

Torres Strait Scientific Advisory Committee

Preliminary Research Proposal for funding beginning 2016/2017

Please keep your preliminary proposals to no longer than two A4 pages in total.

Project Title: Torres Strait rock lobster (TRL) fishery surveys, stock assessment, harvest control rules and Recommended Biological Catch

Principal Investigator: Éva Plagányi (Eva.Plaganyi-lloyd@csiro.au)

Organisation: CSIRO Oceans and Atmosphere

Start Date: 1 July 2016 **End Date:** 15 June 2019

BUDGET ¹					CONTRIBUTIONS				
TOTAL PROJECT COSTS					TOTAL				
Year	Salary	Travel	Operating	Capital		AFMA Contribution	Applicant Contribution	Applicant In kind	Other In kind
2016/2017 [#]	130,072	32,608	188,904		351,584	246,620	104,963		
2017/2018 [#]	133,714	32,608	192,348		358,671	252,303	106,368		
2018/2019 [#]	156,035	32,608	211,396		400,039	278,282	121,757		
Totals	419,821	97,824	592,648		1,110,293	777,205	333,088		

[#]Budget Option 3 shown as this corresponds most closely to 2015/2016 research undertaken, but please see Appendix A for five alternative options as requested by the TRLRAG, and also detailing separately monitoring and stock assessment costs as requested

Research Priorities

Identify research priorities from the 2015 Operational Plan for Torres Strait Fisheries that this Application addresses.

- (B) Rock Lobster 1) Providing advice for fisheries management 1a) Evaluation of alternative management strategies including harvest control rules and spatial and seasonal management controls 1b) Development of simulation operating models of the fishery to be used for the evaluation of management strategies. 1c) Regular updates of stock assessments to provide estimates of stock status and reference points 1d) Improved monitoring of catch and effort in all sectors of the fishery. 2) Continuation and improvement of data collection 2a) Fishery independent surveys of resource abundance 2b) Improved monitoring of commercial catch and effort in all sectors of the fishery. 5) Environmental impacts 5a) Collect relevant baseline information to assess environmental change impacts on lobster populations 5b) Analyse the impact of environmental change on the fishery

Need

Describe why and how this application was developed. What is the priority need for this research?

Given that the fishery is moving to quota management there is a need to refine and optimize stock forecasts and RBC estimates, as well as put in place the most appropriate type and frequency of population monitoring surveys, data summaries and full stock assessments to support future management.

Pre-season (November) population surveys of recruiting (1+) lobster abundance are critical to support the proposed new quota managed system, and annual pre-season surveys were conducted during 2005-2008, 2014-2015 to provide managers with information on the abundance and biomass of fishery recruits and the likely stock biomass available to be fished each year. These data sets are integral to the outputs of the fishery model developed to assess fishery status and to forecast stock size and RBC. Given ongoing discussions by the TRLRAG and TRLWG as to future research planning, several alternative survey options with associated budgets are provided in this pre-proposal.

Objectives

What are the objectives to be achieved?

1. Recommend a RBC annually for each of the fishing seasons based on the long-term stock assessment using the integrated fishery model with updated fishery-independent and

¹ Please list budget exclusive of GST

commercial catch data, and/or implement a harvest control rule to inform RBC

2. Conduct a full-scale (140 sites) or reduced scale (74 sites) pre-season survey in November each year including, as required, support for a component involving TiB divers in the scientific surveys (see alternative options in Appendix A)
3. Contingent on the timing of introduction of the QMS, as well as the Alternative Option selected, conduct a mid-year population survey in May/June 2016 (and/or 2017) of the relative abundance of recruiting (1+) and fished (2+) lobsters, as well as size-frequency of the TRL population in 2016 (and/or 2017).
4. Undertake a research workshop in Torres Strait to continue strengthening engagement of the TIB sector in research data collection, analysis and interpretation
5. Present the outcomes of this research project to Torres Strait communities at its completion

Planned Outcomes and Benefits

What are the Planned Outcome(s) that this project will achieve and how will this be measured? How will these outcomes benefit Torres Strait fisheries and Torres Strait Islanders? Is there relevance to fisheries management and is there a planned path for uptake.

