Australian Government
Australian Fisheries Management Authority

Torres Strait Hand Collectables Working Group

Meeting 19

10 November 2022

Meeting Record

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

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1 Preliminaries

1.1 Acknowledgment of traditional owners, welcome and apologies

1. The Chair welcomed members and observers to the 19th meeting of the Torres Strait Hand Collectables Working Group (the WG), in particular the new Traditional Inhabitant Members Graham Hirakawa (Kaiwalagal) and Toshie Kris (Maluialgal). The Chair acknowledged the Traditional Owners of the lands on which members were participating both in the meeting and those members on video conference and paid respect to Elders past, present and emerging.
2. The Chair noted that apologies had been received from Nicole Murphy (Scientific Member), Pabai Pabai (Traditional Inhabitant Member for Gudumalulgal), and John Tabo (Traditional Inhabitant Member for Kemer Kemer Meriam).
3. The meeting was conducted as a face-to-face on Thursday Island and a video conference. The Scientific Member Steve Purcell, QDAF Member Jenny Keys and ABARES Observer Ian Butler participated by video conference. HCRAG Scientific Member and CSIRO black teatfish stock assessment project Principal Investigator Dr Eva Plaganyi-Lloyd participated by video conference during Agenda Item 3.

1.2 Adoption of agenda

4. The WG adopted the draft agenda (**Attachment A**) with the AFMA Member noting that a staffing update would be provided under Agenda Item 8 (Other business). Members and observers did not object to the meeting being voice recorded for the purposes of developing the meeting record. The Chair noted that the recording is deleted once the meeting record is finalised and ratified by the WG.

1.3 Declarations of interest

5. The Chair advised members and observers, that as provided in the *PZJA Fisheries Management Paper No. 1* (FMP1), all members must declare all real and potential conflicts of interest in the Torres Strait Beche-de-mer Fishery (BDM Fishery) at the commencement of the meeting.
6. Where it is determined that a direct conflict of interest exists, the WG may allow the member(s) to continue to participate in the discussions relating to the matter but may also determine that, having made their contribution to the discussions, the member should retire from the meeting for the remainder of the discussions on that issue.
7. Declared interests are detailed in **Table 1** below. Each group of members and observers with similar interests were usually asked to leave the meeting to enable the remaining members to:
    a. freely comment on the declared interests;
    b. discuss if the interests preclude the members from participating in any discussions; and
    c. agree on any actions to manage declared conflicts of interest.

    but in this meeting the WG agreed to address any additional conflicts of interest should they arise throughout the discussion of agenda items.
8. The Chair encouraged open and honest discussion about the fishery, acknowledging that Traditional Inhabitants from the cluster Nations have an important role as owners to the access of the resource. The Chair noted that where industry members are involved there was agreement that there were no specific agenda items for which they should be excluded from discussion or recommendations. It was noted that members are attending to represent communities and represent the best interests of the entire fishery. If conflicts relating to individual commercial interests emerge and persist at the formulation of the Recommendation(s) it will need to be managed, noted and recorded in the minutes.
9. With respect to government members, it was recognised that while there was no specific conflict, there was a request that government members recognise that Traditional Inhabitant members are acting on behalf of the community and that they extend trust to the Traditional Inhabitant members in this regard.

10. With respect to scientific members it was identified that they should be part of the discussion but excluded from discussions about recommendations relating to research funding if there is likely to be a pecuniary interest in the recommendations.

Table 1. Declared interests from each attendee

Name	Position	Declaration of interest
Members		
Nicholas McClean	Chair	Employee of the University of Technology (Sydney). Principal investigator on project funded by FRDC in relation to Commonwealth fisheries. Co-investigator on BDM work in Philippines work on mariculture and various other fisheries research projects.
Steve Purcell	Scientific Member	Has interest in invertebrate fishery research has previously worked in the assessment of sea cucumber fisheries in the Pacific and New Caledonia, and on restocking/sea-ranching research. Specialist in sea cucumber ecology and fisheries. Will be involved in a sea cucumber population survey in New Caledonia to inform the CITES Appendix II listing of black and white teatfish.
Graham Hirakawa	Traditional Inhabitant Member Kaiwalagal	TIB licence holder with endorsements in the Spanish mackerel, pearl shell and tropical rock lobster fisheries. Member of Zenadth Kes Fisheries Limited.
Nicholas Pearson	Traditional Inhabitant Member Kulkalgal	TIB licence holder with endorsements in the BDM, finfish and tropical rock lobster fisheries. Part of a family owned fishing business. Member of Zenadth Kes Fisheries Limited.
Toshie Kris	Traditional Inhabitant Member Maluialgal	TIB licence holder with endorsements in the Spanish mackerel and tropical rock lobster fisheries. Member of Zenadth Kes Fisheries Limited.
Emma Freeman	AFMA Member	Employed by AFMA, no pecuniary interests or otherwise.
Nicholas Richards	Torres Strait Regional Authority (TSRA) Member	Employed by TSRA, no pecuniary interests as an individual. TSRA holds fishing licences on behalf of Traditional Inhabitants.
Jenny Keys	QDAF Member	Employed by Queensland Government and working in the Management and Reform Section, managing the East Coast Sea Cucumber and other harvest fisheries in Queensland. No pecuniary interests or otherwise.

Name	Position	Declaration of interest
Danait Ghebrezgabhier	Executive Officer, AFMA	Employed by AFMA, no pecuniary interests or otherwise.
Casual Observers		
Quinten Hirakawa	TSRA	Employed by TSRA and TIB licence holder with endorsements in the tropical rock lobster and BDM fisheries.
Ian Butler	Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES)	Employed by ABARES within the Department of Agriculture, Water and the Environment (DAWE). No pecuniary interests or otherwise.
Brodie Macdonald	AFMA	Employed by AFMA, no pecuniary interests or otherwise.

1.4 Action items from previous meetings

11. The WG noted the progress update provided against action items arising at previous WG meetings.
12. The WG agreed as follows in relation to the specific action items outlined below:
    a. *Items 1, 2 and 5 (HCWG15/16)* – these three action items are now combined as they all relate to the hookah prohibition and all relate to the hosting of a future management workshop in 2023.
    b. *Item 6* – replaced by new action item 1 following discussion of socio-economic under Agenda Item 6 (Research priorities).
    c. *Items 3 and 4 (HCWG16)* – noting the recent changes to the Chairpersons and administration of the Malu Lamar (Torres Strait Islander) Corporation RNTBC, action items pertaining to Malu Lamar should remain open until they re-engage in the PZJA advisory process.
13. The WG noted that the TSRA, where they can, will try to coordinate community visits relating to fisheries matters with AFMA's visits noting that there are other non-fisheries related projects that also require consultation.

2 Working group updates

2.1 Traditional Inhabitant members

14. The WG noted that the majority of the fishers in the inner islands are tropical rock lobster (TRL) fishers and have therefore not fished since the end of the TRL season on 30 September. Traditional Inhabitant members present did not participate in the 2022 black teatfish opening or the BDM Fishery and are reliant on members from the central and eastern islands that are full time fishers to provide updates on the operational aspects of the fishery. Traditional Inhabitant members noted that BDM fishers that attended the HCRAG02 as industry observers have provided feedback on the 2022 black teatfish opening and the fishing season in general.
15. The Traditional Inhabitant Member for Maluialgal advised that mobility and fuel costs make it challenging for western island fishers to travel to the sea cucumber fishing grounds which are mostly located in the central and eastern region of the Torres Strait. The member further noted that industry should provide advice on the timing of the black teatfish closure.
16. The AFMA Member noted that AFMA values the feedback from fishers that have participated in the black teatfish opening to assist in designing opening and forecasting closure to ensure that the total allowable catch (TAC) is not exceeded. Based on feedback received from the 2021 opening, the 2022 was opened

on a neap tide and to avoid fishing on the Sabbath. Due to catch forecasts this year fishers were allowed half day of fishing. Feedback was that industry found it useful to fish but that it would have worked better if tide movements had been taken into consideration to maximise opportunity of this half day of fishing. AFMA is hopeful of opportunities in future for real time communication with industry to ensure that the opening can optimise fishing operations without risking the overcatch of the TAC.

17. An Industry member proposed that the prohibition on the use of hookah equipment to fish for deepwater species continues to be a barrier to participation in the fishery, especially for operators who predominantly operate in other Torres Strait fisheries. The WG noted that this was one of many management items to be discussed at the management workshop in early 2023.

2.2 Scientific members

18. The WG noted the following updates from the Scientific Member Assoc. Prof. Steven Purcell:

    a. Close to finalising a project with the Food and Agriculture Organization of the United Nations that includes undertaking a market study in China to provide information on the price of some sea cucumber species harvested in the Torres Strait.

    b. Continuing work of monitoring project of sea cucumber fisheries in New Caledonia. The New Caledonian fishery is the most similar to the BDM Fishery given the management arrangements, harvesting and status of stocks. Hearing about the evolution of the fishery could be useful for the BDM Fishery as a lens for what's happening and what can be learned from a similar fishery. The WG invited Assoc. Prof. Purcell to present on this work at the next WG and HCRAG meetings.

ACTION – Scientific Member Assoc. Prof. Steven Purcell to present at future meetings of the WG and HCRAG on his work on New Caledonian fisheries and how they have informed fisheries development and management.

2.3 Government agencies

19. The WG noted the verbal update provided by the QDAF Member Jenny Keys including:

    a. Stock assessments from black and white teatfish were undertaken in 2021.

    b. A Wildlife Trade Operation (WTO) was approved for the Queensland Sea Cucumber Fishery on 2 December 2021 and is valid until 30 November 2024.

    c. A positive non-detrimental finding was not found for black teatfish and catches from 2 December 2021 are no-longer allowed to be exported.

    d. Stock collected under the old WTO for black teatfish can still be exported.

    e. Black teatfish can still be collected but can only be sold domestically.

    f. The fishing season runs from 1 July to 30 June.

    g. Quota used so far for the 2022 season is:

        i. 100% for black teatfish (29.988 tonne);

        ii. 96% for white teatfish (53 tonne);

        iii. 31% other species (94.8 taken).

    h. Economic data is collected for Queensland fisheries but it has been challenging to publish data for small fisheries due to confidentiality considerations.

20. The WG noted the update provided by the TSRA Member Nicholas Richards on items included in the agenda paper.

21. The WG noted the written update provided by AFMA in the agenda paper, including:

    a. Progress to date against the nine WTO conditions for the BDM Fishery that will be provided to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in November

2022 as part of the annual reporting requirement. The WTO conditions for the BDM Fishery include additional requirements that need to be met by the PZJA in managing the harvest of black and white teatfish, species listed under Appendix II of CITES.

b. A proposal from the European Union to include all species in the genus Thelenota (including Prickly redfish) under Appendix II of CITES will be discussed at the 19th meeting of the Conference of the Parties to CITES (CoP19) commencing the week of 14 November 2022.

c. The Wildlife Trade Office at DCCEEW is leading the engagement with the various jurisdictions to better understand the potential business and regulatory impacts of the proposed listing. This information will inform Australia's negotiating position at CoP19 and the required Regulatory Impact Analysis and National Impact Analysis, to be considered by the Australian Parliament, should they be adopted. This information will also inform the necessary regulatory arrangements to allow international trade to continue.

d. With respect to compliance activities and Traditional Inhabitant member concern regarding illegal, unreported and unregulated fishing on the southern part of Warrior Reef, AFMA's ongoing compliance presence is heavily reliant on Australian Navy and Australian Border Force platforms. The redirection of these platforms to other more urgent operations since 2020 has had an impact on the patrols that would normally be undertaken. AFMA continues to work with other enforcement agencies to collect intelligence. AFMA also works closely with the Papua New Guinea National Fisheries Authority (PNG NFA) to mitigate the risk of illegal fishing activity and ensure that there are complementary management arrangements in place for shared stocks.

2.4 Native Title

22. As there were no representatives from the Malu Lamar (Torres Strait Islanders) Corporation RNTBC, no update on Native Title matters was provided.

2.5 PNG National Fisheries Authority

23. The WG noted that although invited to the meeting, officials from the PNG NFA were not in attendance to provide a further update to the background information on the PNG BDM Fishery provided by AFMA in the agenda paper.

3 Black teatfish trial opening 9-12 May 2022 and future openings

Dr Eva Plaganyi-Lloyd joined the meeting at 1pm to answer questions relating to the preliminary black teatfish stock assessment results as presented to the HCRAG02 meeting on 27-28 September 2022.

