas in which they have fished and may instead nominate the area in which catch is being landed.<br>Example: last season, catches attributed to the Badu (8) and Thursday Island (9) strata were likely to be overstated - catches were more likely coming from the Mabuiag (7) and Northern (3) strata. | **TDB02 CDR**<br>• Align the survey and TDB02 CDR strata.<br>• Continue to work with the TIB sector to improve voluntary reporting of spatial data, educating fishers and fish receivers on the importance of providing this voluntary data, how it is used and its confidentiality protected.<br>• Consider further alternatives for the TIB sector to confidentially report their area fished data at a resolution that is more useful for the assessment.<br>**TRL04 logbook**<br>• Amend the TRL04 logbook to capture spatial information at the tender level, either in latitude/longitude format (at midday), or by smaller strata. | • Legislative amendments to the *Torres Strait Fisheries Act 1984* to require the TIB sector to complete TRL04 logbooks.<br>• VMS units on all tenders and dinghies. |
| **Discards**<br>• Discards are not currently required to be reported explicitly in either the TDB02 CDR nor TRL04 logbook.<br>• Fishers discard lobsters that die while being held in cages at sea. This mortality can be due to poor weather, high water temperatures, cages overturning, not resting lobsters before towing, | **TDB02 CDR**<br>• Add an additional processing code to the TDB02 CDR, "DIS" for 'dead and discarded', noting that TDB02 forms apply to other fisheries and may therefore need explicit instructions for each fishery, i.e. beche-de-mer versus TRL.<br>**TRL04 logbook**<br>• Amend the TRL04 logbook to capture discards. Further advice needed on the form this data should take (e.g. piece counts or estimated whole weight). | Nil |

| Description of issue | Short-term recommendations | Long-term recommendations |
|---|---|---|
| towing cages too quickly etc.<br>• There is no prohibition on discarding.<br>Example: industry have reported that there is discarding happening before lobsters are landed (i.e. at sea) and at the point of landing to fish receivers. | • CSIRO to give further consideration to, that if there has been a change to selectivity/grading underwater, what data is needed on this to support the stock assessment. | |
| **Length frequency data**<br>• The TRLRAG agreed this data is of high value and has been particularly useful this season in informing analyses on the performance of the TRL Fishery. However, there is a longer term need to collect representative length frequency data from across the TRL Fishery. | • The Data Sub-Group did not provide specific recommendations to address the issue of capturing length frequency data in response to changing fishing behaviour to grade lobsters underwater.<br>• AFMA has considered independent scientific observers however this has not yet been explored in detail. | Nil |
| **0+ abundance** | Nil | Nil |
| **Effort creep** | • Undertake an industry survey to collect information about changes to fishing power factors (e.g. gear, technology, horsepower, dinghy/tender size etc) over time. This could be a Masters project/seek FRDC funding. This project should be included in the research plan for the TRL Fishery going forward. | Nil |
| **Depth** | **TRL04 logbook**<br>• Add a field to the TRL04 logbook to provide average depth based on the majority of dive time spent at a particular depth. | • Consider technology that records fine scale resolution data on time spent underwater e.g. dive watches. |
| **PNG data**<br>• A better understanding is needed of PNG catch and effort inside and outside of the TSPZ including spatial (inside/outside TSPZ and 'outside but near area') and temporal (by month) data | • AFMA to continue liaising closely with PNG NFA regarding the data PNG collects and how it feeds in to the stock assessment of the TRL Fishery, and the processes around cross-endorsement ahead of time in order to determine final TAC for the season with the aim of providing more certainty to industry. | Nil |

*Next meeting of the TRLRAG Data Sub-Group*

5. The Sub-Group is tentatively scheduled to meet again at the end of March 2020 (to be discussed under **Agenda Item 11**). Items proposed for discussion include:
    a. Draft amendments to the TDB02 CDR, noting this CDR is used to collect data from all Torres Strait fisheries. Any changes to this CDR to meet data needs for the TRL Fishery, need to be compatible with the data needs of other fisheries.
    b. Draft amendments to the TRL04 logbook, noting Queensland now uses a different logbook for the Queensland East Coast TRL Fishery.
    c. Discussion on whether any of the changes will result in a break in the CPUE series.
    d. Improvements to PNG data inputs to the assessment for the TRL Fishery.
    e. Strategies to improve voluntary provision of spatial and effort data through the TDB02 CDR.
    f. Draft data plan – see below item.
6. The RAG is asked to consider these items and provide advice on any additional issues concerning fishery dependent data inputs to the TRL Fishery assessment framework that require consideration by the Sub-Group.

*Data plan for the TRL Fishery*

7. AFMA have developed data plans for a range of Commonwealth-managed fisheries around Australia. The objective of a data plan is to clearly detail the plan for collecting the data/information needed to support fishery assessments and management decisions in a given fishery, in particular:
    a. for target species, define the data/information needs and collection methods to support the application of the fishery's harvest strategy;
    b. for non-target species (including protected species), habitats and communities, define the data/information needs and collection methods to support ecological risk assessment processes;
    c. define the data needed to monitor compliance by the fishing industry with management arrangements;
    d. ensure the collection of any additional data/information required to meet data provision and reporting obligations under fishery policies and guidelines, international agreements and obligations;
    e. ensure that data collection processes are cost effective and efficient;
    f. ensure the data collected supports the research needs of the fishery;
    g. ensure data processes (collection, storage, dissemination, use) are consistent with the data related requirements of relevent quality assurance and disclosure policies;
8. For each of the above, the plan would:
    a. describe how the data/information is to be collected and managed, considering frequency, quantity, representativeness, reliability, auditing, risk, and cost efficiency;
    b. identify gaps in current data processes and actions to rectify those gaps.
9. The development of a data plan for the TRL fishery would involve a review of current data collection processes against data needs (including consultation with industry, TRLRAG and TRL Working Group), with a focus on addressing data gaps and assumptions that might pose a risk to achievement of management objectives.
10. A data plan would complement (and support) other information sources that are also used by the PZJA in decision making processes including:
    a. fishery dependent or independent research;

b. expert opinion (including advisory committees);

c. other published information/research.

11. The RAG asked to consider and provide advice concerning the utility of a data plan for the TRL Fishery, noting if this approach is recommended, a draft data plan will be provided for discussion at the next meeting of the RAG Data Sub-Group, prior to RAG consideration.

**BACKGROUND**

12. At the RAG meeting held on 18-19 October 2018, the RAG recommended a sub-group of the RAG be established to examine and recommend improvements to be made to the collection and analysis of catch and effort data for the TRL Fishery, including:

    a. TRL04 logbook and TDB02 CDR - improving the accuracy of spatial data (e.g. point of capture as opposed to point of anchoring or landing), finer scale measure of effort (e.g. 'hours actively fishing/in the water' as opposed to 'days fished'), further details on effort (e.g. to include time spent travelling, searching and actively fishing), collection of depth data.

    b. Fishing power (efficiency) - developing a better understanding on 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.

    c. Use of data collection technology - assessing the use of electronic logbooks in the Fishery.

    d. Use of monitoring technology - assessing the use of VMS on all boats in the Fishery.

13. The RAG further recommended a draft terms of reference (ToR) be developed for consideration at the first meeting of the sub-group to be convened alongside the next meeting of the RAG. The final ToR is provided at **Attachment 3b**.

14. The RAG Data Sub-Group has been established for an initial term of 18 months. The Sub-Group will focus on issues concerning fishery dependent data inputs to the TRL Fishery assessment framework. The Sub-Group will meet on an as needs basis. A report will be provided to the RAG following each meeting. The RAG will be asked to consider each report, provide guidance on further work to be undertaken by the Sub-Group including an assessment of the ongoing need for the Sub-Group.

15. It is expected, that once the issues identified for examination by the RAG Data Sub-Group have been appropriately addressed, the Sub-Group will be dissolved and the RAG will return to business as usual.

# Torres Strait Tropical Rock Lobster Resource Assessment Group (TRLRAG) Data Sub-Group Meeting 1

Report to the TRLRAG

18 June 2019

Cairns

Note all meeting papers and record available on the PZJA webpage: www.pzja.gov.au

Australian Government

Australian Fisheries Management Authority

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# Contents



# Tables

## Meeting participants

| Name | Position |
|---|---|
| James Billy | TRLRAG Traditional Inhabitant industry member (Kulkalgal cluster) |
| Mark David | TRLWG Traditional Inhabitant industry member (Kulkalgal cluster) |
| Trent Butcher | TRLWG industry member |
| Mark Dean | TRLWG industry member |
| Dr Andrew Penney | TRLRAG scientific member |
| Dr Robert Campbell | CSIRO |
| Dr Judy Upston | CSIRO |
| Roy Deng | CSIRO |
| Natalie Couchman | AFMA |
| Georgia Langdon | AFMA |
| Natalie Rivero | AFMA |
| Danielle Stewart | TRLRAG and TRLWG QDAF member |

## Preliminaries

1. The Tropical Rock Lobster Resource Assessment Group (TRLRAG) Data Sub-Group meeting was opened in prayer at 9:15 am on 18 June 2019.
2. AFMA officer Natalie Couchman welcomed attendees to the meeting and acknowledged traditional owners of the land on which the meeting was held, and paid respect to elders past, present and emerging.

## Terms of reference

3. The Data Sub-Group noted the terms of reference (**Attachment A**), acknowledging that the sub-group was tasked by the TRLRAG to assess, identify and report on fishery dependent data inputs to the Torres Strait TRL Fishery scientific assessment framework.

## Catch Per Unit Effort (CPUE) Standardisation

4. The Data Sub-Group noted a presentation from Dr Robert Campbell providing an overview of how CPUE data is standardised to give an abundance index used in stock assessments. CPUE standardisation.
5. The Data Sub-Group noted that the TRL Fishery is unique in that a fishery independent survey is undertaken annually and is a key input into the stock assessment. However as the funding to conduct surveys has become more constrained over time, CPUE data from both the Traditional Inhabitant (TIB) and non-Traditional Inhabitant (TVH) sectors is taking on greater importance. Under the draft Harvest Strategy for the TRL Fishery, the empirical Harvest Control Rule (eHCR) gives 10 per cent weighting to each the TIB and TVH CPUE indices. Whilst the CPUE data currently collected is sufficient (largely collected from the TVH sector) there is scope for improvement particularly given the changes to fishing behaviour across the two sectors during

the transition of the TRL Fishery to a quota management system and the need to understand how these changes influence the CPUE standardisation.

## Fishery dependent data issues in the TRL Fishery

6. The Data Sub-Group considered a range of issues identified by the TRLRAG and provided advice on improvements and refinements to the fishery dependent data currently collected as well as additional fishery dependent data required to improve the assessment and management of the Fishery.
7. Each issue was discussed in terms of identifying solutions that can be implemented in the short-term in order to provide immediate improvements, as well as identifying longer term solutions that will require ongoing efforts. The feasibility and costs of data collection were considered in providing advice.
8. A summary of the discussion on each issue and corresponding recommendations is detailed in **Table 1**.
9. In making the recommendations, the Data Sub-Group agreed further consideration needs to be given to:
    a. The TDB02 CDR is used to collect data from all Torres Strait fisheries. Any changes to this CDR to meet data needs for the TRL Fishery, need to be compatible with the data needs of other fisheries.
    b. Whether any of the recommendations will result in a break in the CPUE series.
10. The Data Sub-Group also encouraged the PZJA to implement logbook requirements for the TIB sector as a priority, noting significant delays in delivering this commitment to date.

**Table 1. Summary of discussion and recommendations for each data issue.**

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| **Effort data - time spent fishing**<br>• 'Number of days' is a crude measure of effort and does not indicate different fishing activities (e.g. active fishing, searching, steaming)<br>• CDR instructions provide for the 'duration of fishing trip' to be recorded. This is already captured through the 'start and end dates' field<br>Example: it is current common practice for fishers to round-up to whole days | **TRL04 logbook**<br>• A standard TVH fishing trip with a primary/tender operation has three key components:<br>a. travelling or steaming (in the primary boat);<br>b. searching (in a tender); and<br>c. diving.<br>• Generally when leaving port, a TVH operator knows where they are going, heading directly for a particular waypoint. This travel time should not be considered 'searching'.<br>• The time taken to search at a waypoint (in both the tender and underwater) depends on the experience of the diver/s.<br>• Dive time underwater is predominantly via hookah gear.<br>• Dive time (in hours) underwater per diver is the most important data need.<br>• Time a tender is away from the primary boat (deemed as searching) is useful but secondary to dive time.<br>• Steaming/travelling time to a waypoint is not a data need.<br><br>**TDB02 CDR**<br>• TIB operations are largely conducted from small dinghies (e.g. less than 6m). Few primary boats operate in this sector.<br>• Dive time underwater is via freediving, with some hookah gear also used. | **TRL04 logbook**<br>• Add a field to capture "Dive Time Underwater" per diver, per tender.<br>• Amend existing field "Total Hours Fishing" to "Total Hours Searching" and update instructions to describe "Total Hours Searching" as time spent in a tender away from the primary boat, but not time spent underwater.<br><br>**TDB02 CDR**<br>• Amend Part B Voluntary Fishing Effort and Area section to better capture time spent searching, and dive time underwater in hours. | • Legislative amendments to the *Torres Strait Fisheries Act 1984* to require the TIB sector to complete TRL04 logbooks.<br>• Consider technology that records fine scale data on time spent underwater e.g. dive watches. |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| | • Time spent searching as well as dive time underwater are equally important data needs.<br>• It is difficult to calculate dive time underwater when freediving due to the nature of divers bouncing to check certain waypoints.<br>• The time between the first and last dives of the day is the best way to capture this data.<br>• Counting the number of dives between the first and last dives is not needed. | • Amend instructions to define "time spent searching" as time in hours spent in a dinghy or tender looking for a waypoint or site to dive.<br>• Amend instructions to define "dive time underwater" as time in hours between the first and last dives of each day. | |
| **Effort data - number of fishers** | **TDB02 CDR**<br>• Currently the TDB02 CDR requests voluntary information about the number of fishers per fishing trip.<br>• Dr Robert Campbell sought clarification from industry members that when this value is recorded as more than 1 fisher, should this be considered to be 1 diver, or multiple. The Traditional Inhabitant industry members indicated that if 2 fishers are indicated, this means only 1 diver in the water and 1 driving the dinghy. They may swap around but there is typically only 1 diver in the water at any one time. On occasion there may be 2 divers in the water but often the second is learning.<br>• If there are multiple fishers recorded in conjunction with multiple days fished (e.g. 2 fishers over 3 days), it was agreed this should be considered as 3 days fished (e.g. 1 diver in the water over 3 days). | **TDB02 CDR**<br>• Amend the "Number of fishers" field to read "number of divers". | |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| **Spatial data**<br>• Fishers are reluctant to disclose the areas in which they have fished and may instead nominate the area in which catch is being landed.<br>Example: last season, catches attributed to the Badu (8) and Thursday Island (9) strata were likely to be overstated - catches were more likely coming from the Mabuiag (7) and Northern (3) strata. | • Agreement that some of the current strata are too big and that some of the larger strata could be sub-divided.<br>• Confidentiality issues with the TIB sector reporting voluntary area fished information to a third party (i.e. the fish receiver).<br>• Agreement that spatial data at the tender level (in a primary/tender operation) is a data need. Currently the TRL04 logbook only captures latitude/longitude data for the primary boat, and tenders may travel up to 20nm from the primary boat. | • Align the survey and TDB02 CDR strata.<br>• Continue to work with the TIB sector to improve voluntary reporting of spatial data, educating fishers and fish receivers on the importance of providing this voluntary data, how it is used and its confidentiality protected.<br>• Consider further alternatives for the TIB sector to confidentially report their area fished data at a resolution that is more useful for the assessment.<br>• Amend the TRL04 logbook to capture spatial information at the tender level, either in latitude/longitude format (at midday), or by smaller strata. | • Legislative amendments to the *Torres Strait Fisheries Act 1984* to require the TIB sector to complete TRL04 logbooks.<br>• VMS units on all tenders and dinghies. |
| **Discards**<br>• Discards are not currently required to be reported explicitly in either the TDB02 CDR nor TRL04 logbook.<br>• Fishers discard lobsters that die while being held in cages at sea. This mortality can be due to poor weather, high water temperatures, cages overturning, not resting lobsters before towing, | • Discards of dead lobsters at sea is not currently captured in the TRL04 logbook nor TDB02 CDR. Some fishers voluntarily capture this data in the comments section, however there is no consistent way to record this data.<br>• TVH operators (particularly those with smaller quota holdings) are fishing more selectively as a result of the transition of the TRL Fishery to a quota management system. This includes purposefully not collecting moulting lobsters, selecting the prime (larger) sizes and keeping lower stocking densities in cages to reduce the level of mortalities. | • Add an additional processing code to the TDB02 CDR, “DIS” for ‘dead and discarded’, noting that TDB02 forms apply to other fisheries and may therefore need explicit instructions for each fishery, i.e. beche-de-mer versus TRL.<br>• Amend the TRL04 logbook to capture discards. Further advice needed on the form this data should take (e.g. piece counts or estimated whole weight).<br>• CSIRO to give further consideration to, that if there | |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| towing cages too quickly etc.<br>• There is no prohibition on discarding.<br>Example: industry have reported that there is discarding happening before lobsters are landed (i.e. at sea) and at the point of landing to fish receivers. | • Cages are also being towed at slower speeds, and lobsters are 'rested' in cages for 1-2 days before being landed to maintain higher quality of the live product.<br>• Some boats are also grading catch in cages or tanks to ensure similar sized lobsters are stocked together to avoid mortalities caused by cannibalism.<br>• Lobsters that are returned to the sea alive are not considered discards on the basis that they have high survivability, though this needs to be confirmed.<br>• Some industry members reported up to 10% mortality of lobsters during airfreight however this is not important for the scientific data as the weights of these lobsters has already been recorded before they are airfreighted.<br>• The TIB sector are also stocking cages with fewer lobsters and floating the cages deeper in the water column, particularly when water temperatures are warmer.<br>• Lobsters that die whilst stocked in TIB cages are difficult to account for as mortalities are usually only indicated by dead carapaces' left behind. Traditional Inhabitant industry members indicated that these could be counted and have an approximate whole weight estimated based on the numbers of carapaces.<br>• CSIRO confirmed that piece counts of dead lobsters would also be sufficient assuming the size distribution of the dead lobsters is similar to those live. | has been a change to selectivity/grading underwater, what data is needed on this to support the stock assessment. | |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| | • It was agreed that even if generally the discard rate is zero, this information needs to be captured so as to create a time series.<br>• Environmental factors also need to be better understood, particularly if they relate to future mass mortality events. | | |
| **Length frequency data**<br>• The TRLRAG agreed this data is of high value and has been particularly useful this season in informing analyses on the performance of the TRL Fishery. However, there is a longer term need to collect representative length frequency data from across the TRL Fishery. | • Size grade data is currently provided by MG Kailis for Australian caught lobster since 2005, and PNG caught lobster since 2013.<br>• Size distributions of commercial catches are usually consistent (due to minimum size limits).<br>• Size data (tail width) is also captured in a snapshot each year during the pre-season survey, and in those years with mid-season surveys.<br>• The transition of the TRL Fishery to a quota management system means some TVH operators are actively selecting larger crays and grading underwater, increasing the size selectivity.<br>• Dr Andrew Penny advised that currently length frequency data collection is sufficient, however with the increasing tendency to grade lobsters underwater, an alternative method of collecting length frequency data may need to be explored. | • The Data Sub-Group did not provide specific recommendations to address the issue of capturing length frequency data in response to changing fishing behaviour to grade lobsters underwater.<br>• AFMA has considered independent scientific observers however this has not yet been explored in detail. | |
| **0+ abundance** | • The merit and options for improving the index of 0+ lobster abundance, through TDB02 CDR, TRL04 logbook or other means was considered. | | |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| | • Dr Andrew Penney noted that an accurate index of 0+ lobsters is difficult to derive in the absence of a mid-season survey. Noting this, the 0+ index is down weighted in both the stock assessment and under the eHCR.<br>• Some anecdotal reports regarding 0+ abundance is provided by industry however this is not quantitative. | | |
| **Effort creep** | • Effort creep over time is not something easily captured by adding or amending the data fields in the TRL04 logbook or TDB02 CDR.<br>• Need to understand changes through time, whether incremental or stepwise and use this information to generate a power index to factor in to the stock assessment. | • Undertake an industry survey to collect information about changes to fishing power factors (e.g. gear, technology, horsepower, dinghy/tender size etc) over time. This could be a Masters project/seek FRDC funding. This project should be included in the research plan for the TRL Fishery going forward. | |
| **Depth** | • Depth can be estimated roughly through the specification of fishing method (i.e. hookah or freedive)<br>• Dr Robert Campbell noted that depth information is easy to collect, however the full merit of collecting depth data may not be realised until analysis. | • Add a field to the TRL04 logbook to provide average depth based on the majority of dive time spent at a particular depth. | • Consider technology that records fine scale resolution data on time spent underwater e.g. dive watches. |
| **PNG data**<br>• A better understanding is needed of PNG catch and effort inside and outside of the TSPZ including spatial (inside/outside TSPZ and 'outside but near | • The Sub-Group was unable to discuss this issue in detail as there was no representative from PNG NFA present. | • AFMA to continue liaising closely with PNG NFA regarding the data PNG collects and how it feeds in to the stock assessment of the TRL Fishery, and the processes around cross-endorsement ahead of time in order to determine final | |

| Description of issue | Summary of discussion | Short-term recommendation/s | Long-term recommendation/s |
|---|---|---|---|
| area') and temporal (by month) data | | TAC for the season with the aim of providing more certainty to industry. | |

## Using technology to collect and verify fisheries data

11. The Data Sub-Group noted a presentation provided by Natalie Rivero (Regulatory Improvement and External Services (RIES) section, AFMA) regarding the use of technology to collect and verify fisheries data.
12. There are a number of benefits in using technology to collect fisheries data, including:
    a. Data driven decision making, in real time;
    b. Supporting more efficient business processes and planning;
    c. Reducing paperwork burden;
    d. Cost savings for governments and businesses; and
    e. Traceability and market access.
13. However, the use of technology presents a range of challenges, including:
    a. Solutions that don't benefit everyone;
    b. Steep learning curves due to highly variable computer literacy among users;
    c. Costs of rollout and adoption;
    d. Necessary legislative updates; and
    e. Internet connectivity.
14. The Data Sub-Group noted the key to implementing digital data collection is first understanding the data needs and defining the data objectives before deciding what tools to use in collection and verification. This includes understanding what data is required and why, and prioritising the data needs (i.e. must have versus nice to have versus dream big). Once the needs and objectives have been identified, available tools can then be considered – a combination of tools may be used for the same task/objective.
15. The Data Sub-Group noted some technologies currently available and in use within Commonwealth managed fisheries versus those currently under development (**Table 2**).

**Table 2. Current and emerging technologies used in Commonwealth managed fisheries.**

| Available now | Under development |
|---|---|
| **CDR**: paper based and used to verify logbook reported catch and effort. | **e-CDR**: digital submission of catch disposal by both the fisher and fish receiver. |
| **EM catch composition review**: third party independent review annotates catch composition, protected species interactions. | **EM image recognition**: learning algorithms automate footage review. |
| **e-logs**: third party software developed, no validation of data at point of entry, difficult to update fields. | **e-logs:** improved digital platform, allows for validation at point of entry, flexible with changes. |

16. The Data Sub-Group further noted a case study on technologies used in the New Zealand Pāua (Abalone) Fishery, in particular data loggers which provide high resolution spatial and CPUE data. The system consists of two hardware components (the boat unit which records catch) and the turtle logger which records effort), and a database system. The database system manages data uploads from the units and processes the data into a set of tables for analysis and visualisation.
17. The use of similar data loggers has been tested in a number of Australian abalone fisheries:
    a. Under an FRDC funded pilot project, and in joint collaboration with New Zealand, Tasmania trialled data loggers in their fishery. The project generated approx. eight million records a year from 24,000 dives.

b. This was followed by a four year FRDC funded project with Tasmania, western Victoria and New South Wales. The data loggers under this project do not collect information on catch, only effort data which is used in stock assessments. The type of data logger used requires boat memory units to be exchanged every 3 months. Amalgamated information is also used to identify trends and develop performance indicators for fisheries.

## Date and venue of next meeting

18. The date and venue of the next data meeting is to be confirmed.

19. The meeting was closed in prayer at 4.30pm.

## TRLRAG Data Sub-Group Terms of Reference

1. The Tropical Rock Lobster Resource Assessment Group (TRLRAG) Data Sub-Group will assess, identify and report to the TRLRAG on fishery dependent data inputs to the Torres Strait Tropical Rock Lobster (TRL) Fishery assessment framework.
2. In particular this group should identify:
   a. the fishery dependent data required to inform and improve the TRL stock assessment (e.g. the data required to better describe fishing effort and changes in fishing behaviour and fishing power over time to better inform the standardisation of CPUE data);
   b. other fishery dependent data required to improve management of the fishery (e.g. reporting on discarding);
   c. the means by which the data requirements noted in (a) and (b) above can be collected, in particular improvements and refinements to the fishery dependent data collected through logbooks, catch disposal records and other methods;
   d. the practicalities and impediments to collecting these data and the means of overcoming these issues;
   e. the use of data collection technology to improve collection of fishery dependent data (e.g. electronic logbooks);
   f. the use of monitoring technology to improve fishery dependent data verification and analyses (e.g. VMS coverage).
3. Where possible this group should liaise with other researchers, experts and industry members in order to achieve the above objectives.

**Attachment 3b**

## TRLRAG Data Sub-Group Terms of Reference

1. The Tropical Rock Lobster Resource Assessment Group (TRLRAG) Data Sub-Group will assess, identify and report to the TRLRAG on fishery dependent data inputs to the Torres Strait Tropical Rock Lobster (TRL) Fishery assessment framework.
2. In particular this group should identify:
   a. the fishery dependent data required to inform and improve the TRL stock assessment (e.g. the data required to better describe fishing effort and changes in fishing behaviour and fishing power over time to better inform the standardisation of CPUE data);
   b. other fishery dependent data required to improve management of the fishery (e.g. reporting on discarding);
   c. the means by which the data requirements noted in (a) and (b) above can be collected, in particular improvements and refinements to the fishery dependent data collected through logbooks, catch disposal records and other methods;
   d. the practicalities and impediments to collecting these data and the means of overcoming these issues;
   e. the use of data collection technology to improve collection of fishery dependent data (e.g. electronic logbooks);
   f. the use of monitoring technology to improve fishery dependent data verification and analyses (e.g. VMS coverage).
3. Where possible this group should liaise with other researchers, experts and industry members in order to achieve the above objectives.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| CATCH AND EFFORT ANALYSES FOR THE 2018-19 FISHING SEASON | Agenda Item 4<br>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) and PNG TRL Fishery for the 2018-19 fishing season provided at **Attachments 4a-4b**;
    b. **DISCUSS** and **PROVIDE ADVICE** on the catch and catch per unit effort (CPUE) data analyses for the Australian TRL Fishery for the 2018-19 fishing season undertaken by CSIRO (**Attachments 4c-4e** pending).

## 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 2018-19 fishing season is 415,835 kilograms. All reported catches are from inside the Torres Strait Protected Zone (TSPZ) and Australia's declared outside but near area.
4. This equates to 84.03 per cent of Australia's 494,850 kilogram total allowable catch (TAC) for the 2018-19 fishing season. This catch data is sourced from the Torres Strait Fisheries Catch Disposal Record (TDB02) and covers the Traditional Inhabitant Boat (TIB) and Transferable Vessel Holder (TVH) sectors.
5. A summary of the reported landed catch for the Australian TRL Fishery is provided at **Attachment 4a**. An infographic showing the final catch sharing agreement between Australia and PNG is shown at **Attachment 4b**.

*PNG TRL Fishery catch*

6. 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.
7. PNG National Fisheries Authority (NFA) has do date reported landed catches for the PNG TRL Fishery for 1 January through to 31 August 2019. NFA is expected to provide updated catch figures.
8. The reported PNG landed catch as at 31 August 2019 is 86,560 kilograms inside the TSPZ. A further 32,923 kilograms was reported from outside the TSPZ. AFMA is seeking confirmation from PNG NFA on the location of these catches deemed outside of the TSPZ, including clarification of whether PNG has declared an 'outside but near' area under the Torres Strait Treaty. Under the Treaty (Article 1(1)(h)), areas declared by either Australia or PNG as 'outside but near' are considered to be part of a Protected Zone commercial fishery.
9. The catch inside the TSPZ equates to 90.03 per cent of PNG's 96,150 kilogram TAC for 2019, with 4 months remaining in the PNG season.

10. A summary of the reported landed catch for the PNG TRL Fishery as at 31 August 2019 is provided at **Attachment 4a**.

*Total reported commercial catch for the TRL stock*

11. The total reported commercial catch for the TRL stock is:

| Area | Total (tonnes) |
|---|---|
| Australian TRL Fishery | 415.84 |
| PNG TRL Fishery - catches inside the TSPZ as at 31 August 2019 | 86.56 |
| PNG TRL Fishery - catches outside the TSPZ as at 31 August 2019 | 32.92 |
| **Total** | **535.32** |

*Catch and catch per unit effort (CPUE) data analyses*

12. The annual data summary to be presented by CSIRO under this agenda item and Agenda Item 5 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 final Harvest Strategy).

13. The RAG is asked to consider the following catch and CPUE analyses CSIRO has prepared for the 2018-19 fishing season and provide advice as appropriate:

    a. *Catch and effort summary paper pending* (**Attachment 4c**);

    b. *TIB CPUE analysis paper pending* (**Attachment 4d**);

    c. *TVH CPUE analysis paper pending* (**Attachment 4e**).

14. These analyses will be presented by CSIRO 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) and integrated stock assessment.

15. Further analyses of the November 2019 pre-season survey data, including size-frequency 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 for the 2018-19 fishing season. Source: Torres Strait Fisheries Catch Disposal Record (TDB02) as at 19 November 2019.

| Month | Reported catch (kg) for Traditional Inhabitant Boat (TIB) licence holders | Reported catch (kg) for Transferable Vessel Holder (TVH) licence holders | Total reported catch (kg) |
|---|---|---|---|
| Dec-18 | 23,938 | 23,178[#] | **80,947[#]** |
| Jan-19 | 14,695 | | |
| Feb-19 | 19,137 | | |
| Mar-19 | 52,184 | 28,082 | **80,266** |
| Apr-19 | 37,781 | 6,635 | **44,416** |
| May-19 | 31,716 | 29,515 | **61,232** |
| Jun-19 | 28,345 | 19,081 | **47,426** |
| Jul-19 | 24,228 | 27,094 | **51,322** |
| Aug-19 | 18,801 | 12,746 | **31,548** |
| Sep-19 | 8,920 | 9,759 | **18,086** |
| **Total reported catch (kg)** | **259,744** | **156,091** | **415,835** |
| **Reported catch as a per cent of the TAC*** | **79.33** | **93.24** | **84.03** |

[#] In accordance with AFMA's Information Disclosure policy (*Fisheries Management Paper 12*), catches by month have been aggregated for December 2018 through to February 2019, as less than 5 boats operated in the Transferable Vessel Holder (TVH) sector in each December 2018 and January 2019.

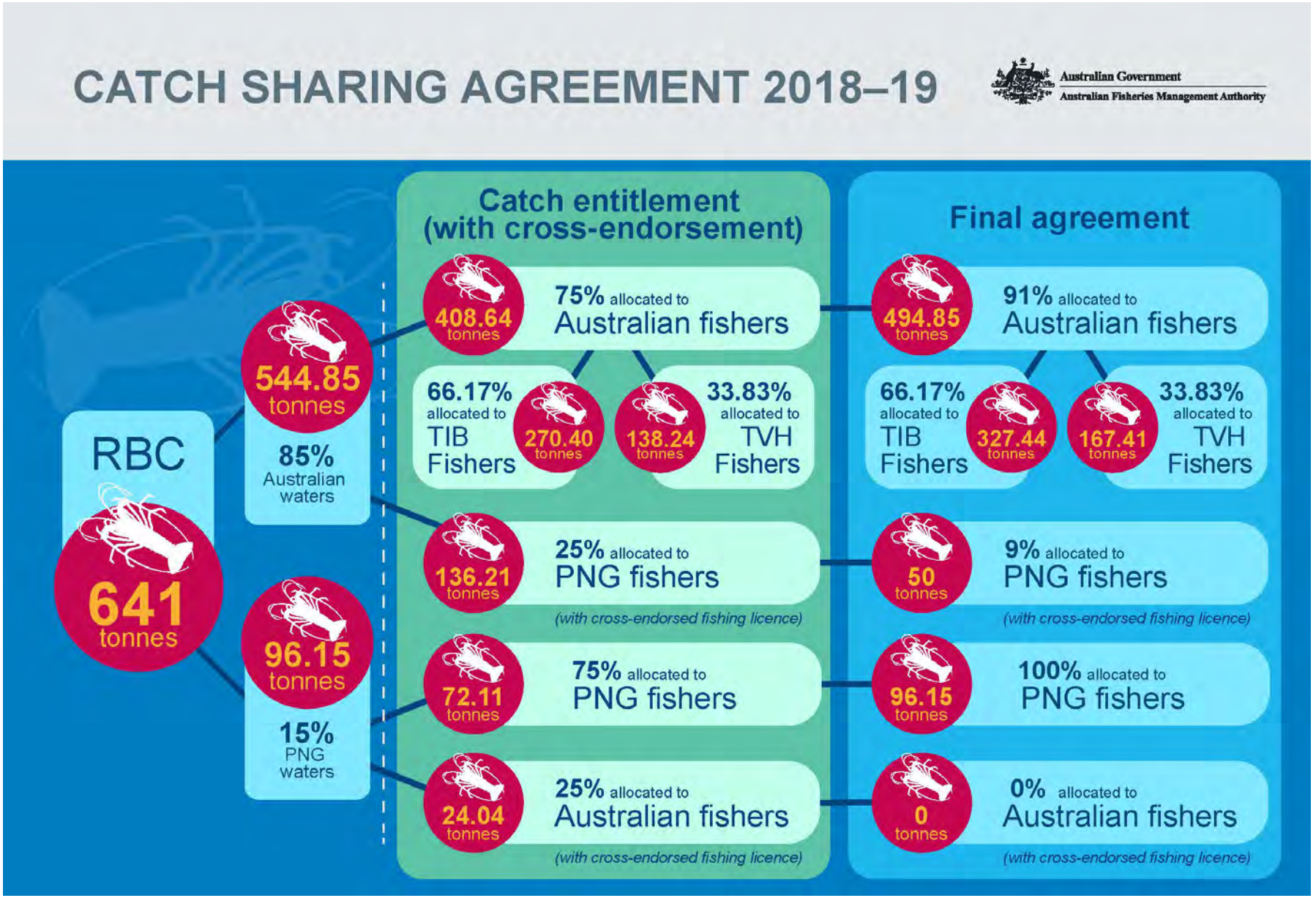
* The final total allowable catch (TAC) for the Australian Torres Strait Tropical Rock Lobster Fishery for the 2018-19 fishing season was 494,850 kilograms. Interim sectoral catch shares were calculated based on the agreed splits under the *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018*. Based in the final TAC, these shares were 327,442 kilograms for the Traditional Inhabitant Boat (TIB) sector and 167,407 kilograms for the TVH sector.