This research project will provide annual estimates of recruiting (1+) and fished (2+) lobster abundance as inputs to an updated stock assessment and annual RBC recommendations using the integrated fishery stock assessment model. The model will be updated each year using all available commercial catch, survey, CPUE and catch at age data. Alternatively, as detailed in Appendix A, the stock assessment model will only be updated every 3rd year, and instead annual data summaries will be produced and a harvest control rule (HCR) implemented instead to inform setting of a RBC.

The choice of the most appropriate research survey design each year will be based on extensive consultations and discussions by the TRLRAG and TRLWG as to the effectiveness, feasibility, accuracy and reliability of alternative designs, as well as plans to move towards greater inclusion of stakeholders.

Consultation

Specify any planned or completed consultation with Torres Strait Islanders, industry, fisheries management and other parties. **Particular emphasis should be included on consultation with Traditional Owners and support from them for the project. Researchers should consider information in the document 'A Guide for Fisheries Researchers Working In the Torres Strait'². Researchers should note that The TSSAC may require formal support from relevant communities for individual research projects if appropriate.**

The aims and methods of the survey and stock assessment research have been developed through consultation principally at TRL RAG, TRL WG and TSSAC meetings, involving AFMA and state managers, independent scientists, TVH and TiB fisher representatives and flow-on business stakeholders. Representatives from these groups have made significant contributions to the development of the fishery-independent surveys, commercial catch and effort monitoring and the integrated fishery model through these consultative meetings. The RBC setting and harvest control rules for this fishery were also developed through consultation with all stakeholders. Pre-season population surveys, deemed essential for accurate RBC setting by the TRL RAG, were omitted for several years as a result of the quota managed system being delayed, but recent consultation have pointed to the need to reintroduce these surveys given plans by management to transition to a quota managed system.

The desire to include in-kind support from industry in designing and implementing the research surveys was discussed at the TRL Working Group meeting held in April 2013, as well as all RAG, WG and stakeholder workshops since then. CSIRO held a science capability training workshop in Brisbane, 3-5 November 2015, to bring together Torres Strait TIB fishers, representatives and CSIRO scientists to learn from each other and share knowledge of the fishery and the science underpinning its management. The workshop was helpful in getting inputs to improve the

² Available at www.pzja.gov.au

commercial catch database as well as plan future improved close collaboration between researchers and Traditional Owners.

Extension and Communication Activities

Describe the extension and communication activities planned for the project. End-users are often in the best position to decide the most appropriate outputs, so consider having them describe their output needs. **Particular emphasis should be included on communication and extension strategies that are suitable for Traditional Owners and consider 'A Guide for Fisheries Researchers Working In the Torres Strait'².**

The results of the population surveys, size-frequency data, seabed habitat data and TAC estimation will be summarised in annual final reports. The results will be communicated to Torres Strait islanders, managers, stakeholders and industry at TRL working group meetings and TRL RAG meetings, as well as at bilateral meetings where required. The information summarised in the reports will be adopted by the RAG to set sustainable levels of catch and effort. This information will also flow to the PNG fishery managers and incorporate obligations under the catch sharing arrangements. The results will also flow to the Queensland rock lobster fishery since the stock is shared and some non-islander vessels are dual endorsed.

Dissemination of the results of this research will be through progress and final reports; the latter including executive summaries written to include a wide audience. Ongoing efforts will be made to improve communication methods to as broad an audience as possible, for example as demonstrated by CSIRO's graphic recording/visual minutes produced as posters and in print form (available on request) following the 2 workshops held with stakeholders in 2015 (workshop on industry participation in research, Thursday Island, July 2015 and Science capability workshop, Brisbane, November 2015). Positive feedback was received regarding use of visual minutes. CSIRO researchers have also done radio interviews on TRL research and researchers regularly respond to queries from TiB fishers and community members via email and phone.

Engagement of Torres Strait Islanders

Describe how the project plans to engage Torres Strait Islanders/Prescribed Body Corporates in meaningful and appropriate ways. Include details on the level of engagement and, in particular if employment is included.