24. The WG noted the update on the outcomes of the black teatfish trial opening on 9-12 May 2022 (**Attachment B**), including:

a. An overview of catch and effort reporting by licenced fish receivers. The catch of black teatfish was 17.05t (wet-gutted weight). During the opening, there were also 2t of other species caught, including blackfish, mixed curryfish, prickly redfish, and white teatfish.

b. That size frequency sampling was undertaken during the opening on Erub and Mer Islands and, to a limited extent, Bourke Islet. Dr Eva Plaganyi advised that, in the 2022 opening, there were fewer of the larger black teatfish caught and the size-frequencies were skewed more towards smaller individuals than in previous years.

c. That, having considered all available information, including the draft CSIRO analysis of the catch and sampling data from the openings, the HCRAG02 recommended (draft) that black teatfish continues to open annually with a 20t TAC on the basis that:

i. The 2022 trial reopening TAC of 20t was not overcaught (condition 5 of the Torres Strait Beche-de-mer Harvest Strategy (the HS)).

ii. Data were collected satisfactorily during the opening (condition 6 of the HS).

iii. Updated modelling analysis, inclusive of 2022 catch and sampling data, confirmed that a 20t TAC is sustainable and would not lead to a decrease in black teatfish biomass after the first year of fishing (condition 7 of the HS). In contrast, the modelling found that catches of 30t could lead to a gradual depletion of the stock.

iv. That AFMA continue to focus on communication and education on improving voluntary reporting of area and effort data by fishers and fish receivers, including preparing fact/information sheets and organising a teleconference with all fish receivers as a cost effective way to discuss ways of improving voluntary reporting.

v. Given the usefulness of the size frequency sampling undertaken during the 2022 opening, continue to undertake scientifically designed sub-sampling during the opening to collect size and weight frequency data during black teatfish openings at key landing locations.

CONDITION 5 - If the Trial TAC is exceeded by more than 5%, then the fishery is automatically paused (i.e. no fishing allowed) for the following year

25. Noting that this is the second trial opening and that the 20t TAC was not exceeded (total catch was 17.06t), the HS recommendation that the fishery automatically pause for the following year if the TAC is exceeded by 5 per cent does not apply.

CONDITION 6 - Was data collection during the trial conducted satisfactorily?

26. The WG noted the draft HCRAG02 advice that data collection during the trial opening was conducted satisfactorily based on the reliability of the total catch reported and the results of the CSIRO analysis. The WG specifically noted that there has been a significant improvement in the level of voluntary reporting of area information since the 2021 opening.

27. The Executive Officer clarified that the catch figures in the reported catch data summary where all based on wet gutted weight (landed weight that has been converted using the processed conversion ratios stipulated in the HS and Traditional Inhabitant Boat (TIB) licence conditions). The WG suggested that this needs to be clearly stipulated in future catch data summaries.

ACTION – Clarify that catch reported in summaries is clearly labelled as wet gutted weight (landed weight that has been converted using the processed conversion ratios stipulated in the HS and TIB licence conditions).

CONDITION 7 - Noting the TAC was not exceeded and reliable data were collected, the data need to be analysed to review the TAC and potential for the fishery to stay open in the future, or be re-opened periodically after a pre-specified interval

28. The WG noted the HCRAG's draft recommendations, based on its consideration of the updated fishery and scientific information (preliminary results of the catch and sampling data and the stock assessment):

    a. of a 20t TAC for the next black teatfish opening;

    b. given two successful trial openings, that the species continue to open on an ongoing basis in accordance with the requirements of the HS.

29. The WG recognised the importance of fully realising the available TAC as the additional catches can make a substantial difference to communities given limited sources of alternative income, while noting some of the challenges associated with effectively administering the season. The closure arrangements adopted for the 2021 and 2022 openings, whilst considered strict by some, are one of the important ways in which AFMA tries to mitigate the risk of a TAC overcatch in a re-opened fishery. The last day of fishing is determined based on catch information from the first few days of the opening and as AFMA has limited real time information about how fishing effort may change on a daily basis it assumes that fishers may increase their effort, and hence the total landed catch, as daily catches approach the TAC. Furthermore, as catch reporting is still paper based and requires manual data entry once received as the season progresses, AFMA needs to allow adequate time to capture all the catch data, assess the daily catch rate

and advise fishers and fish receivers of the total catch for the day and whether the season is still open. A greater uptake of electronic catch disposal records (e-CDRs) could potentially streamline the reporting process for future openings.

30. The WG discussed at length various TAC setting and HS approaches to ensure that the 20t TAC is fully caught, ultimately agreeing that, in the short term, operational strategies that assist and support industry to fully utilise the black teatfish TAC would be most beneficial. Other approaches discussed include:

    a. *Setting an aspirational TAC of 22t with a hard 20t catch limit* – the WG discussed that there is currently no scientific basis to support a 22t aspirational TAC and the importance of being cognisant of the precedent that a departure from the current HS sets for the application of other harvest strategies and TACs. The WG further noted Dr Plaganyi's advice that the black teatfish stock assessment model will benefit from a time series of additional data, including catch, and that as the model becomes more integrated it will start accounting for undercaught TACs and help inform potential TAC increases in the future.

    b. *Carry over of uncaught TAC between fishing seasons* – the WG noted that the HS does not currently provide for this due to lack of consensus on the inclusion of under catch provisions during its development. The carry-over of uncaught black teatfish TAC across fishing seasons needs to be scientifically informed and based on a defensible mechanism. It would also involve seeking a variation to WTO Condition 8 for the fishery from the DCCEEW, which currently limits the seasonal take of black teatfish to 20t. The WG noted that AFMA is currently seeking advice from the Wildlife Trade Office at the DCCEEW on their requirements for the variation of seasonal species catch limits in WTO conditions outside of the 3 year re-assessment cycle. Noting the in-built review mechanisms, the WG agreed the review of the HS is a key body of work for the future that will most likely require a research project.

    c. *Community or fishers to distribute uncaught black teatfish TAC* – the WG agreed that any community-based arrangements would need to be equitable and acceptable to all fishers and suggested that options could be discussed at the industry workshop in early 2023.

31. The WG, **accepted** the HCRAG's draft advice to transition fishing for black teatfish from a trial opening to an ongoing annual opening to be managed in accordance with the TS BDM HS, noting further discussions with fishers on strategies for fully utilising the black teatfish TAC at the industry workshop in early 2023.

32. The WG, noting the draft HCRAG advice, **recommended** the continuation of the 20t TAC and sought advice from the HCRAG on:

    a. the anticipated duration of an annual 20t catch limit, noting a few more years of data is required to increase certainty on what future annual TACs might be possible;

    b. the scientific basis for the development and application of under catch carry-over provisions; and

    c. options for the review of the BDM HS to include provisions to carry over undercatch and set provisional TACs.

4 Applying the harvest strategy to review total allowable catches (TACs)

33. The WG noted that:

    a. On 19 November 2019 the PZJA agreed to adopt the HS. Current total allowable catches (TACs) (excluding black teatfish which is considered separately) were agreed in line with the starting TACs recommended in the HS and have applied since 1 January 2020.

    b. All species assessed remain in the low tier of the HS as transition to the middle tier:

        i. requires high quality data for at least two primary indicators; and

        ii. is not applicable during the initial years of HS implementation as insufficient detailed historical fishery data are available.

c. At its meeting on 28-29 September 2022, the HCRAG, having applied the HS to all new information available since its last meeting (this being catch data for the 2021 fishing season as outlined in the species assessment sheets tabled under Agenda Item 4, Attachment 4a):

   i. **Recommended** no changes to current TACs (outlined in Table 2. below) for the 2023 fishing season, commencing on 1 January 2023.

   ii. Upon the HCWG18's recommendation, **revisited** its advice to increase the curryfish vastus trigger limit from 15t to 30t and **recommended** that the trigger limit remain at 15t until such time there is new data to support an increase.

   iii. **Noted** that no TACs or individual basket species trigger limits were exceeded during the 2021 fishing season, therefore low tier overcatch deduction provisions in the HS do not apply.

Table 2. TACs for the 2023 BDM fishing season commencing on 1 January 2023

Species	**2023 TAC (t)**
Curryfish basket (2 species)	60
Deepwater redfish	5
Greenfish	40
Hairy blackfish	5
Prickly redfish	15
Sandfish (CLOSED)	0
Surf redfish (CLOSED)	0
White teatfish	15
Other sea cucumbers (13 species)	50
TOTAL	**190**

34. Having considered the draft HCRAG advice and noting that no TACs or individual basket species trigger limits were exceeded during the 2021 fishing season, the WG **recommended** the TACs in Table 2 for the 2023 fishing season commencing on 1 January 2023.

35. The WG noted that the prohibition on the use of hookah gear is impacting industry's ability to catch deeper water sea cucumber species such as white teatfish.

36. The ABARES Observer expressed the view that in his opinion white teatfish is currently being economically overfished due to consistently low recent catches compared to historical catches. However, Dr Plaganyi advised that care needs to be taken in interpreting changes in catch data as the species was historically fished using hookah.

5 Research priorities

37. The WG considered the information provided on the status of identified research priorities and needs for the BDM Fishery, and on the TSSAC research funding process, including funding available for the 2023/24 financial year. The WG also considered the additional analysis and sampling needs identified by the HCRAG to address some of the key data gaps that exist in the fishery. The WG reviewed all identified research needs and priorities as outlined in Table 3, taking into account HCRAG's draft advice on priorities and noting that draft scopes for high priority research needs (sandfish stock survey and black teatfish size frequency sampling) will be circulated for their consideration and comment.

38. Assoc. Prof. Steven Purcell presented to the group on research undertaken in the Pacific on the utility of socioeconomic research for managing hand-collectable fisheries. The WG noted that socioeconomic

surveys can produce data that complements biological, catch or survey information. Assoc. Prof. Purcell's presentation is included as **Attachment C**.

39. Mr Richards also presented to the group on the potential for market development for BDM in the Torres Strait and his presentation is included as **Attachment D**.

40. The WG agreed that socioeconomic research could assist in understanding the needs and aspirations of Indigenous fishers including the need to generate more income from fishing in the Torres Strait. The WG agreed that it would be important to identify the scope of this work (e.g. cross fishery or BDM specific) and identify the key information that needs to be collected through a scoping or discussion paper.

ACTION - Assoc. Prof. Purcell and Mr Richards to prepare a short introductory discussion paper (~5 pages) on the potential for socioeconomic data collection and market development in the fishery, with input from the WG Chair Nicholas McClean as required.

6 Update on new application to undertake aquarium fishing in the Torres Strait

41. The WG noted the agenda paper on an application to undertake aquarium fishing in the Torres Strait and that the application had been considered by the HCRAG at its meeting on 28-29 September 2022. The WG further noted that the PZJA, at its meeting on 4 October 2022, took a decision not to renew licenses that might allow this type of fishing and that the decision was published on the PZJA website.

7 Future priorities and date for the next meeting

42. The WG noted that the agenda paper on future priorities captures items previously identified and endorsed by the WG, as well as a progress update against each item. The WG also noted that the next WG meeting is tentatively scheduled for October 2023.

8 Other business

43. The Chair thanked all members and observers for their contribution to a productive meeting. The Chair and members acknowledged and thanked the outgoing AFMA Senior Fisheries Management Officer for Hand Collectable Fisheries, Danait Ghebrezgabhier for all her work in and contributions to Torres Strait Fisheries.

44. Mr Nicholas Pearson closed the meeting at 5:22pm in Prayer.

Table colour key	Completed	Scoped and/or costed	Not scoped/not costed	Funded

Table 3. Overview and status update of research needs identified or discussed for Hand Collectable Fisheries at previous HCRAG and HCWG meetings and the rolling five-year research plan.

	Research activity	Detail	Status	Draft HCRAG02 advice	Draft HCWG19 advice
1	Status of BDM stocks in relation to harvest strategy reference points	Consistent with the BDM harvest strategy and where there is sufficient information available, a tactical research project is needed to determine the current status of sea cucumber stocks in relation to the harvest strategy reference points, noting that the first step is to define the reference points for the species for which it may be possible.	Not scoped/not costed	Suggestion to remove this research activity and replace with species specific needs to define HS reference points and linked to the MSE of the BDM HS research activity.	
2	White teatfish modelling	Additional analysis on white teatfish to develop a rationale on the status of the stock in relation to harvest strategy reference points and modelling analysis on a sustainable TAC increase.	Funded and underway in 2022-23 FY	**High priority**	
3	Black teatfish sampling 2022	Representative sampling to collect size and weight frequencies during the black teatfish openings.	Funded and underway in 2022-23 FY	**High priority.** Develop a scope to undertake size frequency sampling during the 2023 opening.	Noted HCRAG02 draft advice and that the draft scope will be provided to the HCWG.
4	Development of curryfish conversion ratios	Project to develop conversion ratios for curryfish with industry undertaking the sampling process.	Funded and underway in 2022-23 FY	**High priority.**	
5	Sandfish stock survey	Outstanding stock survey of Sandfish at Warrior Reef to better understand its status	Not scoped Est. cost 150k – 300k	**High priority** subject to confirmation of support from Iama and Tudu Island PBC, GBK, Traditional Owners and fishers. Initial engagement to be led by the TSRA regarding support for the project to be	Noted HCRAG02 draft advice and that the draft scope will be provided to the HCWG.