**Table 2.** Reported landed catch (kilograms whole weight) of TRL for the Papua New Guinea (PNG) TRL Fishery (inside the area of the Torres Strait Protected Zone) by month for 2019. Source: PNG National Fisheries Authority (NFA) as at 1 November 2019.

| Month | Tail weight (conversion factor of 2.677 applied) (kg) | Whole weight (kg) | Total reported catch (kg) |
|---|---|---|---|
| Jan-19 | 5,831 | 214 | **6,045** |
| Feb-19 | 7,746 | 1,039 | **8,785** |
| Mar-19 | 16,104 | 1,790 | **17,895** |
| Apr-19 | 3,786 | 264 | **4,050** |
| May-19 | 20,498 | 730 | **21,227** |
| Jun-19 | 10,781 | 1,773 | **12,553** |
| Jul-19 | 5,085 | 2,592 | **7,676** |
| Aug-19 | 5,660 | 2,668 | **8,328** |
| **Total reported catch (kg)** | **75,491** | **11,069** | **86,560** |

**Table 3.** Reported landed catch (kilograms whole weight) of TRL for the PNG TRL Fishery (outside the area of the Torres Strait Protected Zone) by month for 2019. Source: PNG NFA as at 1 November 2019.

| Month | Tail weight (conversion factor of 2.677 applied) (kg) | Whole weight (kg) | Total reported catch (kg) |
|---|---|---|---|
| Jan-19 | 6,186 | 288 | **6,474** |
| Feb-19 | 3,664 | 981 | **4,645** |
| Mar-19 | 3,866 | 634 | **4,500** |
| Apr-19 | 132 | | **132** |
| May-19 | 838 | | **838** |
| Jun-19 | 4,604 | 1,476 | **6,079** |
| Jul-19 | 3,936 | 669 | **4,604** |
| Aug-19 | 5,255 | 395 | **5,650** |
| **Total reported catch (kg)** | **28,480** | **4,443** | **32,923** |


CATCH SHARING AGREEMENT 2018–19
Australian Government
Australian Fisheries Management Authority
RBC
641 tonnes
544.85 tonnes
85% Australian waters
96.15 tonnes
15% PNG waters
Catch entitlement (with cross-endorsement)
408.64 tonnes
75% allocated to Australian fishers
66.17% allocated to TIB Fishers
270.40 tonnes
138.24 tonnes
33.83% allocated to TVH Fishers
136.21 tonnes
25% allocated to PNG fishers
(with cross-endorsed fishing licence)
72.11 tonnes
75% allocated to PNG fishers
24.04 tonnes
25% allocated to Australian fishers
(with cross-endorsed fishing licence)
Final agreement
494.85 tonnes
91% allocated to Australian fishers
66.17% allocated to TIB Fishers
327.44 tonnes
167.41 tonnes
33.83% allocated to TVH Fishers
50 tonnes
9% allocated to PNG fishers
(with cross-endorsed fishing licence)
96.15 tonnes
100% allocated to PNG fishers
0 tonnes
0% allocated to Australian fishers
(with cross-endorsed fishing licence)

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| RESULTS OF THE NOVEMBER 2019 PRE-SEASON SURVEY | Agenda Item 5<br>For discussion and advice |

**RECOMMENDATIONS**

1. That the RAG **DISCUSS** and **PROVIDE ADVICE** on the results of the November 2019 pre-season survey to be presented by CSIRO at the meeting.

**KEY ISSUES**

2. CSIRO conducted the annual pre-season survey from 10-23 November 2019. A total of 75 sites were surveyed, selected to provide for comparison with previous surveys. The amount of seabed biota (plants and some selected animals) and also substrate type will also be recorded at each survey site. Length frequency data will also be collected from captured TRL.
3. The pre-season survey data is a key data input for the empirical harvest control rule (HCR) and integrated stock assessment.
4. The results of the November 2019 pre-season survey will be presented by CSIRO at the meeting.
5. The RAG is being asked to review the analysis and where relevant provide advice on the findings and/or need for further analysis.
6. Of particular relevance, section 2.10 of the final Harvest Strategy (provided at **Attachment 6a**) provides that:
    a. 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.
7. Regardless of whether the pre-season trigger is triggered, a stock assessment update is being conducted in 2019. Preliminary results will be discussed under **Agenda Item 7**.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| RECOMMENDED BIOLOGICAL CATCH | Agenda Item 6<br>For discussion and advice |

**RECOMMENDATIONS**

1. That the RAG:
    a. **NOTE**, at its meeting on 19 November 2019, the Protected Zone Joint Authority (PZJA) agreed to adopt the final Harvest Strategy for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) (**Attachment 6a**).
    b. **NOTE**, on 19 November 2019, Senator the Hon. Jonathon Duniam determined a total allowable catch (TAC) of 200,000 kilograms of TRL in the Australian waters of the TRL Fishery for the 2019-20 fishing season.
        i. 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 Papua New Guinea (PNG) have been taken into account.
    c. **CONSIDER** the recommended biological catch (RBC) estimates derived through the application of the empirical harvest control rule (eHCR) under the final Harvest Strategy - to be presented by CSIRO at the meeting.
    d. **DISCUSS** and **PROVIDE ADVICE** on a RBC for the 2019-20 fishing season.
        i. The RBC covers the Torres Strait Protected Zone (TSPZ) (Australia and Papua New Guinea (PNG)).

**KEY ISSUES**

*Interim TAC*

2. At its meeting on 19 November 2019, consistent with previous advice from the TRLRAG and TRLWG, the PZJA agreed for the TRL Fishery to have an interim TAC of 200,000 kgs (unprocessed weight) for the 2019-20 fishing season. Noting this, the Minister subsequently determined the TAC under section 13 of the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Management Plan).
3. 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 taken into account. Any increase in the TAC is expected to be determined by the end of February 2020. Further details on the expected timeline is provided at **Attachment 6b**.

*Final Harvest Strategy*

4. At its meeting on 19 November 2019, following consideration of the outcomes of public consultation and advice from the TRLRAG and TRLWG, the PZJA agreed to adopt the final Harvest Strategy for the TRL Fishery (**Attachment 6a**).
5. Previously the TRL Fishery was operating under an interim Harvest Strategy. The key differences between the interim and final Harvest strategy are the use of an eHCR to estimate a RBC annually, with the stock assessment model to be updated every three years (rather than annually) to assess the status of the TRL stock and evaluate the performance

of the eHCR. The final Harvest Strategy also details a number of decision rules that are designed to maintain the stock at the agreed target reference point.

6. The eHCR uses the pre-season survey 1+ and 0+ indices, both standardised catch per unit effort (CPUE) indices (TVH and TIB), applies the natural logarithms of the slopes of the five most recent years' data and includes an upper catch limit of 1,000 tonnes. The relative weightings of the eHCR indices are 70% pre-season survey 1+ index, 10% pre-season survey 0+ index, 10% TIB sector standardised CPUE and 10% TVH sector standardised CPUE. The eHCR includes a maximum catch limit of 1000 tonnes. Further explanation regarding the design of the eHCR is provided at **Attachments 6c-6d**.
7. CSIRO have developed an eHCR RBC calculator to assist stakeholders in understanding how the eHCR works (**Attachment 6e**).

*RBC*

8. The eHCR will be applied to provide RBC estimates for the 2019-20 fishing season. CSIRO will present this work at the meeting.
9. The RAG is being asked to review CSIRO's application of the eHCR and provide advice on a RBC for the 2019-20 fishing season.
10. Under the final Harvest Strategy, the stock assessment model is to be updated every three years. This cycle will commence in 2019. The preliminary results of the updated stock assessment will be presented by CSIRO under Agenda Item 7. These results will not be used to determine a RBC for the 2019-20 fishing season, rather to assess the status of the TRL stock and evaluate the performance of the eHCR.

## BACKGROUND

*TAC setting process*

11. The quota management system (including the TAC determination arrangements) under the Management Plan comes into effect for the first fishing season following the finalisation of the allocation process prescribed under Part 3 of the Plan. The allocation process was completed on 16 September 2019. The next fishing season commences on 1 December 2019.
12. Under subsection 13 of the 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.
13. 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.
14. 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.
15. 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 2019-20 fishing season is provided in **Attachment 6f**.

*Interim TAC*

16. 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.

17. The TRLRAG further advised that if needed, an additional 100 tonnes be added to the start of season catch limit amount, to account for catches from PNG.

18. 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.

19. The TRLWG supported the above approach at their meeting on 8 November 2018.

*Development of the Harvest Strategy*

20. The draft Harvest Strategy was developed in close consultation with the TRLRAG and TRL Working Group (TRLWG) at meetings held since 2016. The release of the draft Harvest Strategy for public consultation was supported by both the TRLRAG and TRLWG (meetings held on 5 February 2019 and 19-20 February 2019, respectively).

21. At its meeting on 1 April 2019, the PZJA agreed to release the draft Harvest Strategy for the TRL Fishery for public consultation for a period of 8 weeks. Submissions were able to be made by in writing, over the phone and at community meetings. The period for submissions closed on 31 May 2019.

22. The TRLRAG and TRLWG were provided an opportunity to consider the outcomes of public consultation out-of-session from 16 September to 9 October 2019.

23. At its meeting on 19 November 2019, following consideration of the outcomes of public consultation and advice from the TRLRAG and TRLWG, the PZJA agreed to adopt the final Harvest Strategy for the TRL Fishery.

Australian Government

Australian Fisheries Management Authority

# Torres Strait Tropical Rock Lobster Fishery Harvest Strategy

November 2019

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This harvest strategy is based on outcomes from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Oceans and Atmosphere Division project, *Torres Strait Tropical Rock Lobster (TRL) fishery surveys, stock assessment, harvest control rules and RBC*. The project was funded by the Australian Fisheries Management Authority (AFMA).

AFMA Project No. 2016/0822.

Project Authors: Éva Plagányi (Principal Investigator), Darren Dennis, Roy Deng, Robert Campbell, Trevor Hutton, Mark Tonks

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# GLOSSARY

**Types of reference points:**

| Reference Point | Description |
|---|---|
| Metarule | A rule that describes how the RBCs obtained from an assessment should be adjusted in calculating a recommended TAC |
| Target | The desired state of the stock or fishery (for example, MEY or $B_{TARG}$)[1] |
| Limit | The level of an indicator (such as biomass or fishing mortality) beyond which the risk to the stock is regarded as unacceptably high[1] |
| MEY | The sustainable catch or effort level for a commercial fishery that allows net economic returns to be maximised. In this context, maximised equates to the largest positive difference between total revenue and total cost of fishing[1] |
| MSY | The maximum average annual catch that can be removed from a stock over an indefinite period under prevailing environmental conditions[1] |

**Notation:**

| Notation | Description |
|---|---|
| B | Spawning biomass - the total weight of all adult (reproductively mature) fish in a population[1] |
| $B_0$ | The unfished spawning biomass (determined from an appropriate reference point) |
| F | Fishing mortality rate |
| $B_{LIM}$ | Biomass limit reference point - the point beyond which the risk to the stock is regarded as unacceptably high[1] |
| $B_{TARG}$ | Biomass target reference point - the desired biomass of the stock[1] |

**Other acronyms:**

| Acronym | Description |
|---|---|
| CPUE | Catch per unit effort |
| eHCR | Empirical Harvest Control Rule |
| HCR | Harvest Control Rule - pre-determined rules that control fishing activity according to the biological and economic conditions of the fishery (as defined by monitoring or assessment). Also called 'decision rules'. HCR are a key element of a harvest strategy[1] |
| HSP | *Commonwealth Fisheries Harvest Strategy Policy: Framework for applying an evidence-based approach to setting harvest levels in Commonwealth fisheries* (June 2018) |
| HS | Torres Strait Tropical Rock Lobster Fishery Harvest Strategy |
| PZJA | Protected Zone Joint Authority |

[1] Definition sourced from the *Commonwealth Fisheries Harvest Strategy Policy: Framework for applying an evidence-based approach to setting harvest levels in Commonwealth fisheries* (June 2018)

| | |
|---|---|
| MSE | Management Strategy Evaluation - a procedure whereby alternative management strategies are tested and compared using simulations of stock and fishery dynamics[1] |
| RBC | Recommended Biological Catch |
| TRLRAG | Protected Zone Joint Authority Tropical Rock Lobster Resource Assessment Group |
| TRLWG | Protected Zone Joint Authority Tropical Rock Lobster Working Group |
| TAC | Total Allowable Catch- the annual catch limit set for a stock, species or species group. Used to control fishing mortality within a fishery[1] |
| Tiered approach | A framework that uses different control rules to cater for different levels of uncertainty about a stock |
| TIB | Traditional inhabitant boat |
| TVH | Transferrable vessel holder |
| TRL | Tropical Rock Lobster |
| TSPZ | Torres Strait Protected Zone |

# OVERVIEW

The Torres Strait Tropical Rock Lobster Fishery (the Fishery) Harvest Strategy (HS) sets out the management actions needed to achieve the agreed Fishery objectives. The HS describes the performance indicators used for monitoring the condition of the stock, the fishery-independent survey and stock assessment procedures and the rules applied to determine the recommended biological catch (RBC) and the total allowable catch (TAC) each fishing season.

The HS uses a single tier approach with an empirical harvest control rule (eHCR) that is used to determine a RBC. The eHCR uses the pre-season survey index of abundance of juvenile (1+) and newly recruited (0+) Tropical Rock Lobster (TRL) and the catch per unit effort (CPUE) indices for the traditional inhabitant boat (TIB) and transferrable vessel holder (TVH) fishing sectors. The eHCR has been extensively tested using Management Strategy Evaluation (MSE) (Plagányi *et al.* 2018). The RBC is the best available scientific advice on what the total fishing mortality (landings from all sectors and discards) should be for the stock. The RBC is used to negotiate Australia-Papua New Guinea catch sharing and recommend TACs (an enforced limit on total catches).

The HS meets the requirements of the *Commonwealth Fisheries Harvest Strategy Policy: Framework for applying an evidence-based approach to setting harvest levels in Commonwealth fisheries* (June 2018) *(*HSP) by applying a precautionary approach to the reference points and measures to be implemented in accordance with the reference points. This is reflected in the use of proxy reference points that are more precautionary than those specified in the HSP. The eHCR is designed to decrease exploitation rate as the stock size decreases below the target reference point. The HS uses a biomass target reference point equal to recent levels (2005-2015) that take account of the fact that the resource is shared and important for the traditional way of life and livelihood of traditional inhabitants and is biologically and economically acceptable. The HS proxies are $B_{LIM}$ is 32% of $B_0$, $B_{TARG}$ is 65% of $B_0$.

Further work for the HS will include the development of a tiered approach. The tiered approach applies different types of control rules to cater for different amounts of data available and to account for changes to uncertainty on stock status. A tiered approach adopts increased levels of precaution that correspond to increasing levels of uncertainty about the stock status, in order to maintain the same level of risk across the different tiers.

The status of the stock and how it is tracking against the HS, is reported to the Tropical Rock Lobster Resource Assessment Group (RAG), Tropical Rock Lobster Working Group (TRLWG) and the Protected Zone Joint Authority (PZJA). The stock assessment is conducted periodically to evaluate stock status relative to reference levels and, in doing so, performance of the eHCR. The stock assessment includes considerations of the catch rates in current and previous fishing seasons, how the catches compare to the RBCs, stock status indicators in relation to the reference points and an RBC for the upcoming fishing season.

# 1 BACKGROUND

This Torres Strait Tropical Rock Lobster Fishery (the Fishery) Harvest Strategy (HS) has been developed in accordance with the *Commonwealth Fisheries Harvest Strategy Policy: Framework for applying an evidence-based approach to setting harvest levels in Commonwealth fisheries* (June 2018) (HSP) and consistent with objectives of the *Torres Strait Fisheries Act 1984* (the Act).

The Fishery HS takes into account key fishery specific attributes including:

a) there is potential for large, unpredictable inter-annual variations in availability and abundance of Tropical Rock Lobster (TRL);

b) TRL is a shared resource important for the traditional way of life and livelihood of traditional inhabitants, commercial and recreational sectors (Tropical Rock Lobster Resource Assessment Group (TRLRAG) 20, 4-5 April 2017); and

c) advice from the TRLRAG industry members to maintain stock abundance at recent levels (2005-2015) (TRLRAG 17, 31 March 2016).

## 1.1 COMMONWEALTH FISHERIES HARVEST STRATEGY POLICY

The objective of the HSP is the ecologically sustainable and profitable use of Australia's Commonwealth commercial fisheries resources (where ecological sustainability takes priority) - through implementation of harvest strategies.

To pursue this objective the Australian Government will implement harvest strategies that:

a) ensure exploitation of fisheries resources and related activities are conducted in a manner consistent with the principles of ecologically sustainable development, including the exercise of the precautionary principle

b) maximise net economic returns to the Australian community from management of Australian fisheries - always in the context of maintaining commercial fish stocks at sustainable levels

c) maintain key commercial fish stocks, on average, at the required target biomass to produce maximum economic yield from the fishery

d) maintain all commercial fish stocks, including byproduct, above a biomass limit where the risk to the stock is regarded as unacceptable ($B_{LIM}$), at least 90 per cent of the time

e) ensure fishing is conducted in a manner that does not lead to overfishing - where overfishing of a stock is identified, action will be taken immediately to cease overfishing

f) minimise discarding of commercial species as much as possible

g) are consistent with the *Environment Protection and Biodiversity Conservation Act 1999* and the *Guidelines for the Ecologically Sustainable Management of Fisheries*.

For fisheries that are managed jointly by an international organisation or arrangement, the HSP does not prescribe management arrangements. This includes management arrangements for commercial and traditional fishing in the Torres Strait Protected Zone (TSPZ), which are governed by provisions of the Torres Strait Treaty and the *Torres Strait Fisheries Act 1984*. However, it does articulate the government's preferred approach.

The HSP provides for the use of proxy settings for reference points to cater for different levels of information available and unique fishery circumstances. This balance between prescription and flexibility encourages the development of innovative and cost effective strategies to meet key policy objectives. Proxies, including those that exceed the minimum standards, must be demonstrated to be compliant with the HSP objective.

With a harvest strategy in place, fishery managers and stakeholders are able to operate with pre-defined rules, management decisions are more transparent, and there are likely fewer unanticipated outcomes necessitating hasty management responses. However, due to the inherently natural variability of TRL abundance there may be a need for significant changes in recommended catch on an annual basis.

## 1.2 DEVELOPMENT OF THE TRL HARVEST STRATEGY

The HS has been developed in consultation with the TRLRAG (meeting no. 17 on 31 March 2016; meeting no. 18 on 2-3 August 2016; meeting no. 19 on 13 December 2016; meeting no. 20 on 4-5 April 2017; meeting no. 22 on 27-28 March 2018; meeting no. 24 on 18-19 October 2018; and meeting no. 25 on 11-12 December 2018; out of session 16 September-9 October 2019) and TRLWG (meeting no. 6 on 25-26 July 2017; meeting no. 9 on 19-20 February 2019; out of session 16 September-9 October 2019). This HS replaces the interim HS developed for the Fishery in 2008.

# 2 TRL FISHERY HARVEST STRATEGY

## 2.1 SCOPE

This HS applies to the whole Fishery and it takes into account catch sharing arrangements between Australia and Papua New Guinea (PNG).

The HS outlines the control rules used to develop advice on the recommended biological catch (RBC) and to recommend total allowable catches (TACs) (an enforced limit on total catches). The HS sets the criteria that pre-agreed management decisions will be based on in order to achieve the HS objectives.

Over time the HS may be amended to use a tiered approach to cater for different amounts of data available and different types of assessments (for example mid-season surveys and annual assessments). Underpinning a tiered HS is increased levels of precaution with increasing levels of uncertainty about the stock status. Each tier has its own harvest control rule (HCR) and associated rules that are used to determine a RBC.

## 2.2 OBJECTIVES

The operational objectives of the HS are to:

a) Maintain the stock at (on average), or return to, a target biomass point $B_{TARG}$ equal to recent levels (2005-2015) that take account of the fact that the resource is shared and important for the traditional way of life and livelihood of traditional inhabitants and is biologically and economically acceptable.

    - The agreed $B_{TARG}$ is more precautionary than the default proxy $B_{MEY}$ (biomass at maximum economic yield) level as outlined in the HSP.

b) Maintain the stock above the limit biomass level ($B_{LIM}$), or an appropriate proxy, at least 90 per cent of the time.

    - The agreed $B_{LIM}$ is more precautionary than the default proxy HSP $B_{LIM}$.

c) Implement rebuilding strategies, if the spawning stock biomass is assessed to fall below $B_{LIM}$ in two successive years.

## 2.3 RECOMMENDING TACs FROM RBCs

The RBC is the recommended total catch of TRL (both retained and discarded) that can be taken by all sectors within the TSPZ and waters declared as areas outside but near to the TSPZ, including Australian and PNG fishers. The HSP states that when setting the TAC for the next fishing season the HS should take into account all sources of fishing mortality.

The HS does not include catches taken by non-commercial fishing sectors, for example traditional, recreational or research catches. The TRLRAG recommended at meeting no. 18 on 2-3 August 2016 that non-commercial catches not be estimated in the stock assessment model or when setting the TAC at this time, noting the likely low level of overall catch and

the lack of accurate data. However, if unaccounted fishing mortality were to increase significantly this may impact on the performance of the stock assessment. The HS may be updated in the future to account for changing circumstances in the Fishery, the review provisions are described in **Section 2.13**.

## 2.4 MONITORING

Biological data for the Fishery are monitored by a range of methods listed below. Currently there is no ongoing monitoring strategy in place to collect economic information.

**Fishery independent surveys**

A key component of the monitoring program is the fishery-independent survey which provides a time-series of relative abundance indices for TRL. 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 transition to quota management and setting of a TAC. Pre-season surveys also provide indices of recently-settled (age 0+) lobsters, which may become useful under quota management as they allow forecasting of stock one year in advance and are used in the eHCR.

**Catch and effort information**

Fishers in the transferrable vessel holder (TVH) sector are required to record catch and effort information in the Torres Strait Tropical Rock Lobster Daily Fishing Log (TRL04). The following data are recorded for each TVH fishing operation: the port and date of departure and return, fishing area, fishing method, hours fished and the weight (whole or tails) of TRL retained. Fishers in both the TVH and traditional inhabitant boat (TIB) sectors are required to record catch information in the Torres Strait Fisheries Catch Disposal Record (TDB02). The provision of effort information under the TDB02 is voluntary. Some processors previously (2014-2016) reported aggregate TIB catch information directly to AFMA predominantly through the Torres Strait Seafood Buyers and Processors Docket Book (TDB01).

## 2.5 INTEGRATED STOCK ASSESSMENT MODEL

The stock assessment model (termed the 'Integrated Model') (Plagányi *et al.* 2009) was developed in 2009 and is an Age-Structured Production Model, or Statistical Catch-at-Age Analysis (SCAA) (e.g. Fournier and Archibald 1982). It is a widely used approach for providing RBC advice and the associated uncertainties.

The model integrates all available information into a single framework to assess resource status and provide a RBC. The model addresses all of the concerns highlighted in a review of the previous stock assessment approach (Bentley 2006, Ye *et al*. 2006, 2007). The model

is fitted to the mid-season and pre-season survey data and TIB and TVH catch per unit effort (CPUE) data. The growth relationships used in the model were revised from the previous stock assessment model (Ye *et al*. 2006) to ensure that the modelled individual mass at age more closely resembled field measurements. The model has been used as an Operating Model in a Management Strategy Evaluation (MSE) framework to support the management of the Fishery (Plagányi *et al.* 2012, 2013, 2018).

The stock assessment model is non-spatial and assumes (conservatively) that the Torres Strait Tropical Rock Lobster Fishery stock is independent of the Queensland East Coast Tropical Rock Lobster Fishery stock. A spatial version of the model has been developed as part of an earlier MSE project, and can be used to investigate plausible linkages between these stocks (Plagányi *et al*. 2012, 2013).

The model includes three age-classes only (0+, 1+ and 2+ age lobsters) as it is assumed that lobsters migrate out of the Torres Strait in October each year. Torres Strait TRL emigrate in spring (September-November) and breed during the subsequent summer (November-February) (MacFarlane and Moore 1986; Moore and Macfarlane 1984). A Beverton-Holt stock-recruitment relationship is used (Beverton and Holt 1957), allowing for annual fluctuation about the average value predicted by the recruitment curve. The model is fitted to the available abundance indices by maximising the likelihood function. Quasi-Newton minimisation is used to minimise the total negative log-likelihood function (using the package AD Model Builder™) (Fournier *et al*. 2012).

## 2.6 EMPIRICAL HARVEST CONTROL RULE

The empirical harvest control rule (eHCR) recommended by the TRLRAG uses the pre-season survey 1+ and 0+ indices, both standardised CPUE indices (TVH and TIB), applies the natural logarithms of the slopes of the five most recent years' data and the average catch over the past five years, with an upper catch limit of 1,000 t. The relative weightings of the eHCR indices are 70 per cent pre-season survey 1+ index, 10 per cent pre-season survey 0+ index, 10 per cent TIB sector standardised CPUE and 10 per cent TVH sector standardised CPUE.

The basic formula is:

$$RBC_{y+1} = wt\_s1 \cdot \left(1 + s_y^{presurv,1}\right) \cdot \bar{C}_{y-4,y} + wt\_s2 \cdot \left(1 + s_y^{presurv,0}\right) \cdot \bar{C}_{y-4,y}$$
$$+ wt\_c1 \cdot \left(1 + s_y^{CPUE,TVH}\right) \cdot \bar{C}_{y-4,y} + wt\_c2 \cdot \left(1 + s_y^{CPUE,TIB}\right) \cdot \bar{C}_{y-4,y}$$

Or if $RBC_{y+1}$ > 1000t, $TAC_{y+1}$ = 1000.

Where:

$\bar{C}_{y-4,y}$ is the average achieved catch during the past 5 years, including the current year i.e. from year *y*-4 to year *y*,

$s_y^{presurv,1}$ is the slope of the logarithms of the preseason survey 1+ abundance index, based on the 5 most recent values;

$s_y^{presurv,0}$ is the slope of the logarithms of the preseason survey 0+ abundance index, based on the 5 most recent values;

$s_y^{CPUE,TVH}, s_y^{CPUE,TIB}$ is the slope of the logarithms of the TVH and TIB CPUE abundance index, based on the 5 most recent values;

wt_s1, wt_s2, wt_c1, wt_c2 are tuning parameters that assign relative weight to the preseason 1+ (wt_s1) and 0+ (wt_s2) survey trends compared with the CPUE TVH (wt_c1) and TIB (wt_c2) trends.

## 2.7 REFERENCE POINTS

The HS reference points are:

a) The unfished biomass $B_0$ is the model-estimate of spawning stock biomass in 1973 (start of the Fishery). $B_0 = B_{1973}$.

b) The target biomass $B_{TARG}$ is the spawning biomass level equal to recent levels (2005-2015) that take account of the fact that the resource is shared and important for the traditional way of life and livelihood of traditional inhabitants and is biologically and economically acceptable. $B_{TARG}$ is the proxy for $B_{MEY}$, $B_{TARG} = 0.65\ B_0$.

   - The agreed $B_{TARG}$ is more precautionary than the default proxy $B_{MEY}$ (biomass at maximum economic yield) level as outlined in the HSP. The TRLRAG noted a $B_{TARG}$ higher that the HSP default was considered important for the Fishery because: 1) the stock is a shared resource that is particularly important for traditional fishing; 2) the stock has high variability; and, 3) all industry members recommended the HS maintain the stock around the relatively high current levels (TRLRAG meeting no. 17, 31 March 2016 and meeting no. 18, 2-3 August 2016).

c) The limit biomass $B_{LIM}$ is the spawning biomass level below which the risk to the stock is unacceptably high and the stock is defined as 'overfished'. $B_{LIM}$ is agreed to be half of $B_{TARG}$, $B_{LIM} = 0.32\ B_0$.

   - The agreed $B_{LIM}$ is more precautionary than the default proxy HSP $B_{LIM}$.

d) If the limit reference point ($B_{LIM}$) is triggered in two successive years then the Fishery is closed.

e) The target fishing mortality rate $F_{TARG}$ is the estimated level of fishing mortality rate that maintains the spawning biomass around $B_{TARG}$. $F_{TARG} = 0.15$.

- $F_{TARG}$ = 0.15 is the target fishing mortality rate that corresponds to an optimal level in terms of economic, biological and social considerations (TRLRAG meeting no. 18, 2-3 August 2016).

***Rational for reference points***

The HSP recognises that each stock/species/fishery will require an approach tailored to the fishery circumstances, including species characteristics. The HSP identifies that the selection of reference points within harvest strategies need to be realistic with respect to the scale or nature of the fishery and the resources available to manage it. Reference points should be set at levels appropriate to the biology of the species and the proper functioning of the broader marine ecosystem. Further, stocks that fall below $B_{LIM}$ will be subject to the recovery measures stipulated in the HSP. A number of adaptive management approaches may be used to deal with this, such as pre-season surveys to provide estimates of abundance to which the eHCR is applied.

The Fishery is characterised by a highly variable stock where majority of the catch (since 2001 due to the introduction of a minimum size limit) is from a single cohort. The stock assessment model and MSE testing have identified the target biomass should be set between 65 and 80 per cent of the unfished biomass to account for the importance of the stock for the traditional way of life and livelihood of traditional inhabitants and to achieve biological and economic objectives. The HS's higher average target biomass level, compared to the default HSP target of 0.48 per cent of unfished biomass, reduces the risk of recruitment being compromised.

The unfished biomass ($B_0$) is calculated within the stock assessment model, the value of unfished biomass and target biomass have therefore varied over time in response to annual data updates and model parameter settings and estimates. Estimates of unfished biomass and target biomass are particularly sensitive to changes to parameter *h*, which determines the steepness of the stock-recruit relationship, and the input parameter that controls the level of stock-recruit variability.

Independent of variability to the unfished biomass value, the target fishing mortality rate $F_{TARG}$ = 0.15 is applied to maintain the spawning biomass around the biomass target reference point ($B_{TARG}$), which is the average level over the past two decades. This is assumed to be a proxy for $B_{MEY}$ because stakeholders agreed that this target level corresponded to an optimal level in terms of economic, biological and social considerations (TRLRAG meeting no. 18, 2-3 August 2016).

The biomass limit reference point ($B_{LIM}$) is 32 per cent of unfished biomass. The higher limit reference point, compared to the HSP proxy of 20 per cent of unfished biomass, is supported by recommendations of similar limit reference points for other highly variable species such as forage fish (Pikitch *et al.* 2012). Due to the changing values of unfished biomass and target biomass the value of the limit reference point, taken as half the target reference point, has previously varied between 32 and 40 per cent of unfished biomass.

Recent MSE testing identified that a limit reference point of 40 per cent unfished biomass is too conservative, it would result in the limit reference point being breached more frequently and add unnecessary precaution to the HS. The TRLRAG agreed to set the limit reference

point at 32 per cent of unfished biomass with the condition that if the stock falls below the limit reference point in two successive years it triggers a Fishery closure. The eHCR is more precautionary than the HSP criterion to 'maintain all commercial fish stocks, including byproduct, above a biomass limit where the risk to the stock is regarded as unacceptable ($B_{LIM}$), at least 90 per cent of the time'. The HSP provides for the designation of a limit reference point above the proxy ($B_{20}$) where this has been estimated or is deemed appropriate.

## 2.8 eHCR AND STOCK ASSESSMENT CYCLE

The eHCR and stock assessment cycle is as follows:

- The eHCR is run in November each year to provide a RBC by 1 December for the following fishing season.
- A stock assessment is run on a three year cycle by March, unless the stock assessment is triggered by a decision rule **(Section 2.10)**. The stock assessment determines the Fishery stock status and evaluates the performance of the eHCR and identifies if any revisions to the eHCR are required.
- If the eHCR needs to be revised, the stock assessment is conducted annually to estimate the RBC until the revised eHCR is agreed.

## 2.9 DATA SUMMARY

The annual data summary reviews the nominal and standardised 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.

## 2.10 DECISION RULES

The decision rules for the HS are:

**Maximum catch limit**

- The eHCR includes a maximum catch limit of 1000 t. Once the HS is implemented the cap will be reviewed after three years using MSE testing with the updated stock assessment model.

**Pre-season survey trigger**

- 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.

**Biomass limit reference point triggered**

- If the pre-season survey trigger is triggered in the first year, a stock assessment update must be conducted in March.
    - If after the first year the stock is assessed below the biomass limit reference point, it is optional to conduct a mid-season survey, the pre-season survey must continue annually.
- If the pre-season survey trigger is triggered two years in a row, a stock assessment must be conducted in December (of the second year).

**Fishery closure rules**

- If the stock assessment determines the stock to be below the biomass limit reference point in two successive years, the Fishery will be closed to commercial fishing.
    - MSE testing of the eHCR has shown that it is extremely unlikely (<1%) for the Fishery to be closed based on its current performance (Plagányi *et al.* 2018).

**Re-opening the Fishery**

- Following closure of the Fishery, fishery-independent mid-season and pre-season surveys are mandatory. The Fishery can only be re-opened when a stock assessment determines the Fishery to be above the biomass limit reference point **(Attachment A, Figure 5)**.

Based on the decision rules, there are four alternative possible scenarios **(Section 2.11)** that may occur under the application of the eHCR. Graphic representations of the four scenarios are provided in **Attachment A**.

## 2.11 DECISION RULE SCENARIOS

**Scenario 1 – Pre-season survey trigger not triggered and the eHCR does not require revision**

- The pre-season survey trigger is not triggered.
- The eHCR RBCs appear to remain within ranges tested by MSE.
- The updated stock assessment does not indicate any need for revision of the eHCR.
- Application of the eHCR continues unchanged.
- A graphic representation of Scenario 1 is provided in **Attachment A, Figure 1**.

**Scenario 2 – Pre-season survey trigger not triggered, eHCR and stock assessment require revision**

- The pre-season survey trigger is not triggered.

- The eHCR RBCs appear to remain within ranges tested by MSE.
- The updated stock assessment indicates the eHCR recommended RBCs are outside the revised ranges tested by MSE, indicating that the eHCR should be revised.
- Annual RBCs need to be set using annual stock assessments until a revised eHCR has been agreed, after which the revised eHCR is applied.

A graphic representation of Scenario 2 is provided in **Attachment A, Figure 2**.

**Scenario 3– Pre-season survey trigger is triggered, eHCR is reviewed by stock assessment and the biomass limit reference point is not breached**

- The pre-season survey trigger is triggered in one year.
- A stock assessment update (March) is required to confirm if the biomass limit reference point has been breached. This assessment update determines that the biomass limit reference point has not been breached.
- If the biomass limit reference point is breached once, discussions will be held on preventative measures to reduce the risk of closure.
- The eHCR RBC is applied and consideration is given to revising the eHCR to prevent future incorrect indications that the biomass limit reference point may have been breached.
- The stock assessment continues on a three year cycle, unless triggered to occur by a decision rule.
- A graphic representation of Scenario 3 is provided in **Attachment A, Figure 3**.

**Scenario 4 – Pre-season survey trigger is triggered, stock assessment confirms the biomass limit reference point is breached**

- The pre-season survey trigger is triggered in one year.
- A stock assessment update (March) is required to confirm if the biomass limit reference point has been breached. This assessment update determines that the biomass limit reference point has been breached.
- The pre-season survey trigger is triggered for a second successive year.
- A second stock assessment update (December) is required to confirm whether the biomass limit reference point has been breached a second time. This assessment update determines that the biomass limit reference point has been breached a second time.
- The commercial fishery is closed until an assessment update confirms that the stock has recovered to above the biomass limit reference point.
    - If the Fishery is closed to commercial fishing, discussions are held on future management arrangements.

  - Fishery-independent mid-season and pre-season surveys are mandatory and conducted on an annual basis. The Fishery will only re-open when the Fishery is assessed to be above the biomass limit reference point by the stock assessment.
  - The eHCR must be revised before being re-implemented to reduce the risk of the Fishery breaching the biomass limit reference point and for the eHCR to incorporate rebuilding requirements.

- A graphic representation of Scenario 4 is provided in **Attachment A, Figure 4**.

## 2.12 GOVERNANCE

The status of the Fishery and how it is tracking against the HS is reported to the TRLRAG, TRLWG and the PZJA as part of the yearly RBC and TAC setting process.

## 2.13 REVIEW

Harvest strategies are to be reviewed every five years. However, it may be necessary to amend harvest strategies earlier if:

- a marked change in stocks targeted occurs, leading to a change in which stocks are categorised as key commercial
- new information substantially changes understanding of the fishery, leading to revised estimates of indicators relative to reference points
- external drivers have unexpectedly increased the risk to a fishery and fish stocks, including environmental or climate drivers that have substantially altered the productivity characteristics (growth or recruitment) of the stock
- performance indicators show that harvest strategies are not working effectively, and that the intent of the HSP is not being met.

Early review may be triggered when either:

- harvest strategies are implemented without formal testing or evaluation using methods such as MSE
- MSE testing did not take adequate account of the changes in risk factors subsequently observed, or
- subsequent estimates of the performance indicators used in the HCR are biased or uncertain to the extent that application of the control rule using these indicators fails to appropriately adjust fishing pressure.