Options are continuing to be explored as to ways to involve Torres Strait Islanders in the future pre-season surveys or to transition surveys to this sector. This is being discussed in consultation with stakeholders at the TRL Working group meetings, TRLRAG, with TSRA and during field visits.

An initial start has been made to include Torres Strait Islanders in improving the quality of data that is used as an input to the stock assessment model – for example, CPUE data from the TiB sector, and the option is also being pursued of engaging key Torres Strait islander representatives in collating high quality catch, effort and size composition data at key island communities in Torres Strait. Depending on the survey design each year, discussions are also in progress to train Torres Strait Islanders to undertake aspects of the research surveys and collect information (eg using underwater video footage) on seabed habitat components.

Methods

Describe how the research will be carried out. Will the research be conducted in culturally appropriate ways (refer to 'A Guide for Fisheries Researchers Working in Torres Strait'). Include plans for data management during and after the project.

This pre-proposal was prepared based on extensive consultations regarding potential alternative future survey scenarios and analysis methods. Appendix A provides a summary of these alternatives and the associated costs. CSIRO have a 28-year history of conducting surveys on TRL, and hence have the necessary experience and flexibility to implement and support any of the alternative research designs. Below follows a brief summary of the methods that would be used for the various components if they are required as part of the final research proposal.

The field sampling methods employed during the pre-season population surveys will mostly be consistent with those used during all previous surveys, and the sites established during 2005-2008 (~140) or in the case of reduced surveys (or surveys that are complemented by additional industry-run sampling) approximately 74 sites corresponding to the mid-year survey sites will be included to ensure inter-annual comparisons of lobster abundance and habitat are consistent. The seabed habitat at each site will be recorded using standard categories established during

previous surveys. It is hoped that this task can also be transitioned to industry divers, but alternative monitoring methods (eg. Wearing GoPro cameras) will be explored. The pre-season relative abundance indices can be converted to absolute abundance estimates by comparing the mean estimates from the repeated sites.

If mid-year population surveys are included in a final proposal, the field sampling methods employed will be consistent with those used during all previous surveys. The lobster count data will be entered into the historical data-base and indices of recruiting (1+) and fished (2+) lobster abundance per strata and overall will be calculated for input to the integrated fishery model. Size and sex data from commercial lobster catches will be recorded monthly at M. G. Kailis in Cairns and entered into the historical data-base.

The integrated stock assessment model will be updated with all available information, and appropriate sensitivity tests run, in order to provide forecasts of recommended RBCs. Continued refinements will be made to the method for standardising both the TVH and TIB CPUE data.

An empirical harvest control rule (eHCR) is currently being developed, and further refinements to the eHCR, in consultation with stakeholders, will be developed and the eHCR will be implemented to inform a RBC. Development will also focus on use of a tiered harvest strategy that accounts for different risk-catch-cost trade-offs of different stock assessment and monitoring options for the fishery.

Estimates of recruiting (1+) and fished lobster (2+) abundance, the size distributions of sampled lobsters, spatial distributions of lobsters and maps of seabed habitats and the updated stock assessment and TAC estimates will be reported at the annual TRL RAG meetings.

Related Projects and Research Capability

[Describe links to past or present research and how this proposal will add value.](#)

The TRL Management Strategy Evaluation (MSE) project was completed in 2012. There were obvious links between the MSE model and the ongoing survey and stock assessment research given that the biological operating model used in the MSE was based on the fishery stock assessment model.

CSIRO has conducted TRL population surveys, including seabed habitat monitoring and subsequent stock assessments since 1989. CSIRO has collaborated with Torres Strait islander communities, organizations and individuals throughout its research history to ensure research outcomes are relevant to Torres Strait and Torres Strait islanders are provided with results of the research projects.