	Research activity	Detail	Status	Draft HCRAG02 advice	Draft HCWG19 advice
		(**Note** - Identified as a research need for the fishery by HCWG17 at its meeting 12 October 2020. Was part of the 2019-20 stock survey but did not proceed.)		followed by subsequent consultation by AFMA on the draft project scope and potentially proposal following HCRAG review.	
7	Socio-economic metrics	Collecting data on socioeconomic indicators for the fishery through recall surveys.	Not scoped/not costed	**High priority.** Subject to: • further HCRAG advice on the scope and additional work to be done to support it. • more clarity on questions being asked, data required and indicative cost. Project may fall within the remit of ACR. Update scope to address any supply chain issues that could be addressed.	Action item for Scientific Member Steven Purcell and Mr Nicholas Richards (TSRA) to prepare a short discussion paper on the potential for socioeconomic data collection and market development in the fishery.
8	Management Strategy Evaluation (MSE) of the Beche-de-mer Harvest Strategy	1. Collate all data and biological information; 2. Update and extend the spatial multispecies TS BDM operating model developed earlier (or construct a new model); 3. Use MSE to evaluate how well the HS achieves the pre-specified objectives; 4. In consultation with stakeholders, use the MSE framework to investigate ways to improve the current HS. (**Note** - Requires 3-5 years of BDM HS implementation.)	Not scoped Est cost – $130k	**Medium priority** and to be held off until the harvest strategy has been in place for a few years. Interacts with no.1	
9	Supply chain	Better understanding of the supply chains as per other fisheries to better understand vulnerabilities and help develop an industry	Not scoped/not costed	Not prioritised – could benefit from better articulation to differentiate from a value chain issue and informed by any	

	Research activity	Detail	Status	Draft HCRAG02 advice	Draft HCWG19 advice
		that is resilient to fluctuating export market conditions.		socioeconomic surveys that may be undertaken in the future.	
10	Ecological Risk Assessment (ERA) – Torres Strait Pearl Shell Fishery	Conduct an ERA for the Torres Strait Pearl Shell (TSPF) Fishery (**Note** - Identified as an essential research priority by HCWG in the rolling five-year research plan for Hand Collectable Fisheries)	Not scoped Est cost - $20,400	**To be retained in research plan** and activated when fishing for pearl oysters commences. There is some information on Pearl shell stock estimates from Tropical Rock Lobster surveys**.**	
11	Understanding biological parameters of BDM species, including growth, mortality, size and breeding seasonality	Identifying gaps in knowledge of biological parameters of BDM species and investigating options for collaborative research	Not scoped/not costed	**Medium priority** and proposed that it be addressed as the need arises. There are conservative proxies that are best addressed through other avenues such as PhD projects and through QLDRAC given similar projects were recently funded by FRDC for finfish species in Qld.	Noted and supported draft HCRAG02 advice. Sci Member Steven Purcell advised that some of this work is already underway in other areas.
12	Stock Status Survey	To undertake a stock survey of all Torres Strait beche-de-mer species with a focus on deeper water species	Completed in 2019 - 2020	Noted	Noted
13	Ecological Risk Assessment (ERA)	Conduct an ERA for the TSBDM Fishery	Final report completed on 21 Dec 2021	Noted	Noted
14	Climate Change impacts and vulnerability	Scoping study across all Torres Strait	Completed	Noted	Noted
15	Data analysis	Further analysis of catch data collected during the 2021 trial reopening of black teatfish to inform future openings and follow up work from the stock survey.	Completed	Noted	Noted

Summary of actions arising from HCWG19

Action item	Actioning member
Scientific Member Assoc. Prof. Steven Purcell to present at future meetings of the WG and HCRAG on his work on New Caledonian fisheries and how they have informed fisheries development and management.	Assoc. Prof. Purcell
Clarify that catch reported in summaries is clearly labelled as wet gutted weight (landed weight that has been converted using the processed conversion ratios stipulated in the HS and TIB licence conditions).	Executive Officer
Assoc. Prof. Purcell and Mr Richards to prepare a short introductory discussion paper (~5 pages) on the potential for socioeconomic data collection and market development in the fishery, with input from the WG Chair Nicholas McClean as required.	Assoc. Prof. Purcell and Mr Richards

Summary of HCWG19 recommendations

Agenda item #	Recommendation
3	The WG, **accepted** the HCRAG's draft advice to transition fishing for black teatfish from a trial opening to an ongoing annual opening to be managed in accordance with the TS BDM HS, noting further discussions with fishers on strategies for fully utilising the black teatfish TAC at the industry workshop in early 2023. The WG, noting the draft HCRAG advice, **recommended** the continuation of the 20t TAC and sought advice from the HCRAG on: a. the anticipated duration of an annual 20t catch limit, noting a few more years of data is required to increase certainty on what future annual TACs might be possible; b. the scientific basis for the development and application of under catch carry-over provisions; and c. options for the review of the BDM HS to include provisions to carry over undercatch and set provisional TACs.
4	Having considered the draft HCRAG advice and noting that no TACs or individual basket species trigger limits were exceeded during the 2021 fishing season, the WG **recommended** the TACs in Table 2 for the 2023 fishing season commencing on 1 January 2023.

List of attachments

Attachment A – Meeting agenda

Attachment B – CSIRO summary paper on the black teatfish trial fishery openings in 2021 and 2022

Attachment C – The utility of socioeconomic research for hand collectable fisheries (Assoc. Prof Steven Purcell)

Attachment D - Balancing the Dimensions of Sustainable BDM Fisheries Management (Nicholas Richards, TSRA)

19th MEETING OF THE PZJA TORRES STRAIT HAND COLLECTABLES WORKING GROUP

10 Nov 2022 (8:30 am – 5:00pm)

TSRA Board Room, Level 1 Torres Strait Haus, 46 Victoria Parade, Thursday Island

(video conference)

DRAFT AGENDA

AGENDA ITEM 1 PRELIMINARIES

1.1 Acknowledgement of Traditional Owners, welcome and apologies

The Chair will welcome HCWG members, permanent observers, and casual observers to the 19th Torres Strait Hand Collectables Working Group.

1.2 Adoption of agenda

The working group is invited to consider and adopt the draft agenda.

1.3 Declarations of interest

Working group members are invited to declare any real or potential conflicts of interests to the group 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 working group will note the status of action items arising from previous HCWG meetings.

AGENDA ITEM 2 WORKING GROUP UPDATES

2.1 PZJA Traditional Inhabitant members

PZJA TI members are invited to introduce themselves and provide an update on matters concerning the Torres Strait Hand Collectable fisheries, in particular, providing comment on fishing patterns, behaviours, prices, and market trends.

2.2 Scientific members

Scientific members are invited to provide an update on relevant research matters relevant to Torres Strait Hand Collectable fisheries.

2.3 Government Agencies

The Working Group will note updates from each of the PZJA government agency members on the latest developments relevant to Hand Collectable fisheries.

2.4 Native Title

The Working Group will note a verbal update from the Malu Lamar representative if in attendance.

2.5 Papua New Guinea National Fisheries Authority

The Working Group will note an update from the PNG NFA officials if in attendance.

AGENDA ITEM 3 BLACK TEATFISH TRIAL OPENING 9-12 MAY 2022 AND FUTURE OPENINGS

Having regard for advice from the Hand Collectable Resource Assessment Group (HCRAG) and the application of the Harvest Strategy, the Working Group will discuss and provide advice on the potential for a future black teatfish opening and any arrangements required to support an opening.

AGENDA ITEM 4 TOTAL ALLOWABLE CATCHES FOR THE 2023 FISHING SEASON

Having regard for advice from the HCRAG and applying the Harvest Strategy to all new information, the Working Group will discuss and provide advice on TACs for the 2022 fishing season.

AGENDA ITEM 5 RESEARCH PRIORITIES

Having regard for HCRAG advice, the Working Group will discuss and provide advice to the TSSAC on research priorities for the beche-de-mer, trochus, mud crab and pearl shell fisheries under the Five-Year Rolling Research Plan. A five-year rolling research plan for Hand Collectable Fisheries is used to inform the Torres Strait Scientific Advisory Committee's (TSSAC) annual call for research funding proposals.

AGENDA ITEM 6 UPDATE ON A RECENT APPLICATION TO UNDERTAKE AQUARIUM FISHING IN THE TORRES STRAIT AND RELATED LICENCING MATTERS

The HCWG is asked to note updates on a recent application to undertake aquarium fishing in the Torres Strait and a PZJA decision on related licencing matters.

AGENDA ITEM 7 FUTURE MANAGEMENT PRIORITIES AND DATE FOR NEXT MEETING

The Working Group will discuss and provide advice on management priorities for Torres Strait Hand Collectable Fisheries. Having agreed management priorities and a work plan for Hand Collectable Fisheries aims to achieve a more efficient management process. The Working Group will consider a date and venue for HCWG20.

AGENDA ITEM 8 OTHER BUSINESS

The Working Group is invited to nominate any other business for discussion.

CLOSE OF MEETING

Black teatfish trial fishery openings – 2021 & 2022

Nicole Murphy, Éva Plagányi and Tim Skewes

The data in this summary were gathered by AFMA logbooks and observers during the Black teatfish fishery openings in 2021 (April 30 to May 3) and 2022 (May 9 to May 12).

Thank you and appreciation to TSI fishers for providing their fishery data and AFMA Thursday Island and Observers Tamre Sarhan, Ben Lidell, David Schubert, Henry Oak and Stephen Hall.

This document provides a brief summary of some of the data in order to inform ongoing management.

Length frequency

A total of 1886 Black teatfish were sampled for size frequency measurements of length and width during the 2022 fishery season, with 1701 weights also recorded. Measurements of length, width and weight were also recorded for other sea cucumber species (Table 1).

Table 1. Number of sea cucumber species measured during Black teatfish opening in 2022.

Common name	Whole Length (mm)	Number
Black teatfish	*Holothuria whitmaei*	1886
White teatfish	*Holothuria fuscogilva*	29
Curryfish common	*Stichopus herrmanni*	44
Curryfish vastus	*Stichopus vastus*	33
Prickly redfish	*Thelenota ananas*	24
Burrowing blackfish	*Actinopyga spinea*	2

Length frequency measurements (whole) from previous sea cucumber surveys (Figure 1) and observer data (Figure 2) are shown below. Unfortunately, the pre-2020 population survey data aren't sufficiently comparable to the 2022 Observer data (as the latter are based on commercial catches and a Minimum Legal Size (MLS) restriction), but data from future fishery openings will allow more detailed comparisons such as of the median size of animals caught, and trends in growth.

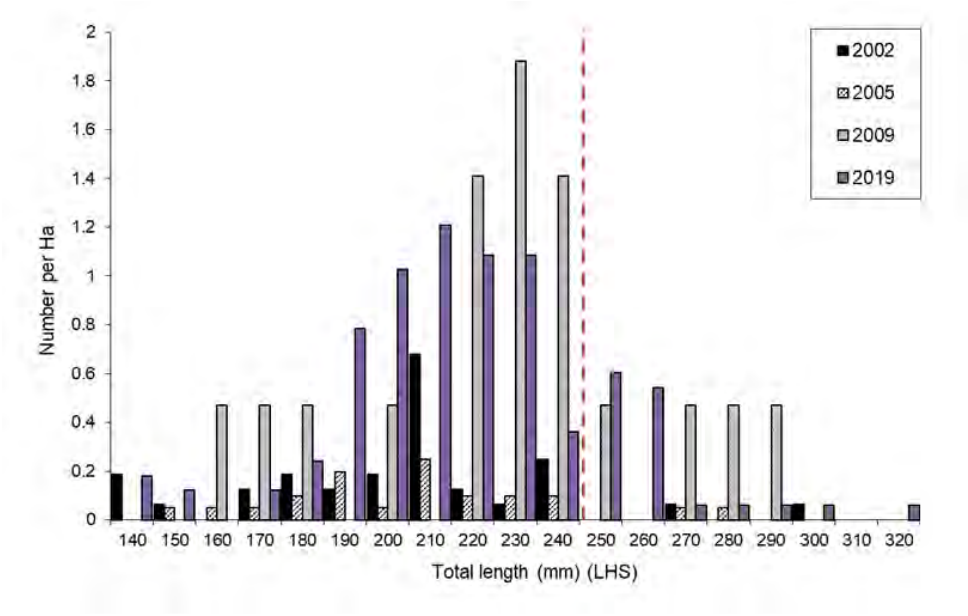


Figure 1. Length frequency for Black teatfish collected during population surveys in East Torres Strait in 2002, 2005, 2009 and 2019/2020. Minimum Legal Size (MLS) of 250 mm indicated; LHS = minimum size of bin range (Murphy et al. 2021).

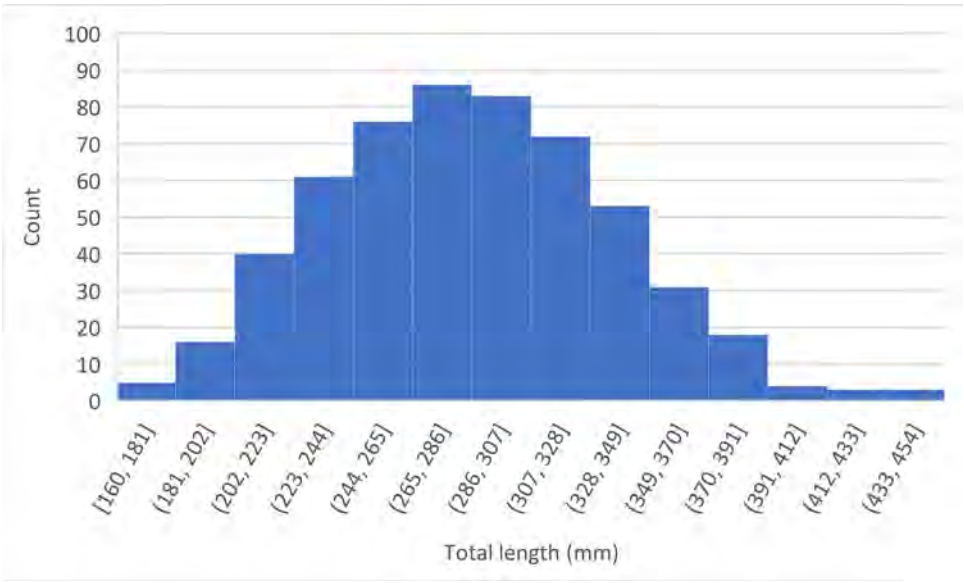


Figure 2. Length frequency measurements (whole) for Black teatfish for the 2022 fishery opening.