# 3 REFERENCES


Bentley, N. 2006. Review of chapter 5 of Ye *et al* (2006) "Sustainability Assessment of the Torres Strait Rock Lobster Fishery". Report submitted to AFMA.

Beverton, R.; Holt, S. 1957. On the dynamics of exploited fish populations. UK Ministry of Agriculture and Fisheries Investigations (Ser 2). 19.

Department of Agriculture and Water Resources. 2018. Commonwealth Fisheries Harvest Strategy Policy, Canberra, June. CC BY 4.0.

Fournier, D.A.; Skaug, H.J.; Ancheta, J.; Ianelli, J.; Magnusson, A.; Maunder, M.N.; Nielsen, A.; Sibert, J. 2012. AD Model Builder: using automatic differentiation for statistical inference of highly parameterized complex nonlinear models. *Optimization Methods and Software*. 27:233-249.

MacFarlane, J.; Moore, R. 1986. Reproduction of the ornate rock lobster, *Panulirus ornat*us (Fabricius), in Papua New Guinea. *Mar Freshwater Res*. 37:55-65.

Moore, R.; Macfarlane, J.W. 1984. Migration of the Ornate Rock Lobster, *Panulirus ornatus* (Fabricius), in Papua-New-Guinea. *Aust J Mar Fresh Res*. 35:197-212.

Pikitch, E.; Boersma, P.D.; Boyd, I.L.; Conover, D.O.; Cury, P.; Essington, T.; Heppell, S.S.; Houde, E.D.; Mangel, M.; Pauly, D.; Plagányi, É.E.; Sainsbury, K.; R.S. Steneck. 2012. Little Fish, Big Impact: Managing a crucial link in ocean food webs. Lenfest Ocean Program. Washington, DC. 108 pp.

Plagányi, É.E.; Dennis, D.; Kienzle, M.; Ye, Y.; Haywood, M.; Mcleod, I.; Wassenberg, T.; Pillans, R.; Dell, Q.; Coman, G.; Tonks, M.; Murphy, N. 2009. TAC estimation & relative lobster abundance surveys 2008/09. AFMA Project Number: 2008/837. CSIRO Final Report, October 2009. 80 pp.

Plagányi, É.E.; Kienzle, M.; Dennis, D.; Venables, W.; Tonks, M.; Murphy, N.; Wassenberg, T. 2010. Refined stock assessment and TAC estimation for the Torres Strait rock lobster (TRL) fishery. Australian Fisheries Management Authority Torres Strait Research program Final Report. AFMA Project number: 2009/845. 84 pp.

Plagányi, É.; Deng, R.; Dennis, D.; Hutton, T.; Pascoe, S.; van Putten, I.; Skewes, T. 2012. An integrated Management Strategy Evaluation (MSE) for the Torres Strait Tropical Rock Lobster *Panulirus ornatus* fishery. CSIRO/AFMA Final Project Report.

Plagányi, É.; Dennis, D.; Deng, R.; Campbell, R.; Hutton, T.; Tonks, M. 2016. Torres Strait Tropical Rock Lobster (TRL) *Panulirus ornatus* Harvest Control Rule (HCR) development and evaluation. CSIRO/AFMA Draft Final Project Report, AFMA Project No. 2016/0822; 110pp.

Plagányi, E.E.; van Putten, I.; Hutton, T.; Deng, R.A.; Dennis, D.; Pascoe, S.; Skewes, T.; Campbell, R.A. 2013. Integrating indigenous livelihood and lifestyle objectives in managing a natural resource. *P Natl Acad Sci USA*. 110:3639-3644.

Plagányi, É.; Deng, R.A.; Campbell, R.A.; Dennis, D.; Hutton, T.; Haywood, M.; Tonks, M. 2018. Evaluating an empirical harvest control rule for the Torres Strait *Panulirus ornatus* tropical rock lobster fishery. *Bulletin of Marine Science*, 94(3), pp.1095-1120.

Ye, Y.; Dennis, D.; Skewes, T. 2008. Estimating the sustainable lobster (*Panulirus ornatus*) catch in Torres Strait, Australia, using an age-structured stock assessment model. *Continental Shelf Research.* 28:2160-67.

## Torres Strait Tropical Rock Lobster Fishery – alternative annual Harvest Control Rule application scenarios

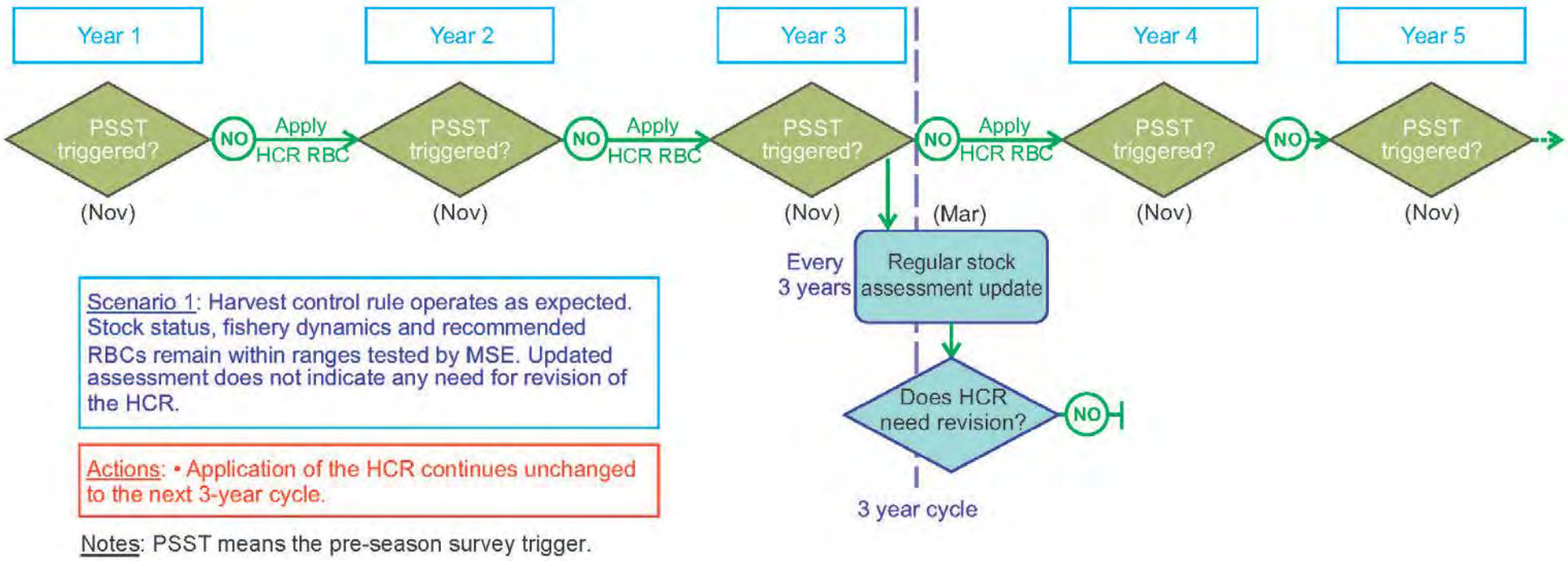



**Figure 1**. Torres Strait Tropical Rock Lobster Fishery decision rule scenario 1.

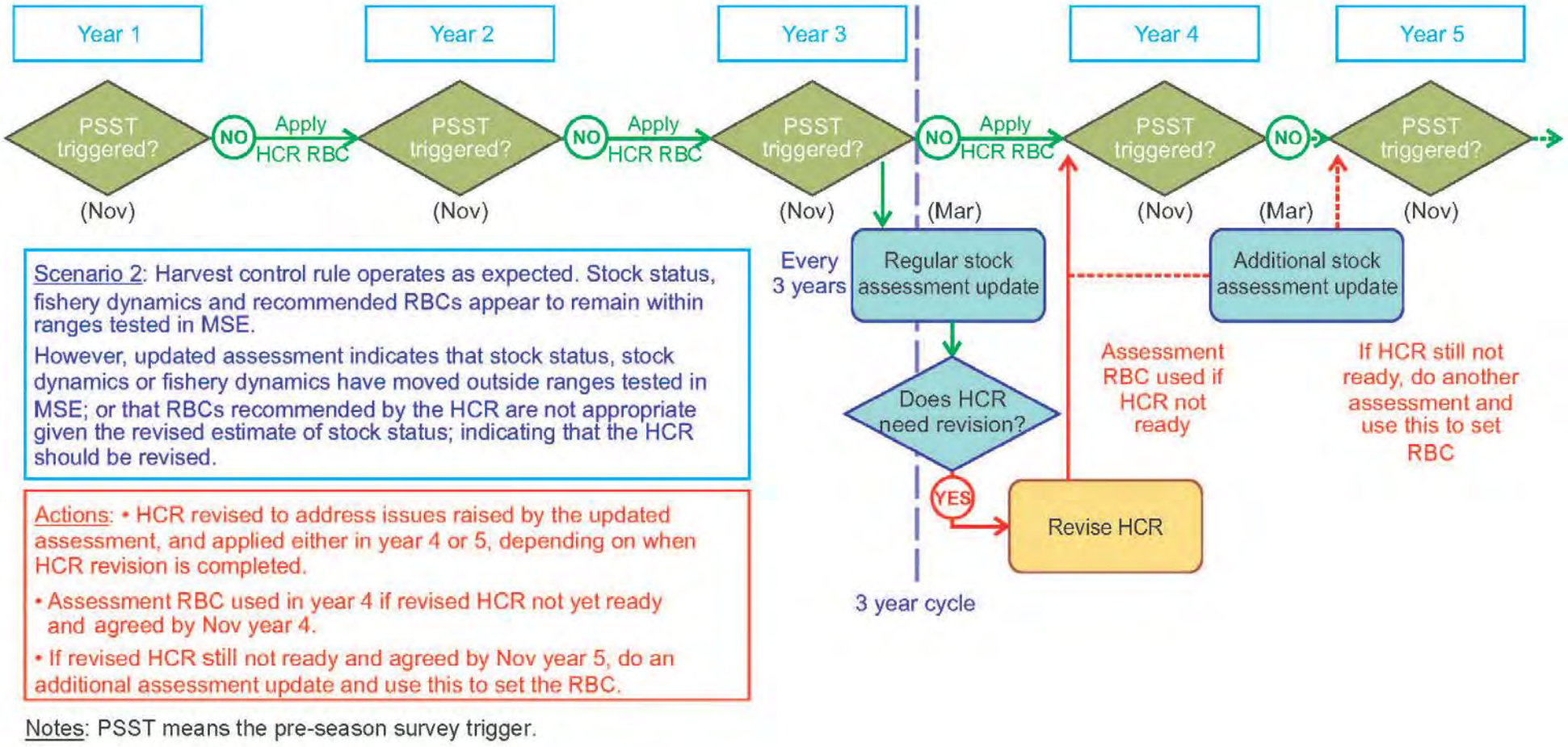



**Figure 2**. Torres Strait Tropical Rock Lobster Fishery decision rule scenario 2.

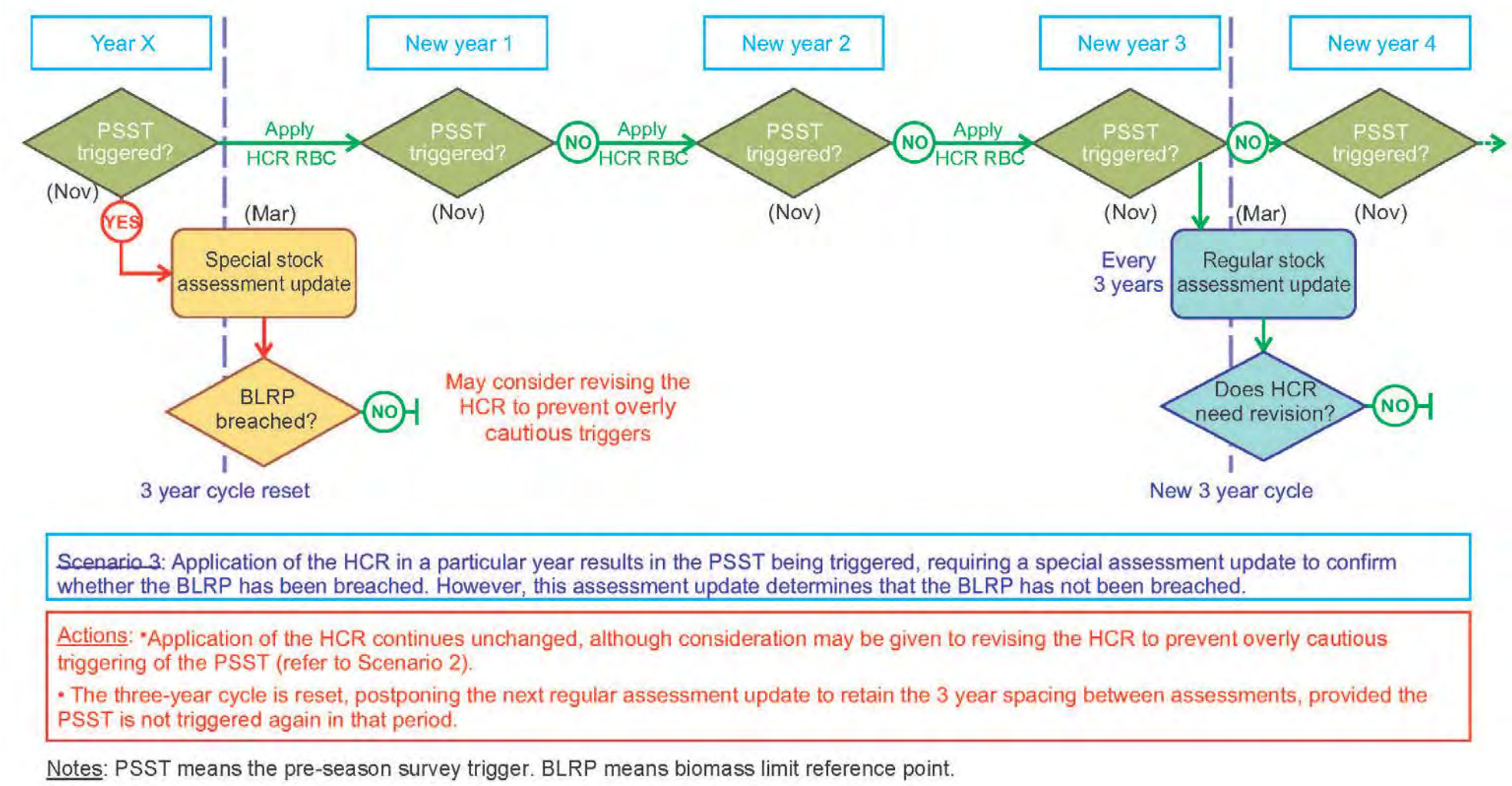
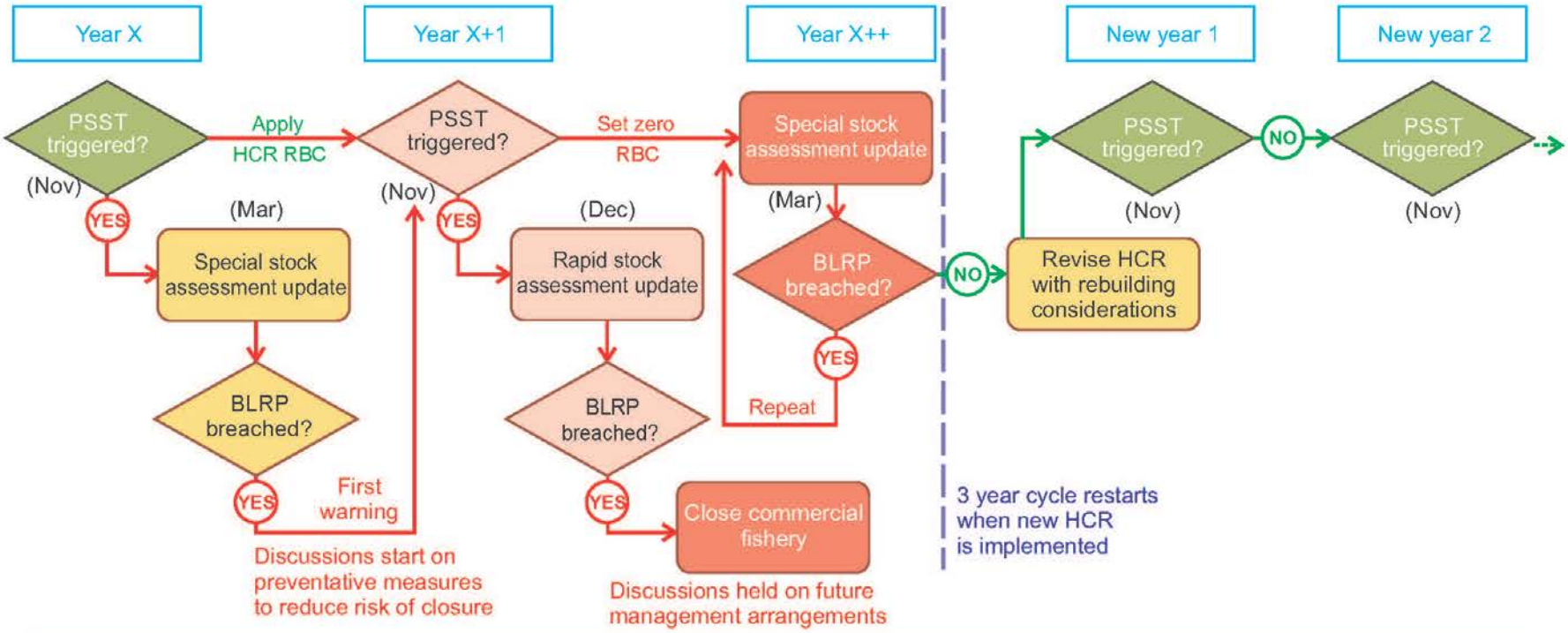



**Figure 3**. Torres Strait Tropical Rock Lobster Fishery decision rule scenario 3.




Scenario 4: Application of the HCR in a particular year results in the PSST being triggered, requiring a special assessment update to confirm whether the BLRP has been breached. Special assessment update confirms that the BLRP has indeed been breached.

Application of the HCR the following year results in the PSST being triggered for the second successive year, requiring a second rapid assessment update to confirm whether the BLRP has been breached a second time. Assessment update confirms that the BLRP has been breached again.

The commercial fishery is closed until an assessment update confirms that the stock has recovered to above the BLRP.

Actions: • When it has been confirmed that the BLRP has been breached the first time, discussions will be held on preventative measures to reduce the risk of closure.

• If it is confirmed that the BLRP has been breached for a second year and that the commercial fishery must be closed, discussions will be held on future management arrangements to reduce the risk of future closures.

• If the fishery is closed, annual assessments will be done until an assessment update confirms that the stock has recovered to above the BLRP.

• Before being re-implemented, the HCR will be revised to reduce the risk of breaching the BLRP in future and to incorporate rebuilding requirements.

Notes: PSST means the pre-season survey trigger. BLRP means biomass limit reference point.

**Figure 4**. Torres Strait Tropical Rock Lobster Fishery decision rule scenario 4.

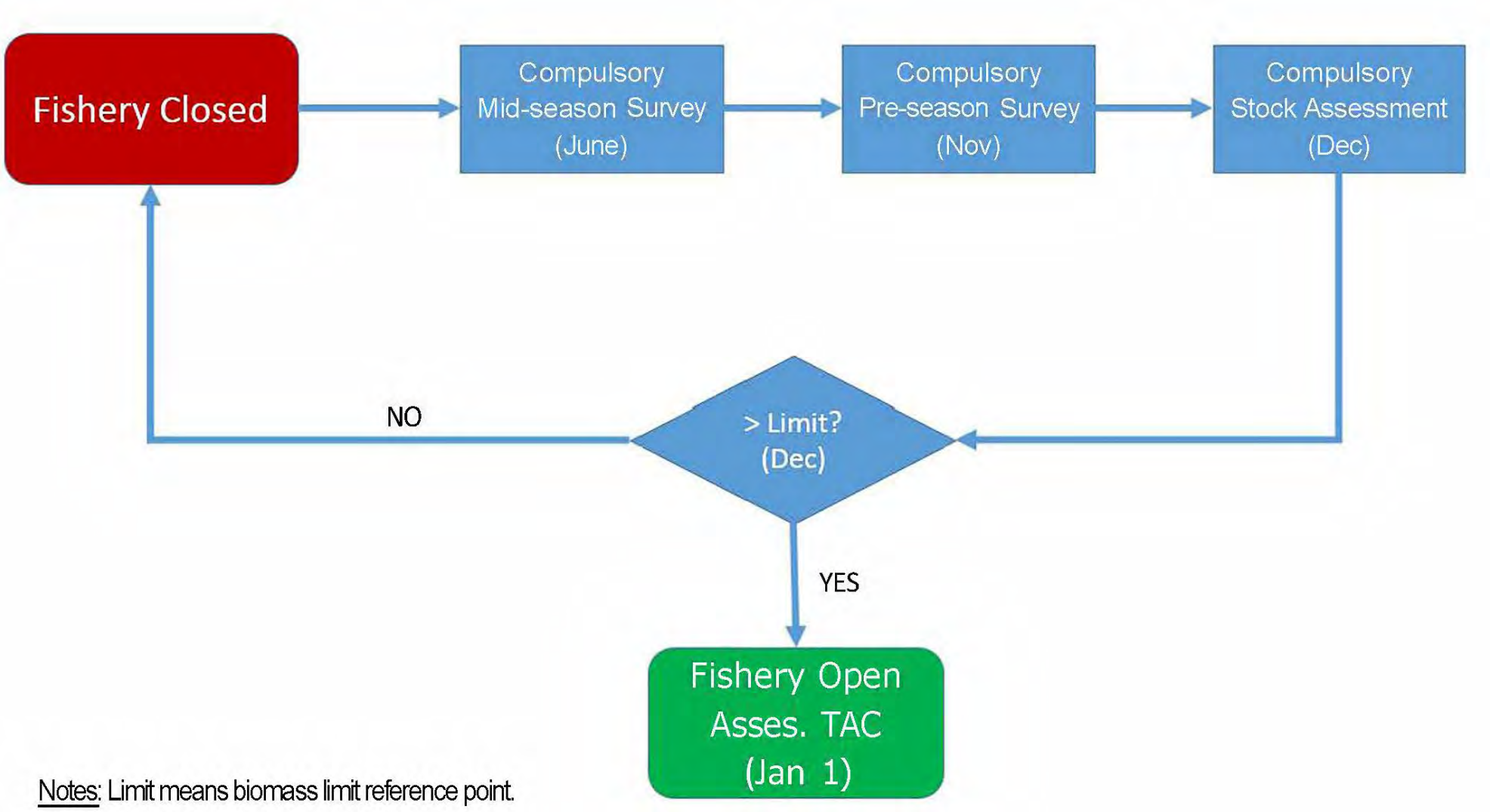



**Figure 5**. Torres Strait Tropical Rock Lobster Fishery closure and re-opening rule.

**Attachment 6b**

**Expected timeline for finalising a total allowable catch (TAC) for the Australian Torres Strait Tropical Rock Lobster Fishery (TRL Fishery)**

**Key:**

Scientific assessment and advice
PNG-Australia agreement
Administrative step for Australia

| Steps | Description | Indicative timeline |
|---|---|---|
| Agree timeline and process | AFMA CEO and PNG NFA Director General to meet to agree on process for agreement on catch sharing arrangements for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) for the coming fishing season. | 10 October 2019 |
| PNG and Australian catch and effort data compiled | Australian and PNG catch and effort data are compiled[1]. | By 31 October 2019 |
| Pre-season scientific survey | Survey data are collected and used to update TRL survey abundance indices used to calculate a recommended biological catch (RBC)[2]. Survey must be conducted in November to provide comparable results overtime and the most accurate estimate of annual lobster recruitment into the fishery. | 10-23 November 2019 |
| Australian start of season TAC determined | Minister to determine a 200 tonnes start of season[3] TAC for the Australian TRL Fishery for the 2019-20 fishing season, as per section 13 of the *Torres Strait Fisheries (Quotas for Tropical Rock LOobster (Kaiar)) Management Plan 2018* (the Plan)[4]. Start of season TAC based on advice received from TRLRAG and TRLWG in October-November 2018. TAC to apply to Australian TRL Fishery only. | 19 November 2019 |

[1] These data are provided to CSIRO to update catch per unit effort indices used to calculate a recommended biological catch for the coming fishing season.
[2] A RBC is the total amount of TRL that can be sustainably taken out of the water by all fishers (commercial, traditional, recreational) each season, while leaving enough in the water to breed.
[3] The Australian TRL Fishery fishing season runs from 1 December each year to 30 September the following year.
[4] The Plan is accessible online at https://www.legislation.gov.au/Details/F2018L01645

| | | |
|---|---|---|
| RBC calculation | CSIRO to use empirical Harvest Control Rule (eHCR) to calculate a RBC.<br>Every three years (starting in 2019), CSIRO to update and run the stock assessment model to evaluate the performance of the eHCR. Preliminary stock assessment results are usually available within 4-5 weeks of the pre-season scientific survey. | Late November through to early December 2019 |
| TRL Resource Assessment Group (TRLRAG) and TRL Working Group (TRLWG) advice[5] | TRLRAG to review the survey results, CPUE analyses and application of the eHCR. Advice provided on a final RBC.<br>TRLWG to review TRLRAG advice. Advice provided on a final global TAC[6].<br>Every three years (starting in 2019), TRLRAG and TRLWG to consider preliminary results of stock assessment. Advice provided on finalising the assessment. | 10-12 December 2019 |
| PZJA agreement to final global TAC | PZJA to review TRLRAG and TRLWG advice and agree to final global TAC. | January 2020 (date of PZJA meeting to be confirmed) |
| Agree final global TAC, shares of the TAC, cross-endorsement apportionments and any preferential entitlements | AFMA CEO and PNG NFA Director General to meet to agree, as per the terms of the Torres Strait Treaty, on:<br>- a final global TAC as per article 23(2);<br>- shares of the final global TAC as per article 22(1) (e.g. 15%:85% split);<br>- cross-endorsement apportionments as per articles 23(4) and 25;<br>- preferential entitlement to any unfished cross-endorsement apportionments as per article 25.<br>An exchange of letters is required to formalise the agreement. | By 31 January 2020 |
| Australian final TAC determined | Minister to determine a final TAC for the Australian TRL Fishery for the 2019-20 fishing season, as per section 14 of the Plan. TAC to apply to Australian TRL Fishery only. | By 29 February 2020 |

[5] Officers from PNG NFA are invited to attend all PZJA advisory forums.
[6] A global TAC is the total amount of TRL that can be sustainably taken out of the water by both Australian and PNG commercial fishers each season.

| | | |
|---|---|---|
| TRLRAG advice | Every three years (starting in 2019), TRLRAG to review the final stock assessment results. Advice provided on the need to review the eHCR and conduct a stock assessment in subsequent years, as per Harvest Strategy rules. | February/March 2020 (date of TRLRAG meeting to be confirmed) |
| If relevant, submit any formal requests for cross-endorsement | PNG and/or Australia to provide formal request to the other Party seeking cross-endorsement pursuant to article 26 of the Torres Strait Treaty. Request to include:<br>- a copy of the licence/s for which a Treaty endorsement is sought[7];<br>- a copy of any licence conditions in force for the licence/s;<br>- boat particulars;<br>- details for payment of applicable fees.<br>It will take approximately 6 weeks for Australia to complete the domestic processes to issue a Treaty endorsement/s[8]. | By 31 March 2020 |

[7] For PNG licence/s, each licence needs to be current at the time of the formal request, valid for the period for which a Treaty endorsement is sought and have the same details as that written in the formal request, and valid in PNG for the same fishery as it is proposed to operate in Australian waters.
[8] Australia's domestic process include requirements to undertake native title notification pursuant to sub-sections 24HA(2) and (7) of the Commonwealth *Native Title Act 1993*, which takes a minimum of 1 month, and to seek approvals to issue a Treaty endorsement/s.

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Attachment 6c

research paper

# Evaluating an empirical harvest control rule for the Torres Strait *Panulirus ornatus* tropical rock lobster fishery

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ABSTRACT.—The Torres Strait tropical rock lobster, *Panulirus ornatus* (Fabricius, 1798), fishery is a culturally and economically important fishery. The Australian Commonwealth has an obligation under the Torres Strait Treaty to protect the traditional way of life and livelihood of Traditional Inhabitants, as well as promote employment opportunities for them. Management of the fishery is complicated by the high natural recruitment variability, and diving surveys have been used for the past 28 yrs to monitor changes in the size of the recruiting population. Here, we describe development of an empirical harvest control rule (eHCR) to achieve defined biological, economic and sociocultural objectives for the lobster fishery. A key principle is that fishery managers, fishers, and key stakeholders utilize pre–agreed upon and pretested rules to adjust management recommendations given updates of data. The performance of eHCR alternative candidates is evaluated using four alternative operating models, with 200 stochastic replicates each and 800 total simulations, accounting for observation error and implementation uncertainty. The eHCR adjusts recommended biological catches relative to a recent average, based predominantly on the logarithm of the slopes of recent trends in the preseason recruiting lobster, with lower weighting accorded to trends in recently-settled lobster and catch per unit effort (CPUE) from two fishing sectors. In addition, a maximum catch limit of 1000 t is set. The eHCR formula thus uses recent trends in survey and CPUE information to implement rapid, but precautionary, short-term adjustments needed to effectively manage a highly variable fishery.

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Geographically situated between Papua New Guinea and northern Australia (Fig. 1), the Torres Strait provides fishing grounds for indigenous peoples from both nations and is a prime example of indigenous participation in commercial fishing and management thereof (e.g., Durette 2007). Traditionally, Torres Strait Islanders and Papua New Guineans have relied on the tropical rock lobster, *Panulirus ornatus* (Fabricius, 1798), for subsistence and cultural uses, and it is currently the region's economically most important fishery. The fishery is comprised of three sectors: two in Australian waters and a third in Papua New Guinea (PNG). In Australia, the two main Torres Strait fishing sectors are the Traditional Inhabitant Boat (TIB) licence holders, who typically conduct day trips harvesting lobster from dinghies only (TSRA 2009), and the Transferable Vessel (licence) Holders (TVH) sector consisting mostly of nonindigenous-owned commercial vessels (a mothership with tenders/dinghies). There is considerable heterogeneity within the Australian indigenous sector and between the Australian indigenous, nonindigenous, and Papua New Guinea sectors in terms of the way they fish and the associated economics (van Putten et al. 2013a,b, Hutton et al. 2016). Social objectives are stated explicitly as part of a treaty between Australia and Papua New Guinea: "… acknowledg[ing] and protect[ing] the traditional way of life and livelihood of the traditional inhabitants including their traditional fishing and free movement" (*see* https://www.legislation.gov.au/Details/C2016C00677).

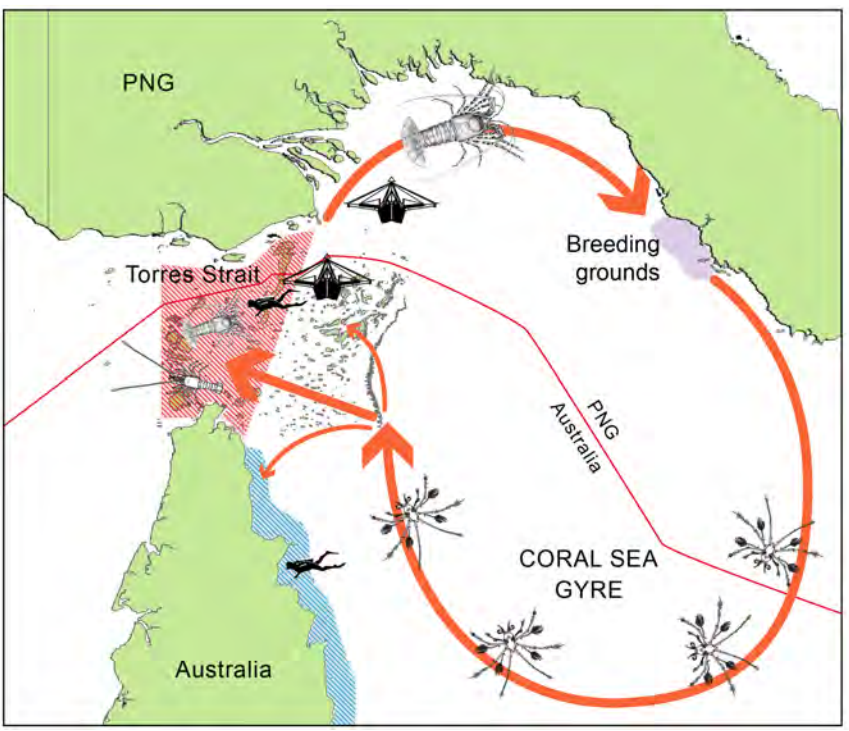


Figure 1. Map showing location of Torres Strait dive fishery (red shading) between Australia and Papua New Guinea (PNG) and migratory route of *Panulirus ornatus* eastwards to breeding grounds, with larvae then transported via currents and settling back in Torres Strait after approximately 6 mo, with some mixing with the Queensland East Coast dive fishery (blue hatching). Trawler icons show historical areas of operation.

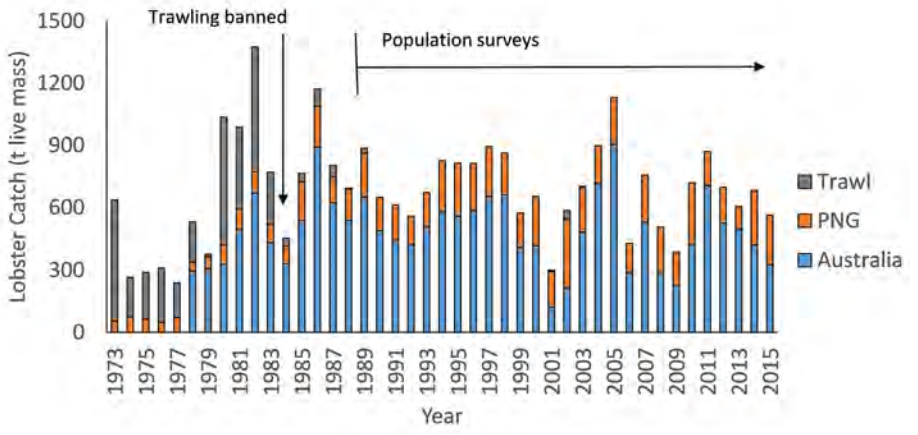


Figure 2. Annual commercial *Panulirus ornatus* catch taken by the Australian (AUSDIVE) and Papua New Guinea (PNGDIVE) dive sectors and historically by trawling.

As it is a shared stock, within Australia it is managed by the Commonwealth. The same species is also fished to the south of Torres Strait, off Queensland's east coast, but is separately managed by the Queensland State Government (Fig. 1). A trawl ban was implemented in 1984 to protect aggregations of lobsters undergoing breeding migrations (Ye and Dennis 2009) and has resulted in development of a nonindustrial fishery that is accessible to fishers throughout Torres Strait. Unlike most other lobster fisheries, *P. ornatus* do not enter baited traps and hence the fishery is predominantly a dive-based (free dive or hookah) fishery. In line with China's emergence as an important market for live lobsters during the past decade, most lobsters are now caught live for export to China (Plagányi et al. 2018). The average annual total catch from 2005 to 2014 was 680 t (Fig. 2).

Management recommendations for the past 28 yrs have been underpinned by scientific surveys of the lobster population and targeted ecological research (Ye et al. 2005, Dennis et al. 2015) (Fig. 3). The surveys are regarded by some as high cost relative to the gross value of production (GVP) of the fishery. However a recent study using tropical rock lobster as an example, Dennis et al. (2015) showed that including one or more fishery-independent surveys annually returned a positive net present value over a 20-yr timeframe, even when randomly varying biomass within the observed historical range, and accounting for increasing survey costs, lower gross margins, and lower lobster prices.