Flow Of Benefits (%)

<u>Fishery</u>	<u>Commercial Sector</u>	<u>Recreational Sector</u>	<u>Traditional Fishing Sector</u>
Torres TRL	50%		50%

Appendix A. Torres Strait Tropical Rock Lobster Fishery stock assessment options identified by the Torres Strait Tropical Rock Lobster Resource Assessment Group, including alternative combinations of monitoring, data analysis, HCR development and implementation and stock assessment. The pre-proposal uses as an example Option 3 (with HCR) below as this corresponds most closely to the current research project

Data/Assessment	Need	Option 1 Mini	Option 2 Ford	Option 3 Commodore	Option 4 Rolls Royce	Option 5 SUV
Catch and effort data from the TIB and TVH sectors	Mandatory	Annual ✓	Annual ✓	Annual ✓	Annual ✓	Annual ✓
Length frequency data from processors	Mandatory	Annual ✓	Annual ✓	Annual ✓	Annual ✓	Annual ✓
Pre-season survey	High priority for setting a total allowable catch		Annual ✓	Annual ✓	Annual ✓	
Mid-season survey	Understanding of the relative biomass		Annual ✓		Annual ✓	Annual ✓
Data summary (review of the catch per unit effort data)	Indicator for how the fishery is tracking	Annual ✓		Annual ✓	Annual ✓	
Full assessment	Setting a total allowable catch and estimate of biomass.	Every 3 years ✓	Annual ✓	Every 3 years ✓	Every 3 years ✓	Annual ✓
Harvest Control Rule	Pre-agreed decision rule for setting a total allowable catch	Annual ✓		Annual ✓	Annual ✓	
PRELIM ESTIMATE OF TOTAL ANNUAL COST (average over 3 years) (A) CSIRO surveys		TOTAL (\$204.9) AFMA (\$143.5k) CSIRO contribution (\$61.5k)	TOTAL (\$502k) AFMA (\$352k) CSIRO contribution (\$151k)	(A) Incl initial development and testing of HCR TOTAL (\$370.1k) AFMA (\$259.1k) CSIRO contribution (\$111k) (B) Excl HCR development TOTAL (\$340.1) AFMA (\$238.6k) CSIRO contribution (\$102.3k)	(A) Incl initial development and testing of HCR TOTAL (\$535.4) AFMA (\$374.8k) CSIRO contribution (\$160.6k) (B) Excl HCR development TOTAL (\$490) AFMA (\$343.2k) CSIRO contribution (\$147.1k)	TOTAL (\$377.9) AFMA (\$264.6k) CSIRO contribution (\$113.4k)
(B) Contract surveys		To be estimated				
Charter costs (included in CSIRO total)		-	\$134k	\$67k	\$134k	\$67k

Costs are calculated as the average over the next 3 years (i.e. annual amounts will be slightly more or less) and include inflation over this period. CSIRO contribution is 30% on average in all these cases and this includes the monitoring and data collection component, noting that CSIRO does not co-invest in monitoring if part of a stand-alone proposal.	Main staff roles: Eva Plaganyi (overall project management, analyses and report writing; stock assessment; HCR; attend meetings and stakeholder communication) Darren Dennis (planning, management and execution of diving surveys; attend meetings) Rob Campbell (collation, review and analysis of catch and other fishery data, plus survey data; attend meetings) Roy Deng (support and assist with analyses) Trevor Hutton (advising on economic information and trends to inform analyses) Divers (3 divers + Darren needed for each survey conducted, where time allocation for each diver per survey is 5%)	Staff % of time: EP 15% DD 20% RC 10% RD 5% TH 2% Additional divers 0% Operating expenses largely re travel and general operating, + Kailis size monitoring (\$2650) (same for all options) Notes: includes time for CSIRO to oversee, collate and analyse data collected by contractor/industry	Staff % of time: EP 25% DD 30% RC 18% RD 5% TH 2% Additional divers 30% Operating expenses largely re charter, survey expenses, travel Notes: assumes would do midyear and end of year assessment and update	Staff % of time: EP 23% (or excl HCR initial development 18%) DD 25% RC 20% RD 2% TH 1% Additional divers 15% Operating expenses largely re charter, survey expenses, travel	Staff % of time: EP 30% (or excl HCR initial development 20%) DD 30% RC 20% RD 2% TH 1% Additional divers 30% Operating expenses largely re charter, survey expenses, travel	Staff % of time: EP 25% DD 25% RC 20% RD 5% TH 2% Additional divers 15% Operating expenses largely re charter, survey expenses, travel
---	--	---	---	--	--	--