Black teatfish catch

Data analyses for 2021 and 2022 fishery openings

A summary of the total catch per area and per day, for 2021 and 2022 is shown in Table 2. Recorded weights have all been converted to standard units (wet-gutted weight) using the agreed conversion factors. The total Black teatfish catch for 2021 was 17.4 tonnes and for 2022 was 17.05 tonnes and hence below the TAC (Total Allowable Catch) limit of 20 tonnes, confirming that the trial openings for both years were successfully managed.

Whereas the total catch amounts were reliably reported in 2021, the majority (55%) of the catch did not include details such as the area caught. This limits the usefulness of the data to support additional analyses related to the sustainability and productivity of the stock. In 2022, catch amounts were again reliably reported and there was an improvement in reporting the area caught (logbook zone), with 68% of total records recording the corresponding area caught (Table 2).

*Catch error – 2021: A slight dating error exists that has implication for the total catch for Black teatfish to date – a catch entry was entered for the 2nd of April due to a dating error on the CDR. This resulted in the record not being captured in the data extract for the opening period (30th April – 3rd May 2021). The record amount was 181.95 kg and brings the total catch of Black teatfish to *17,615.47* kg.

Table 2. Sum of converted (gutted) weight (kg) for catch taken for logbook zones for each fishing day in years 2021 and 2022.

	Day	Warrior	GNE Channel	Darnley	Cumberland	Don Cay	Seven Reefs	Barrier	Unknown%	Grand total
2021	30-Apr	-	119.78	41.24	468.95	311.13	-	-	3075.51	**4016.62**
2021	1-May	-	141.19	551.31	1392.45	-	-	-	2820.29	**4905.24**
2021	2-May	-	67.14	276.20	1030.81	-	-	-	166.42	**1540.57**
2021	3-May	50.95	-	1010.19	2210.87	145.56	-	-	3553.51	**6971.08**
Total		**50.95**	**328.12**	**1878.94**	**5103.08**	**456.69**	-	**-**	**9797.69**	**17615.47**
	Day	**Warrior**	**GNE Channel**	**Darnley**	**Cumberland**	**Don Cay**	**Seven Reefs**	**Barrier**	**Unknown%**	**Grand total**
2022	9-May	-	-	985.82	1768.25	1229.02	-	-	210.75	**4193.85**
2022	10-May	-	331.00	1379.75	1948.39	631.25	324.11	-	873.56	**5488.07**
2022	11-May	-	-	1065.44	4024.48	641.80	270.01	185.23	-	**6186.96**
2022	12-May	-	-	335.02	397.09	371.24	--	-	83.54	**1186.90**
Total		**-**	**331.00**	**3766.03**	**8138.22**	**594.13**	**2873.30**	**185.23**	**1167.85**	**17055.76**

%Unknown: Fished area left blank in reporting.

Catch per day

In 2021, the largest catch was taken on day 4 and the least on day 3. For 2022, the largest catch was taken on day 3 and the least on day 4 (Figure 3).

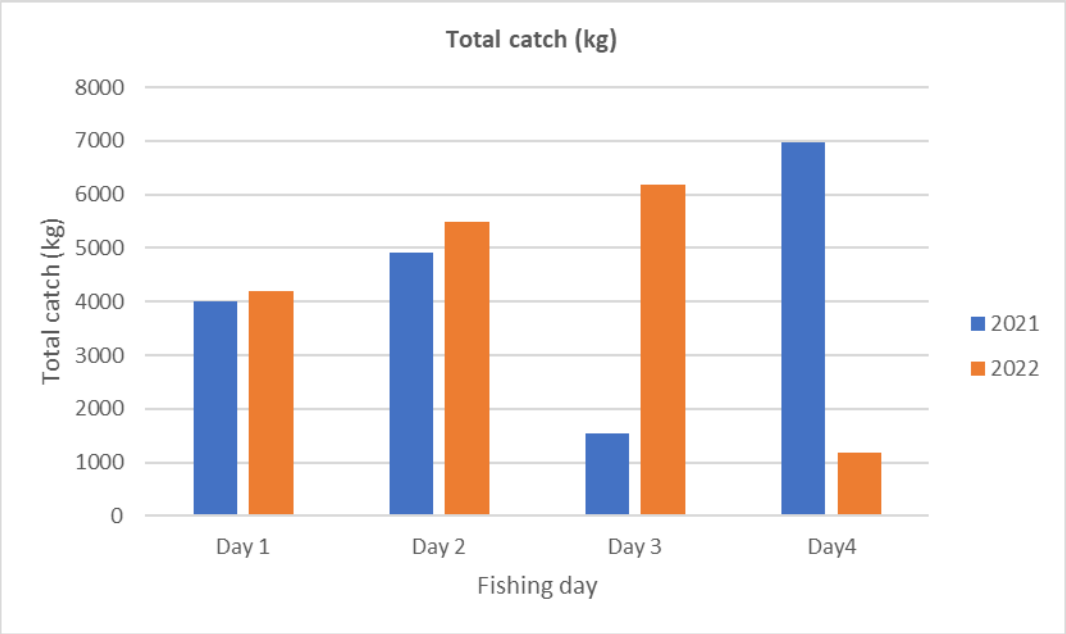


Figure 3. Total catch per day (gutted weight - kg).

The temporal pattern in catches as shown in Table 2 and Figure 3 suggest the following:

- No evidence of stockpiling as day 1 catches were not relatively large
- No evidence of declining catch after a few days, which would indicate depletion
- Low catch on day 3 - 2021 due to falling on the Sabbath
- Low catch on day 4 - 2022 due to fishery opening for a half day and some fishers choosing not to fish
- Cumulative catches were tracked and adhered to the management TAC
- The number of fishers participating in the fishery was only a fraction of the available fishing effort (i.e. potential TIB effort in Torres Strait) indicating possibly that fishing effort was controlled by local traditional “Island custom” management

Area fished

In 2021, the largest catch was taken from ‘Unknown’ area recorded in the catch data (Table 3; Figure 4). Following this opening, meetings stressed that it is important to improve communication for future fishing around the need to record location, as this limits the usefulness of the data.

In 2022, there was an improvement in recording location for catch (Table 3; Figure 4). The areas of Darnley, Cumberland and Don Cay received more effort, suggesting these areas may have contributed to the Unknown data in 2021. The areas of Seven Reefs and Barrier

were additionally fished—they were not in 2021. Further information as to why these areas were accessed would help scientific understanding of the information content of the data and inform on fisher behaviour.

Table 3. Total sum of converted weight (kg) for catch taken for logbook zones for each fishing day between years.

2021	Day	Warrior	GNE Channel	Darnley	Cumberland	Don Cay	Seven Reefs	Barrier	Unknown
	1	-	119.78	41.24	468.95	311.13	-	-	3075.51
	2	-	141.19	551.31	1392.45	-	-	-	2820.29
	3	-	67.14	276.20	1030.81	-	-	-	166.42
	4	50.95	-	1010.19	2210.87	145.56	-	-	3553.51
2022	**Day**	**Warrior**	**GNE Channel**	**Darnley**	**Cumberland**	**Don Cay**	**Seven Reefs**	**Barrier**	**Unknown**
	1	-	-	985.82	1768.25	1229.02	-	-	210.75
	2	-	331.000	1379.75	1948.39	631.25	324.11	-	873.56
	3	-	-	1065.44	4024.48	641.80	270.01	185.23	-
	4	-	-	335.02	397.09	371.24	-	-	83.54

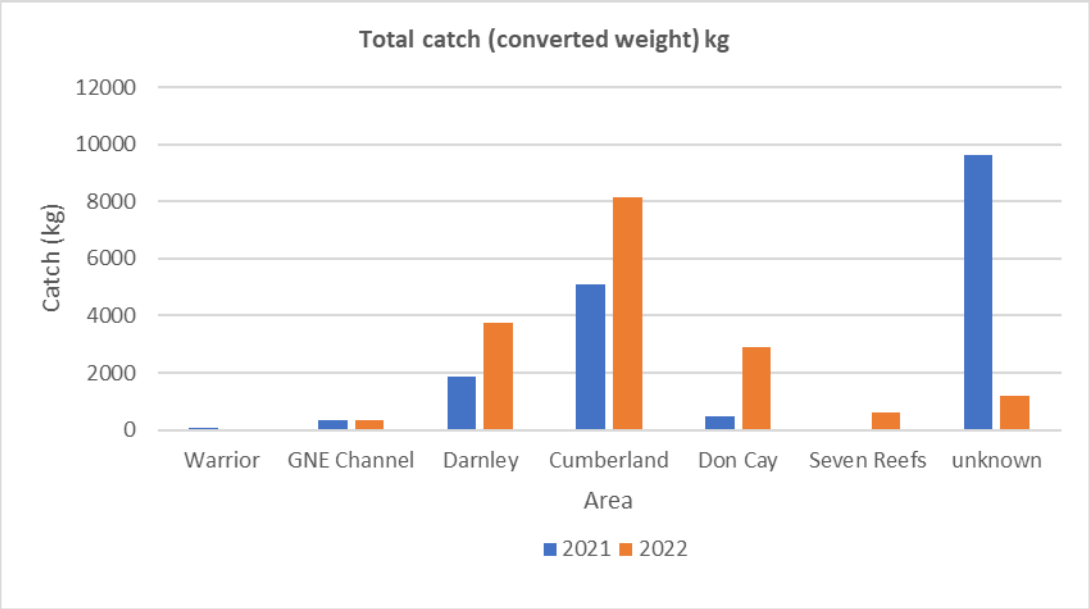


Figure 4. Total catch (converted weight - kg) for logbook zones between years.

Area fished across days

In 2021, most of the fishing effort was in the areas of Darnley and Cumberland, with similar effort across days (Figure 5).

For 2022, the majority of effort occurred at Cumberland, increasing across days. Effort was also seen at Darnley and Don Cay (Figure 5).

Travelling and processor location likely played a role in areas fished.

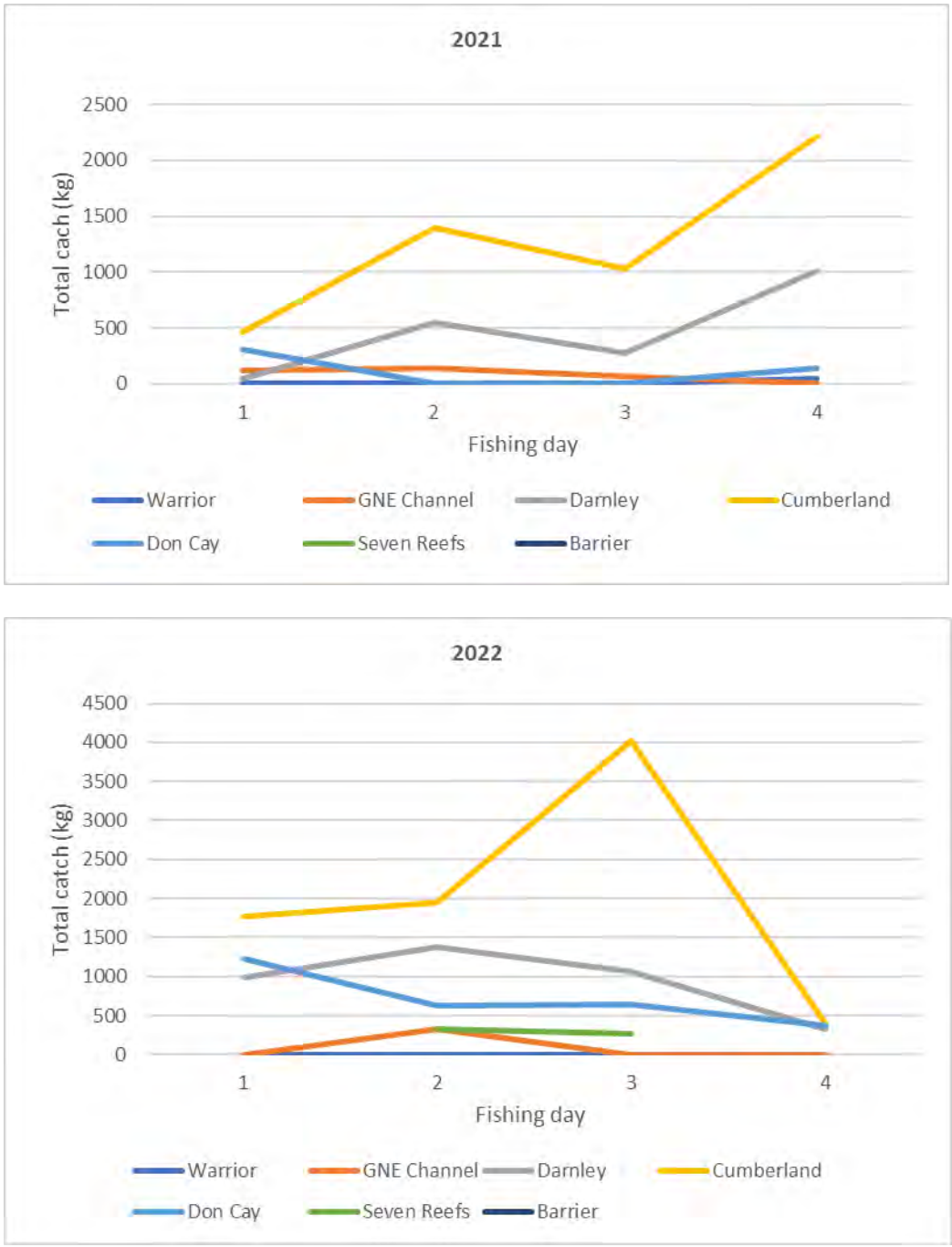


Figure 5. Total catch (converted weight - kg) for logbook zones for each fishing day for 2021 (top) and 2022 (bottom).