The survey and stock assessment methods have been developed through consultation with indigenous fishers and their representative bodies, in addition to federal and state fisheries managers, independent scientists, nonindigenous fisher representatives, and flow-on business stakeholders. Representatives from these groups, and particularly the Tropical Rock Lobster Resource Assessment Group (TRLRAG), have made significant contributions to the development of the fishery-independent surveys, commercial catch and effort monitoring, and the integrated fishery model through consultative meetings. The fishery provides a successful example of the integration of western science and traditional fisheries management (Plagányi et al. 2013).

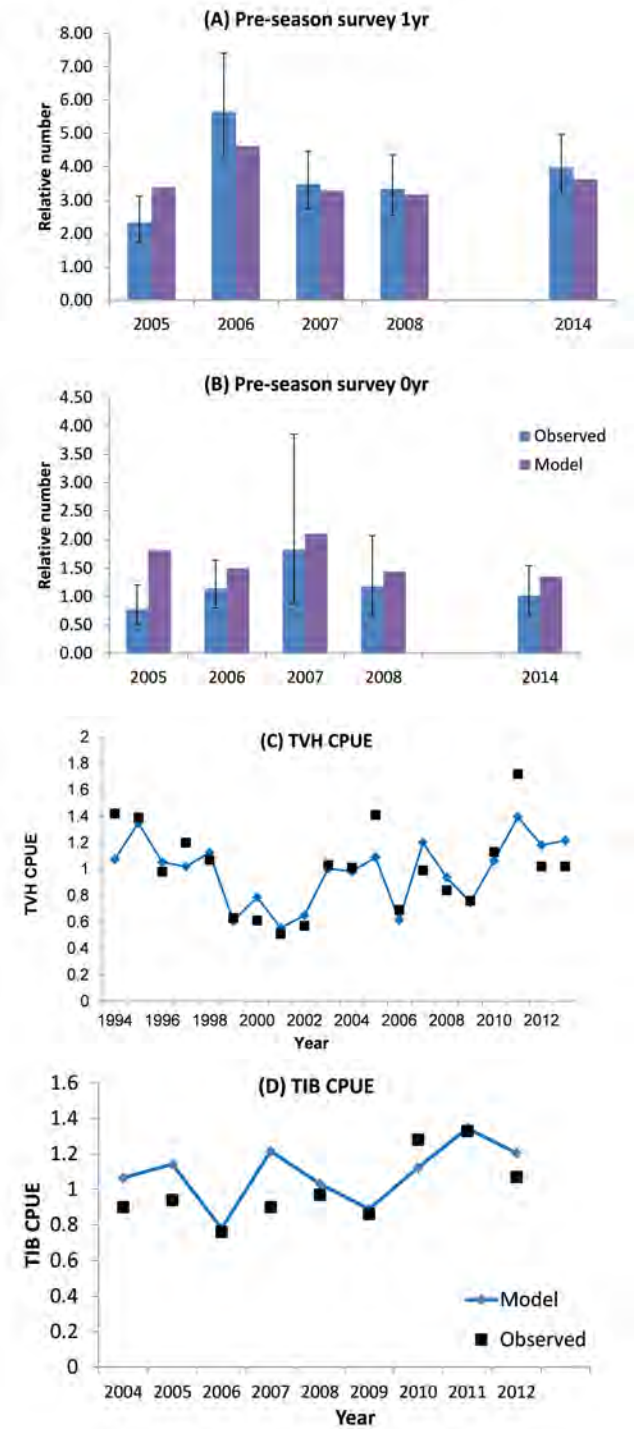


Figure 3. Reference case model fits to indices of abundance, including the primary indicator (Preseason 1yr survey relative abundance and survey standard deviation) used in the harvest control rule described in this paper, together with secondary indicators, namely the Preseason 0yr survey relative abundance and standardized CPUE from the TVH and TIB rock lobster fishery sectors.

Considerable historical research has focused on understanding the biology and ecology of *P. ornatus*. Benchmark surveys played a valuable role in defining population distribution and abundance (Pitcher et al. 1992). Extensive tagging studies (approximately 20,000 tags) were conducted in Torres Strait and Queensland waters and recaptures showed the 550 km breeding migration that starts in August and September, from Torres Strait to the eastern part of the Gulf of Papua, as well as clear separation of the Torres Strait and Queensland subpopulations (Moore and Macfarlane 1984, Skewes et al. 1997, Dennis et al. 2001). As a result of the complex life history comprising a 6-mo larval life (Fig. 1), the stock is naturally highly variable and the fishery focuses largely on a single 2-yr old age-class only. A recommended biological catch (RBC) needs to be set annually in such a way as to ensure biological and economic sustainability consistent with the principles of the Australian Commonwealth Harvest Strategy, as well as the tropical rock lobster fisheries and Protected Zone Joint Authority (PZJA) objectives. For this reason, an annual preseason survey of 1-yr old recruits is conducted as close to the start of the fishing season as possible (November) to inform on the likely biomass of the fishable cohort the next year. Previously, this information together with all other sources of information and data for the fishery were input to an integrated stock assessment model that was used to set the RBC (Plagányi et al. 2015). However, there is insufficient time following the preseason survey for the relevant management groups to review the stock assessment update annually, and hence an alternative approach has been recommended.

The new approach uses an empirical (data-based) harvest control rule (eHCR) that can be rapidly applied to provide a RBC once the catch, survey indices, and other data inputs (catch per unit effort, or CPUE) become available. The eHCR is a central component of a new harvest strategy that is under development for this fishery. Australia's Commonwealth Harvest Strategy Policy defines harvest strategies as "a framework that specifies the predetermined management actions in a fishery necessary to achieve the agreed ecological, economic and/or social management objectives" (Rayns 2007). A key principle is that fishery managers, fishers, and key stakeholders utilize preagreed (and preferably pretested) rules to adjust management recommendations given updates of data and/or model outputs (HSP) (http://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy).

Simulation models are increasingly being used to evaluate alternative management approaches or harvest control rules, to identify the potential for trade-offs among fisheries management objectives, using the approach of management strategy evaluation (MSE) (Smith et al. 2007, Pascoe et al. 2016). MSE approaches can serve as formal risk assessment methods, given their focus on the identification and modelling of uncertainties, as well as in balancing different representations of resource dynamics (Sainsbury et al. 2000, Plagányi 2016). This includes consideration of the implications—for both the resource and its stakeholders—of alternative combinations of monitoring data, analytical procedures, and decision rules (Sainsbury et al. 2000, Rademeyer et al. 2007, Smith et al. 2007). It provides indicators on whether different objectives can be reconciled and whether the outcomes are robust to inherent uncertainties in the inputs and assumptions on which decisions are based by identifying and evaluating trade-offs in performance across a range of management objectives (Cooke 1999).

MSE (Butterworth and Punt 1999, Smith et al. 2007, Dankel and Edwards 2016) has been used to evaluate approaches for setting total allowable catches (TACs) for several rock lobster resources, including in Australia (Punt and Hobday 2009, Punt et al. 2012), New Zealand (Starr et al. 1997), and South Africa (Johnston and Butterworth 2005). In Australia, the decision rule (or harvest control rule) for southern rock lobster in South Australia's southern zone is based on changes in catch rates, with the aim of maintaining constant exploitation rates.

Here, we describe the use of MSE to evaluate alternative candidate eHCRs for the Torres Strait *P. ornatus* fishery, and describe the preferred choice that was made by stakeholders.

## Methods

The Torres Strait *P. ornatus* fishery is managed as a single stock and hence the assessment and management includes information from each of the three sectors: Australian TIB and TVH, and the PNG sector, which has a one-third share in the fishery. The stock comprises mainly three age classes, recently-settled (6 mo old, termed *0yr*), recruiting (average 1.5 years old, termed *1yr*), and fished (average 2.5 years old, termed *2yr*). The basic steps to evaluate the eHCRs are consistent with the best practice guidelines outlined by Punt et al. (2016).

The eHCR has been developed in close consultation with stakeholders at a number of meetings, including resource assessment groups (RAGs), fishery working groups, and dedicated communication workshops. Consistent with the partnership approach to managing other Commonwealth managed fisheries in Australia, the RAG includes a chair, Australian Fisheries Management Authority manager, stock assessment and fisheries biology scientists, an independent scientist, a conservation member, and several industry representatives (including key processors), plus a Torres Strait Regional Authority and community leader representatives (Smith et al. 1999). In the case of Torres Strait, representatives from Papua New Guinea are also members, and local fishers are invited to attend as observers, such that meetings typically include 20–30 people. Effective communication is considered a high priority and methods include use of graphic recording to summarize key considerations in the process, as illustrated in Figure 4.

The Operating Model.—The stock assessment model of Plagányi et al. (2015) is used as the operating model OM (Online Appendix 1), and hence assumed to represent reality in terms of the underlying lobster population dynamics. The age-structured stock assessment model is a form of statistical catch-at-age analysis (e.g., Fournier and Archibald 1982) that fits to all available fishery-independent (surveys from 1989) and fishery-dependent data (*see* Online Appendix 1). The model was implemented using AD Model Builder which uses quasi-Newton automatic differentiation for statistical inference (Fournier et al. 2012).

Based on previous assessments, key uncertainties, and sensitivities identified included choice of the stock-recruitment steepness parameter $h$, inclusion or not of an assumption of hyperstability for the two sectors (TIB, TVH) CPUE data, and alternative recruitment assumptions. No CPUE data were available for the PNG sector. A Beverton-Holt stock-recruitment relationship is used to estimate the number of


Figure 4. Graphic recording of key advantages and elements of a harvest strategy as discussed with stakeholders at one of the workshops. Artwork by S Pillans (http://www.drsuepillans.com), reproduced with permission.

recruits $R_y$ at the start of year $y$, allowing for annual fluctuation in the deterministic relationship:

$$R_y = \frac{\alpha B^{sp}_{y-1}}{\beta + B^{sp}_{y-1}} e^{(\gamma_y - (\sigma_R)^2/2)} \quad \text{(Eq. 1)}$$

where $B^{sp}_y$ is the spawning biomass at the start of year $y$, parameters $\alpha$, $\beta$ are based on the pre-exploitation equilibrium spawning biomass $K^{sp}$, and the "steepness," $h$, of the stock-recruitment relationship - $h$ represents the proportion of the virgin recruitment that is realized at a spawning biomass level of 20% of the virgin spawning biomass (Francis 1992):

$$\beta = \frac{(K^{sp})(1 - 5h0.2)}{5h - 1} \quad \text{(Eq. 2)}$$

and

$$\alpha = \frac{\beta + (K^{sp})}{SPR_{virg}} \quad \text{(Eq. 3)}$$

where

$$SPR_{virg} = w_3^{st} N_3^{virg} \quad \text{(Eq. 4)}$$

with

$$N_1^{virg} = 1 \quad \text{(Eq. 5)}$$

$$N_a^{virg} = N_{a-1}^{virg} e^{-M_{a-1}} \quad \text{for} \quad 2 < a \leq m \quad \text{(Eq. 6)}$$

where $w_3^{st}$ is the mass of lobsters of age 3 (i.e., in December during the spawning season), and $m$ is the maximum age considered (taken to be 3).

Parameter $\gamma_y$ reflects fluctuations around the expected recruitment for year $y$, which is assumed to be normally distributed with standard deviation $\sigma_R$ (Online Appendix 1). The residuals are treated as estimable parameters in the model fitting process.

A hyperstable relationship was assumed between the CPUE relative abundance index for each sector $f$ and the exploitable biomass as follows:

$$\left(\frac{\hat{C}}{E}\right)_y^f = q_f \left(B_y^{ex}\right)^{hyps^f} \quad \text{(Eq. 7)}$$

where $hyps^f$, the hyperstability parameter per sector $f$, was set as described below. Pascoe et al. (2013) estimated a vessel level production function for the TIB and TVH fleet, which included an estimate of the stock as one of the explanatory variables. From this, a hyperstability parameter estimate of around 0.5 was found for both fleets. For the TVH fleet, however, an interaction term between stock and fishing effort (dory days) was also significant, and increased this parameter value when both stock and effort were above the average level over the period 2004–2010. The study also found a strong economic incentive for the TVH vessels to increase their individual effort if less constrained. Given changes in restrictions on dory numbers and the improvement in stock size, it is expected that the relevant hyperstability parameter estimate for the TVH fleet would now be >0.5. Hence, 0.75 was assumed in the stock assessment model, and a no-hyperstability sensitivity analysis is also included.

A reference set (Rademeyer et al. 2007) comprising four different operating models (OMs; *see* tables and figure in Online Appendix 1) was constructed to include a sufficiently representative range of potential estimates of current population status and productivity. The choice of OMs was based on key uncertainties identified over the past few years during the annual stock assessment reviews that also included stakeholder inputs (Plagányi et al. 2012, 2015, Pascoe et al. 2013). These encompass uncertainty as to the stock-recruitment parameter $h$ (*see* Online Appendix 1) and recruitment levels, as well as the hyperstability parameters as discussed above:

OM1: Based on stock assessment model with $h$ = 0.7; and hyperstability (*hyps*) parameters for CPUE TVH and TIB sectors set at *hyps1* = 0.75 and *hyps2* = 0.5 respectively;

OM2: More conservative steepness parameter $h$ = 0.5 of the stock-recruitment function (and with *hyps1* = 0.75; *hyps2* = 0.5);

OM3: No hyperstability assumed (linear index) i.e., *hyps1* = 1; *hyps2* = 1 (and with $h$ = 0.7);

OM4: As in OM1, but testing sensitivity to more negative recruitment scenarios with possible autocorrelation. This is implemented by randomly (10% probability of this occurring in any year) forcing recruitment to be three-quarters of the level from Equation 1 in that particular year (Recruitment(year2)), and generating a random autocorrelation parameter $\rho$, where $\rho$ determines the extent to which the recruitment in the second year is similar to that in the previous year, i.e., Recruitment (year 2)* = $\rho$ × Recruitment(year1) + (1 − $\rho$) × Recruitment(year2).

Each of the four OMs was fitted over the historical period 1973–2015 (Online Appendix 1), and then used to do 20-yr forward projection. All model results are integrated across these four alternative models, with equal weight accorded to each, and 200 replicates of each OM, yielding a total of 800 projection scenarios over which results are integrated. The OMs are all assumed to be plausible alternative representations of the system and to reflect key uncertainties, hence they are accorded the same weight rather than Akaike information criterion weighting, for example, in line with recommendations by Punt et al. (2016). Best practice guidelines are also followed in dividing the trials into "reference" and "robustness" sets (Rademeyer et al. 2007, Punt et al. 2016) as described further below.

Future Projections.—"Future data" in the form of survey indices of abundance (Preseason 0yr, 1yr) and sector-specific CPUE series (TIB and TVH) are required by the eHCR to compute a RBC for each of the years in the projection period for each candidate rule tested. These abundance indices (CPUE and surveys) are generated from the OM, assuming the same error structures as in the past (*see* Online Appendix 1). For the CPUE data, additional sources of variation were accounted for by increasing the standard deviation estimates to 0.4. This is also because when computing the RBC for year $y + 1$, CPUE data are assumed to be available for year $y$, but as these indices are based on all data available at the end of October, there may be an additional error if there is a delay in some of the data being submitted and analyzed in time for that year's analyses. The future CPUE data series are generated from model estimates for exploitable biomass and catchability coefficients.

Future survey data are generated from model estimates of preseason (November) survey biomass. Log-normal error variance includes the survey sampling variance with the standard deviation set equal to the average historical values of 0.18 and 0.35, respectively, for the 1yr and 0yr indices. For the RBC for year $y + 1$, such data are available for year $y$.

Simulating RBCs and Actual Catches.—The total RBC is divided in fixed proportions $p_f$ among the various sectors $f$, with the following values used for the sector allocations: TIB: 38%, TVH: 29%, PNG: 33%. We include in this model implementation uncertainty, which is defined as the difference between the model RBC and the actual catch that is taken in a year. Sources of implementation uncertainty can include unreported catches, discarded catches, or lower than expected catches due to capacity constraints and sociocultural drivers (van Putten et al. 2013a). It was considered important to include implementation uncertainty for a number of reasons: (1) observed substantial differences between the actual catches and the nominal TAC over the past decade (during which time a proposed move to output controls has been trialed), as well as in the performance of the three sectors relative to their

nominal allocation (the RBC was not strictly binding as the system was under an input control system); (2) challenges in ensuring that under a quota management system, each of the three sectors (TIB, TVH, PNG) will effectively monitor catches during the fishing season and ensure that fishing stops when the limit is reached; (3) uncertainty as to possible discard mortalities under quota management, which may be exacerbated during anomalously warm periods due to higher associated mortality rates of captured lobsters (the fishery is predominantly for live animals that are held in relatively high densities in sea cages that may suffer from reduced water circulation, are close to the surface and as such, may be vulnerable to overheating or reduced oxygen during periods of low water movement and high temperatures); (4) whether decision makers accept or change the scientifically-based RBC recommendation (no precedent for this scenario); (5) potential (unknown) catches of tropical rock lobster from other sources; and (6) unknown future changes in fishing operations.

The relationship between the RBC for year $y$ ($RBC_y$) and the actual catch in year $y$ ($C_y$), given proportional allocations $p_f$ per sector, is modelled using the formula:

$$C_y = \sum_{f=1}^{3} p_f RBC_y \times e^{\varepsilon_y^f}, \quad \varepsilon_y^f \quad \text{from} \quad N(0;\sigma_f^2) \qquad \text{(Eq. 8)}$$

where catch is the total from the three sectors and a value for $\sigma_f$ for each sector was selected based on comparison with past observations over the period 2006–2015. Different implementation error magnitudes are set using $\sigma_{TIB}$ (0.06), $\sigma_{TVH}$ (0.04), and $\sigma_{PNG}$ (0.1). These values can be adjusted, for example, to simulate scenarios in which different sectors reduce the difference between total catch and the allocated catch based on the RBC. Sensitivity to alternative values of $\sigma_f$ was also investigated.

Candidate eHCRs Considered.—We focused on empirical approaches for the reasons elaborated above. Hence, the HCRs tested were "model-free" (sensu Rademeyer et al. 2007), increasing or decreasing the RBC in response to the magnitude of recent trends in CPUE and survey estimates.

A range of alternatives was tested that included different combinations of all available indices of abundance, including options that accorded zero weight to some abundance series (Table 1). Four different kinds of HCRs were tested as follows:

(1) Constant Catch: a range of alternative values, including a fixed average, were tested and are briefly discussed given some stakeholders expressed a preference for using a fixed annual catch.
(2) Slope: Based on a simple fixed slope parameter applied to the preseason survey indices—this option is not described further as it performed poorly relative to the options below.
(3) Regression: Based on the slope of a regression line that is fitted each year to the past $n$ ($n$ = 5 was the preferred choice following testing using $n$ = 3 and $n$ = 6) survey data points, and similarly for CPUE where included, and multiplied by either a fixed average historical catch or a moving average of the previous 5 years' catch.
(4) Log regression: As above, except that the slope is computed based on the natural logarithm of the survey and CPUE indices in an attempt to decrease interannual variability.

Table 1. Summary of empirical harvest control rule (eHCR) final set of candidates, showing range of alternative weightings used in testing candidate eHCRs assigning different weighting to the four available indices of abundance, and ranging from using the key survey 1-yr index (Pre1) only through to using only fishery-dependent catch per unit effort (CPUE) data. Results are shown for the subset labelled revised HCR. TVH = transferable vessel holders, TIB = traditional inhabitant boat.

| Candidate HCR | Description | Indicator (all Catch_ave_5yrs unless indicated) | | | |
|---|---|---|---|---|---|
| Name | with Ln(slopes last 5 yrs) unless indicated | Pre1 | Pre0 | CPUE_TVH | CPUE_TIB |
| Primary indicator only | Weighting on single indicator (Pre1) | 1.00 | 0.00 | 0.00 | 0.00 |
| Fishery-dependent only | Equal weighting of fleet indicators only | 0.00 | 0.00 | 0.50 | 0.50 |
| Revised HCR | | | | | |
| eHCR1 | Weighting factor on all indicators | 0.60 | 0.10 | 0.15 | 0.15 |
| eHCR2[1] | Weighting factor on all indicators | 0.60 | 0.10 | 0.15 | 0.15 |
| eHCR3 | Weighting factor on all indicators | 0.60 | 0.30 | 0.05 | 0.05 |
| eHCR4[1] | Weighting factor on all indicators | 0.60 | 0.30 | 0.05 | 0.05 |
| eHCR5 | Weighting factor on all indicators | 0.80 | 0.10 | 0.05 | 0.05 |
| eHCR6 | Weighting factor on all indicators | 0.70 | 0.20 | 0.05 | 0.05 |
| eHCR7 | Weighting factor on all indicators | 0.70 | 0.10 | 0.10 | 0.10 |
| eHCR8 | Weighting factor on all indicators | 0.50 | 0.10 | 0.20 | 0.20 |
| eHCR9[2] | Weighting factor on all indicators | 0.41 | 0.21 | 0.19 | 0.19 |
| eHCR10[3] | Weighting factor on all indicators | 0.60 | 0.10 | 0.15 | 0.15 |
| eHCR11[4] | Weighting factor on all indicators | 0.60 | 0.10 | 0.15 | 0.15 |
| eHCR12 | Constant catch 700 | | | | |

[1] No log of slope - variability higher

[2] Inverse of sigma

[3] Catch_ave = 665 t

[4] Hockey Rule; Surv_lim = 0.8; Surv_trig = 1.25

In all these cases, an additional option was included to cap the maximum catch (1000 t in base-case). The basic form of the HCR for Options (3) and (4) uses the preseason survey 1yr and 0yr indices, both sector CPUE indices, with or without natural logarithms of the slopes, an upper catch limit, and using weightings as shown in Table 1 was as follows:

$$TAC_{y+1} = wt\_s1 \cdot (1 + s_y^{presurv,1}) \cdot \overline{C}_{y-4,y} + wt\_s2 \cdot (1 + s_y^{presurv,0}) \cdot \overline{C}_{y-4,y} + wt\_c1 \cdot (1 + s_y^{CPUE,TVH}) \cdot \overline{C}_{y-4,y} + wt\_c2 \cdot (1 + s_y^{CPUE,TIB}) \cdot \overline{C}_{y-4,y} \quad \text{(Eq. 9)}$$

or if $TAC_{y+1} > 1000$ t, $TAC_{y+1} = 1000$,

where

$\overline{C}_{y-4,y}$ is the average achieved catch during the past 5 years, including the current year; i.e., from year $y - 4$ to year $y$,

$S_y^{presurv,1}$ is the slope of the (logarithms of the) preseason survey 1yr abundance index, based on the 5 most recent values;

$S_y^{presurv,0}$ is the slope of the (logarithms of the) preseason survey 0yr abundance index, based on the 5 most recent values;

$S_y^{CPUE,TVH}$, $S_y^{CPUE,TIB}$ is the slope of the (logarithms of the) TVH and TIB CPUE abundance index, based on the 5 most recent values;

*wt_s1, wt_s2, wt_c1,* and *wt_c2* are tuning parameters that assign relative weight to the preseason 1yr (*wt_s1*) and 0yr (*wt_s2*) survey trends compared with the CPUE TVH (*wt_c1*) and TIB (*wt_c2*) trends, with some key alternatives considered as summarized in Table 1. A "hockey-stick" rule (eHCR11; *see* Table 1 for information on this and other candidates) was also tested, with the example shown applying eHCR1 whenever the 1yr survey index was above the threshold value of 1.25, but with RBC set to 0 if the 1yr survey index fell below limit reference level of 0.8, and the RBC set as a linearly decreasing proportion of the value computed using eHCR1 for survey values between the limit and threshold values.

Management Objectives.—The management objectives identified for the tropical rock lobster fishery are as follows:

- maintain the stock at (on average), or return to, a target biomass point ($B_{TARG}$) equal to recent levels (2005–2015) that take account of the fact that the resource is shared and important for the traditional way of life and livelihood of traditional inhabitants, and is at a level that is biologically and economically acceptable;
- maintain stocks above the limit biomass level ($B_{LIM}$), or an appropriate proxy (selected as half the $B_{TARG}$ level), at least 90% of the time;
- implement rebuilding strategies, if the spawning stock biomass is assessed to fall below $B_{LIM}$ in two successive years.

Candidate HCRs were evaluated as to their ability to maintain the resource as fluctuating about the target level and to ensure that they do not pose unacceptable risk to the spawning biomass. Quantifying the risk to the resource under alternative HCRs assists in the final selection of a HCR, which meets the objectives of low risk of depleting the spawning biomass, as well as ensuring that potential economic gains are not lost due to an overly conservative approach. Projected future catch rates for the TVH and TIB sectors were used as a proxy for economic performance, and an additional consideration related to the inter-annual variability in catch. Stakeholders also expressed a preference for an upper limit to be set on the total annual catch to reduce biological risk.

Performance Statistics.—Projections were conducted over 20 yrs and 200 replicates of each of the four OMs, i.e., a total of 800 simulations. The same set of random numbers were used in testing all HCR candidates. In each case, the median and 75$^{th}$ and 25$^{th}$ percentiles of all key outputs were computed, and the range of values also shown for the full projection period given that there is a lot of inter-annual variability in stock biomass. Examples of individual trajectories (worm plots) are also presented. These are randomly drawn individual catch, spawning biomass, and CPUE trajectories, which are examples of plausible future outcomes, noting that the median projections shown are not representative of any individual plausible outcome. The following performance statistics were computed for each candidate harvest control rule (HCR):

- $B^{sp}_{2034}/B^{sp}_{1973}$: the expected median spawning biomass at the end of the projection period, and for all years *y*, relative to the starting (1973) level (used as a proxy for carrying capacity, *K*).

- $B^{sp}_{2034}/B^{sp}_{unfished}$: the expected median spawning biomass at the end of the projection period, and for all years *y*, relative to the comparable no-fishing level (i.e., biomass at the end of the 20-yr projection period when assuming zero future fishing, yielding a dynamic rather than equilibrium reference point as is considered more suitable for highly variable stocks).
- Risk of depletion: number of times in 20-yr forward projection that biomass decreased below a reference point, expressed as proportion (e.g., 1/20 = 0.05) of all individual runs with projected biomass: (1) below the limit reference point (LRP), where $B_{LIM} = 0.32K$; and (2) below precautionary level $0.48K$.
- Average catch: $\overline{C} = \frac{1}{20}\sum C_y$ over 2015 to 2034.
- Average Annual Variability (AAV) of Catch $\frac{1}{20}\sum \frac{|C_y - C_{y-1}|}{C_{y-1}}$.
- Projected future CPUE for comparison with historical observations for the TVH (1994–2013) and TIB (2004–2012) sectors (*see* Fig. 3)
- Projected average fishing mortality.

Tuning and Designing HCR with Stakeholder Input.—A large number of alternative HCRs were trialed and the resultant trade-offs presented to stakeholders to select a preferred HCR (e.g., trade-off to ensure high average annual catch but low risk of depletion of lobster population). Tuning parameters included: weighting of preseason data vs TIB CPUE, TVH CPUE; number of years to compute slope over as applied to trends in abundance indices; catch multipliers in the decision rule; and the form of slope regression (e.g., using logarithm of indices). Alternatives were also investigated to impose constraints on the extent the RBC can vary, or setting the maximum and minimum values. The results from testing a wide range of alternative candidate HCRs are not repeated here and instead this paper focuses on the final subset (*see* Table 1) used to obtain consensus from stakeholders on choice of the final eHCR.

Robustness Tests.—As recommended by Cooke (1999) and Rademeyer et al. (2007), the reference set reflects the current best representation of the resource dynamics and associated uncertainties, but a further, broader set of robustness tests is also considered to further ensure that the final choice of eHCR is robust to a full range of uncertainties. As the tropical rock lobster fishery has never been closed and has been maintained at a relatively high average biomass level, it is important to minimize the risk of fishery closure given this would have large socioeconomic impacts. The final set of HCRs were thus subjected to a number of sensitivity and robustness tests to see how well they would perform under more severe conditions, and the risk of closure was used as a key statistic to distinguish the performance of alternative candidate HCRs. The following final robustness tests are presented here (*see* Table 2 for sensitivity tests, here called *Sens*):

(1) higher implementation error, particularly for PNG given unexpectedly large trawling catches were reported in 2014 (Sens1);
(2) several scenarios with increases or decreases in future catchability, such as might arise due to changes in fishing efficiency under quota management, or environmental influences, such as sand incursions changing the distribution and availability of lobsters, but not necessarily total abundance (Sens2–4);

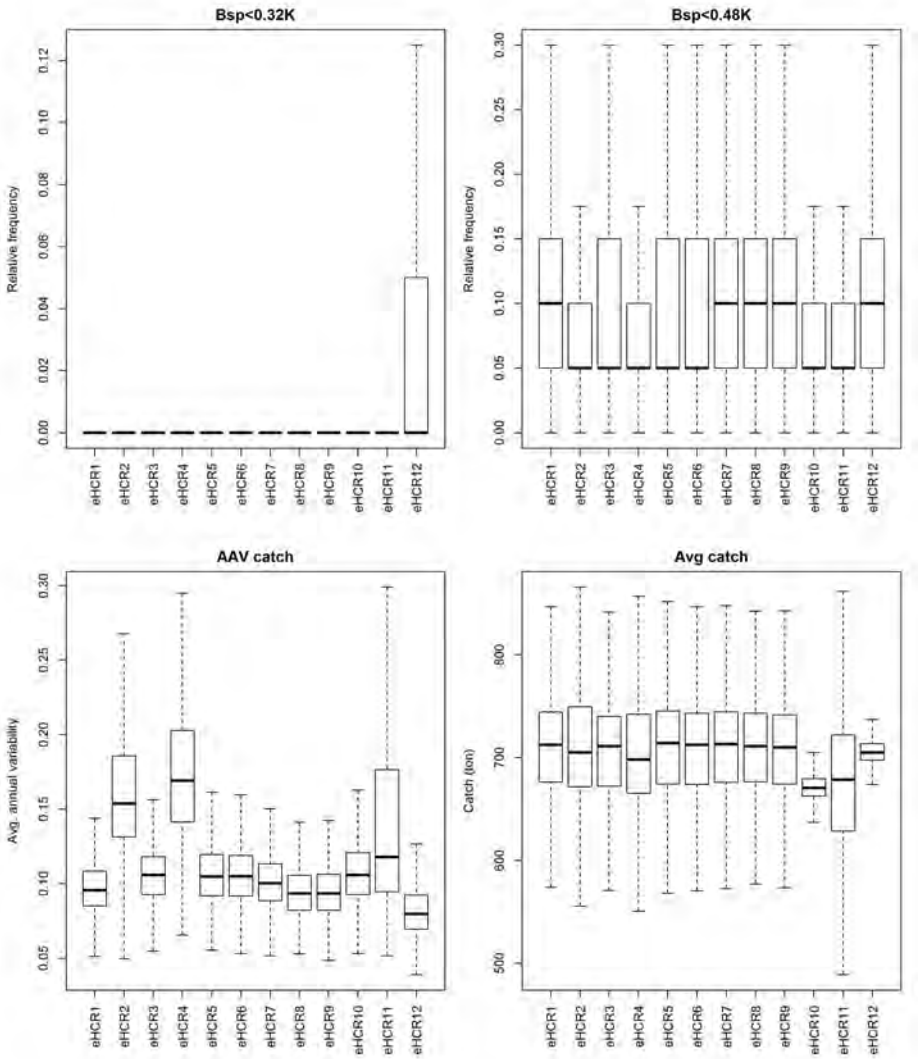


Figure 5. Comparison of some key performance statistics for final set of eHCRs. Plots show the probability of depletion below each of two reference levels, $B_{LIM}$ = 0.32K and precautionary level 0.48K limit reference point, together the Average Annual Variability (AAV) of catch, and total annual catch (t). The central line shows the median, the box the 75th and 25th percentiles and the whiskers represent the full range of projected values excluding outliers.

(3) several negative recruitment scenarios to see how well the eHCR might perform if there are unexpected low recruitment events in the future, such as due to environmental influences (Sens5–8);
(4) periodic large increases in natural mortality rates of the lobsters, such as could occur in anomalously warm years, as has been the actual case recently (Sens9).
(5) an increasing trend in the future mortality rate of large 2yr lobsters due to environmental impacts associated with climate change (Sens10).

In addition, the robustness tests above were repeated using a constant catch scenario, with annual catch equal to 680t (average of last 10 years), as this option was

Table 2. Summary of robustness tests to ensure that the final choice of empirical harvest control rule is robust to a full range of uncertainties. PNG = Papua New Guinea.

| Sensitivity test | Description | Details |
|---|---|---|
| Sens1 | Higher implementation error | PNG implementation error = 0.3 |
| Sens2 | Sustained increase in catchability and Sens1 | Catchability ($q$) is 1.2*$q$ for all future years |
| Sens3 | Catchability decrease | 20% probability that catchability is 0.6$q$ in any 1 year; e.g., sand incursion |
| Sens4 | Catchability increase and survey observation error | 20% probability that catchability is 1.3$q$ in any 1 year and variance doubled for preseason survey |
| Sens5 | Poor recruitment periodically | 20% probability that recruitment halved compared to expected level |
| Sens6 | Less frequent very poor recruitment event | 10% probability that recruitment one-third compared to expected level |
| Sens7 | Less frequent poor recruitment | 10% probability that recruitment half compared to expected level |
| Sens8 | Less frequent poor recruitment and includes mortality | 10% probability that recruitment half compared to expected level and mortality increase 20% |
| Sens9 | Infrequent large increase in mortality | 10% probability that mortality increases by 50% in any one year |
| Sens10 | Increase in mortality of spawning lobsters | One-third increase in future mortality rate of 2+ lobsters |

preferred by some stakeholders. A final scenario was calibrated to have the same overall risk to the resource and fishery as eHCR7, but with a fixed annual catch (eHCR12).

## Results

For each HCR, there are a large number of performance statistics output for consideration by stakeholders. For all statistics, values shown are the median of the 800 replicates, together with the 75$^{th}$ and 25$^{th}$ percentiles (i.e., the rectangles encompass 50% of all outcomes for box and whisker plots), as well as the range of values excluding outliers (Fig. 5).

The constant catch option (eHCR12) had a much higher risk of the stock falling below the limit biomass reference level of 32% of $K$ (Fig. 5) than any of the adaptive options. Preliminary testing ruled in favor of basing the HCR on an average of the last 5 yrs' data in preference to 3 or 6 yrs (for indices of abundance) or a fixed average catch (Plagányi et al. 2016). Preliminary testing also found relatively poor performance in terms of the risk-catch tradeoff if only fishery-dependent CPUE data were used, compared with HCRs including survey data catch (Plagányi et al. 2016).

There were several examples of HCRs (e.g., eHCR1, eHCR5, eHCR6) that yielded high average catch for low risk across a range of alternative weightings accorded to the survey and CPUE information (Table 1, Fig. 5). Stakeholders preferred the HCR candidates that used the log of the slope because it reduced catch variability compared with candidates not based on the log of the slope, such as eHCR2 and eHCR4 in Figure 5. The candidate eHCR11 that used a hockey-stick type rule to adjust catches was also considered to result in overly variable catches corresponding to a relatively poor median catch (Fig. 5).

The TRLRAG reviewed the performance of a range of HCRs, and gradually reduced the set for final consideration based on considerations, such as yielding an

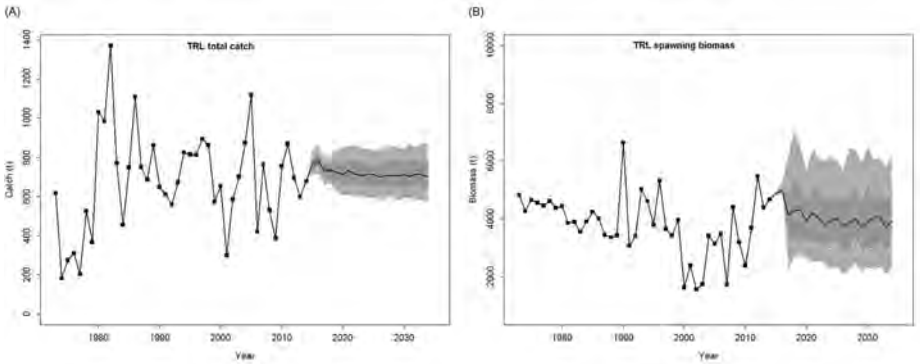


Figure 6. Distributions (solid line: median, 50% intervals: dark shaded area, 80% intervals: light shaded area) of future projected (A) spawning biomass, and (B) total catch (t) for tropical rock lobster compared with historic values and when using the final eHCR (eHCR7).

average catch that was too low compared to other strategies for the same overall risk (e.g., eHCR10), strategies that were too risky in terms of risk of depletion of the resource, or risk of closure of the fishery (e.g., eHCR12), as well as being too variable (e.g., eHCR11).

The final set of HCRs performed similarly; specifically eHCR1, eHCR5, and eHCR6. The TRLRAG discussed the relative advantages and disadvantages of according more or less weight to the four different abundance indices, acknowledging

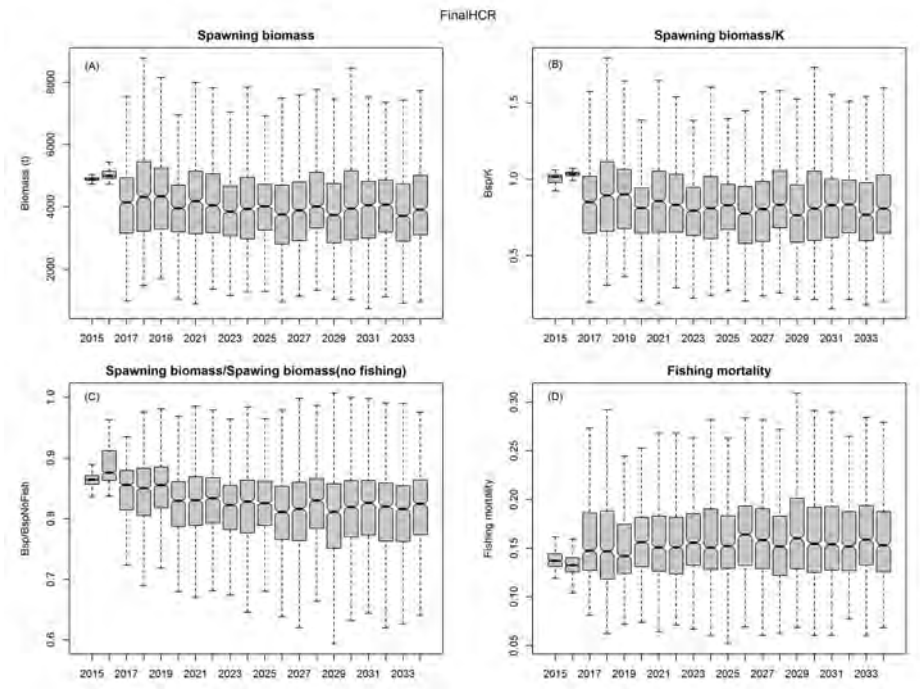


Figure 7. Summary of future projected spawning biomass, depletion proportion relative to carrying capacity *K*, depletion relative to comparable no-fishing level and fishing mortality for TRL when using the final eHCR (eHCR7). The central line shows the median, the box the 75$^{th}$ and 25$^{th}$ percentiles and the whiskers represent the full range of projected values excluding outliers.

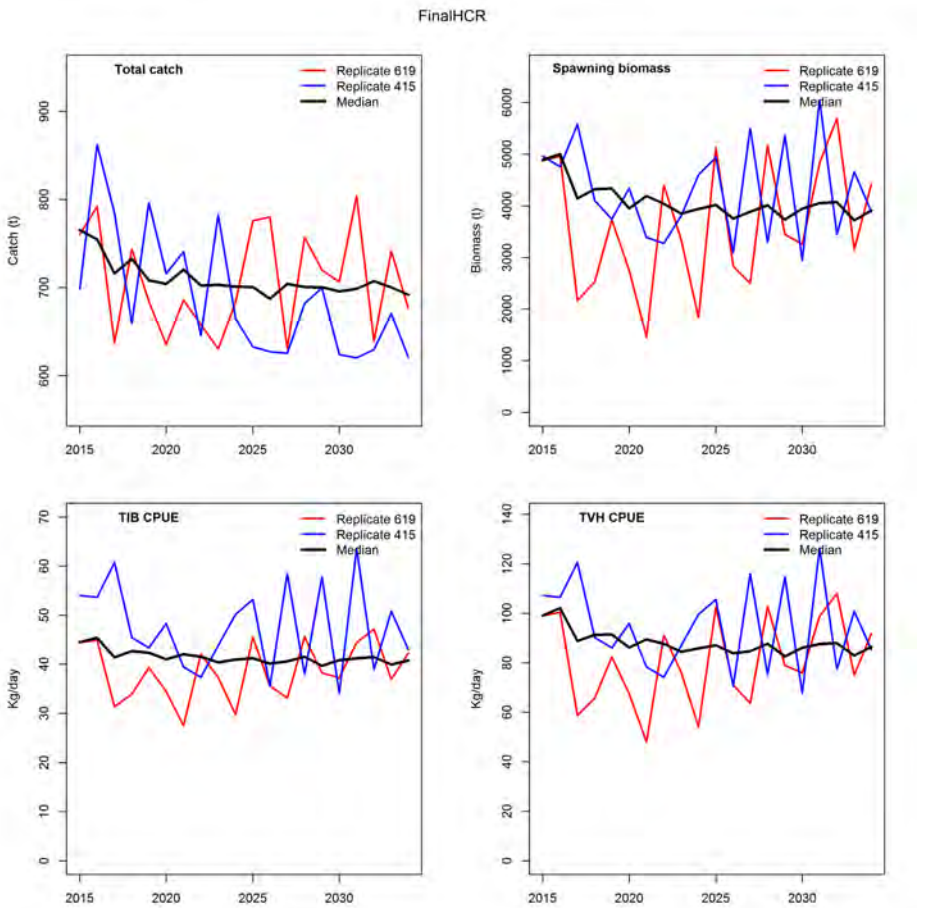


Figure 8. Worm plots showing two randomly selected individual trajectories compared with the median values of total catch and spawning biomass (top panels) and projected CPUE for the two sectors TIB and TVH (bottom panels).

that the preseason 1yr index provided the most reliable and most direct indication of how many lobsters would be available to be fished the following year. On the other hand, it was noted that these data are derived from a survey that is conducted only once a year, whereas the CPUE data indexes the overall abundance throughout the fishing year, and by both sectors. The CPUE index provides a measure of the spawning biomass, rather than next year's fishable biomass, but including it in the HCR means that the rule will take account of likely future changes in recruitment, and hence enable proactive adjustments in the setting of RBC's. Similarly, the preseason 0yr index is equivalent to the "puerulus index" used in several lobster fisheries, and similarly provides an early heads up of likely future stock levels. Several stakeholders felt that it would be advantageous to include a portfolio of abundance indices (both to spread the risk and utilize all available information) in the final HCR. The final HCR selected by the TRLRAG, eHCR7, accords equal weights of 10% to each of the two CPUE series, as well as preseason 0yr index, and a larger weight of 70% to the preseason 1yr index.

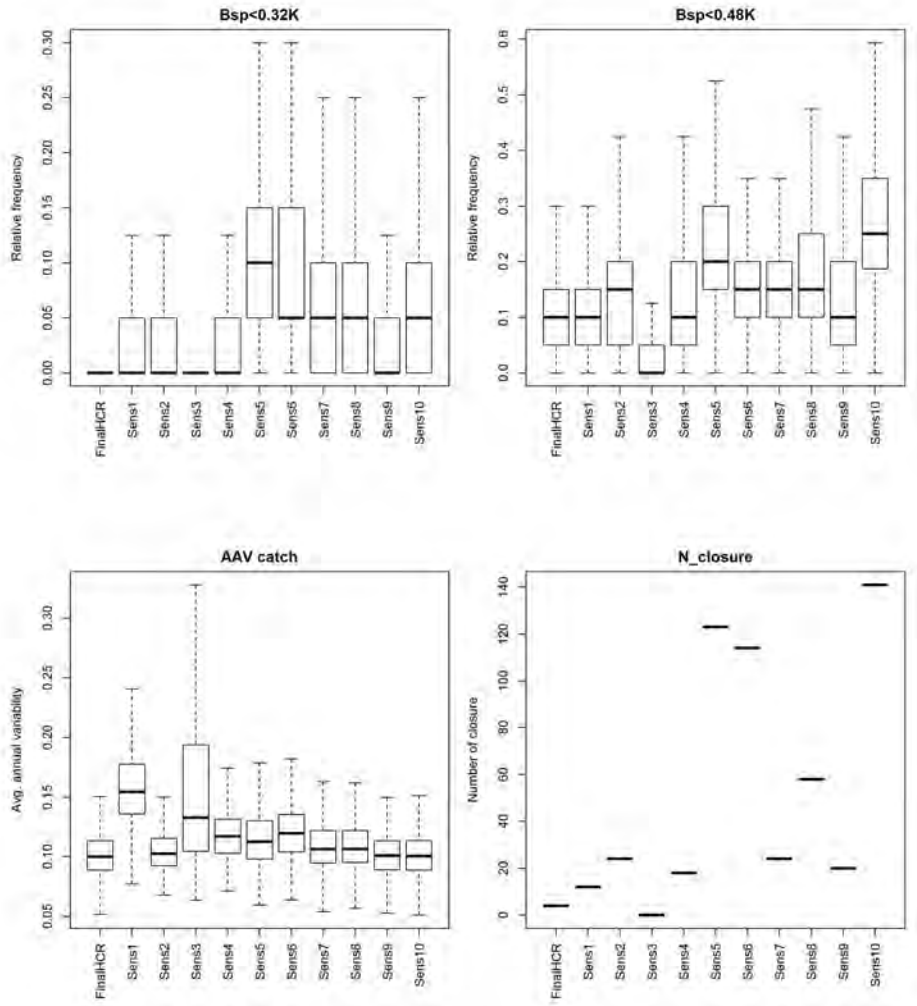


Figure 9. Selected performance statistics for final set of sensitivity tests. Plots show the probability of depletion below each of two reference levels, $B_{LIM} = 0.32K$ and precautionary level $0.48K$ limit reference point, together the average annual variability (AAV) of catch, and relative number of fishery closures triggered in the simulations. The central line shows the median, the box the 75th and 25th percentiles and the whiskers represent the full range of projected values excluding outliers.

In addition, several stakeholders felt that it was important to include an upper limit for the RBC. The possibility of using limits such as 800 t was considered, but it was shown that this may be unnecessarily low and may lead to the average catch declining over time, and testing showed that an upper limit of 1000 t avoided these problems.

The final selected eHCR rule is as follows, and uses the preseason survey 1yr and 0yr indices, both CPUE indices, taking natural logarithms of the slopes, an upper catch limit, and using weightings as follows:

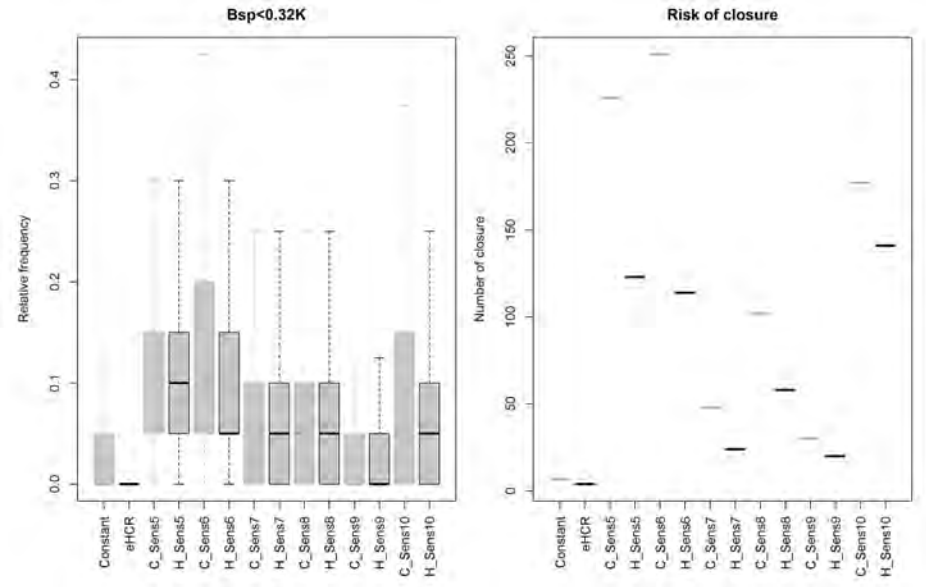


Figure 10. Comparison between final eHCR (H) and constant catch (C) set at 680t performance statistics using final set of robustness tests Sens5 to Sens10, and showing performance in terms of risk of dropping below the limit reference point (0.32$K$) and relative risk of a fishery closure (from 800 simulations). The central line shows the median, the box the 75$^{th}$ and 25$^{th}$ percentiles and the whiskers represent the full range of projected values excluding outliers.

$$RBC_{y+1} = \left[0.7 \cdot (1 + s_y^{presurv,1}) + 0.1 \cdot \left[(1 + s_y^{presurv,0}) + (1 + s_y^{CPUE,TVH}) + (1 + s_y^{CPUE,TIB})\right]\right] \cdot \overline{C}_{y-4,y}$$

or if $RBC_{y+1}$ > 1000t, $RBC_{y+1}$ = 1000. (Eq. 10)

The performance of the final eHCR in terms of two key measures, namely projected spawning biomass and total catch, is illustrated in Figure 6. The plot shows the distribution of potential future outcomes relative to the historical observed catches and spawning biomass as estimated by the stock assessment model (*see* Online Appendix 1). Projected medians and associated ranges remained close to target levels for spawning biomass relative to the starting (1973) level, as well as relative to the comparable no-fishing level, and projected fishing mortality (after applying implementation errors) fluctuated around the target level (Fig. 7).

Focusing on median values can give a false idea of the extent of inter-annual variability that may be observed in future catch and CPUE because the median does not represent an actual trajectory. Hence examples of individual worm plots (Fig. 8) were also presented to stakeholders.

Under the final set of sensitivity tests (Table 2), the median risk of depletion associated with the eHCR remained at or below the reference level of 10% and the catch variability increased by a maximum of 50% (Fig. 9), suggesting the eHCR will perform satisfactorily even if there are unexpected and unusual situations that arise in the future. The model suggested a moderate increase in risk under a scenario with a large sustained increase in catchability (Sens2; Fig. 9) that remains undetected over time, which means a model will most likely overestimate resource biomass and as a consequence catches and fishing mortality will be too high.

As this fishery is largely recruit driven, changes in recruitment can be expected to have a large impact on the stock and fishable biomass. The poor recruitment sensitivities (Table 2, Fig. 9) result in a slight decline in average spawning biomass over time, and an increase in the risk of depletion (although not >10%), but the eHCR brings catches down in response, so as to reduce risk to the resource. Similarly, if there are occasional increases in natural mortality rate, catches are decreased and the overall risk to the resource remains low. If there is a sustained increase in the mortality of the large lobsters (Sens10), this results in a drop in the average spawning biomass and increase in the risk of depletion below the LRP, as well as an increased risk of closure of the fishery (Fig. 9), even given the decline in catches. However, the risk to the resource is acceptable (median risk of biomass dropping below the LRP ≤ 10%) even under this extreme scenario, which provides support as to the robustness of the eHCR.

Figure 10 compares the performance of the final eHCR and a constant catch scenario (680 t) under the last five of the above sensitivity tests. The constant catch scenario consistently results in higher risk to the resource (Fig. 10) and the risk of closure is approximately doubled.

## Discussion

The tropical rock lobster fishery is transitioning from using a traditional stock assessment approach to a formal harvest strategy framework consisting of three elements: monitoring, stock assessment, and control rules. The latter harvest control rules specify what management actions should be taken in response to assessment information about the stock (Rayns 2007). Previously in this fishery, a stock assessment model was used annually to analyze fishery data, and assess current status and productivity of the resource as a basis for setting a RBC (Plagányi et al. 2015). The new approach involves using a formula for providing the RBC, based on prespecified data inputs. The harvest control rule is empirical, as it uses the data directly, e.g., recent upward or downward trends in abundance indices are used directly as feedback and hence the RBC changes in the same direction.

Empirical harvest control rules are now implemented in a number of fisheries globally, including for a number of lobster fisheries: Australia's southern rock lobster, *Jasus edwardsii* (Hutton, 1875), fishery (Punt et al. 2012), South African rock lobster, *Jasus lalandii* (H. Milne-Edwards, 1837) (Johnston and Butterworth 2005), New Zealand rock lobster, *J. edwardsii* (Bentley et al. 2005, Miller and Breen 2010), and the Tristan da Cunha lobster, *Jasus paulensis* (Heller, 1862), fishery (Johnston and Butterworth 2013). Examples of other fisheries include South African hake, *Merluccius* species (Rademeyer et al. 2008), anchovy, *Engraulis encrasicolus* (Linnaeus, 1758), and sardine, *Sardinops sagax* (Jenyns, 1842) (de Moor et al. 2011), and groundfish, *Anoplopoma fimbria* (Pallas, 1814), fisheries in British Columbia (Cox and Kronlund 2008). The eHCR for Australia's southern lobster is based on the catch rate for the most recent year and hence reacts quickly to changes in catch rates (Punt et al. 2012). To avoid high levels of interannual catch variability that can arise from such approaches, other lobster fisheries, such as for the South African west coast lobster fishery (Johnston and Butterworth 2005) and Tristan da Cunha lobster fishery (Johnston and Butterworth 2013), base decisions on average catch rates over a number of preceding years. Trying to track signals in the data rather than "noise"

is similarly the motivation for the use of recent averages in the tropical rock lobster eHCR. In addition, taking the natural logarithm was preferred because this has the effect of dampening some of the interannual variability and hence ensuring that the RBC responds to medium-term changes in resource trends rather than bouncing up or down more erratically due to potentially large interannual changes in observed CPUE.

The tropical rock lobster stakeholders also expressed a preference to use a portfolio approach drawing on information from several data sources, including survey and CPUE data, albeit with more weight accorded to the most direct and accurate index, the 1yr survey index, compared with the prerecruit 0yr index and the CPUE indices. The latter reflect the abundance of the large 2yr lobsters, the survivors of which mostly migrate out of the Torres Strait to breed such that only a very small proportion remain available to be fished in future (Dennis et al. 1992), but their spawning biomass index is an important consideration in terms of ensuring the future sustainability of the stock. There are examples of other harvest control rules that use a combination of CPUE and fishery-independent survey information (e.g., Rademeyer et al. 2008), as well as prerecruit (puerulus) indices (Bentley et al. 2005). The tropical rock lobster eHCR rule is relatively data-rich compared with that applied to other lobster fisheries, as the rule uses information from all the sources mentioned above. Harvest control rules may also include additional metrics, such as size compositions and somatic growth rate (Johnston and Butterworth 2005, Plagányi et al. 2007), and these may be considered in future work.

Empirical HCRs are considered a defensible approach given that they have been shown to perform almost as well as model-based approaches (Rademeyer et al. 2007, Punt et al. 2012, 2016, Geromont and Butterworth 2015, Punt et al. 2016). Both model-based and empirical harvest control rules typically include free parameters that can be adjusted to tune their performance to achieve desired optimal tradeoffs between performance statistics. Empirical harvest strategies have demonstrated the ability to achieve objectives, such as reversing a decline in a population (Geromont and Butterworth 2015). However, they can suffer from a lack of information about the exact level of the resource, and hence additional analyses are required to determine what the status of the resource is relative to specified reference levels (Rademeyer et al. 2007). Some approaches use a "target"-based rule whereby TAC adjustments are based on the magnitude of the difference between the recent CPUE and a target value (Johnston and Butterworth 2013). Compared with model-based harvest control rules, Rademeyer et al. (2007) and Butterworth (2008a) suggest that empirical approaches can be easier to test and are often more easily understandable by stakeholders.

The eHCR has been extensively tested by simulation to provide appropriate tradeoffs, taking into account a range of uncertainties and using methods that are now well established internationally (Dankel and Edwards 2016). The greatest advantages to adopting an eHCR approach are that: (1) it can be applied quickly and easily to set a RBC in time for the start of the new fishing season; (2) it provides a transparent and easily understandable tool for stakeholders (e.g., the effect on the RBC of negative or positive decreases/increases in stock abundance indices can be readily seen, and a spreadsheet example is provided to stakeholders for this purpose); (3) it provides a sound basis for setting RBCs without compromising resource status; (4) it properly addresses concerns about scientific uncertainty through simulation testing

to ensure that feedback secures reasonably robust performance across a range of plausible alternative resource dynamics; and (5) when tested using the MSE process, it empowers stakeholders by allowing them to transparently assess tradeoffs between key performance measures and select the most favorable option taking into account a range of biological, economic, social, and cultural considerations (Butterworth and Punt 1999, Butterworth 2007, Plagányi et al. 2007, Rademeyer et al. 2007).

Smith et al. (1999) and Butterworth et al. (2010) underscore that MSE approaches fail at the implementation level in the absence of stakeholder participation and acceptance. Stakeholder participation not only improves buy-in (Smith et al. 2008), but can make important contributions, such as helping develop co-management, addressing policy and process conflicts, and motivating for testing practical data-based methods (Cox and Kronlund 2008). To effectively engage industry, performance statistics need to be understandable and adequately capture the management objectives (Punt et al. 2016). For stakeholders that are new to the concepts of eHCRs, it is important to first explain the motivation for the approach and the complex underlying concepts to genuinely engage with stakeholders. For this reason, we used a range of communication methods, including graphical recording, which proved highly effective in capturing key points from discussion sessions in a visually appealing and easily understandable format (Fig. 4). A series of these graphics assisted stakeholders in understanding the process from data gathering through to choice of RBC and evaluation of associated tradeoffs, and hence making valuable contributions to each step. Our study is a rare example of participation by indigenous stakeholders (in this instance from two countries), together with nonindigenous stakeholders, to collaboratively decide on the best assessment, monitoring, and harvest control rules to implement in the fishery. Similar approaches are currently being developed for the region's other major fisheries, namely bêche-de-mer (sea cucumber, including the genera *Holothuria, Thelenota, Stichopus,* and *Actinopyga*) and finfish (*Plectropomus* spp. and Scombridae).

Harvest control rules are often complemented by "exceptional circumstances" clauses to account for unexpected events (Butterworth 2008b); for example, sizeable "walkouts" of South African west coast lobsters emerging onto beaches in response to low-oxygen events, greatly increasing the stock's mortality rate (Johnston and Butterworth 2005, Plagányi et al. 2007). The tropical rock lobster eHCR specifies that a stock assessment will be conducted every 3 yrs to rigorously assess stock status and productivity, and check that the eHCR is working as it is supposed to. As a stock assessment is only scheduled for every third year, action may not be taken quickly enough if the spawning biomass drops to very low levels, and hence an additional precaution has been built into the harvest strategy. Based on analysis of the historical preseason and mid-year survey indices, a preseason 1yr survey trigger point of 1.25 (average number of lobsters per survey transect and lower than any historically observed values) has been set, such that if this lower limit is triggered in any year, then the required action is that a stock assessment be conducted in the following year. This is similar to what is done in some other fisheries, such as decision rules for some of the New Zealand substocks, whereby a stock assessment is mandated if CPUE decreases below a specified base level (Bentley et al. 2005). If the stock assessment suggests that the spawning stock biomass is above the LRP, then the process continues as previously. However, if spawning biomass is assessed as below the LRP, then a stock assessment is again triggered in the following year. If the second stock

assessment suggests the stock is above the LRP, then the process again continues as previously, but if the spawning biomass is below LRP (i.e., two consecutive years with spawning biomass below LRP), then the fishery is closed and appropriate action (e.g., implementing surveys, analyzing size structure and environmental information) is put in place. In general, the eHCR is therefore applied every year unless the LRP is triggered in two consecutive years.

Ongoing work is exploring the implications of including additional survey information, as well as the possibility of some data not being available to inform the eHCR. This will usefully inform the settings for a tiered harvest strategy approach that accounts for the different risk-catch-cost tradeoffs of different stock assessment and monitoring options (Dichmont et al. 2016). For example, if no data are available to inform on trends in the stock, then the RBC needs to be set at a lower level such as the 360 t recommended above based on calibration to the same level of risk as the adaptive eHCR. The draft harvest strategy for tropical rock lobster is currently in review and needs to be approved by the PZJA before it can formally be implemented; however, as indicated herein, much progress has been made in supporting the evaluation of alternative harvest control rules in the fishery with full stakeholder inclusion.

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## Literature Cited

Bentley N, Breen PA, Kim SW, Starr PJ. 2005. Can additional abundance indices improve harvest control rules for New Zealand rock lobster (*Jasus edwardsii*) fisheries? N Z J Mar Freshw Res. 39:629–644. https://doi.org/10.1080/00288330.2005.9517341

Butterworth D. 2008a. Some lessons from implementing management procedures. Proc Fisheries for global welfare and environment 5th World Fisheries Congress, 2008. Terrapub.

Butterworth DS. 2007. Why a management procedure approach? Some positives and negatives. ICES J Mar Sci. 64:613–617. https://doi.org/10.1093/icesjms/fsm003

Butterworth DS. 2008b. A commentary on: salvaged pearls: lessons learned from a floundering attempt to develop a management procedure for Southern Bluefin Tuna. Fish Res. 94:351–354. https://doi.org/10.1016/j.fishres.2008.09.034

Butterworth DS, Bentley N, De Oliveira JAA, Donovan GP, Kell LT, Parma AM, Punt AE, Sainsbury KJ, Smith ADM, Stokes TK. 2010. Purported flaws in management strategy evaluation: basic problems or misinterpretations? ICES J Mar Sci. 67:567–574. https://doi.org/10.1093/icesjms/fsq009

Butterworth DS, Punt AE. 1999. Experiences in the evaluation and implementation of management procedures. ICES J Mar Sci. 56:985–998. https://doi.org/10.1006/jmsc.1999.0532

Cooke JG. 1999. Improvement of fishery-management advice through simulation testing of harvest algorithms. ICES J Mar Sci. 56:797–810. https://doi.org/10.1006/jmsc.1999.0552

Cox SP, Kronlund AR. 2008. Practical stakeholder-driven harvest policies for groundfish fisheries in British Columbia, Canada. Fish Res. 94:224–237. https://doi.org/10.1016/j.fishres.2008.05.006

Dankel DJ, Edwards CT. 2016. Management science in fisheries: an introduction to simulation-based methods. Routledge.

de Moor CL, Butterworth DS, De Oliveira JAA. 2011. Is the management procedure approach equipped to handle short-lived pelagic species with their boom and bust dynamics? The case of the South African fishery for sardine and anchovy. ICES J Mar Sci. 68:2075–2085. https://doi.org/10.1093/icesjms/fsr165

Dennis D, Plaganyi E, van Putten I, Hutton T, Pascoe S. 2015. Cost benefit of fishery-independent surveys: are they worth the money? Mar Policy. 58:108–115. https://doi.org/10.1016/j.marpol.2015.04.016

Dennis DM, Pitcher CR, Prescott JH, Skewes TD. 1992. Severe mortality in a breeding population of ornate rock lobster *Panulirus-ornatus* (Fabricius) at Yule Island, Papua-New-Guinea. J Exp Mar Biol Ecol. 162:143–158. https://doi.org/10.1016/0022-0981(92)90198-J

Dennis DM, Pitcher CR, Skewes TD. 2001. Distribution and transport pathways of *Panulirus ornatus* (Fabricius, 1776) and *Panulirus* spp. larvae in the Coral Sea, Australia. Mar Freshw Res. 52:1175–1185. https://doi.org/10.1071/MF01186

Dichmont CM, Punt AE, Dowling N, De Oliveira JA, Little LR, Sporcic M, Fulton E, Gorton R, Klaer N, Haddon M. 2016. Is risk consistent across tier-based harvest control rule management systems? A comparison of four case-studies. Fish Fish. 17:731–747. https://doi.org/10.1111/faf.12142

Durette M. 2007. Indigenous property rights in commercial fisheries: Canada, New Zealand and Australia compared. Centre for Aboriginal Economic Policy Research.

Fournier D, Archibald CP. 1982. A general theory for analyzing catch at age data. Can J Fish Aquat Sci. 39(8):1195–1207. https://doi.org/10.1139/f82-157

Fournier DA, Skaug HJ, Ancheta J, Ianelli J, Magnusson A, Maunder MN, Nielsen A, Sibert J. 2012. AD Model Builder: using automatic differentiation for statistical inference of highly parameterized complex nonlinear models. Optim Methods Softw. 27:233–249. https://doi.org/10.1080/10556788.2011.597854

Francis RICC. 1992. Use of risk analysis to assess fishery management strategies: a case study using orange roughy (*Hoplostethus atlanticus*) on the Chatham Rise, New Zealand. Can J Fish Aquat Sci. 49:922–930. https://doi.org/10.1139/f92-102

Geromont HF, Butterworth DS. 2015. Complex assessments or simple management procedures for efficient fisheries management: a comparative study. ICES J Mar Sci. 72:262–274. https://doi.org/10.1093/icesjms/fsu017

Hutton T, Putten E, Pascoe S, Deng R, Plagányi É, Dennis D. 2016. Trade-offs in transitions between indigenous and commercial fishing sectors: the Torres Strait tropical rock lobster fishery. Fish Manag Ecol. 23:463–477. https://doi.org/10.1111/fme.12186

Johnston S, Butterworth D. (2013) An operational management procedure for the Tristan da Cunha rock lobster fishery. Document MARAM/TRISTAN/2013/OCT/14, 11 pp. Accessed 10 November, 2014. Available from: http://www.mth.uct.ac.za/maram/pub/2013/MARAM_Tristan_2013_OCT_14.pdf

Johnston SJ, Butterworth DS. 2005. Evolution of operational management procedures for the South African west coast rock lobster (*Jasus lalandii*) fishery. N Z J Mar Freshw Res. 39:687–702. https://doi.org/10.1080/00288330.2005.9517345

Miller R, Breen P. 2010. Are lobster fisheries being managed effectively? Examples from New Zealand and Nova Scotia. Fish Manag Ecol. 17:394–403. https://doi.org/10.1111/j.1365-2400.2010.00737.x

Moore R, Macfarlane JW. 1984. Migration of the ornate rock lobster, *Panulirus-ornatus* (Fabricius), in Papua-New-Guinea. Aust J Mar Freshwater Res. 35:197–212. https://doi.org/10.1071/MF9840197

Pascoe S, Hutton T, van Putten I, Dennis D, Plaganyi-Lloyd E, Deng R. 2013. Implications of quota reallocation in the Torres Strait tropical rock lobster fishery. Can J Agric Econ. 61:335–352. https://doi.org/10.1111/cjag.12004

Pascoe SD, Plagányi ÉE, Dichmont CM. 2016. Modelling multiple management objectives in fisheries: Australian experiences. ICES J Mar Sci. 74(2):464–474. https://doi.org/10.1093/icesjms/fsw051

Pitcher CR, Skewes TD, Dennis DM, Prescott JH. 1992. Estimation of the abundance of the tropical lobster *Panulirus-ornatus* in Torres Strait, using visual transect-survey methods. Mar Biol. 113:57–64. https://doi.org/10.1007/BF00367638

Plagányi ÉE. 2016. Using simulation evaluation to account for ecosystem considerations in fisheries management. *In:* Dankel DJ, Edwards CT, editors. Management science in fisheries: an introduction to simulation-based methods. Routledge. 460 p.

Plagányi ÉE, Dennis D, Campbell R, Haywood M, Pillans R, Tonks M. 2012. Refined survey, stock assessment and MSE for the Torres Strait rock lobster (TRL) fishery. AFMA Project 2012/810. October 2012 Milestone report.

Plagányi ÉE, Dennis D, Campbell R, Haywood M, Pillans R, Tonks M, Murphy N, McLeod I. 2015. Torres Strait rock lobster (TRL) fishery surveys and stock assessment: TRL fishery model, used to calculate the upcoming TAC updated using the 2014 survey data and the previous year's CPUE data. AFMA Project 2013/803. June 2015 Milestone report. AFMA Project 2013/803 June 2015 Milestone report 64 p.

Plagányi ÉE, Dennis D, Deng R, Campbell R, Hutton T, Tonks M. 2016. Torres Strait tropical lobster (TRL) *Panulirus ornatus* harvest control rule (HCR) development and evaluation *In:* CSIRO/AFMA Draft Final Report S. Commonwealth Scientific and Industrial Research Organisation. 110 p.

Plagányi ÉE, McGarvey R, Gardner C, Caputi N, Dennis D, de Lestang S, Hartmann K, Liggins G, Linnane A, Ingrid E. 2018. Overview, opportunities and outlook for Australian spiny lobster fisheries. Rev Fish Biol Fisher. 28:57–87. https://doi.org/10.1007/s11160-017-9493-y

Plagányi EE, Rademeyer RA, Butterworth DS, Cunningham CL, Johnston SJ. 2007. Making management procedures operational - innovations implemented in South Africa. ICES J Mar Sci. 64:626–632. https://doi.org/10.1093/icesjms/fsm043

Plagányi EE, van Putten I, Hutton T, Deng RA, Dennis D, Pascoe S, Skewes T, Campbell RA. 2013. Integrating indigenous livelihood and lifestyle objectives in managing a natural resource. Proc Natl Acad Sci USA. 110:3639–3644. https://doi.org/10.1073/pnas.1217822110

Punt AE, Butterworth DS, de Moor CL, De Oliveira JAA, Haddon M. 2016. Management strategy evaluation: best practices. Fish Fish. 17:303–334. https://doi.org/10.1111/faf.12104

Punt AE, Hobday D. 2009. Management strategy evaluation for rock lobster, *Jasus edwardsii*, off Victoria, Australia: accounting for uncertainty in stock structure. N Z J Mar Freshw Res. 43:485–509. https://doi.org/10.1080/00288330909510017

Punt AE, McGarvey R, Linnane A, Phillips J, Triantafillos L, Feenstra J. 2012. Evaluating empirical decision rules for southern rock lobster fisheries: a south Australian example. Fish Res. 115–116:60–71. https://doi.org/10.1016/j.fishres.2011.11.010

Rademeyer R, Butterworth D, Plagányi É. 2008. A history of recent bases for management and the development of a species-combined operational management procedure for the South African hake resource. Afr J Mar Sci. 30:291–310. https://doi.org/10.2989/AJMS.2008.30.2.8.558

Rademeyer RA, Plaganyi EE, Butterworth DS. 2007. Tips and tricks in designing management procedures. ICES J Mar Sci. 64:618–625. https://doi.org/10.1093/icesjms/fsm050

Rayns N. 2007. The Australian government's harvest strategy policy. ICES J Mar Sci. 64:596–598. https://doi.org/10.1093/icesjms/fsm032

Sainsbury KJ, Punt AE, Smith ADM. 2000. Design of operational management strategies for achieving fishery ecosystem objectives. ICES J Mar Sci. 57:731. https://doi.org/10.1006/jmsc.2000.0737

Skewes TD, Pitcher CR, Dennis DM. 1997. Growth of ornate rock lobsters, *Panulirus ornatus*, in Torres Strait, Australia. Mar Freshw Res. 48:497–501. https://doi.org/10.1071/MF96063

Smith AD, Smith DC, Tuck GN, Klaer N, Punt AE, Knuckey I, Prince J, Morison A, Kloser R, Haddon M. 2008. Experience in implementing harvest strategies in Australia's south-eastern fisheries. Fish Res. 94:373–379. https://doi.org/10.1016/j.fishres.2008.06.006

Smith ADM, Fulton EJ, Hobday AJ, Smith DC, Shoulder P. 2007. Scientific tools to support the practical implementation of ecosystem-based fisheries management. ICES J Mar Sci. 64:633–639. https://doi.org/10.1093/icesjms/fsm041

Smith ADM, Sainsbury KJ, Stevens RA. 1999. Implementing effective fisheries-management systems – management strategy evaluation and the Australian partnership approach. ICES J Mar Sci. 56:967–979. https://doi.org/10.1006/jmsc.1999.0540

Starr PJ, Breen PA, Hilborn RH, Kendrick TH. 1997. Evaluation of a management decision rule for a New Zealand rock lobster substock. Mar Freshw Res. 48:1093–1101. https://doi.org/10.1071/MF97171

van Putten I, Deng R, Dennis D, Hutton T, Pascoe S, Plaganyi E, Skewes T. 2013a. The quandary of quota management in the Torres Strait rock lobster fishery. Fish Manag Ecol. 20:326–337. https://doi.org/10.1111/fme.12015

van Putten I, Lalancette A, Bayliss P, Dennis D, Hutton T, Norman-Lopez A, Pascoe S, Plaganyi E, Skewes T. 2013b. A Bayesian model of factors influencing indigenous participation in the Torres Strait tropical rocklobster fishery. Mar Policy. 37:96–105. https://doi.org/10.1016/j.marpol.2012.04.001

Ye YM, Dennis D. 2009. Assessing the impacts of trawling breeding lobsters (*Panulirus ornatus*) on the catch of the Torres Strait lobster fishery shared between Australia and Papua New Guinea. N Z J Mar Freshw Res. 43:419–428. https://doi.org/10.1080/00288330909510011

Ye YM, Pitcher R, Dennis D, Skewes T. 2005. Constructing abundance indices from scientific surveys of different designs for the Torres Strait ornate rock lobster (*Panulirus ornatus*) fishery, Australia. Fish Res. 73:187–200. https://doi.org/10.1016/j.fishres.2004.12.010

## NON-TECHNICAL SUMMARY

# Torres Strait Tropical Rock Lobster (TRL) Fishery Harvest Control Rule (HCR) development and evaluation



**CSIRO/AFMA**

**January 2017**

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CSIRO

Australian Government
Australian Fisheries Management Authority



This non-technical summary has been developed to assist stakeholders in understanding the draft Harvest Strategy under development for the Torres Strait Tropical Rock Lobster Fishery

## Community Summary: Proposed Harvest Strategy for Kaiar

We want to make sure that there will always be lots of kaiar in Torres Strait by managing the TRL fishery effectively into the future. This is because kaiar are very important economically as well as culturally. Researchers, fishers and managers together agree on what number of kaiar can be caught each year to keep the population healthy and the fishery performing well (called target reference points). They also agree on the low population numbers that cause concern and should be avoided (called limit reference points). These numbers will be very important for use in the TRL harvest strategy as described below.