Sea cucumber stock survey 2019/2020

The 2019/2020 sea cucumber survey found that areas with highest average densities were in Barrier and Don Cay, which is consistent with earlier surveys, and is consistent with surveys in other regions (e.g. Great Barrier Reef has highest population density in outer shelf and barrier reef (Benzie and Uthicke, 2003; Knuckey and Koopman, 2016).

The density in Cumberland in 2019/2020 was lower than in 2009 but still higher than historical surveys, and Seven Reefs had the highest density since surveys have been undertaken.

Darnley had the lowest density ever observed (though never a high-density zone in any year) and no Black teatfish were observed at the Great North East Channel zone (Figure 6; Murphy et al., 2021).

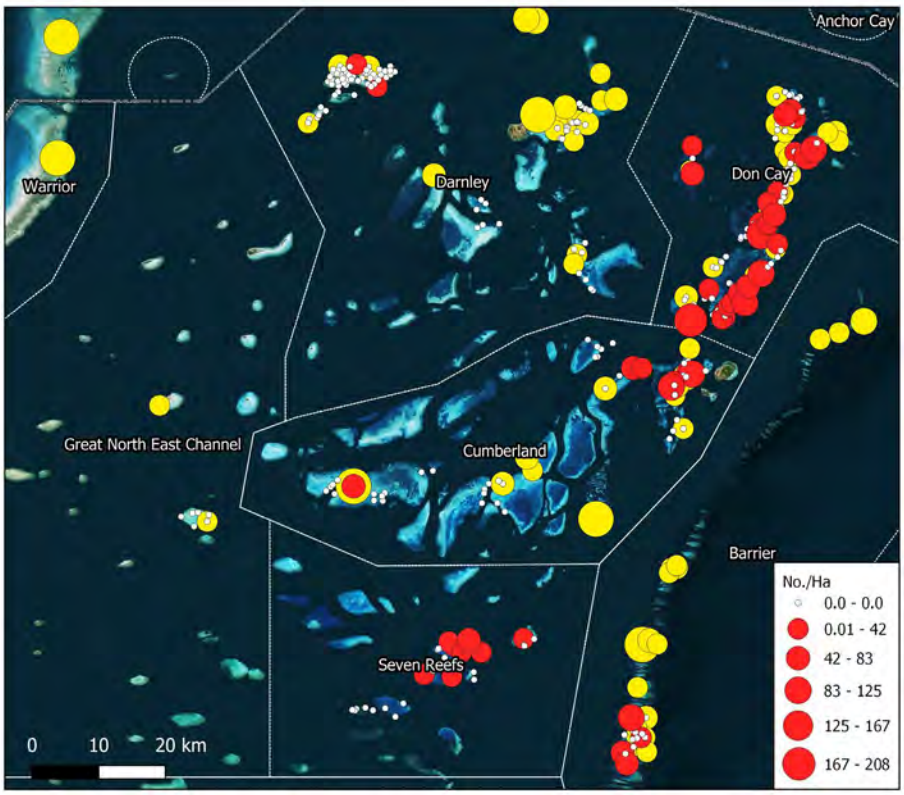


Figure 6. Density of Black teatfish (*H. whitmaei*) at individual survey sites during surveys in East Torres Strait from 1995 to 2009 (yellow) and 2019 (red).

Survey versus catch data

The 2022 catch is modest in comparison to the 2019/2020 survey biomass estimate, even if all the Unknown catch was taken from any of the fished zones (Figure 7).

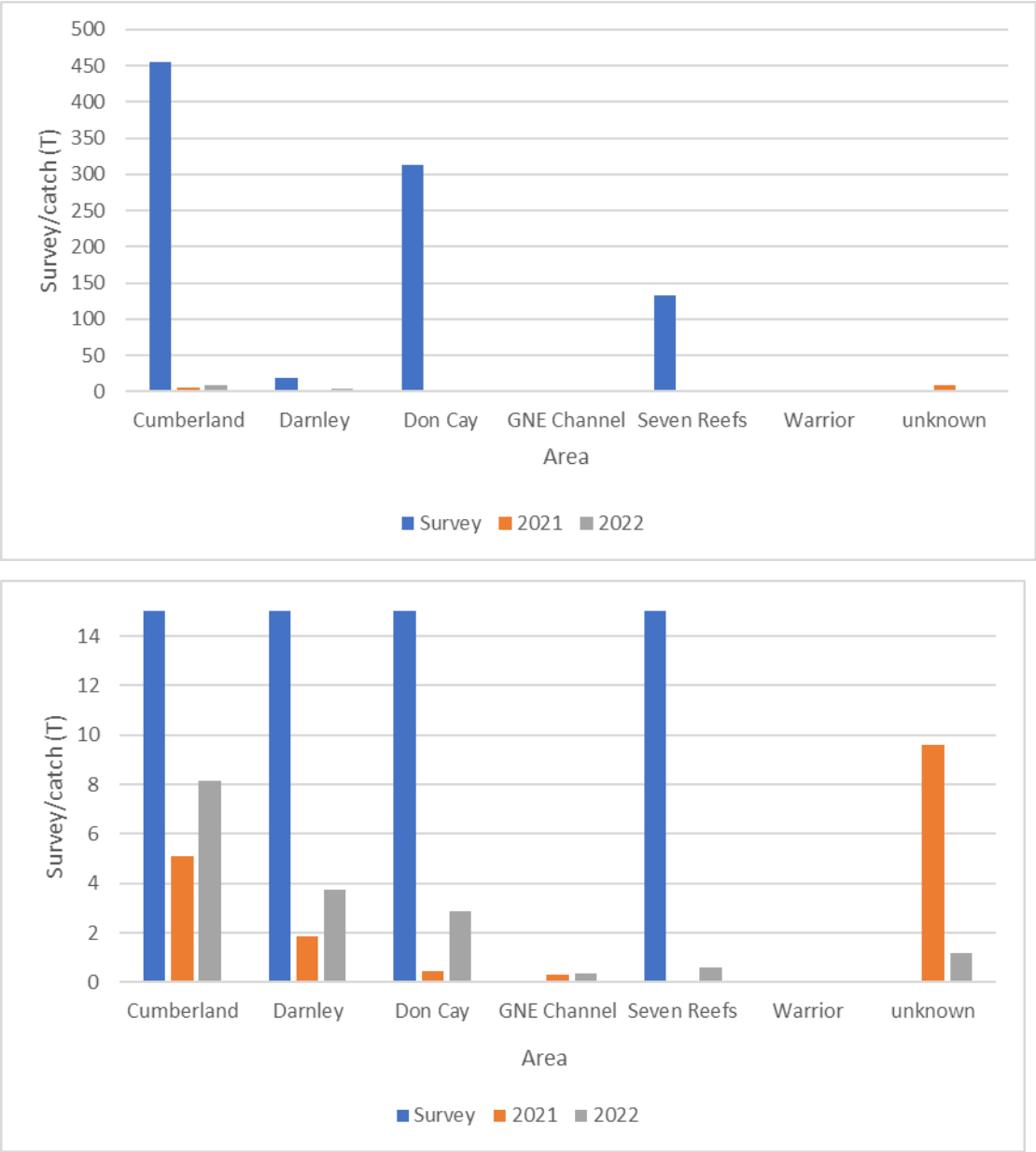


Figure 7. Survey estimates (gutted weight - t) and catch (gutted weight - t) for logbook zones (bottom graph is the same at the top with a reduced (Y) scale).

Total daily catch

In 2021, the area noted 'Unknown' in catch records showed consistent catch effort over days fished. Cumberland was also fished consistently and it is likely that Unknown was taken from this logbook zone (Figure 8).

For 2022, consistent catch effort was seen for Cumberland and Darnley, with Don Cay fished more intensely on the first day, with less (but similar) effort for the remaining days (Figure 8).

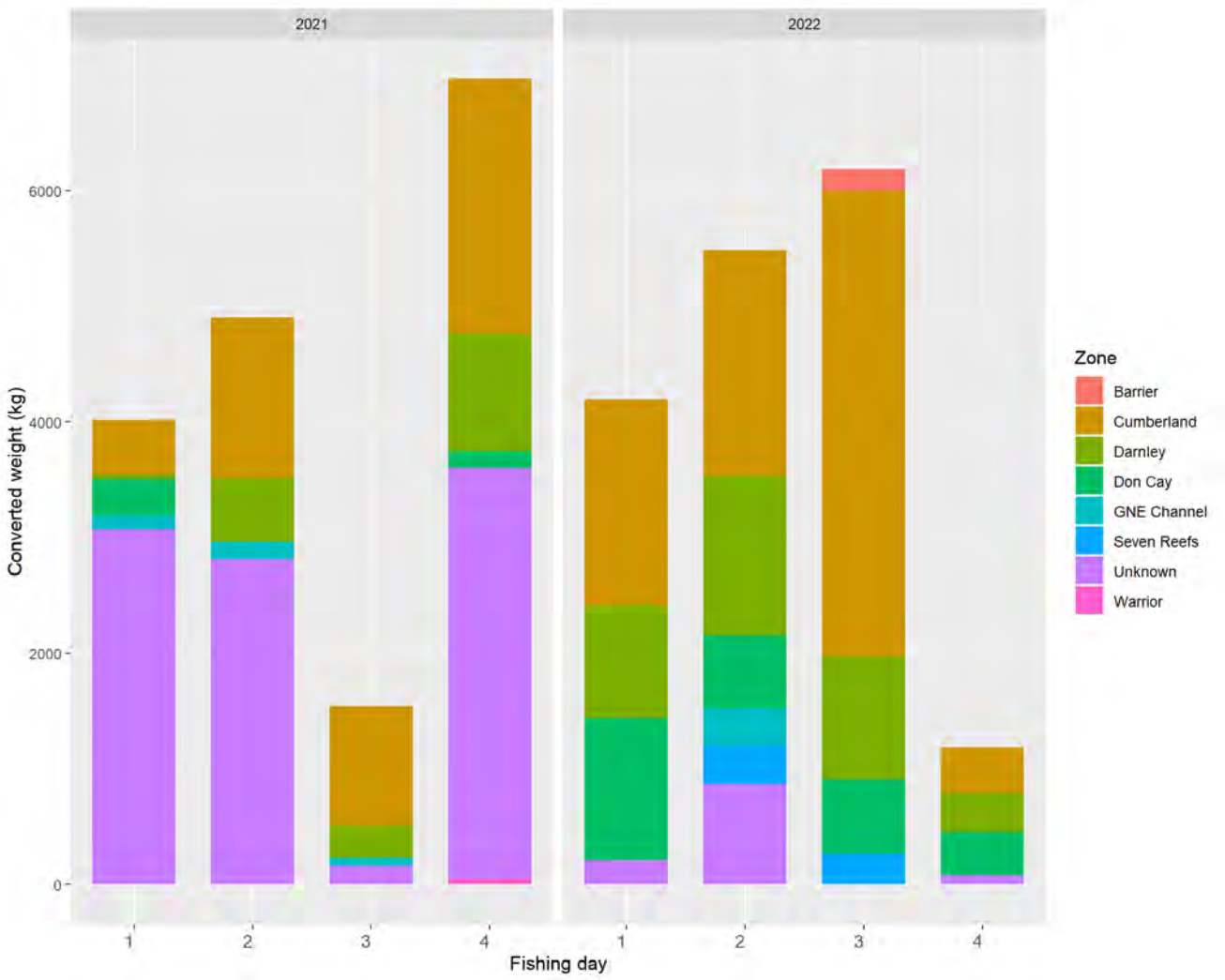
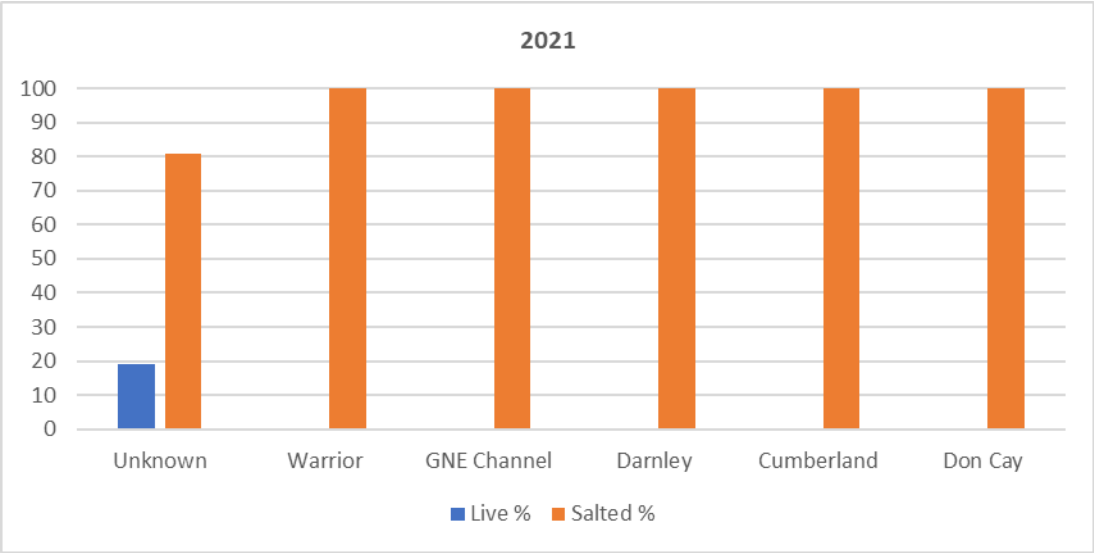


Figure 8. Total daily catch (converted weight – kg) across logbook zones for days fished, between years.