As we all know kaiar numbers go up and down from one year to the next because of natural changes in the environment. In good years we can catch more, but in bad years we need to catch less. We have some good indicators that provide information on how many kaiar there are and how many should be caught.

Firstly fisher catches – if a fisher catches more kaiar each day than in most years, it means there are lots of large kaiar in the population. This also means there should be lots of kaiar left to breed and release eggs. But if there are fewer kaiar being caught each day than in most years, it means there are fewer kaiar left to breed and less should be caught.

Secondly science surveys – surveys have been run by CSIRO for the past 28 years (since 1989) to work out how many kaiar there are on the fishing grounds. The surveys are now run in November (called pre-season surveys) because this is close to the start of the fishing season. If there are lots of kaiar counted on the survey, there should be good numbers in the fishery and it is safe to catch lots of kaiar. If few kaiar are counted, it means that the next year will be a bad year for kaiar and catches should be smaller.

If the fishery catch was set at the same number each year (fixed), then we would have to make sure that the catch wasn't too high in a bad year. This means a fixed total catch would need to be very small. A better strategy is

to change the total catch that is allowed every year up or down depending on the actual number of kaiar available. This is possible because of the information we have from fisher catches and science surveys.

At the moment we use a complex computer model with the catch and survey information to work out how many kaiar can be caught. However, we can also work these numbers out using a Harvest Control Rule (HCR), which is much simpler and takes less time to calculate. Scientific testing suggests that a HCR should work well for the kaiar fishery into the future.

Researchers, fishers and managers also agreed to some extra rules to use with the HCR. Because the fishery is so important the largest catch that would be allowed is 1000 t. Very low survey numbers would be worrying and it was agreed that the computer model would be used in these years to make sure the HCR is working well. It was also agreed that the computer model would be used every three years in any case; as a double check on how many kaiar we think there are in the population.

Of course it is very important for management of the fishery that good information is collected on catches and that good science surveys are done. If more information can be collected and better surveys are done, then it is possible to improve management and increase catches.

The information below gives more details of the harvest strategy and the harvest control rules and staff at AFMA Thursday Island and CSIRO Brisbane will be happy to answer any other questions you may have.

*CSIRO engaging with the Torres Strait TRL community to discuss the science of the Kaiar Fishery, on Thursday Island in November 2016*

# TRL Harvest Strategy

## Background Information

The Torres Strait tropical rock lobster (TRL) fishery is moving from input controls to output controls which involves the setting of Total Allowable Catch (TAC) levels. The stock is naturally highly variable due to variable numbers of recruits (1+ lobsters) each year, and the fishers catch essentially a single age-class (2+) only. This age-class then leaves Torres Strait to breed. Hence, a TAC needs to be set annually in such a way as to ensure biological and economic sustainability consistent with the principles of the Australian Commonwealth Harvest Strategy as well as the TRL fisheries and PZJA objectives. For this reason, it is important to conduct an annual pre-season survey of 1+ recruits as close to the start of the fishing season as possible (November) to inform on the likely size of the fishable stock the next year. Previously, this information together with all other sources of information and data for the fishery were input to an integrated stock assessment model that was used to set the TAC. As an input control system is currently in place an indicative TAC is set (a "dummy" TAC). However, there is not enough time after the pre-season survey for the TRLRAG to review an updated stock assessment; thus an alternative new approach has been recommended. In addition, the TRLRAG identified potential cost savings by only conducting an assessment every three years rather than annually, and replacing this with an approach as described below. There were also additional benefits identified in reducing the frequency of running the full stock assessment model, mainly by allowing additional time to update and improve the model in the intervening years.

The TRL fishery is the most important commercial fishery to Torres Strait Islanders and provides significant financial independence for island communities in the region. The fishery is based almost entirely on one species *Panulirus ornatus*; the ornate rock lobster.

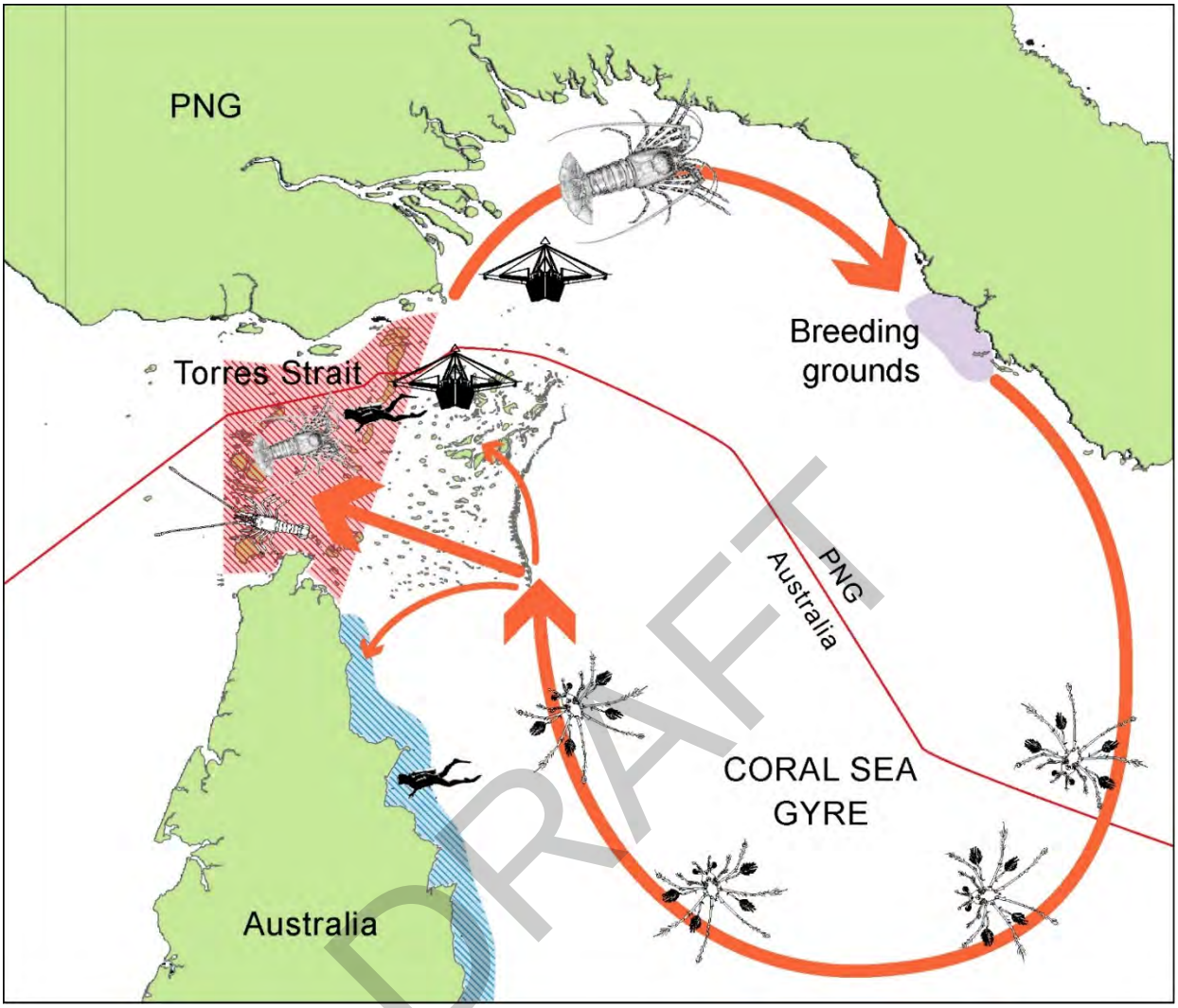
The TRL fishery is managed by the Protected Zone Joint Authority (PZJA), made up of representatives from the Australian and Queensland governments. The authority is guided by the Torres Strait Treaty (February 1985) between Australia and Papua New Guinea, which defines the fishery boundaries and catch sharing arrangements.

Research on the TRL fishery is important to ensure that enough lobsters escape to breed each year to replenish future populations. At the same time research is important to ensure that the catch of the fishery is big enough to support the livelihood of Torres Strait Islanders without impacting the traditional way of life.

Tropical rock lobsters from Torres Strait are very adventurous animals. To breed, they undertake long marches often as far as the Gulf of Papua towards Yule Island where they congregate to spawn (as shown on the map below). This journey, several hundreds of kilometres long, is exhausting and most of them will die after releasing the next generation of lobsters.  Other known breeding areas include the outer barrier reef and lobsters probably spawn anywhere around the northern Coral Sea.

The tiny lobster larvae are called phyllosomes and don’t look anything like adult lobsters. Also unlike their parents, phyllosomes live at the surface of the ocean (pelagic) rather than on the seabed (benthic). They drift with ocean currents in the Coral Sea. And the Coral Sea Gyre distributes them

clockwise throughout the year around the Coral Sea, as shown in the map below.



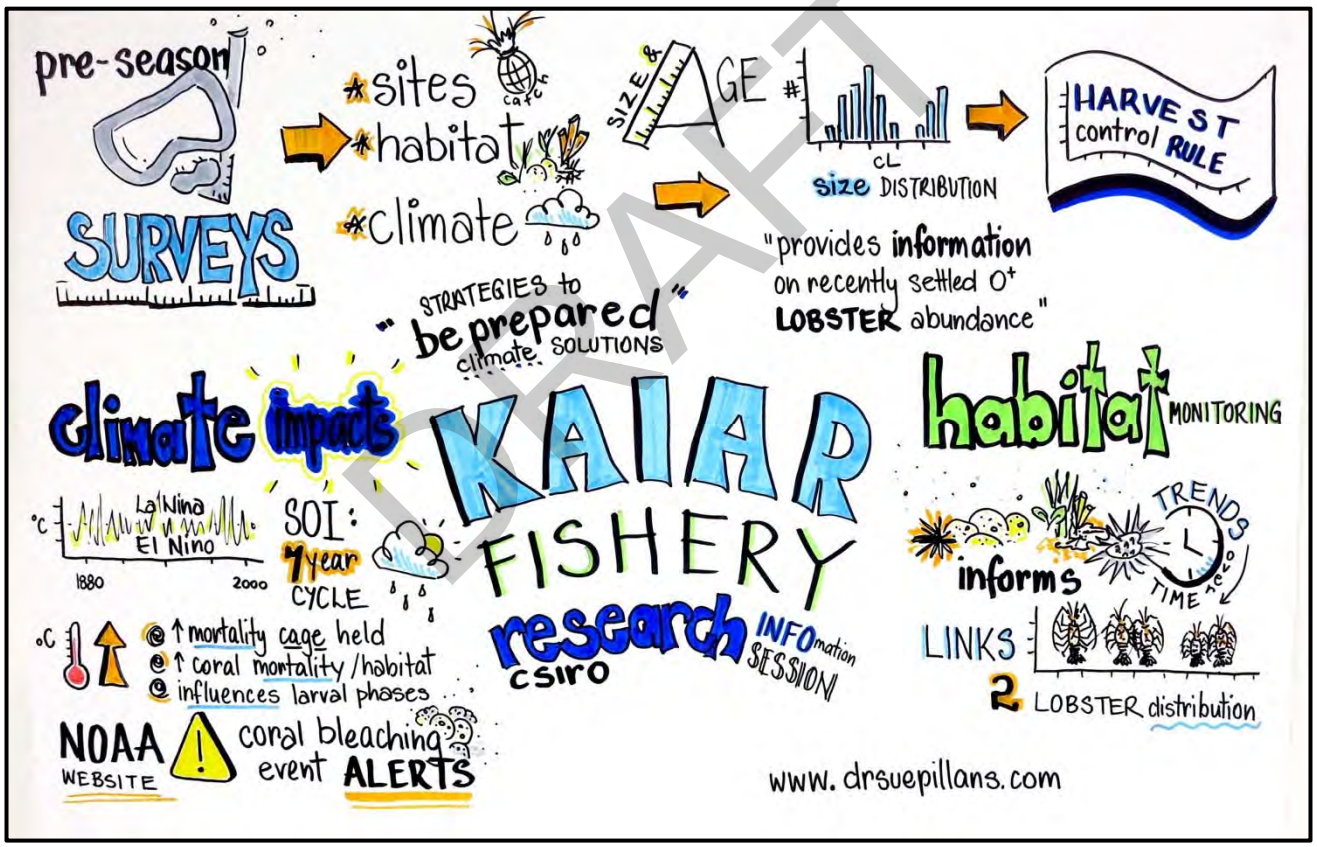



The ocean currents transport the lobster larvae from the breeding grounds back to Torres Strait. In winter some of the lobster larvae make it to Torres Strait and undergo one final dramatic change into a puerulus. The puerulus stage looks like a tiny transparent lobster and it begins the benthic phase of life.

The tiny lobsters must find suitable tight-fitting shelters on the seabed as they are easy prey for fish. They grow rapidly and by the time they are 2 years old most are larger than the legal minimum size (90 mm carapace length). These sub-adult lobsters then spend another 9-10 months in Torres Strait and are the basis of the TRL fishery. In August/September

each year lobsters approaching 3 years of age migrate out of Torres Strait and move to the breeding grounds to complete the life cycle.

It is not possible to count lobsters in all areas in Torres Strait so CSIRO scientists divided the fishery into several regions and selected sites at random in each region. The regions, also known as sampling stratums, are shown in the map below. The number of sites surveyed in each region depends on the size of the region and available habitat. The map shows the locations of the 375 sites sampled in the full-scale 2002 survey. A smaller sub-set of these sites has been sampled each year since then to provide information on the numbers of lobsters in the fishery and the weight of lobsters available to be fished.

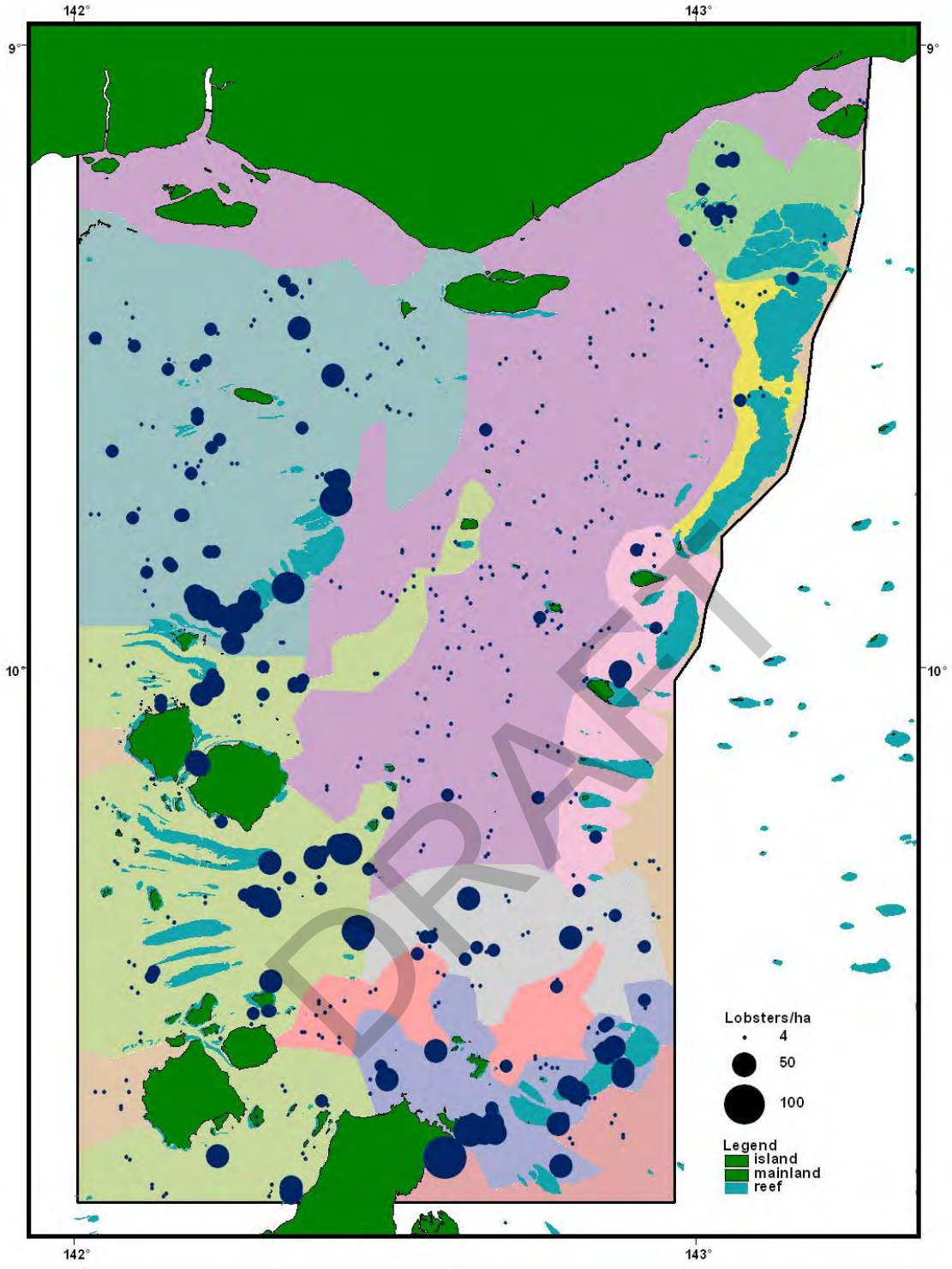



*Visual story of the Kaiar Fishery CSIRO research information session held with the TRL community on Thursday Island in November 2016 explaining the fisheries science (Graphic by Dr Sue Pillans, [www.drsuepillans.com](http://www.drsuepillans.com))*

## Harvest Control Rule

The new approach to setting sustainable catches uses an empirical (data-based) Harvest Control Rule (eHCR) that can be rapidly applied to provide a Recommended Biological catch (RBC) once the catch, survey indices and other data inputs (CPUE or Catch-Per-Unit-Effort) become available. The eHCR is a central component of the Harvest Strategy, defined as "a framework that specifies the pre-determined management actions in a fishery necessary to achieve the agreed ecological, economic and/or social management objectives." A key principle is that fishery managers, fishers and key stakeholders utilise pre-agreed (and preferably pre-tested) rules as to how to adjust management recommendations given updates of data and/or model outputs (http://www.agriculture.gov.au/fisheries/domestic/harvest_strategy_policy).

The eHCR selected by the TRLRAG (August 2016), from a number of alternative candidates that were evaluated, is a formula that outputs a RBC in December for the following year. This formula is the multiple of the average catch over the last 5 years and a statistic which measures the relative performance of the fishery based on the following 5 data inputs: (1) Pre-season recruiting lobster (1+) standardised relative numbers; (2) Pre-season recently-settled lobster (0+) standardised relative numbers; (3) nominal CPUE (TIB sector) and (4) standardised CPUE (TVH sector) (using data available up until end of October); and (5) total catch (TIB,TVH,PNG) (using data available up until end of October. This eHCR implies that if the performance of the fishery is improving then the RBC will increase while if the performance of the fishery is decreasing then the RBC will also decrease. Over the long-term this eHCR should maintain the stock around the target biomass level.




Different weightings are applied to the four abundance indices included in the relative performance statistic used in the eHCR, based on extensive testing to compare performance of alternative weightings and also on considerations of the information content and reliability of each series, as well as a preference expressed by the stakeholders to use a portfolio approach in determining the RBC. The pre-season 1+ index is the most

reliable and direct in terms of indexing the biomass of lobsters that will be available to be caught in the next fishing season, and hence this index is assigned the highest weighting of 70%. The pre-season 0+ index provides an early indication of the following year's recruitment, whereas the CPUE indices reflect the abundance of the large 2+ lobsters, the survivors of which will migrate out of the Torres Strait to spawning grounds to the East, and hence they index spawning biomass which is an important consideration in terms of ensuring the future sustainability of the stock. Each of these three secondary indices (Survey 0+ and CPUE (TIB and TVH)) are assigned a weighting of 10% in the eHCR formula.


*Visual story of the Kaiar Fishery CSIRO research information session held with the TRL community on Thursday Island in November 2016 explaining the science of the Harvest Control Rule (HCR) (Graphic by Dr Sue Pillans, [www.drsuepillans.com](http://www.drsuepillans.com))*



Simulation testing showed that the best approach is to use the slope of the trends in the secondary indices over the last five years' data (after first taking the natural logarithm of the data) for each of the abundance indices. This allows the RBC to be based on medium term trends in abundance, rather than on just the current abundance. Using the last five years' data gave the best performance in terms of a number of key statistics that were used to compare the performance of alternative candidate rules. Key performance statistics considered by the TRLRAG included those related to resource status (spawning biomass level, and levels relative to target reference levels), average annual catch (averaged over 20 years), average annual variability in catch, as well as risk to the fishery and risk of closure of the fishery. The eHCR candidate that included taking the natural logarithm was preferred because this has the effect of dampening some of the inter-annual variability and hence ensuring that the RBC responds to medium-term changes in resource trends rather than bouncing up or down very erratically. Similarly, a number of alternative options were explored that used the trend fitted to different numbers of

years of historical abundance indices, but using the trend based on the past 5 years was shown to perform best.

The preferred eHCR therefore outputs a RBC based on the slopes of the regression lines fitted to the pre-season survey and CPUE indices, with different weightings applied to the different data sources (70% pre-season 1+; 10% pre-season 0+; 10% CPUE_TIB; 10% CPUE_TVH), and the overall resultant trend multiplied by the average of the last 5 years' catch. In essence, this will output annual catches with an average similar to the average of recent catches, but the actual value each year will be scaled up or down based on the resource status. For example if the abundance indices suggest the resource is increasing, the RBC will be increased and conversely, so as to ensure that the stock is not overfished in years when recruitment naturally fluctuates to low levels. Stakeholders also selected an additional rule to cap the total catch at 1000 t in the (unlikely) event that the eHCR outputs a RBC that exceeds this tonnage.

### Forecast TAC

Consistent with previous approaches, a Forecast TAC is generated each year to provide a heads-up of the likely RBC for year y+2, in case this is useful for planning purposes. The Forecast value uses the pre-season 0+ data only, and is scaled (using a multiplier of 0.85) so that on average the value is 100t less than the final TAC, as the TRLRAG previously agreed that the Forecast should be set lower than the final TAC because of greater uncertainty in predicting more than one year ahead, and also because it would be preferable to increase rather than decrease any preliminary RBC value. Simulation testing suggested that the Forecast performs reasonably in predicting future fishable biomass, and that with increased survey effort (to improve the precision of the 0+ abundance index), the

precision and reliability of both the Forecast and RBC (which also uses the 0+ index) could be improved.

### Stock Assessment of Resource Status

The eHCR will be applied annually to set a RBC that takes into account recent trends in resource abundance indices, but it does not provide information as to the current stock size, for example relative to important reference levels such as the target biomass level (65% of the comparable unfished biomass) and limit reference point (LRP) (32% of the comparable unfished biomass). The eHCR is tuned so that on average the stock will fluctuate around the target biomass level and avoid the limit biomass level, but to accurately assess resource status, it is necessary to do a stock assessment. A stock assessment will thus be conducted every three years to rigorously assess stock status and productivity, and check that the eHCR is working as it is supposed to. A stock assessment is also necessary to evaluate whether the spawning stock biomass drops below the LRP because if the LRP is triggered in two successive years, then the fishery is closed.

### Fishery Closure Rule

As a stock assessment is only scheduled for every third year, this means that action may not be taken quickly enough if the spawning biomass drops to very low levels (which may be due to either fishery or environmental conditions), and hence an additional precaution has been built into the Harvest Strategy. Based on analysis of the historical pre-season and mid-year survey indices, a pre-season 1+ survey trigger point of 1.25 (average number of lobsters per survey transect and lower than any historically observed values) has been set, such that if this lower limit is triggered in any year, then the required action is that a stock assessment be conducted in the following year. If the stock assessment suggests that the spawning stock biomass is above the LRP, then the process continues as previously. However, if spawning biomass is assessed as below the LRP, then a stock assessment is again triggered in the following year. If the second stock assessment suggests the stock is above the LRP, then the

process again continues as previously, but if the spawning biomass is below LRP (i.e. two consecutive years with spawning biomass below LRP), then the fishery is closed and appropriate action (e.g. implementing surveys, analysing size structure and environmental information) is put in place to rebuild the stock. In general, the eHCR is therefore applied every year unless the LRP is triggered in two consecutive years, or there are exceptional circumstances. Exceptional circumstances include situations where the new data collected indicate that the resource has moved outside the range for which the eHCR has been tested, or environmental conditions have an impact on the stock that is similarly outside the bounds of what the eHCR has been tested as robust to. An examples would be an extreme weather event resulting in a very low stock.

## Harvest Control Rule Testing

The eHCR is a relatively simple formula for calculating the recommended biological catch each year. However, it is important to understand that although simple it has been rigorously and extensively tested using historical information and simulations of likely outcomes. Hence it has a solid foundation based on the wealth of historical data and information for the fishery. To test the performance (in terms of meeting pre-specified objectives) and robustness (i.e. ensuring it doesn't fall over if the stock or fishers behave or change in certain ways) of the eHCR, we use as the so-called operating model, the 2015 integrated stock assessment model that integrates all historical information (catch records since 1973, mid-year survey data from 1989-2014, Benchmark surveys, pre-season survey data (2005-2009; 2014-2015), catch-at-age information, size composition information). In addition, rather than using the single best-case stock assessment model, we use four versions of the model that include alternative parametrisations related to the stock-recruitment assumptions (more conservative steepness parameter; sporadic poorer auto-correlated recruitment) and the form of the assumed relationship between stock biomass and CPUE (hyperstability parameter settings). We project each model forward 20 years, generating random future recruitment scenarios

that are based on what has been observed in the past, as well as future survey "data" and CPUE that are assumed collected with observation errors similar to what has been observed in the past. We test how well each alternative candidate eHCR performs by testing it using 200 replicates of each of the four operating models (i.e. 800 future scenarios). We also account for implementation uncertainty which describes the difference between the RBC allocation to each sector (not considered in this study which focuses only on the total RBC) and the actual catch of each sector. The implementation errors assumed for each sector in the testing are similar to past observed differences between "dummy" TAC allocations and actual catches, and hence are greatest for the PNG sector, followed by TIB and TVH sectors.




*CSIRO picturing the Kaiar Fishery with the TRL community on Thursday Island in November 2016*

A large number of alternative types of eHCR rules using different combinations of data inputs were trialled to inform selection of the final rule. There is no one single correct answer in this process of Management Strategy Evaluation (MSE) testing. Rather, selection of a final eHCR is made by comparing trade-offs across a range of different performance statistics (e.g. the trade-off between a rule that sets a very high catch is that it likely results in high risk to a resource) and also that it performs satisfactorily in meeting pre-specified objectives (such as the target biomass level). In addition, the performance of the eHCR needs to be tested using sensitivity and robustness tests, to see whether it still performs satisfactorily even if there are moderate changes in the stock, environment, fisher behaviour, surveys and other aspects of the fishery. For example, sensitivity tests were done assuming higher implementation errors, survey observation errors, future changes in catchability (which might be linked to improvements in efficiency, changes in fishing practices or environmental drivers making lobsters harder to find and catch) as well as future poor recruitment events or increases in the natural mortality rate.



### HCR Selected by TRLRAG

The eHCR selected by the TRLRAG performed reasonably across a broad range of sensitivity scenarios, suggesting that it is a reasonably robust method that will respond appropriately to unforeseen future changes to adjust stock size upwards or downwards as necessary, in such a way as to substantially reduce the risk of overfishing or underfishing (i.e. not optimally utilising the resource). This is illustrated by comparing the performance with a constant catch strategy (with catch set at 680 t or alternatively, the average of the past 10 years' catch). Results highlight that such a constant catch strategy poses an unacceptably high risk to the resource and importantly a substantially higher risk of invoking a closure of the fishery in the future, compared to the adaptive eHCR presented above, which adjusts catches in line with stock fluctuations. It is worth noting that previous TAC estimates were as low as 470 t; hence a constant catch may result in overfishing by 200 t in low stock years. Simulations

suggest that to achieve the same level of risk as the adaptive eHCR being proposed, the constant catch would need to be set at a low total of 360 t, which is approximately half the average catch that could be achieved using an adaptive eHCR.


## Data quality requirements

The eHCR relies critically on the provision of high quality data that are provided before pre-specified deadlines. The Australian Harvest Strategy Policy allows for tiered approaches which cater for different levels of certainty about a stock. It is well recognized that increased levels of precaution are necessary as levels of uncertainty about stock status increase (e.g. if there are fewer data to inform on stock status). Hence catch or exploitation levels can be adjusted on the basis of keeping the risk approximately constant across the tiers, such that catch and exploitation rates will decrease as tier levels increase. Future work will quantify what the penalties or bonuses are that should be applied in a tier system that accounts for differences from year to year in the amount and quality of data that are available to inform the setting of a RBC. Simulations are being used to compute how much additional catch could be taken, for the same level of risk, if additional surveys (such as re-implementing a mid-

year survey or extending the pre-season 0+ survey) are conducted. On the other hand, a penalty, determined by again calibrating to the same level of risk, needs to be applied to the RBC if the quality or quantity of survey other data are degraded in a particular year. As above, if there are no survey data, then a low constant catch of 360 t could be set, and if there are no data at all (i.e. no surveys, CPUE or reliable catch), then the fishery should be closed.

Adopting an eHCR approach means that it is imperative that data are collected reliably and timeously each year in order to manage the stock effectively.

## Summary

In summary, the TRLRAG are proposing that the basis for setting a TAC be changed from a traditional approach to a Harvest Control Rule approach, such as is now implemented in a number of fisheries globally, including for Australia's southern rock lobster fishery. Previously, a stock assessment model was used annually to analyse fishery data and assess current status and productivity of the resource. A "best assessment" then provided the RBC and a reference-point hockey-stick HCR informed the TAC recommendation and management action. The new approach involves using a formula for providing the RBC, based on pre-specified data inputs, and therefore for setting the TAC. The formula or harvest control rule (also called a decision rule) is empirical, as it uses the data directly e.g. recent upward or downward trends in abundance indices are used directly as feedback and hence the TAC changes in the same direction. In addition, a full stock assessment using the integrated fishery model will be conducted every third year.

The eHCR has been extensively tested by simulation to provide appropriate trade-offs, taking into account a range of uncertainties and using methods that are now well established internationally and recognised as state-of-the-art approaches to successfully and optimally managing fisheries. The greatest advantages to adopting a HCR approach are that (1) it can be applied quickly and easily to set a TAC in time for the start of the new fishing

season; (2) it provides a transparent and easily understandable tool for stakeholders (e.g. the effect on the RBC of negative or positive decreases/increases in stock abundance indices can be readily seen, and a spreadsheet example is provided to stakeholders for this purpose); (3) it provides a sound basis for setting TACs without compromising resource status; (4) it properly addresses concerns about scientific uncertainty through simulation testing to ensure that feedback secures reasonably robust performance across a range of plausible alternative resource dynamics; and (5) it empowers stakeholders by allowing them to transparently assess trade-offs between key performance measures and select the most favourable option taking into account a range of biological, economic, social and cultural considerations. Another advantage of a HCR is: (6) it uses pre-agreed rules for management of the fishery thus allowing management to be pro-active instead of re-active.

## Summary explanation of TRL Harvest Control Rules

**RULE 1:** Total Allowable Catch is equal to a base amount which is increased or decreased each year depending on an index of lobster in the Pre-season Survey *and* depending on whether trends in Catch per Unit of Effort in each fleet have increased or decreased.

The base amount is the average of the last 5 years of total catch and the rule is that the base amount must be increased or decreased according to the Pre-season Survey and fleet catch rates in order to meet the objective of sustainable management of Torres Strait marine stocks.

**RULE 2**: If the Pre-season Survey index falls below a value (1.25); that is lower than the lowest recorded index value then the stock assessment will be undertaken for the next year; else

**RULE 3**: The stock assessment is undertaken every 3 years to check if the stock is meeting the Target Reference Point and not falling below the Limit Reference Point; and

**RULE 4:** If the stock falls below the Limit Reference Point for two consecutive years as determined by the stock assessments in those two years then Total Allowable Catch will be the minimum (zero).

**RULE 5:** Finally, the maximum Total Allowable Catch is equal to 1000 tonnes if **RULE 1** ever evokes a higher value.

Additional info: Target Reference Point is equal to 65% of the pristine total biomass.

Limit Reference Point is equal to 32% of the unfished total biomass.

Rules based on using a fixed (average) catch pose high risk for variable stocks such as TRL.



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Australian Government
Australian Fisheries Management Authority

File reference: DOC19/30851

22 November 2019

Dear Torres Strait Tropical Rock Lobster Fishery licence holder

**Management Arrangements for the 2019-20 Fishing Season**

The 2019-20 fishing season for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) will commence on 1 December 2019. This letter details some key management arrangements that will apply this season.

**Total Allowable Catch**

On 19 November 2019, Senator the Hon. Jonathon Duniam determined a total allowable catch (TAC) of 200,000 kilograms of tropical rock lobster (TRL) in the Australian waters of the TRL Fishery for the 2019-20 fishing season. This was agreed as an interim TAC by the Protected Zone Joint Authority (PZJA) at their meeting on 19 November 2019 and will apply for the fishing season commencing 1 December 2019. 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 Papua New Guinea (PNG) have been taken into account. Any increase in the TAC is expected to be determined by the end of February 2020.

Under this TAC, the value of each quota unit and available catch for each TRL Fishery sector is outlined in the table below. All weights are provided in unprocessed weight in kilograms.

| TRL Fishery sector | TAC (kilograms) | Number of quota units | Value of each quota unit (kilograms) | Available catch per sector (kilograms) |
|---|---|---|---|---|
| Traditional Inhabitant Boat (TIB) licence holders | 200,000 | 662,016* | 0.200 | **132,403.2** |
| Transferable Vessel Holder (TVH) licence holders | | 337,981 | | **67,596.2** |

* Held by the Torres Strait Regional Authority (TSRA).

**Harvest Strategy for the TRL Fishery**

The TRL Harvest Strategy was adopted by the PZJA at their meeting on 19 November 2019 and sets out the objectives for the Fishery, how the Fishery will be monitored, what data should

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be collected, and rules for the determination of a global TAC each season. The Harvest Strategy will be used in the 2019-20 fishing season to determine the global TAC for the Fishery.