Processing state

In 2021, the majority of product landed at fish receivers was salted, with ~20% live landed for one zone (Unknown) only (Figure 9).

For 2022, a greater variety of product types were landed. Gutted catch was recorded solely for the area of the Great North East Channel, as well as Unknown, Darnley and Cumberland. There was also live product landed for Unknown, Cumberland and Don Cay, which wasn't the case in 2021 (Figure 9).



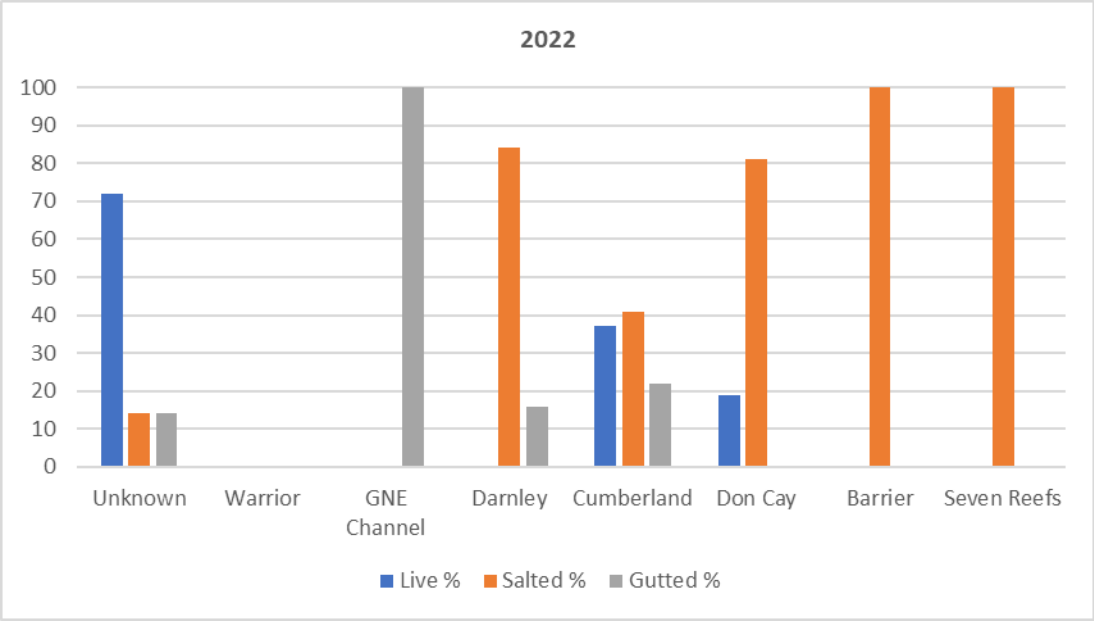


Figure 9. Percent product form of catch landed at fish receivers, also showing logbook zones for 2021 (top) and 2022 (bottom).

References

Benzie JAH and Uthicke S. 2003. Stock size of bêche-de-mer, recruitment patterns and gene flow in black teatfish, and recovery of overfished black teatfish stocks in the Great Barrier Reef. Australian Institute of Marine Sciences, Townsville, Qld. 93 pp.

Knuckey IA. and Koopman M. 2016. Survey to estimate the biomass and recovery of Black teatfish (Holothuria whitmaei) in Zone 1 of the Queensland Sea Cucumber Fishery (East Coast). Fishwell Consulting. 41 pp.

Murphy NE, Plaganyi E, Edgar S, Salee K, Skewes T. 2021. Stock survey of sea cucumbers in East Torres Strait. Final report. May 2021. CSIRO, Australia. 138 pp.

The utility of socioeconomic research for managing hand-collectible fisheries

Assoc.-Prof. Steve Purcell
National Marine Science Centre
Southern Cross University, Australia

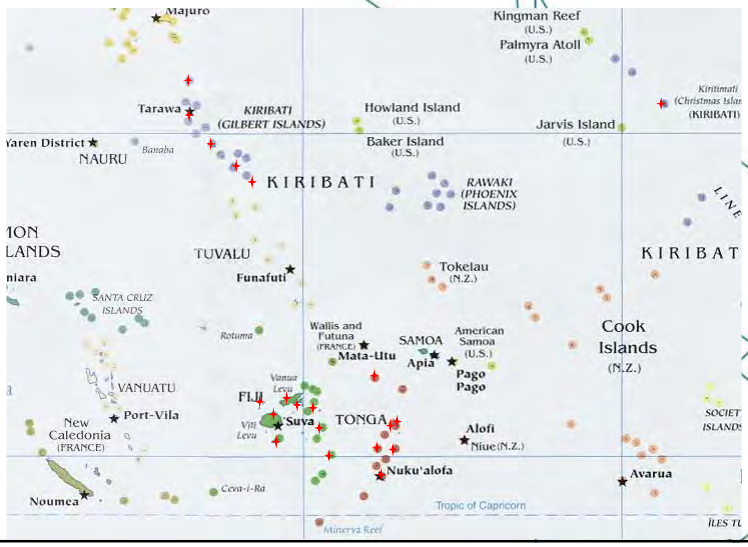
Content

- Data for fisheries management
- Why use socioeconomic surveys to understand the fishery?
- Questionnaire-based interviews and data
- Management questions that can be answered for fishery management
  - Fishing practices
  - Catches
  - Income and livelihoods
  - Value-chain analysis
  - Preferences for regulations

Questionnaire-based surveys

Fiji, Tonga, Kiribati – for sea cucumbers

- Baseline questionnaire-based interviews of 453 fishers among 20 island regions across the three countries
- 278 fishers interviewed in follow-up surveys in Fiji



Questionnaire-based surveys

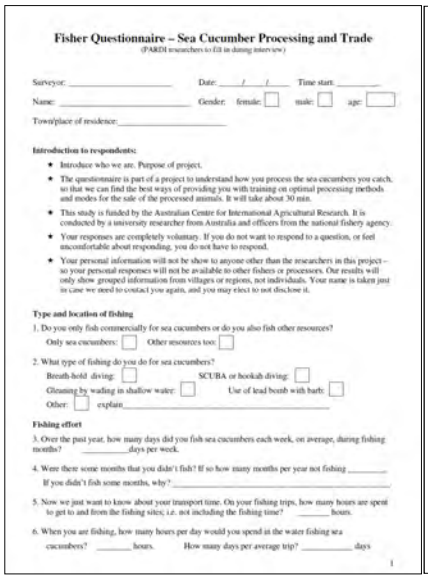
Fiji, Tonga, Kiribati – for sea cucumbers

Questionnaire-based surveys

Samoa – for new trochus fishery

- Questionnaire-based interviews of 303 fishers among 34 villages

Questionnaire-based surveys



Fisher Questionnaire – Sea Cucumber Processing and Trade

(PARDI researchers to fill in during interview)

Survey#: _____ Date: ____/____/____ Time start: _____

Name: _____ Gender: female: ☐ male: ☐ age: ☐☐

Town/place of residence: _____

Introduction to respondents:

- Introduce who we are. Purpose of project.
- The questionnaire is part of a project to understand how you process the sea cucumbers you catch, so that we can find the best ways of providing you with training on optimal processing methods and modes for the sale of the processed animals. It will take about 30 min.
- This study is funded by the Australian Centre for International Agricultural Research. It is conducted by a university researcher from Australia and officers from the national fishery agency.
- Your responses are completely voluntary. If you do not want to respond to a question, or feel uncomfortable about responding, you do not have to respond.
- Your personal information will not be show to anyone other than the researchers in this project – so your personal responses will not be available to other fishers or processors. Our results will only show grouped information from villages or regions, not individuals. Your name is taken just in case we need to contact you again, and you may elect to not disclose it.

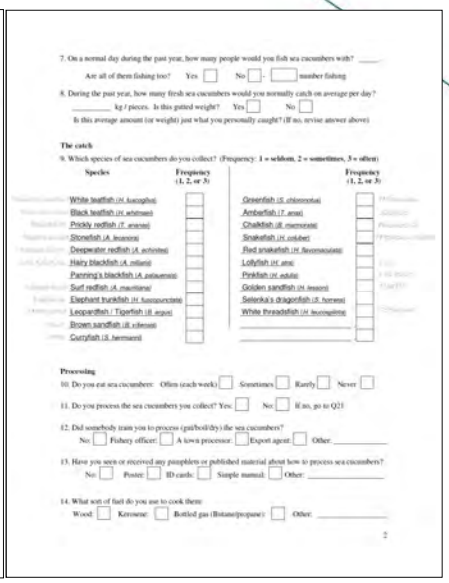
Type and location of fishing

1. Do you only fish commercially for sea cucumbers or do you also fish other resources?
   Only sea cucumbers: ☐ Other resources too: ☐
2. What type of fishing do you do for sea cucumbers?
   Breath-hold diving: ☐ SCUBA or hookah diving: ☐
   Gleaning by wading in shallow water: ☐ Use of lead bomb with barb: ☐
   Other: ☐ explain _____

Fishing effort

3. Over the past year, how many days did you fish sea cucumbers each week, on average, during fishing months? _____days per week.
4. Were there some months that you didn't fish? If so how many months per year not fishing _____
   If you didn't fish some months, why? _____
5. Now we just want to know about your transport time. On your fishing trips, how many hours are spent to get to and from the fishing sites; i.e. not including the fishing time? _____ hours.
6. When you are fishing, how many hours per day would you spend in the water fishing sea cucumbers? _____ hours. How many days per average trip? _____ days

1



7. On a normal day during the past year, how many people would you fish sea cucumbers with? ____
   Are all of them fishing too? Yes ☐ No ☐ - ☐☐ number fishing
8. During the past year, how many fresh sea cucumbers would you normally catch on average per day?
   _____ kg / pieces. Is this gutted weight? Yes ☐ No ☐
   Is this average amount (or weight) just what you personally caught? (If no, revise answer above)

The catch

9. Which species of sea cucumbers do you collect? (Frequency: **1 = seldom, 2 = sometimes, 3 = often**)

Species	Frequency (1, 2, or 3)	Species	Frequency (1, 2, or 3)
White teatfish (*H. fuscogilva*)		Greenfish (*S. chloronotus*)	
Black teatfish (*H. whitmaei*)		Amberfish (*T. anax*)	
Prickly redfish (*T. ananas*)		Chalkfish (*B. marmorata*)	
Stonefish (*A. lecanora*)		Snakefish (*H. colubar*)	
Deepwater redfish (*A. echinites*)		Red snakefish (*H. flavomaculata*)	
Hairy blackfish (*A. miliaris*)		Lollyfish (*H. ana*)	
Panning's blackfish (*A. palauensis*)		Pinkfish (*H. edulis*)	
Surf redfish (*A. mauritiana*)		Golden sandfish (*H. lessoni*)	
Elephant trunkfish (*H. fuscopunctata*)		Seloroka's dragonfish (*S. horrens*)	
Leopardfish / Tigerfish (*B. argus*)		White threadfish (*H. leucospilota*)	
Brown sandfish (*B. vitiensis*)			
Curryfish (*S. hermanni*)			