A further explanation of how TACs are determined for the TRL Fishery, how catch is shared between Australia and PNG, and how each sector's catches will be managed for the 2019-20 fishing season, is provided in **Enclosure A** to this letter.

**Moon-Tide Hookah Closures**

At their meeting held on 26 November 2018, the PZJA reaffirmed existing management controls currently applied to the TRL Fishery, to be implemented under the *Torres Strait Fisheries (Tropical Rock Lobster) Management Instrument 2018* (the Instrument) and licence conditions. This includes periodic closures to the use of hookah gear for three days either side of the full or new moon each month based on the largest difference between high and low tides.

For the purpose of subsection 13(2) of the Instrument, I provide notice that the use, possession or control, on a boat, of hookah gear to take, process or carry TRL will not be permitted during the 2019-20 fishing season during the moon-tide hookah closure periods shown in the calendar (dated 13 November 2019) provided in **Enclosure B** to this letter. The first scheduled moon-tide hookah closure period starts on 6 February 2020.

These moon-tide hookah closures are in addition to the hookah closure period from 1 December and 31 January each fishing season. Free-diving, lamp fishing and traditional fishing are permitted during all hookah closure periods.

As always, licence holders should familiarise themselves with all management arrangements that apply in the TRL Fishery prior to the commencement of fishing. Further information can be found on the PZJA website at www.pzja.gov.au or by contacting AFMA.

Should you have any questions concerning the matters covered in this letter, please contact the AFMA Thursday Island office on 07 4069 1990 or FisheriesTI@afma.gov.au. If you would also like to receive future management updates by email or SMS please contact the AFMA Thursday Island office to update your contact details.

Yours sincerely

Wez Norris

Chief Executive Officer

**Enclosures**

A Additional information regarding management arrangements for the Torres Strait Tropical Rock Lobster Fishery 2019-20 fishing season

B TRL Fishery moon-tide hookah closures for the 2019-20 fishing season (dated 13 November 2019)

**Enclosure A**

**Additional information regarding management arrangements for the Torres Strait Tropical Rock Lobster Fishery 2019-20 fishing season**

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## How much can I catch?

The 2019-20 fishing season for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) will open from 1 December 2019 until 30 September 2020, or until available quota units have been caught.

### If you are fishing under a TIB licence

- 662,016 quota units, with a value of **132,403.2 kilograms** of TRL is available to be caught by Traditional Inhabitant Boat (TIB) licence holders. This is an **interim amount only** and 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 Papua New Guinea (PNG) have been taken into account. AFMA will write to all TRL Fishery licence holders when this happens.
- When this amount has been caught, TIB licence holders will no longer be permitted to fish commercially in the TRL Fishery (unless the total allowable catch (TAC) has been increased – see above).
- TIB licence holders will be provided with a notice by the Commonwealth Minister for Fisheries when this occurs.
- The mandatory Fish Receiver System (catch disposal records) will be used to account for catches by TIB licence holders against the TIB sector's quota holdings (held by the Torres Strait Regional Authority (TSRA) in trust).
- If a TRL is tailed, a weight conversion factor of 2.677 will be applied. This means that if an individual lands 1 kilogram of tailed TRL, 2.677 kilograms of TRL will be deducted from the uncaught quota amount.
- AFMA will monitor the catches of TIB licence holders against the TIB sector's quota holdings, and provide regular catch reports throughout the season to TRL Fishery licence holders on the remaining catch that is available to be taken. These reports will be made available on the Protected Zone Joint Authority (PZJA) website at www.pzja.gov.au and also sent to TRL Fishery licence holders by email and SMS where licence holders have these details registered with AFMA.
- Licence holders will also be able to check the catches of the TIB sector against the TIB sector's quota holdings at any stage by contacting the AFMA Thursday Island office on 07 4069 1990 or FisheriesTI@afma.gov.au.

## If you are fishing under a TVH licence

- 337,981 quota units, with a value of **67,596.2 kilograms** of TRL, have been allocated to individual Transferable Vessel Holder (TVH) licence holders. These quota units are only available to be fished by the individual that holds them. This is an **interim amount only** and 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 taken into account. AFMA will write to all TRL Fishery licence holders when this happens.
- Prior to the start of each fishing season, each TVH licence holder will receive an extract of the Register detailing the number and value of the quota units held by the individual.
- When all the quota units (including any leased units) held by a TVH licence holder have been caught, the licence holder will no longer be permitted to fish commercially in the TRL Fishery.
- It is the responsibility of each TVH licence holder to monitor their catches against the quota units that they hold.
- The Fish Receiver System (catch disposal records) will be used to account for TVH licence holders' catches against their quota unit holdings.
- If a TRL is tailed, a weight conversion factor of 2.677 will be applied. This means that if an individual lands 1 kilogram of tailed TRL, 2.677 kilograms of TRL will be deducted from the individual's uncaught quota amount.
- AFMA will provide regular catch reports detailing the total catch by the TVH sector (not individual catches). These reports will be made available on the PZJA website at www.pzja.gov.au and also sent to TRL Fishery licence holders by email and SMS where licence holders have these details registered with AFMA.
- TVH licence holders will also be able to check their quota holdings at any stage throughout the season by registering for GOFish, AFMA's e-licensing system. Licence holders can do this by contacting the AFMA Licensing team on 02 6225 5555 or licensing@afma.gov.au.

### What is a Harvest Strategy?

The Harvest Strategy for the TRL Fishery was adopted by the PZJA at their meeting held on 19 November 2019, and will be used to determine the global TAC for the 2019-20 and future fishing seasons.

The Harvest Strategy sets out the objectives for the TRL Fishery, how the Fishery is to be monitored, what data should be collected, and rules for determining a recommended biological catch (RBC) and the global TAC each fishing season. Having a harvest strategy in place provides transparency for stakeholders (fishers, traditional owners, communities, scientists and managers) about how the Fishery will be managed into the future.

More information on harvest strategies for Torres Strait fisheries, including the TRL Fishery, can be found on the PZJA website at www.pzja.gov.au.

### What is a TAC and how is it set?

The figure below provides an explanation of how the TAC for the TRL Fishery is set prior to the start of each fishing season and increased to the final amount.

**TRL Fishery survey conducted by CSIRO (in November)**

*The survey estimates the total number of tropical rock lobster (TRL or kaiar) in the water*

⇩

**Australian TRL Fishery opens on 1 December under a 200,000 kg Australian TAC**

*A TAC (total allowable catch) of 200,000 kilograms is set for the Australian TRL Fishery, in the interim, until catch sharing arrangements for the season can be agreed between Australia and PNG*

⇩

**TRL Resource Assessment Group (TRLRAG) provides advice on a RBC**

*A RBC (recommended biological catch) is the total amount of kaiar that can be sustainably taken out of the water, in the area of the Torres Strait Protected Zone, by all fishers (commercial, traditional, recreational) each season, while leaving enough in the water to breed for future seasons*

⇩

**TRL Working Group provides advice on a global TAC**

*A global TAC is the total amount of kaiar that can be sustainably taken out of the water, in the area of the Torres Strait Protected Zone, by both Australian and PNG commercial fishers each season*

⇩

**Global TAC endorsed by the Protected Zone Joint Authority (PZJA)**

⇩

**Australia and PNG agree on the global TAC and how it is to be shared, including cross-endorsement**

*Global TAC to be shared between Australia and PNG as per the terms of the Torres Strait Treaty*

⇩

**Australian TAC is increased**

*The TAC for the Australian TRL Fishery is increased from the initial amount to the final amount, which is equal to Australia's share of the global TAC as agreed between Australia and PNG*

### How does quota work?

On 16 September 2019, 999,997 quota units were granted under the *Torres Strait Fisheries (Quotas for Tropical Rock Lobster (Kaiar)) Management Plan 2018* (the Management Plan):

- 662,016 quota units (or 66.20%) were allocated to the TSRA comprising:
  - 562,000 to hold for the benefit of the TIB sector; and
  - 100,016 for the TVH licences it holds.
- 337,981 quota units (or 33.79%) were allocated to the remaining TVH principal licence holders.

The total number of quota units is fixed and will not change from fishing season to fishing season. However the amount of catch that may be taken against each quota unit will change as the TAC changes each fishing season.

Once a TAC is determined, the amount that each quota is worth will be calculated. This is done by dividing the TAC (in kilograms) by the total number of quota units (999,997). The result of this calculation is the weight value in kilograms of unprocessed TRL that can be taken for each quota unit held.

For example, if the TAC was 500,000 kilograms, then:

*Quota unit value* *= TAC ÷ total number of quota units*

*= 500,000 kilograms ÷ 999,997*

***= 0.500 kilograms***

There are enough quota units to allow the trading of either small or large amounts of quota. The table provided in the covering letter shows the TAC for the 2019-20 fishing season, the value of each quota unit and available catch for each sector.

A Guide to the Management Plan, as well as links to information about quota management systems, can be found on the PZJA website at www.pzja.gov.au.

**How do Australia and PNG share TRL?**

The *Torres Strait Treaty* recognises the rights of both Australia and PNG to commercial fisheries in the area of the Torres Strait Protected Zone (TSPZ). The TSPZ is an area in the Torres Strait that includes both Australian and PNG waters. These rights include the right of Australia and PNG to fish in the waters of the other country. This practice is known as cross-endorsement and involves both countries nominating an agreed number of commercial fishing boats to fish an agreed share of the TAC. This share is usually 25% of the other country's TAC apportionment, unless otherwise agreed.

With regards to the commercial catch of TRL, each year Australia and PNG:

- Agree on the global TAC and how it is to be apportioned between Australian and PNG waters.
    - Generally, it is agreed that 85% of the global TAC is to be taken in Australian waters and 15% of the global TAC is to be taken in PNG waters. This is based on the agreed distribution of TRL in the area of the TSPZ.

For example, if the global TAC was 500,000 kilograms, then:

| | |
|---|---|
| *Australia's apportionment of the global TAC* | *= 85% of the global TAC* |
| | *= 85% of 500,000 kilograms* |
| | *= 0.85 x 500,000 kilograms* |
| | ***= 425,000 kilograms*** |
| *PNG's apportionment of the global TAC* | *= 15% of the global TAC* |
| | *= 15% of 500,000 kilograms* |

*= 0.15 x 500,000 kilograms*

***= 75,000 kilograms***

- Agree on cross-endorsement allocations and preferential entitlement.
    - Under Article 23(4), each country is entitled to fish for 25% of the other country's TAC apportionment in the waters of the other country, unless otherwise agreed.
    - Under Article 25 of the Treaty, where Australia and/or PNG does not itself propose to take all the TAC to which it is entitled, either in its own area of waters or that of the other country, the other country will have preferential entitlement to that share. This must be agreed between Australia and PNG.

For example, if the global TAC was 500,000 kilograms, then:

| | |
|---|---|
| *Australia's cross-endorsement allocation in PNG waters* | *= 25% of PNG's 15% share of the global TAC*<br>*= 25% of 75,000 kilograms*<br>*= 0.25 x 75,000 kilograms*<br>***= 18,750 kilograms*** |
| *PNG's cross-endorsement allocation in Australian waters* | *= 25% of Australia's 85% share of the global TAC*<br>*= 25% of 425,000 kilograms*<br>*= 0.25 x 425,000 kilograms*<br>***= 106,250 kilograms*** |

At their meeting held on 19 November 2019, the PZJA agreed that, subject to further consultation with stakeholders, the preferred arrangement for utilising Australia's cross-endorsement allocation within PNG's waters is to not seek cross-endorsement but rather pursue a preferential entitlement arrangement under Article 25 of the Treaty. In effect this means, Australia will seek to take a proportion of PNG's cross-endorsement allocation within Australian waters equivalent to Australia's cross-endorsement allocation in PNG's waters. Conversely, PNG would be entitled to take Australia's cross-endorsement catch allocation in PNG's waters. Under such an arrangement, Australia's cross-endorsement allocation would be shared across all Australian licence holders in both sectors of the TRL Fishery.

Initial advice regarding the future utilisation of Australia's cross-endorsement allocation within PNG's waters will be sought from the PZJA TRL Working Group meeting to be held on 12 December 2019. Broader consultation with stakeholders, including licence holders, with be undertaken over the coming fishing seasons.

Australian Government | TSRA www.tsra.gov.au | Australian Government Department of Agriculture | Australian Government Australian Fisheries Management Authority | Queensland Government | TORRES STRAIT PZJA PROTECTED ZONE JOINT AUTHORITY

## Torres Strait Tropical Rock Lobster Fishery Moon-Tide Hookah Closures for the 2019-20 Fishing Season* (13 November 2019)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dec-19** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | ○ 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | ● | 27 | 28 | 29 | 30 | 31 |
| **Jan-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
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| **Feb-20** | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | | |
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| **Mar-20** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue |
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| **Apr-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | |
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| **May-20** | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
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| **Jun-20** | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | |
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| **Jul-20** | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri |
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| **Aug-20** | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon |
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| **Sep-20** | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | |
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| **Oct-20** | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
| | 1 | ○ 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | ● | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| **Nov-20** | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | |
| | ○ 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | ● | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | ○ 30 | |

* The 2019-20 fishing season runs from 1 December 2019 through to 30 September 2020.

**KEY**

- ● New Moon
- ○ Full Moon
- Fishery closure (commercial fishing not permitted)
- Hookah closure (use of hookah gear not permitted)
- Moon-tide hookah closure (use of hookah gear not permitted)

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| PRELIMINARY STOCK ASSESSMENT RESULTS | Agenda Item 7<br>For discussion and advice |

**RECOMMENDATIONS**

1. That the RAG:
    a. **CONSIDER** the preliminary stock assessment update for the Torres Strait Tropical Rock Lobster Fishery (TRL Fishery) - to be presented by CSIRO at the meeting.
    b. **DISCUSS** and **PROVIDE ADVICE** on the findings, including any need for revision of the empirical Harvest Control Rule (eHCR).
    c. **NOTE** that a final updated stock assessment will be presented at the next TRLRAG meeting tentatively scheduled for the end of March 2020.

**KEY ISSUES**

2. Under the final Harvest Strategy (refer to **Agenda Item 6**):
    a. a RBC is to be calculated each fishing season by applying the eHCR;
    b. a stock assessment update is to be conducted every three years unless the stock assessment is triggered by a decision rule (sections 2.8, 2.10 and 2.11). The stock assessment determines the TRL Fishery stock status relative to reference levels and, in doing so, the performance of the eHCR. This cycle will commence in 2019.
3. A preliminary stock assessment update will be presented by CSIRO at the meeting. The stock assessment update will incorporate catch and effort data for the 2018-19 fishing season and the results of the November 2019 pre-season survey.
4. The RAG is being asked to review the preliminary stock assessment update and where relevant provide advice on the findings, including any need for revision of the eHCR.
5. Of particular relevance, sections 2.10 and 2.11 of the final Harvest Strategy (provided at **Attachment 6a**) provides that:
    a. if the updated stock assessment indicates the eHCR recommended RBCs are outside the revised ranges tested by management strategy evaluation (MSE), RBCs are to be set using an annual stock assessment until a revised eHCR has been agreed, after which the revised eHCR is applied; and
    b. if the updated stock assessment does not indicate any need for revision of the eHCR, the stock assessment continues on a three year cycle, unless triggered to occur by a decision rule (i.e. pre-season survey trigger is triggered).

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| INTERACTIONS BETWEEN THE TRL FISHERY AND OTHER SPECIES | Agenda Item 8<br>For discussion and advice |

**RECOMMENDATIONS**

1. That the RAG **DISCUSS** and **PROVIDE ADVICE** on the need for further examination of the interactions with tropical rock lobster (TRL) in other fisheries in the Torres Strait and the ecological interactions between TRL and other species in the Torres Strait, noting in particular:
    a. the summary of observer data and anecdotal reports of TRL interactions in the Australian Torres Strait Prawn Fishery (TSPF) and Papua New Guinea (PNG) prawn trawl fishery; and
    b. the concerns expressed by communities during recent community visits regarding interactions (both positive and negative) between TRL and coral trout;
        i. this matter is to be considered at Finfish Resource Assessment Group (FRAG) and Finfish Working Group (FWG) meetings to be held from 27-29 November 2019 – an update of the outcomes of discussion on this matter will be provided by the AFMA member at the meeting.

**KEY ISSUES**

*TRL interactions with prawn fisheries*

2. Understanding TRL interactions in both the Australian TSPF and PNG prawn trawl fishery for the purposes of the TRL stock assessment and monitoring overall fishing mortality against the TRL TAC has been raised as an important issue by both the TRL RAG (Meeting no. 19 on 13 December 2016), TRL Working Group (WG) (Meeting no. 8 on 8 November 2018) and the Australia-PNG Fisheries Committee Bilateral meeting (4 March 2019).
3. The RAG is asked to provide advice on the need for further examination of the interactions with TRL in other fisheries in the Torres Strait, noting that:
    a. AFMA will continue to monitor the TRL interactions in the Australian TSPF and provide ongoing reports to future meetings of the RAG and the Australia-PNG Fisheries Committee Bilateral meeting;
    b. AFMA are working with the PNG NFA to improve data collection and sharing.

*TRL interactions with the Australian Torres Strait Prawn Fishery*

4. The TSPF has a number of management measures in place that reduces the potential level of interactions with TRL. Specifically:
    a. under the *TSPF Management Plan 2009* trawl boats in the TSPF are prohibited from taking, processing or carrying TRL or TRL products; and
    b. there are extensive spatial closures in the TSPF which overlap with key TRL Fishery grounds - see map provided at **Attachment 8a**;
5. Discards of TRL are not required to be recorded in the TSPF logbook (NP16). There are numerous bycatch species in the TSPF and given this it is not practical that they all be recorded in the logbook.
6. However, it is a condition of TSPF licences that licence holders carry an AFMA scientific observer when required to do so, to collect fishery independent scientific data. The AFMA Observer Program in the TSPF aims to observe 2.6% of actual days fished in a given TSPF

season. A preliminary analysis of available TSPF observer data indicates that 599.42 kgs of 'lobster' and 'ornate rock lobster' (2,807 individual lobsters) were sampled by the AFMA Observer Program since 2007. A range of biological data is collected through sampling, including length, sex, weight, fate and life status.

7. Of these samples, approximately 99% of discarded lobsters in an observed trip were recorded as discarded alive - 75% of these were recorded as "alive and vigorous", 24% recorded as "alive and sluggish", 0.5% recorded as "alive, just". Less than 1% is recorded as dead.

8. These observer data on fate (discarded/retained) and life status appear consistent with a historical report on the *Joint Australia/Papua New Guinea Research Program on the Tropical Rock Lobster* (*Panulirus ornatus*) *in Torres Strait* undertaken by CSIRO and PNG Department of Primary Industries in September 1984 which examined the post-capture survival rates of TRL in the TSPF.

9. This study reported that trawled TRL were generally in 'excellent condition' and that TRL that was trawled and returned to the sea have a good chance of surviving predation. A summary of the report notes is provided at **Attachment 8b**, and a copy of the technical report can be provided by AFMA on request.

10. AFMA has also received recent anecdotal reports from TSPF operators who advise that if the incidental capture of TRL in a given trawl shot is significant (e.g. 30-40 lobsters per shot), trawl operators will voluntarily move on from the area. This is because TRL caught in these amounts causes damage to both the trawl nets and the targeted prawn species. The anecdotal reports indicate that rates of incidental capture are lower in the north-east (e.g. in waters near Masig and Ugar) and higher in the south.

*TRL interactions with PNG prawn trawl fishery*

11. At the Australia-PNG Fisheries Committee Bilateral meeting held on 4 March 2019, the PNG National Fisheries Authority (NFA) advised that the PNG prawn trawl fishery has a number of management measures in place, including:

    a. a prohibition the retention of TRL;

    b. mandatory vessel monitoring system (VMS);

    c. observer coverage;

    d. in-port unload inspections;

    e. controls on seafood export permits;

    f. temporal closures that coincide with the hookah closure in the PNG TRL dive fishery between 1 December and 31 March each season.

12. However, unlike the TSPF, PNG NFA advised that TRL captured by PNG prawn trawlers are dead when brought on board.

13. PNG and Australia acknowledged the importance of ensuring ongoing and effective monitoring in order to quantify TRL catches in prawn trawl fisheries and agreed to provide updates on TRL catches in prawn trawl fisheries and management arrangements at future bilateral meetings.

*TRL interactions with coral trout*

14. When discussing the proposed removal of the Torres Strait Finfish Fishery's Western Line Closure (WLC) during community visits in April/May 2019, communities expressed varied views in relation to the possible impacts of the removal of the WLC, particularly in relation to impacts on the TRL stock. Concerns expressed included that increases in coral trout harvests may have adverse impacts on the sustainability of the TRL stock. This concern is based on anecdotal reports of shared habitat and industry observations of interactions between the two species. This concern was also reiterated by the Cape York Land Council in their written submission to AFMA in relation to the WLC. A copy of the CYLC written

submission was previously provided to the RAG out-of-session on 16 September 2019 and can be made available on request.

15. Other anecdotes from an eastern communities indicated that potential increases in harvests of coral trout would be beneficial to the TRL Fishery as it would alleviate coral trout predation on TRL and increase available habitat for TRL.

16. To explore these concerns, AFMA has had preliminary discussions with researchers from CSIRO which have indicated that coral trout are known to predate on small TRL, however there are currently no known quantitative studies that have examined in more detail the ecological interactions between the two species.

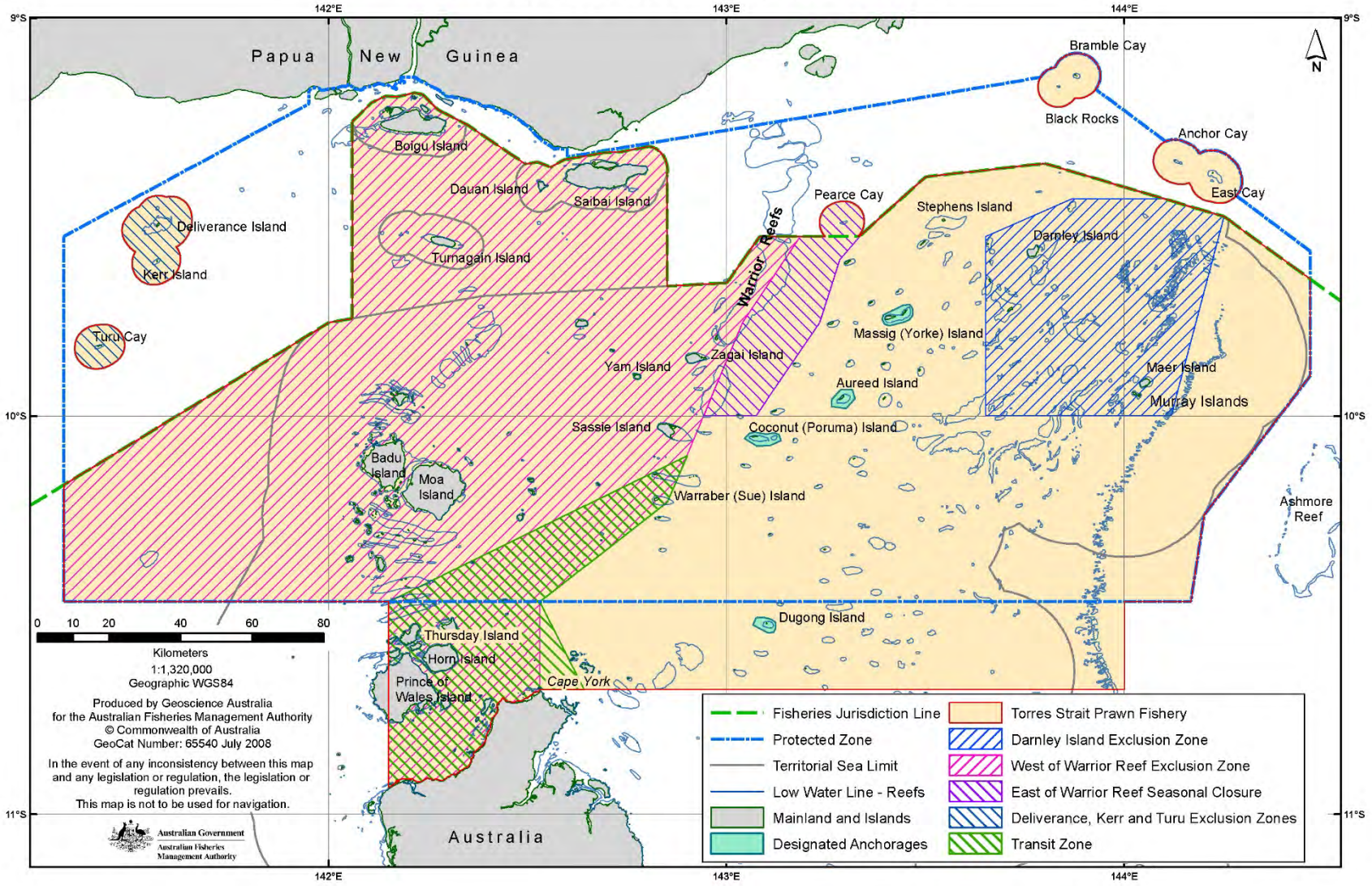
17. The FRAG at their meeting on 27-28 November 2019 and the FWG at their meeting on 29 November 2019 will be asked to discuss and provide advice any on key issues relating to the possible impacts of removing the WLC including the impacts on the TRL Fishery. An update of the outcomes of discussion on this matter will be provided by the AFMA member at the meeting.

18. The RAG is asked to consider this and provide advice on the need for further examination of the interactions between TRL and coral trout.

**BACKGROUND**

19. In April and May 2019, AFMA undertook visits to 13 communities across the Torres Strait and Northern Peninsula Area to consult on a range of fishery matters including the proposal to remove the WLC from the Torres Strait Finfish Fishery. The WLC is a spatial closure that prohibits the commercial take of reef line species (excluding Spanish Mackerel) west of 142° 32'E in the area of waters of the Fishery. Further information concerning the WLC is provided at (**Attachment 8c**).

# Torres Strait Prawn Fishery and Closures



# Notes on the "Melisa" TRL Tagging Program, September 1984

## Introduction

Joint CSIRO / PNG DPI Fisheries study in NE channel of TS during September 1984, using the PNG research trawler "Melisa".

## Staff

Jim Prescott, Dan Tyson (PNG)
Clive Turnbull, Aubrey Harris, Clive Jones (CSIRO)
Geoff Williams (BRS)

## Objectives:

1. To trawl and tag the lobster migration in the NE channel to determine whether they migrate into the GOP.
2. Measure the degree of predation by sharks on tagged TRL returned to the sea from prawn trawlers.
3. Recapture TRL that were tagged in western and southern TS during May/July of 1984 by CSIRO/PNG.

## Methods & Results

### Tagging in NE channel

- Total of 2373 tagged (527 trawled by Melissa and 1846 trawled by commercial trawlers).
- Permission from QBFP for commercial trawlers to hold TRL for use to collect in the morning & tag. So large percentage of the tagged TRL had been held in fin bins for 4-8 hrs.
- 45 tag returns (8 Aust. Trawlers in NE Channel and 37 from Kulasi and joint venture trawler in GOP) plus 6 from tagging near Daru. ~2% return rate.
- The results indicate than TRL trawled up, tagged and released from trawlers in the NE channel migrated into the GOP.

### Survival

- Trawled TRL were generally in good condition – only 5 (over 500) were damaged despite 2hr shots with a single 40m (20 fathom) stern trawl net that resulted in large amounts of material in the cod end.
- On several occasions tagged animals were returned while trawling. Although they were thrown as far as possible away from the trawler many were recaptured, indicating that they make it back to the sea bed and that they need to be released while the nets are up.
- On one occasion, good weather allowed us to video tagged TRL rapidly descending to the sea bed through a school of sharks (~50) that was feeding on trash fish. All of the TRL appeared to safely descend through the feeding sharks.
- Dolphins following the vessel at night turned towards TRL and bugs that were thrown amongst them but they then ignore them.
- On two occasions (once near and island and the other occasion near a reef) underwater observations were made of tagged lobsters being released. The behaviour on both occasions was similar. They initially aggregated on the sea bed then quickly dispersed in small groups in every direction. The lobster released near the reef were followed down a sand ridge to 25m then disappeared from view. Only a few lobsters moved towards the reef.

### West & Southern TS tagging

- No tag returns from but 6 TRL with first left pleopod regrowing were observed suggesting that the animals had been tagged but shed the tag, indicating movement from the western and southern TS into the NE channel. The first left pleopod was clipped on the tagged animals.

## Notes from a report on capture of lobsters by trawlers

"Catches of tropical spiny lobster by Australian prawn trawlers, September to October 1981", Geoff Williams, BRS.

- Vessels working TS prawn grounds during September and October 1981 made the largest catches of TRL by Australian trawlers to date.
- Isolated catches of more than 1000 lobsters per night were reported by many boats during 18-25$^{th}$ September 1981.
- The largest catches were in the Pearce Cay region, NE of Moon Passage.

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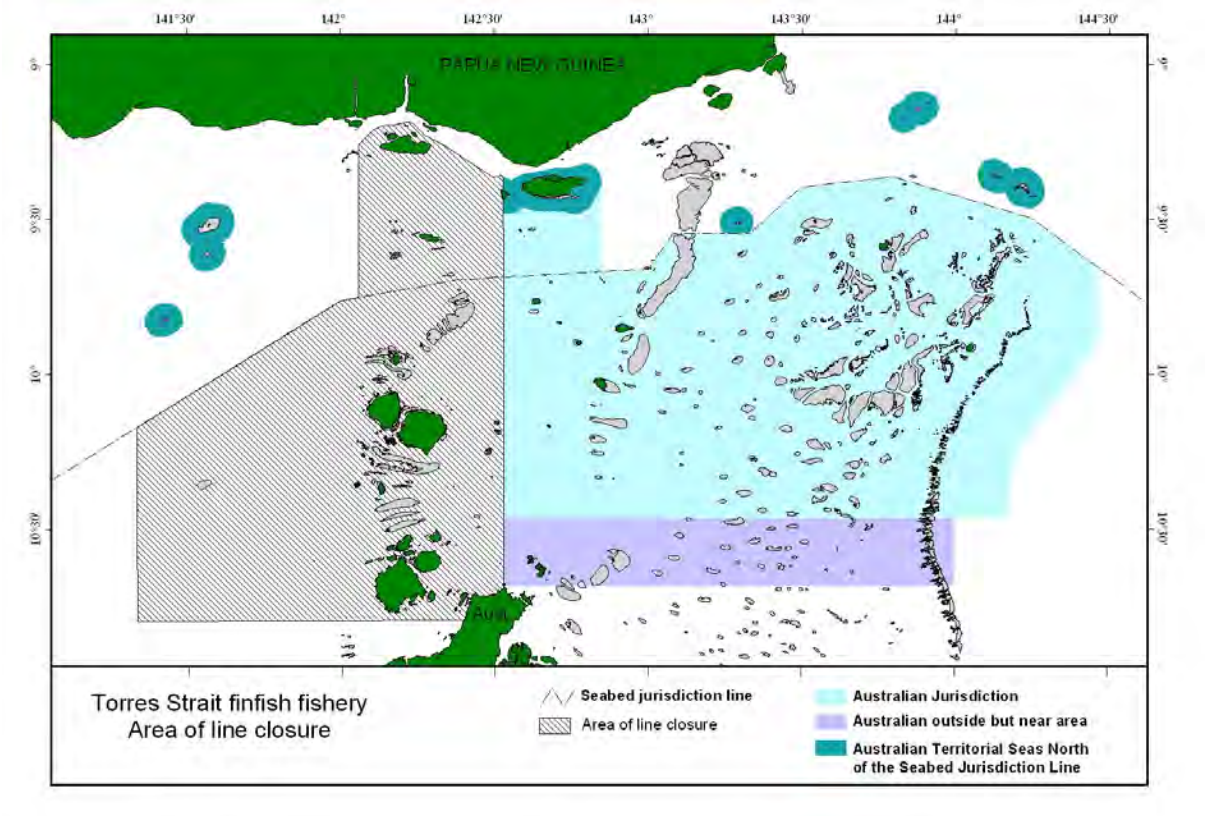
# WESTERN LINE CLOSURE FOR FINFISH

## An Overview




Commercial fishing for reef-line finfish species (e.g. coral trout, trevallies and emperors) is banned in the area of the Torres Strait Finfish Fishery west of 142° 32'E. This is referred to as the western line closure (see map above). The closure does not apply to mackerel commercial fishing or traditional fishing.

The closure effects all Traditional Inhabitant Boat licenced fishers who fish commercially for finfish species under a reef-line (LN) endorsement. Western communities including Boigu, the western half of Dauan, Mabauiag, Badu, Moa, Keriri, Ngurupai, Muralag and Waiben lie within the closure.

The closure does not serve a purpose in managing the fishery and reflects an historic boundary that was carried over when the Fishery was transferred to a single jurisdiction under the PZJA.

## What will happen if the closure is removed?

If the closure is removed the area of the Fishery available for commercial reef-line fishers will increase.

AFMA will continue to monitor catches and participation in the fishery through the Fish Receiver System and will work with the PZJA Finfish Resource Assessment Group and Working Group to monitor how the fishery is performing.

## Finfish Resource Assessment Group and Working Group advice

AFMA has gathered advice on potentially removing the western line closure from PZJA Finfish Resource Assessment Group and the PZJA Finfish Working Group. Both advisory groups support the removal of the closure.

## Draft regulation to remove the closure

If communities support removing the closure the PZJA would need to make a new Fisheries Management Instrument.

In making a new instrument for the fishery, the current mesh net restriction on Australian Traditional Inhabitants engaged in traditional fishing for finfish will be removed to reflect that the PZJA's jurisdiction does not extend to traditional fishing.

If you have any questions contact AFMA on (07) 4069 1990 or via email FisheriesTI@afma.gov.au

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| FIVE-YEAR RESEARCH PLAN | Agenda Item 9<br>For discussion and advice |

## RECOMMENDATIONS

1. That the RAG:
    a. **DISCUSS** and **PROVIDE ADVICE** on the research priorities identified in the Rolling Five-Year Research Plan for 2020/21 to 2024/25 for the Torres Strait Tropical Rock Lobster Fishery (the Research Plan) (**Attachment 9a**), noting comments provided by RAG and TRL Working Group (TRLWG) members out-of-session in September 2019 (**Attachment 9b**).
    b. **DISCUSS** and **PROVIDE ADVICE** on whether to proceed with an independent peer review of the TRL Fishery survey design and, if so, provide comment on the revised terms of reference (ToR) – to be presented by the Chair/Independent Scientific Member at the meeting.
    c. **NOTE**, that pre-proposals and full proposals for funding in the 2020/21 financial year will not be due until early February and May 2020, respectively. Research pre-proposals relevant to the TRL Fishery will be provided to the RAG and TRLWG for out-of-session consideration and comment following this.

## KEY ISSUES

*Rolling five year research plan for the TRL Fishery*

2. Under the Torres Strait Scientific Advisory Committee's (TSSAC) *Torres Strait Fisheries Strategic Research Plan 2018-2023* (SRP), each PZJA RAG and Working Group is tasked with identifying research priorities for their respective fisheries and updating their rolling five year fishery research plans by September each year.
3. On 16 September 2019, AFMA sought the advice of RAG and TRLWG members out-of-session of research priorities identified in the draft Research Plan. It was noted that due to the funding of multi-year projects, approximately $365,000 of a possible $411,000 of TSSAC research funds for the 2020/21 financial year has been committed, leaving approximately $45,000 for any urgent tactical research projects during the 2020/21 financial year.
4. TSSAC recently met on 25 November 2019 to discuss projects that could be funded from this remaining funding. The Research Plan was considered at this meeting. An update on the outcomes of this meeting will be provided by the AFMA member at the meeting.
5. Out-of-session comments on the draft Research Plan included proposed changes to the prioritisation of existing research priorities as well as the identification of new research priorities (**Attachments 9b-9c**).
6. In addition, at its meeting held on 18 June 2019, the RAG Data Sub-Group discussed the proposed 'Understanding changes to fishing power through time' project. The Sub-Group recommended that this project comprise of an industry survey to collect information about changes to fishing power factors (e.g. gear, technology, horsepower, dinghy/tender size etc) over time. This could be a Masters project/seek FRDC funding.
7. The RAG is asked to review all comments and provide advice on further changes to the Research Plan, in particular:

a. the priority ranking of existing research priorities, particularly priorities relating to stock connectivity, peer review of the TRL Fishery survey design, and better understanding fishing behaviour;

b. costings for currently un-costed research projects; and

c. any research priorities suitable for tactical research funding should funds be available in the 2020/2021 financial year.