Processing

10. Do you eat sea cucumbers: Often (each week) ☐ Sometimes ☐ Rarely ☐ Never ☐
11. Do you process the sea cucumbers you collect? Yes ☐ No ☐ If no, go to Q13
12. Did somebody train you to process (gut/boil/dry) the sea cucumbers?
    No ☐ Fishery officer: ☐ A town processor: ☐ Export agent: ☐ Other: _____
13. Have you seen or received any pamphlets or published material about how to process sea cucumbers?
    No ☐ Poster: ☐ ID cards: ☐ Simple manual: ☐ Other: _____
14. What sort of fuel do you use to cook them:
    Wood: ☐ Kerosene: ☐ Bottled gas (Butane/propane): ☐ Other: _____

2

Around 30–45 min

Mostly 'fully structured', although some qualitative notes also taken

Questionnaire-based surveys

Southern Cross University

Fisher number (replicate)	1	2	3	4	5	6
ID Region	3					
Region name	Vava'u					
Waypoint number or coordinates	64					
Date of interview	19/04/2011					
Surveyor	Steve					
Fisher name	Sione Pahulu					
Gender	M					
Age	44					
Town of residence	Mata Maka					
Fishes only sea cucs?	0					
Breath-hold diving	1					
Gleaning by wading	0					
SCUBA or hookah	0					
Use of lead bomb	0					
Other type of fishing	0					
Av days per week fishing	5					
Number of months not fishing	7					
Reason for not fishing	F					
Hours round-trip travel to fishing site	8					
Hours per day in water fishing	6					
number of days per trip	3					
How many people fishing with?	4.5					
Av. № sea cucs he/she collected per day	60					
Frequency white teatfish	2					
Frequency black teatfish	3					
Frequency Prickly redfish	2					
Frequency stonefish	2					
Frequency Deepwater redfish	0					
Frequency Hairy blackfish	3					
Frequency *A. palauensis*	0					

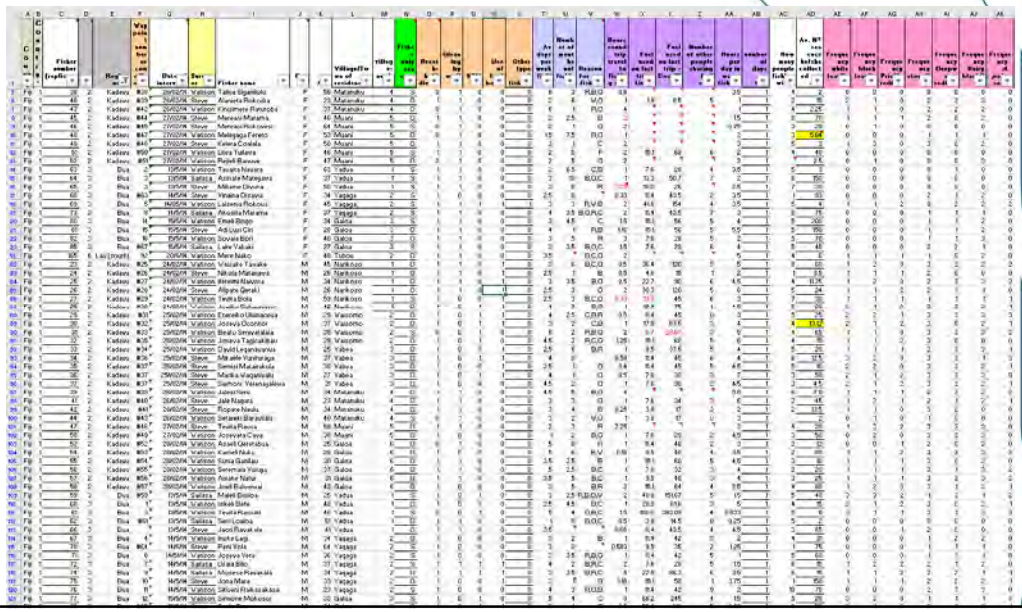
0 =not used
1 = used

F = fishery was closed season
R = had rest or vacation or sick
C = ceremonies or cultural reason
W = had other work
B = bad weather
O = other

1 = seldom/rarely
2 = sometimes
3 = often

Questionnaire-based surveys

Southern Cross University



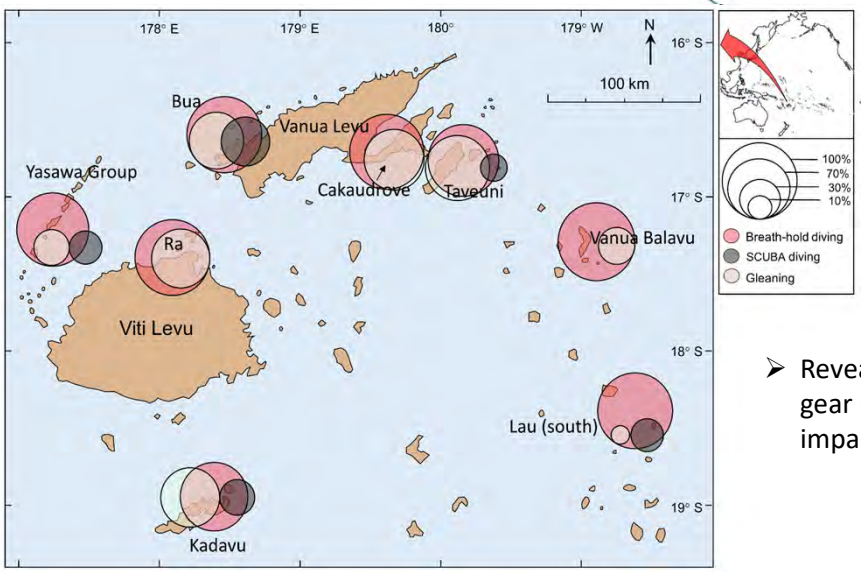
General characteristics of fishers in the fishery?

- Understand *who* is fishing

Characteristics of respondents

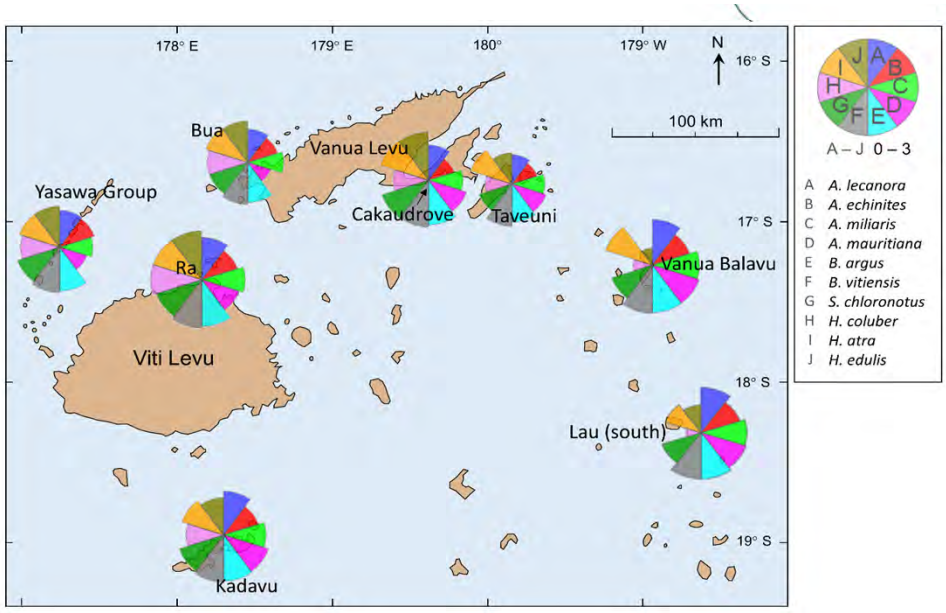
Location	Respondents (*n*)	Average age	Age range	% Males	Av. Experience (years fishing)
Kiribati	84	36	17–68	99	5
Tonga	134	40	15–67	81	7
Fiji	235	38	18–73	74	11
New Caledonia	26	42	19–67	85	8

What fishing methods are being used?

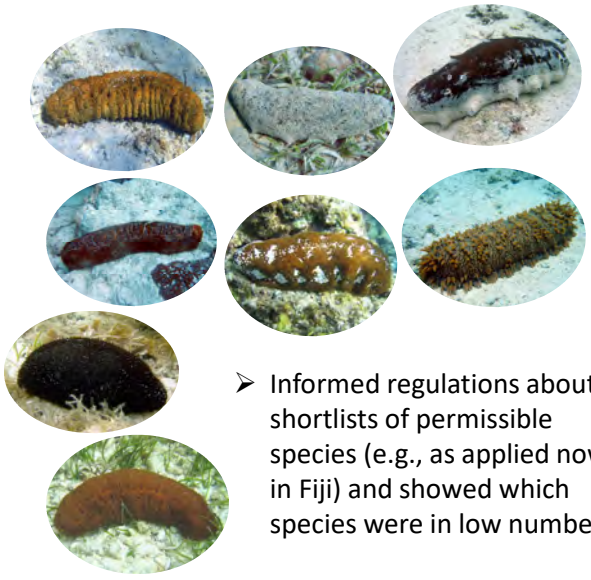


- Reveals the locations where gear restrictions would impact fishers the most.

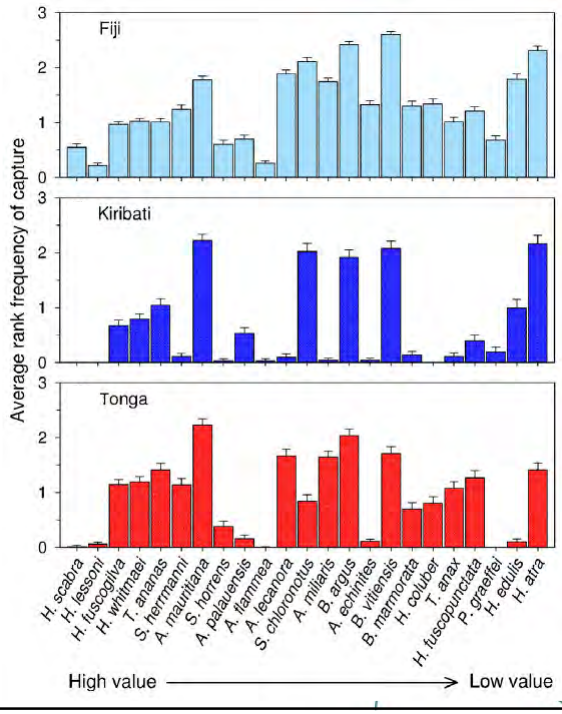
What species are being caught where?



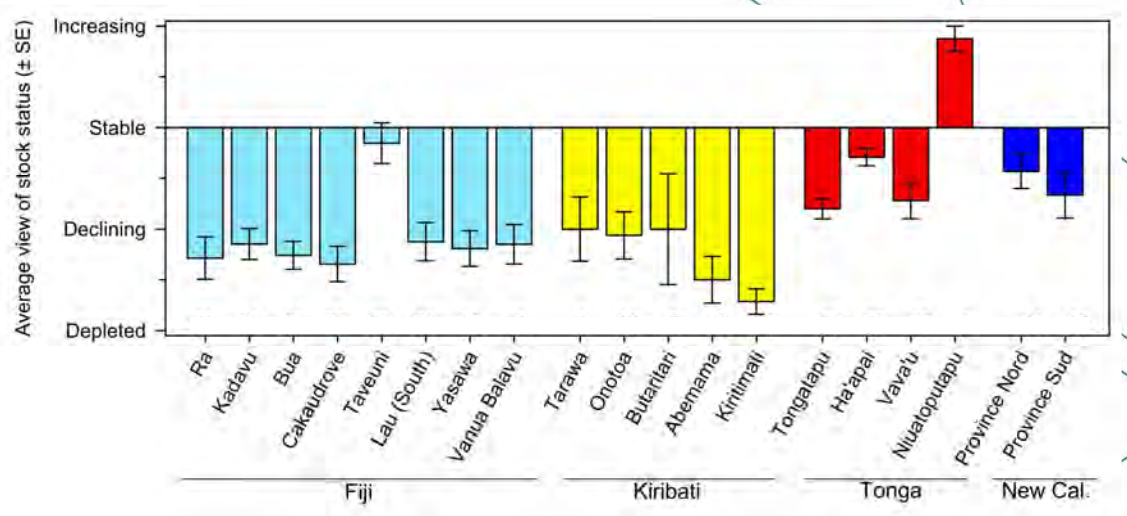
What species are caught most frequently?



- Informed regulations about shortlists of permissible species (e.g., as applied now in Fiji) and showed which species were in low numbers.