8. As part of the out-of-session advice received from members, it was suggested that consideration be given to having a new research priority regarding models for managing/administering Traditional Inhabitant quota. Since this time, at its meeting held on 19 November, the PZJA agreed in principle for the review of the allocation of quota units to the Traditional Inhabitant sector required under the Management Plan be undertaken by an Independent Allocation Advisory Panel (IAAP) and directed the PZJA Standing Committee to provide draft Terms of Reference (ToR) for an IAAP, including its membership and process to the PZJA by April 2020 so that PZJA can confirm this in principle decision. The PZJA also agreed to commence the allocation review following the completion of the TSRA's Fisheries Regional Ownership Framework project, anticipated by 30 June 2020. AFMA recommends that the RAG await a final decision from the PZJA on how it will undertake the review prior to adopting a new research priority.

9. If new research priorities are identified, each will need to be categorised into one of three research themes under the SRP (**Attachment 9d**). There are several strategies under each theme and suggested ideas to help the RAG to think about the sorts of projects which may go under these themes and strategies.

*Peer review of the TRL survey design*

10. At the last RAG meeting held on 5 February 2019 (TRLRAG 26), the RAG considered the draft terms of reference (ToR) for an independent peer review of the TRL Fishery survey design.

11. The Chair and Independent Scientific Member were tasked with revising the draft ToR out-of-session, taking into consideration the changes suggested at TRLRAG 26 and any additional changes received from members – see background for further details.

12. The RAG is asked to provide advice on whether to proceed with an independent peer review of the TRL Fishery survey design and, if so, consider and provide comment on the revised ToR, to be presented by the Chair/Independent Scientific Member at the meeting.

*Research cycle for funding in the 2020/2021 financial year*

13. TSSAC recently met on 25 November 2019 to agree on priorities for the TSSACs call for research for funding in the 2020/2021 financial year. An update on the outcomes of this meeting will be provided by the AFMA member at the meeting.

14. It is expected that the TSSAC call for research will be made in early December, which will involve the publication of scopes and a call for pre-proposals.

15. Pre-proposals and full proposals for funding in the 2020/21 financial year will not be due until early February and May 2020, respectively. Research pre-proposals relevant to the TRL Fishery will be provided to the RAG and TRLWG for out-of-session consideration and comment following this.

16. Further details on the annual research cycle is provided at **Attachment 9e** for information.

## BACKGROUND

*Rolling five year research plan for the TRL Fishery*

17. Each year the TSSAC seeks input from each fishery advisory body (RAG, MAC or WG) to identify research priorities projected over the next five years. Rolling five-year research plans are to be developed for each Torres Strait fishery in conjunction with the TSSAC Five-

year Strategic Research Plan (SRP) with a focus on the three research themes and associated strategies within the SRP.

18. Each fishery's research plan will be assessed by the TSSAC using a set of criteria, and used to produce an Annual Research Statement covering all Torres Strait fisheries.

19. The TSSAC then develop scopes for the highest ranking projects in order to publish its annual call for research proposals. There are likely to be more scopes that funding will provide for so TSSAC can consider a number of proposals before deciding where to commit funding.

20. Fishery research plans are to be reviewed and updated annually by the relevant PZJA consultative committee to ensure the plans maintain a five year projection for priority research. Priorities may also change during the review if needed.

*Peer review of the TRL survey design*

21. At the RAG meeting held on 18-19 October 2018 (TRLRAG 24), the RAG recommended an independent peer review be conducted of the TRL Fishery survey design.

22. At the TSSAC meeting on 5-6 December 2018, it was agreed that if ready to proceed the independent peer review of the TRL Fishery survey design will be considered for funding in 2019/2020 financial year, however this projects will be directly sourced from specific researchers due to the expected low cost and specialist service.

23. A draft ToR was developed by the Chair and provided for consideration at the last RAG meeting held on 5 February 2019 (TRLRAG 26).

24. The Independent Scientific Member reinforced the need for the RAG to decide on, and clearly specify, either key questions, or objectives, to frame the review. The member presented a hierarchy of issues (below) the review could cover, noting that the broader the scope of the review, the more costly it will be, due to the technical expertise and time required to address the more complex questions:

    a. Potential for, or evidence of, bias in survey results:

        i. Survey design (site selection);

        ii. Survey implementation (diver effects);

        iii. Survey data analysis (GLM, spatial raising);

    b. Causes of mismatch between survey results and commercial CPUE:

        i. Has reduction in the number of sites contributed to potential bias, or just to increase in variance?

        ii. What are the likely causes of perceived survey:CPUE mismatch?

        iii. Do these indicate any likelihood of bias in survey results?

        iv. Is there any evidence for a shift in lobster distribution that could be contributing to CPUE mismatch, or resulting in survey bias?

        v. What data would be required to detect such shifts?

    c. Recommendations for improvement.

25. The RAG agreed the draft ToR should be refined by the Chair and Independent Scientific Member out-of-session, taking into consideration the following changes suggested by the RAG. Members were to provide any additional changes to those below to the Executive Officer – no additional changes were received:

    a. any recommended improvements needed to preserve the long-term survey data series for the TRL Fishery;

    b. the terms of reference need to be phrased to ensure they do not indicate an assumption of bias in either the survey or CPUE data;

c. the review should focus on the 1+ survey series;

d. review should not revisit work that has already been undertaken e.g. CSIRO has previously conducted analyses on site reduction and variance, and this can be made available to reviewer;

e. reviewer will be required to comply with data confidentiality requirements; and,

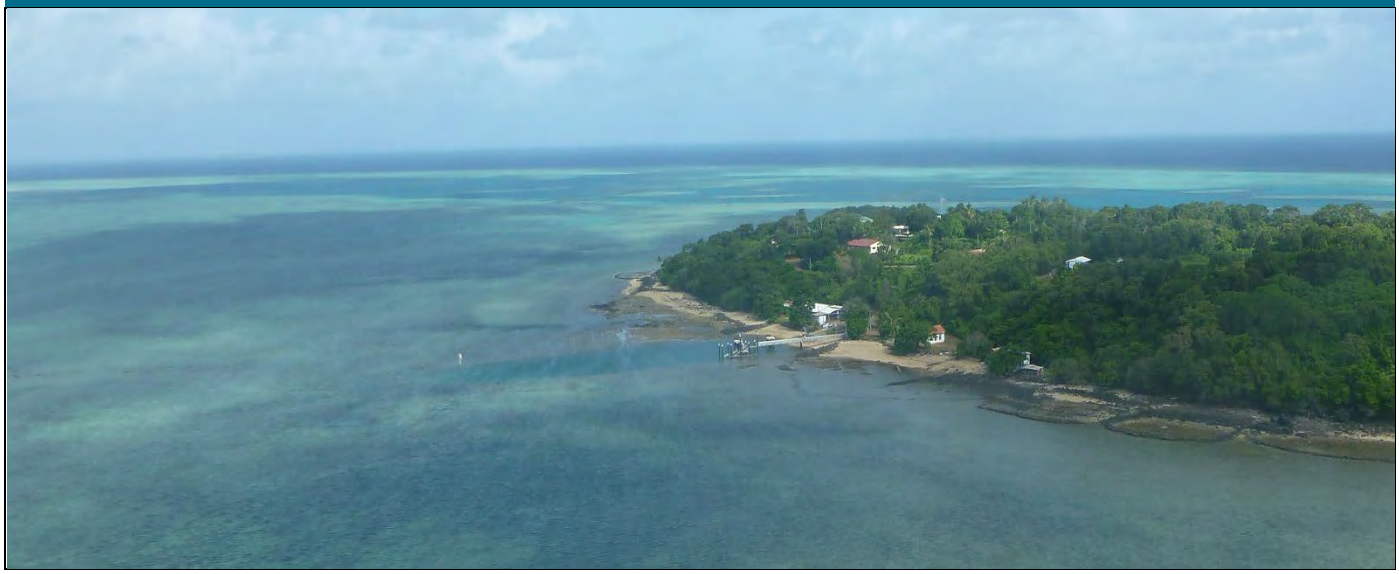
f. if there is bias, is the cause environmental effects, or whole systematic changes to survey design over time.

26. The RAG also discussed potential researchers to undertake the review and agreed for members to send details of potential reviewers to AFMA for further consideration. No responses were received when the Executive Officer followed up with members on this action in March 2019.

Australian Government | TSRA www.tsra.gov.au | Australian Government Department of Agriculture | Australian Government Australian Fisheries Management Authority | Queensland Government | TORRES STRAIT PZJA PROTECTED ZONE JOINT AUTHORITY

# Rolling Five Year Research Plan 2020/21-2024/25

## Torres Strait Tropical Rock Lobster Fishery



**Compiled by AFMA**

**October 2019**

## ABOUT THIS PLAN

The Torres Strait Scientific Advisory Committee (TSSAC) seeks input from each fishery advisory body (Resource Assessment Group (RAG), Management Advisory Committee (MAC) or Working Group (WG)) to identify research priorities over five year periods from 2020/2021 to 2024/25. This template is to be used by the relevant advisory body to complete their five-year plan. The plans are to be developed in conjunction with the TSSAC Five-year Strategic Research Plan (SRP) with a focus on the three research themes and associated strategies within the SRP.

All fishery five-year plans will be assessed by the TSSAC using a set of criteria, and used to produce an Annual Research Statement for all Torres Strait fisheries.

The TSSAC then develop scopes for the highest ranking projects in order to publish its annual call for research proposals. There are likely to be more scopes that funding will provide for so TSSAC can consider a number of proposals before deciding where to commit funding.

The fishery five-year plans are to be reviewed and updated annually by the Torres Strait forums to add an additional year onto the end to ensure the plans maintain a five year projection for priority research. Priorities may also change during the review if needed.

## RESEARCH PRIORITIES

**Table 1.** Five year Torres Strait Tropical Rock Lobster Fishery research plan for 2020/21 to 2024/25.

Note: Blue shading indicates a project that has been funded.

| Proposed Project | Objectives and component tasks | Year project to be carried out and indicative cost* | | | | | | Other funding bodies[1] | Evaluation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2020/21 | 2021/22 | 2022/23 | 2023/24 | 2024/25 | Notes on project timings | | Priority essential / desirable | Priority ranking (1-5 – 1 being highest priority) | Theme |
| 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.<br>➢ Recommend a recommended biological catch (RBC) annually for each season.<br>➢ Every third year update and implement the long-term stock assessment.<br>➢ Conduct a pre- season survey in November each year, including seabed habitat monitoring.<br>➢ Continue development of a harvest strategy for the TRL Fishery including an empirical harvest control rule.<br>➢ Facilitate data sharing with PNG.<br>➢ Development of a tiered harvest strategy for the TRL Fishery. | 319,335 (funded under AFMA Research Project 2019/ 0825) | 290,824 (funded under AFMA Research Project 2019/ 0825) | 240,000 (not yet funded) | 240,000 (not yet funded) | 240,000 (not yet funded) | Nil | AFMA<br>CSIRO<br>PNG<br>NFA<br>Industry | Essential | 1 | 1 |
| Ecological risk assessment (ERA) | ➢ Conduct an update to the 2007 ERA for the TRL Fishery. | 20,400 (identified for potential assessment under broader AFMA Research Project) | 0 | 0 | 0 | 0 | Assessment dependent on remaining funding once high priority fisheries have been assessed | AFMA<br>CSIRO | Essential | 1 | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Improvement of data collection | ➢ Improved monitoring of commercial catch and effort in all sectors of the fishery.<br>➢ Estimate of non-commercial take of TRL.<br>➢ Alternative monitoring techniques of effort, for example GPS tracking. | 20,000 | 0 | 0 | 0 | 0 | Sub-group of the RAG to progress alongside upcoming RAG meetings – funding for sub-group meetings to be sourced from RAG budget | AFMA<br>PNG<br>NFA | Essential | 1 | 1,3 |
| Science peer review | ➢ Consistent with 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, stock assessment and draft Harvest Strategy. | 0 | 60,000-80,000 (dependent on final scope) | 0 | 0 | 0 | Terms of reference to be developed and considered by the TRLRAG in 2019/20 | AFMA | Essential | 1 | 1 |
| 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).<br>➢ Understanding of recruitment connectivity between, and within, jurisdictions, including key areas of larval release within each jurisdiction.<br>➢ Management implications of movement and recruitment connectivity between, and within, jurisdictions. | 0 | TBA | TBA | TBA | TBA | Nil | AFMA<br>PNG<br>NFA<br>CSIRO | Essential | 2 | 1 |
| Understanding changes to fishing power through time | ➢ 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. | 0 | TBA | TBA | TBA | TBA | Sub-group of the RAG to progress once progress on improving data collection has been made – funding for sub-group meetings to be sourced | AFMA<br>CSIRO | Desirable | 2 | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | from RAG budget | | | | |
| Understanding fishing behaviour | ➢ Understanding the drivers and incentives in determining fishing behaviour in all sectors.<br>➢ 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. | 0 | TBA | TBA | TBA | TBA | Timing of project to be considered once a Management Plan has been fully implemented in the TRL Fishery | AFMA | Desirable | 3 | 1 |
| Mid-year survey<br>Note: unless triggered under the Harvest Strategy for the TRL Fishery, this project is not a priority for the TRL Fishery. | ➢ Conduct mid- year survey, as required under the Harvest Strategy for the TRL Fishery. | 0 | 0 | 0 | 0 | 0 | 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 | AFMA<br>CSIRO<br>PNG NFA<br>Industry | Only if triggered under the Harvest Strategy, priority = essential | Only if triggered under the Harvest Strategy, priority ranking = 1 | 1 |

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# Torres Strait Tropical Rock Lobster Resource Assessment Group and Working Group

## Out-of-session items – September-October 2019

## Member comments

Box 7051, Canberra Business Centre, ACT 2610 / Ph (02) 6225 5555 / Fax (02) 6225 5500 / AFMA Direct 1300 723 621 afma.gov.au

## Comments from Tropical Rock Lobster Resource Assessment Group (TRLRAG) members

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| Dr Ian Knuckey - Chair | **No recommendation**<br>No comments provided, not applicable in role as Chair. | **No changes identified**<br>No comments provided, not applicable in role as Chair. |
| Danielle Stewart - QDAF Member* | **No recommendation**<br>No comments provided. | **No changes identified**<br>No comments provided. |
| Allison Runck - TSRA Member* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>We support the TRL Harvest Strategy progressing to the PZJA for adoption, noting this has been under development for some time and has involved extensive consideration by the TRLRAG and TRLWG. | **Changes identified**<br>The mid-year survey and science peer review are both actually desirable (not essential). The current management framework is based around the pre-season survey only, and the HS now sets-out the situation in which a mid-season survey is required/essential. The group may need to consider what is the appropriate action to take if it becomes apparent a mid-year survey is essential, and if this aligns with TSSAC/PZJA funding timelines or would need to be considered through a separate process? From previous discussions of the RAG I understand there has already been strong peer review of the survey design and stock assessment methods - it is still unclear to me the purpose of further science peer review and it probably requires more discussion from the groups about the value of this. We think 'understanding fishing behaviour' will become of much higher importance/desirability over the next funding round, but will be interesting to discuss the best timing of this based on upcoming meetings reflecting on behaviour or CPUE from this season. |
| Dr Andrew Penney - Scientific Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>Nothing to add, covered in previous TRLRAG meetings. | **No changes identified**<br>Nothing to add, covered in previous TRLRAG meetings. |
| Dr Eva Plaganyi - Scientific Member | **No recommendation** | **No changes identified** |

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| | No comments provided, noting the conflict of interest as the principal investigator responsible for the delivery of the Harvest Strategy development project. | No comments provided, noting the conflict of interest as a possible applicant for research funding. |
| Aaron Tom - Traditional Inhabitant Industry Member (Gudumalulgal)* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>Supports the draft Harvest Strategy going to the PZJA, noting that it has been developed in consultation with TRLRAG and TRLWG members and CSIRO over a number of years. Does not support changing the target or limit reference points. | **No changes identified** |
| Les Pitt - Traditional Inhabitant Industry Member (Kemer Kemer Meriam)* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>Does not have any comments or concerns with the outcomes of the draft Harvest Strategy consultation. Does not propose any changes to the draft Harvest Strategy. | **Changes identified**<br>Supports the peer review of the survey design and if warranted the addition of extra survey sites. Encourages the exploration of how surveys can be expanded and greater involvement of industry in the delivery of surveys. |
| James Ahmat - Traditional Inhabitant Industry Member (Maluialgal)* | **No recommendation**<br>Unable to be contacted. | **No changes identified**<br>Unable to be contacted. |
| Harry Nona - Traditional Inhabitant Industry Member (Kaiwalagal) | **No recommendation**<br>As a new member, has not been involved in the development of the draft Harvest Strategy to date and so is not comfortable providing comments. | **No changes identified**<br>As a new member, is not comfortable providing comments. |
| James Billy - Traditional Inhabitant Industry Member (Kulkalgal) | **No recommendation**<br>Unable to be contacted. | **No changes identified**<br>Unable to be contacted. |
| Brett Arlidge - Industry Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>The Harvest Strategy and HCR have been discussed at length and the essentials agreed by all stakeholders. | **No changes identified**<br>Nothing to add. |

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| Dr Ray Moore - Industry Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>From the public comments received there are no issues that require changes to the TRL Harvest Strategy. Most concerns relate to management issues and ensuring that the data collected accurately represents the fishery status. I have made some comments on these above. This does not affect the actual Harvest Strategy, which I think should be finalised and forwarded to the PZJA for consideration.<br>Full comments provided at **Attachment 1**. | **Changes identified**<br>I am happy with the plan as it stands. I add the following comments:<br>Stock connectivity - We have done very little new research into TRL in recent years and as the fishery has developed we now need some more information. We have done some work on spawning stock and recruitment, mainly by the study of larval advection. This should be continued, along with research on the E Coast to determine major areas of larval release. This will help us to understand the connectivity between E Coast, Torres Strait and the Gulf of Papua.<br>But also of major importance is the movement of juvenile lobsters within TS and between other jurisdictions and TS. The Harvest strategy depends on the pre-season survey getting it right. Taking the 2017 survey we see:<br>i. There were almost no 0+ in TS. However in the 2018 survey there were good stocks of 1+ distributed throughout TS. So were the 0+ in other areas of TS and later redistributed as 1+,or did the 1+ move in from another jurisdiction ?<br>ii. There were very poor 1+ stocks in the 2017 pre-season survey resulting in a very low RBC. However some good catches were made by fishermen. Again could this disparity be due to the movement of lobsters from areas not surveyed.<br>This research I think is really important to better understand lobster movement, which in turn should help us fine tune the survey to obtain more reliable stock predictions. |

*Also a member of the Tropical Rock Lobster Working Group.

## Comments from Tropical Rock Lobster Working Group (TRLWG) members

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| John Glaister - Chair | **No recommendation**<br>No comments provided, not applicable in role as Chair. | **No changes identified**<br>No comments provided, not applicable in role as Chair. |
| Danielle Stewart - QDAF Member* | **No recommendation**<br>No comments provided. | **No changes identified**<br>No comments provided. |
| Allison Runck - TSRA Member* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>See TRLRAG comments. | **Changes identified**<br>See TRLRAG comments. |
| Darren Dennis - Scientific Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>The two responses received have been addressed well by AFMA and I concur with the reviews provided. The eHCR was comprehensively tested by CSIRO using almost 30 years of concurrent survey and catch data and was shown to result in very conservative fishing effort levels into the future. There are of course unknowns (primarily major habitat and stock distribution changes, and PNG catch), but the HCR does account for low stocks and subsequent management responses.<br>The concern that survey sites do not cover all fished areas is only relevant if there is a major change in habitat and subsequent stock distribution in the future. Further, CSIRO have recorded several such events in the past (e.g. 1993 seagrass dieback) and the survey abundance indices have proven reliable against concurrent catch and CPUE indices.<br>Re: survey design and survey sites: The sampling design used throughout the surveys, initiated in 1989, has been consistent and relatively unchanged. At several peer reviews of this design including: 4 international lobster conferences, over 30 peer reviewed papers, at national | **Changes identified**<br>The limited research budget has resulted in only tactical projects being funded, which is not surprising and is logical. Nevertheless, the funded research projects also included implicit strategic studies - such as habitat monitoring, influence of abiotic factors on stocks and climate change outcomes (bleaching etc) - which value add to the research investment.<br>Re: spawning stocks and stock connectivity. This area of research remains largely unaddressed due to the geographic extent of the TRL life cycle and the subsequent cost of research to address the information gaps. The relative contributions of the Yule Island and QLD east coast breeding populations are not well understood, but given the conservative harvest strategies adopted in both the EC and Torres Strait fisheries these populations are well protected. Further, breeding area closures are only effective if there are enough TRL allowed to escape the fishery to breed.<br>Re: social indicators for the TRL fishery. Quota management in Australia has invariably resulted in investment opportunities for private interests. This means actual fishers operate under a third party licence and often |

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| | conferences and independent scientific review, the value of this consistency/standardisation has been stressed. Very few Australian fisheries have such a valuable >30 year fishery-independent time series. Hence, any additional survey sites added should not be at the expense of the established survey design. | separate quota. Given the TIB sector is allocated the largest portion of the TAC this situation should not greatly impact the TRL fishery, and in fact should result in greater participation by TIB fishers now that the TVH sector is effectively capped. However, monitoring of the social impacts of QMS for the TRL fishery is now critical to ensure these positive outcomes are realised. In the first instance the number of TIB licences should see an increase. Previous research also showed obvious typologies in the TIB sector (namely commercial fishers, supplemental fishers and "weekend warriors"). The ratio of these typologies should be monitored to allow the TIB sector to review outcomes of quota management and address their desired outcomes. |
| Sevaly Sen - Scientific Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>Agree with the recommendations that the draft HS should be finalised and sent to PZJA for consideration. | **Changes identified**<br>My only comment is that it would be good to consider more research in the plan under strategy 2 a - in particular Models for managing/administering Traditional Inhabitant quota. |
| Aaron Tom - Traditional Inhabitant Industry Member (Gudumalulgal)* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>See TRLRAG comments. | **No changes identified** |
| Les Pitt - Traditional Inhabitant Industry Member (Kemer Kemer Meriam)* | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>See TRLRAG comments. | **Changes identified**<br>See TRLRAG comments. |
| James Ahmat - Traditional Inhabitant Industry Member (Maluialgal)* | **No recommendation**<br>Unable to be contacted. | **No changes identified**<br>Unable to be contacted. |
| Mark David - Traditional Inhabitant | **No recommendation**<br>No comments provided. | **No changes identified**<br>No comments provided. |

| Member | Member comments on item 1 – Outcomes of the draft TRL Harvest Strategy consultation - for consideration and advice | Member comments on item 2 – Rolling Five Year Research Plan 2020/21 to 2024/25 - for consideration and advice |
|---|---|---|
| Industry Member (Kulkalgal) | | |
| Patrick Mills - Traditional Inhabitant Industry Member (Kaiwalagal) | **Does not support the draft Harvest Strategy**<br>Traditional Inhabitants have not been sufficiently consulted in developing the draft Harvest Strategy. In addition, Traditional Inhabitants are not sufficiently involved in negotiations with PNG concerning the sharing of the TAC each season, in particular who has the right to access cross endorsement allocations under the Treaty, including any that are un-utilised by PNG. | **No changes identified** |
| Jerome Kalwij - Industry Member | **No recommendation**<br>As a new member, has not been involved in the development of the draft Harvest Strategy to date and so is not comfortable providing comments. | **No changes identified**<br>Supports research to inform the management of the TRL Fishery. |
| Trent Butcher - Industry Member | **No recommendation**<br>As a new member, has not been involved in the development of the draft Harvest Strategy to date and so is not comfortable providing comments. | **No changes identified**<br>Suggests accuracy of the pre-season survey could be improved. |
| Mark Dean - Industry Member | **Supports the draft Harvest Strategy being finalised and provided to the PZJA for consideration**<br>Would like to see TAC set as close to start of season as possible. Need to be clearer when TACs are set as to the stage of agreement with PNG and whether further increases should be expected. Would like to see review of input controls as soon as possible. | **No changes identified** |

*Also a member of the Tropical Rock Lobster Resource Assessment Group.

**Full response from Dr Ray Moore concerning item 1 – Outcomes of the draft TRL Harvest Strategy consultation**

**Cape York Land Council**

a) Agree with AFMA, the suggested figures are not realistic.

b) and c) Agree with AFMA, not relevant to the TS Harvest Strategy.

**Ken McKenzie**

a) The fishery is very variable, 1984 was a very poor year, 2011 had excellent stocks and 2019 has been quite good. Certainly the fishery has become more competitive but I don't think there has been a continuing decline over the years.

b) Ken's point is that too much emphasis has been placed on the TS spawning stock when the bulk of the recruitment comes from other spawning grounds other than the Gulf of Papua.

For example, spawning grounds on the East Coast. This is relevant to the harvest strategy in that why maintain the spawning mass at 0.65Bo if this biomass is providing only a small % of the recruitment.

Ken is correct in that there is not a good spawning/ stock recruitment relationship for the TS population that spawns in the Gulf of Papua. The research indicates that perhaps an average of about 15% of TS larval recruitment comes directly from the GOP. The other 85% would come from other spawning areas, of which the E Coast would have to be very significant. However the larvae from the GOP spawning are dispersed over an extensive area. Certainly a large % of the recruitment for the E Coast would come from the GOP.

So although a successful spawning in the GOP may not manifest in a good larval recruitment in TS the same year ,this spawning will restock other areas which in turn will restock TS in future spawning's. For this reason it is necessary to maintain the TS spawning stock at a high level.

We do need to ensure that all our hard work in maintaining a healthy spawning stock is not just supporting a trawl fishery during the spawning migration.

c) Ken's point that it is critical that the survey accurately predicts the recruiting stocks is very valid. 80% of the data used for the HCR estimate comes from this single survey. We have to maintain the randomness of site selection so that surveys are comparable with the 30 years of data. As we gain more knowledge of 0+ settlement and 1+ movement from outside of the survey area, we should be able to fine-tune the survey. The Harvest Strategy uses the survey as the major data for estimating the RBC. This has been extensively reviewed and accepted.

With regard to Ken's comment of Whyborn reef being on the E Coast: in fact 7 of the 77 sites surveyed are on the E Coast. There are 2 considerations here:

i) This SE area is extensively fished by TS fishermen and the catch landed as TS catch.
ii) This SE area, including the E Coast south to the cross shelf transect green zone, usually has good stocks of 1+ lobsters. My personal observations over the years suggest that there is possibly a significant movement of 1+ from this area into TS. This would occur after the pre-season survey such that this movement would not be recorded in the assessment.

So whether on the E.Coast or not, we need to maintain our sampling in this area.

d) I agree that CPUE in this fishery is not an accurate indicator of stock abundance. It is difficult to standardise because of the variable ability between operators and the general increase in efficiency, that still continues. It is important that managers pick up changes in fishing practice as soon as possible and adjust CPUE accordingly. With the changes to enforced TAC in 2019 the TVH CPUE would have changed due to

i) Taking larger lobsters only, because of higher prices and limited quota.
ii) Not tailing but discarding weak, damaged and soft shelled lobsters.

So that CPUE for the same stock density would be diminished in 2019 compared with previous years. This would not apply to the TIB CPUE as they were on an Olympic quota.

The Harvest Strategy assessment relies 10% on TVH and 10% TIB CPUE, averaged over 5 years. This has been reviewed and accepted, and there is no reason at this stage to alter it.

**Community visits**

There were no concerns to comment on.

## Summary of research priorities

Note: Blue shading indicates a project that has been funded. For full details refer to the Rolling Five-Year Research Plan for 2020/21 to 2024/25 for the Torres Strait Tropical Rock Lobster Fishery at **Attachment 9a**.

| Proposed project | Objectives and component tasks | Priority | Timing + costing |
|---|---|---|---|
| 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.<br>➢ Recommend a recommended biological catch (RBC) annually for each season.<br>➢ Every third year update and implement the long-term stock assessment.<br>➢ Conduct a pre- season survey in November each year, including seabed habitat monitoring.<br>➢ Continue development of a harvest strategy for the TRL Fishery including an empirical harvest control rule.<br>➢ Facilitate data sharing with PNG.<br>➢ Development of a tiered harvest strategy for the TRL Fishery. | Essential (1) | Funded under AFMA Research Project 2019/0825 until 2021/22 |
| Ecological risk assessment (ERA) | ➢ Conduct an update to the 2007 ERA for the TRL Fishery. | Essential (1) | Identified for potential assessment under AFMA Research Project until 2020/21 |
| Improvement of data collection | ➢ Improved monitoring of commercial catch and effort in all sectors of the fishery.<br>➢ Estimate of non- commercial take of TRL.<br>➢ Alternative monitoring techniques of effort, for example GPS tracking. | Essential (1) | Funding for sub-group meetings to be sourced from RAG budget until 2020/21 |
| Science peer review | ➢ Consistent with 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, stock assessment and draft Harvest Strategy. | Essential (1) | Identified for potential funding in 2021/22. Indicative costing identified ($60-80k) |
| 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).<br>➢ Understanding of recruitment connectivity between, and within, jurisdictions, including key areas of larval release within each jurisdiction.<br>➢ Management implications of movement and recruitment connectivity between, and within, jurisdictions. | Essential (2) | No timing or costing identified |
| Understanding changes to fishing power through time | ➢ 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 (2) | No timing or costing identified |
| Understanding fishing behaviour | ➢ Understanding the drivers and incentives in determining fishing behaviour in all sectors.<br>➢ 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. | Desirable (3) | No timing or costing identified |
| Mid-year survey | ➢ Conduct mid- year survey, as required under the Harvest Strategy for the TRL Fishery. | Only if triggered under the Harvest Strategy, priority = essential (1) | To be conducted only if triggered under the Harvest Strategy Indicative costing identified ($110,000 with in-kind contribution from CSIRO) |

**Torres Strait fisheries strategic research themes, strategies and research activities**

| | |
|---|---|
| **Theme 1: Protecting the Torres Strait marine environment for the benefit of Traditional Inhabitants** | |
| **Aim:** Effective management of fishery stocks based on understanding species and their biology and ecological dependencies so it can support Traditional Inhabitant social and economic needs. | |
| Strategy 1a - Fishery stocks, biology and marine environment | Possible research activities under this theme may include:<br>a. Stock assessment and fishery harvest strategies for key commercial species.<br>b. Ecological risk assessments and management strategies for fisheries.<br>c. Minimising marine debris in the Torres Strait.<br>d. Addressing the effects of climate change on Torres Strait fisheries through adaptation pathways for management, the fishing industry and communities.<br>e. Incorporating Traditional Ecological Knowledge into fisheries management.<br>f. Methods for estimating traditional and recreational catch to improve fisheries sustainability. |
| Strategy 1b – Catch sharing with Papua New Guinea | Possible research activities under this theme may include:<br>a. Status of commercial stocks and catches by all sectors within PNG jurisdiction of the TSPZ.<br>b. Good cross-jurisdictional fisheries management through better monitoring and use of technology. |
| **Theme 2: Social and Economic Benefits** | |
| **Aim:** Increase social and economic benefits to Traditional Inhabitants from Torres Strait Fisheries. | |
| Strategy 2a - Promoting social benefits and economic development in the Torres Strait, including employment opportunities for Traditional Inhabitants | Possible research activities under this theme may include:<br>a. Models for managing/administering Traditional Inhabitant quota<br>b. Understanding what influences participation in commercial fishing by Traditional Inhabitants.<br>c. Understanding the role and contribution of women in fisheries.<br>d. Capacity building for the governance of industry representative bodies<br>e. Methods for valuing social outcomes for participation in Torres Strait fisheries.<br>f. Identifying opportunities and take-up strategies to increase economic benefits from Torres Strait fisheries. |
| **Theme 3: Technology and Innovation** | |
| **Aim:** To have policies and technology that promote economic, environmental and social benefits from the fishing sector. | |
| Strategy 3a – Develop technology to support the management of Torres Strait fisheries. | Possible research activities under this theme may include:<br>a. Electronic reporting and monitoring in the Torres Strait, including for small craft.<br>b. Technologies or systems that support more efficient and effective fisheries management and fishing industry operations. |

**TSSAC annual research cycle**

| | **TSSAC Process** |
|---|---|
| February | Research providers submit pre-proposals for assessment, which meet the scopes provided by TSSAC in November.<br>EOIs submitted are circulated to fisheries managers/ RAGs & MACs for comment; Fisheries Managers, RAGs/MACs identify any additional research priorities for potential FRDC funding. |
| March | TSSAC meets via teleconference to assess pre-proposals and Management/RAG/MAC comments.<br>Applicants notified of TSSAC comments on their pre-proposals and asked to develop the consultation package (for review by AFMA by end of March) for use during full proposal development. |
| April | Researchers to complete full proposal (6 weeks total with consultation period) |
| May | Late May/ early June. TSSAC meet face to face to review full proposals and endorse final applications, or suggest necessary changes before endorsement.<br>Applicants advised of the TSSAC's final evaluation. |
| June | |
| July **(START)** | TSSAC confirm the research budget for the new financial year (it doesn't generally change from year to year - $410 000).<br>New contracts and variations for essential research projects prepared and put in place, confirming forward budgets.<br>RAGs, WGs and MACs to identify THEIR PRIORITY RESEARCH NEEDS for funding in the next financial year by updating their *five year rolling fisheries research plan*. This should be framed around strategies in the 5 year strategic research plan. Provide to TSSAC EO by end August. |
| August | RAGs/MACs submit their five year rolling fishery research plan to the TSSAC Executive Officer, currently lisa.cocking@afma.gov.au, by end August. |
| September | TSSAC EO drafts the TSSAC Annual Research Statement (ARS) with each fisheries priorities for the current year. |
| October | TSSAC meets (face to face or via teleconference) to finalise the PZJA ARS and agree on priorities for the TSSACs call for applications in November.<br>AFMA develop scopes for the priority research projects and send to TSSAC out of session for consideration. |
| November | The annual research call opens in November. Scopes sent to researchers seeking pre-proposals. |

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| OTHER BUSINESS | Agenda Item 10<br>For discussion |

**RECOMMENDATIONS**

1. That the RAG **NOMINATE** any further business for discussion.

| TROPICAL ROCK LOBSTER RESOURCE ASSESSMENT GROUP (TRLRAG) | MEETING 27<br>10-11 December 2019 |
|---|---|
| DATE AND VENUE FOR NEXT MEETING | Agenda Item 11<br>For discussion |

**RECOMMENDATIONS**

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

| Date | Key agenda items |
|---|---|
| 31 March 2020 | TRLRAG Data Sub-Group (meeting 2)<br>- Assess and identify improvements to fisher dependent data inputs to the Torres Strait TRL Fishery assessment framework<br>- Consider draft data plan |
| 1-2 April 2020 | TRLRAG (meeting 28)<br>- Consider final results of the integrated stock assessment and any related intersessional work undertaken by CSIRO<br>- Discuss research and data needs planning, including:<br>  - Consider Data Sub-Group meeting outcomes<br>  - As required, following the introduction of quota management system, develop a work plan to guide future CPUE standardisation work including identification of any additional information needs<br>  - Consider outcomes of outcomes of the FRDC funded project titled: *Decadal scale projection of changes in Australian fisheries stocks under climate change*<br>  - Provide advice to the CSIRO project team for the AFMA funded project titled: *Climate variability and change relevant to key fisheries resources in the Torres Strait*<br>  - Discuss updates to the five-year research plan<br>- Initial consideration of a tiered harvest strategy approach |
| 15-16 December 2020 | TRLRAG (meeting 29)<br>- Consider results of the November 2020 pre-season survey<br>- Consider CPUE analyses for the 2019-20 fishing season<br>- Consider the recommended biological catch (RBC) estimates derived through the application of the empirical harvest control rule (eHCR) under the final Harvest Strategy and provide advice on a RBC for the 2021-22 fishing season<br>- Consider intersessional work undertaken by CSIRO to develop a tiered harvest strategy |