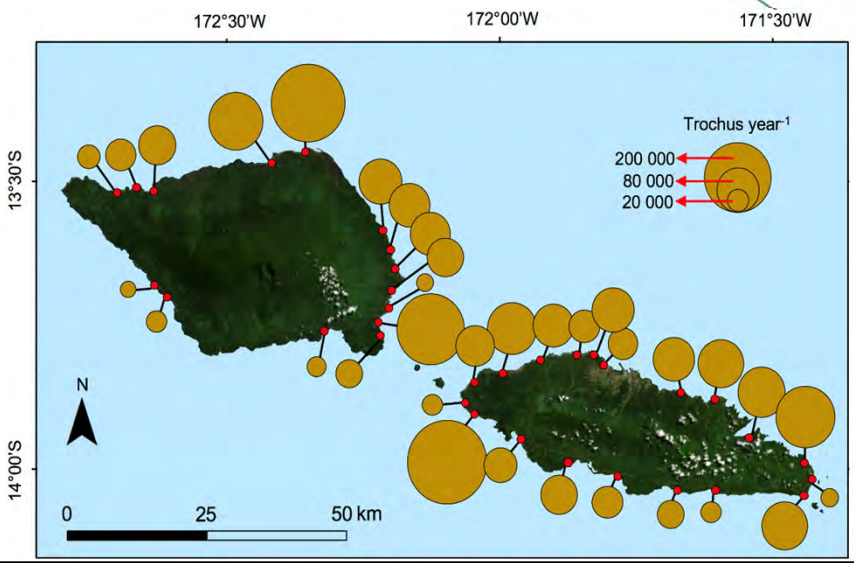
What do fishers think about stocks?



- Used as a gauge of stock status in different locations.

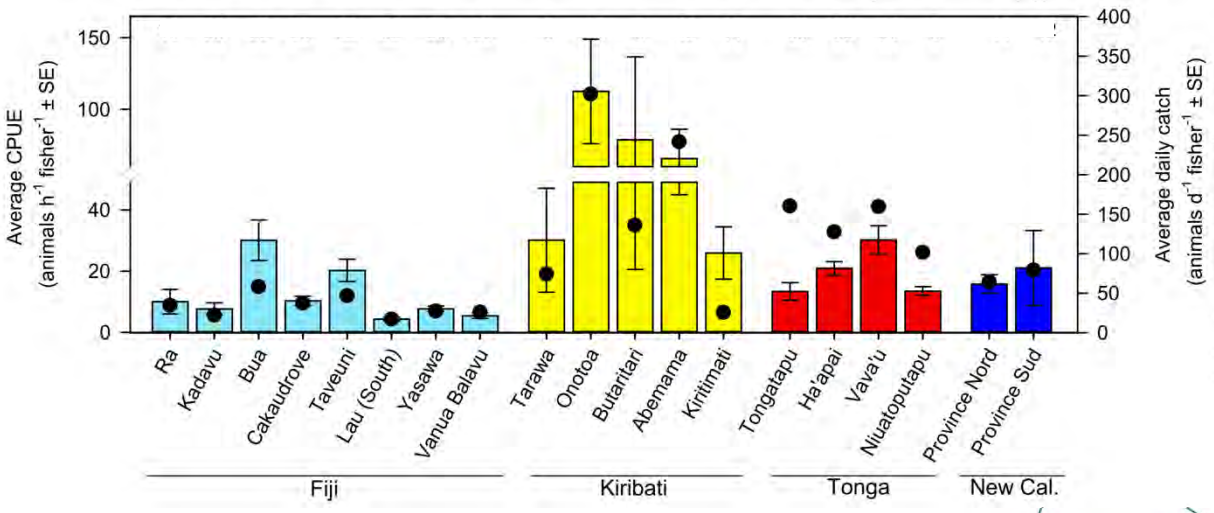
Where are catches greatest?

Annual catch (number of trochus) per village surveyed



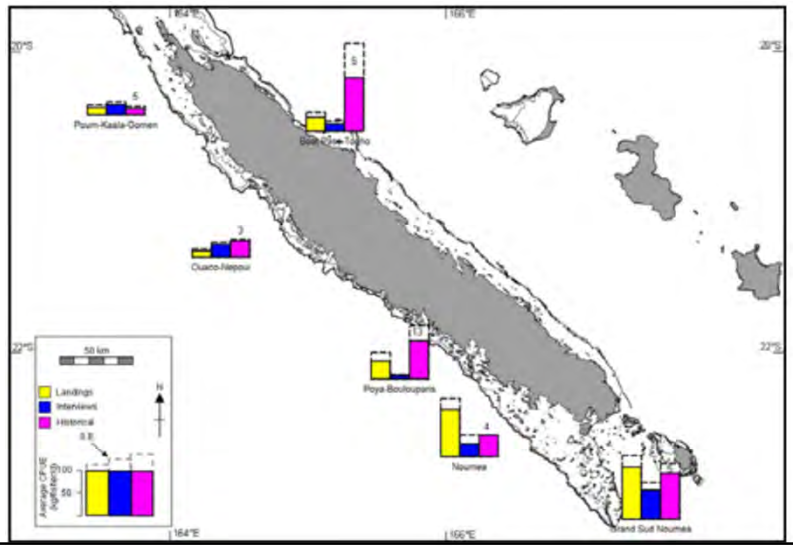
What about catch rates?

Catch-per-unit-effort (CPUE)



What about catch rates?

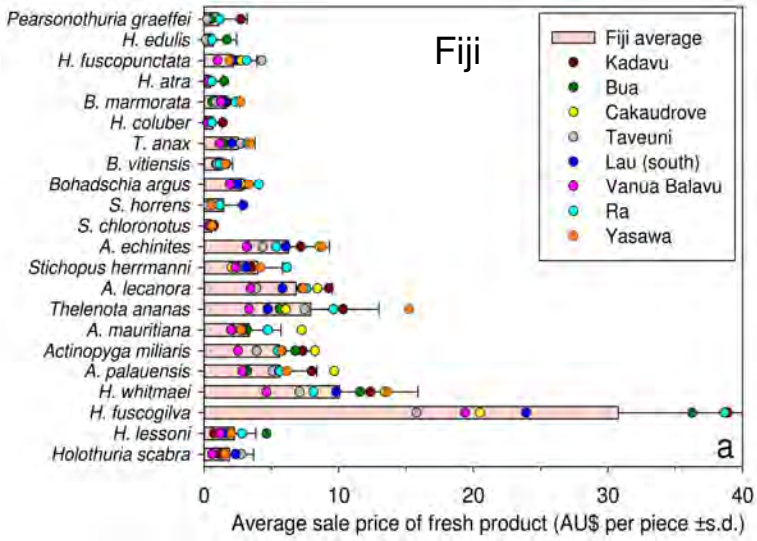
Catch-per-unit-effort (CPUE)



- CPUE data and fisher knowledge give an insight into abundance trends over time.
- Collected cheaply!

How variable are sale prices among locations?

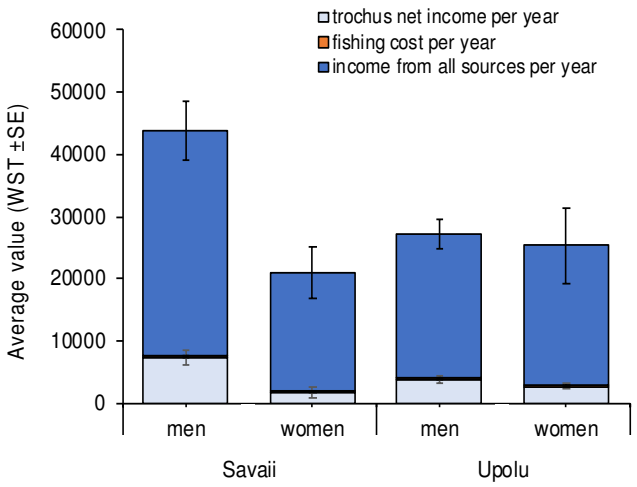
Variation in sale prices for fresh sea cucumbers



- Inconsistency in prices among locations.
- Outliers

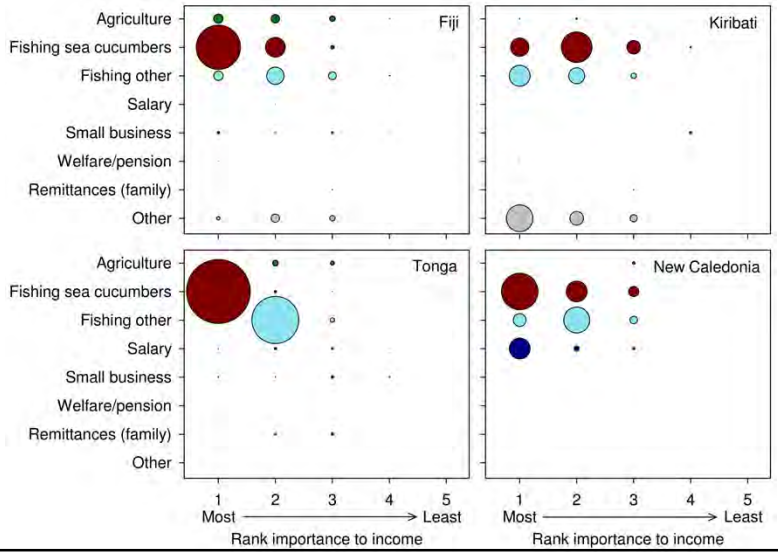
What is the economic importance to overall annual income of the fishers?

Trochus fishery in Samoa



- How dependent fishers are on a fishery.
- How bans or other fishery restrictions would impact their livelihoods.

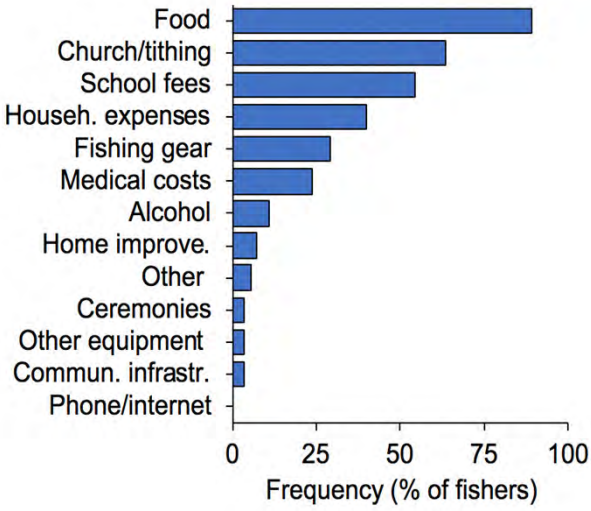
How dependent are fishers on income from fishing sea cucumber?



- Locations where fishers most dependent on the fishery.
- What other livelihoods they have to rely upon.

What is the fishery income spent on?

The fishery fostered positive wellbeing outcomes



- How fishery income contributes to wellbeing of fishers and their communities

What is the overall value of the fishery?

Southern Cross University

Bioeconomic analysis for 2018 fishing of trochus in Samoa

- 7.0 (±2.3) million trochus were harvested across 170 villages
- Annual income from trochus flesh:
  - AUD $830,000 domestically

- What the fishery is worth

What is the estimated carbon emission from the fishery?

- 72 million finfish are caught annually by recreational fishers in Australia

Fiji's sea cucumber fishery (just boat fuel)

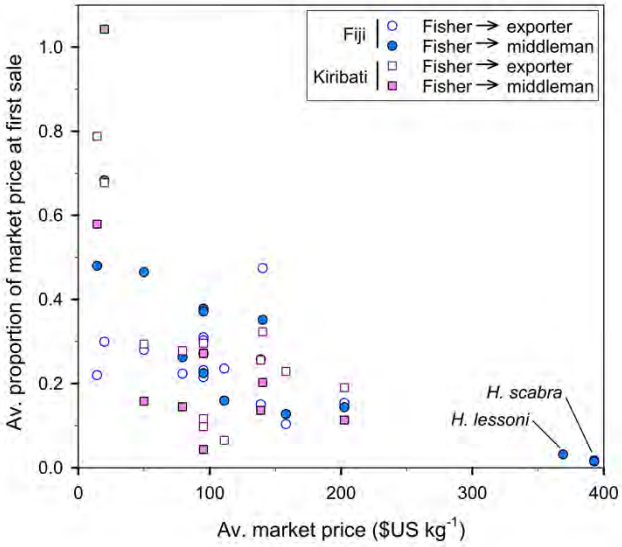
- 8050 tonnes CO_2 (± 750) per year

Samoa's trochus fishery (just boat fuel)

- 20 tonnes CO_2 (± 3) per year

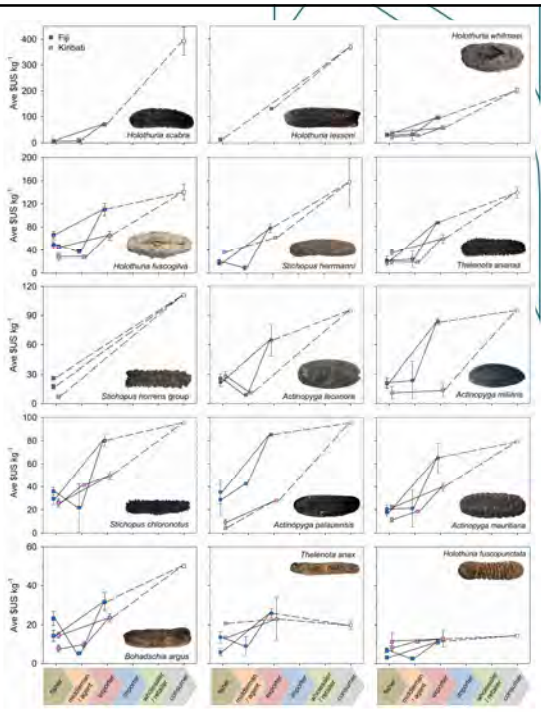
- How impactful the fishery is on national emissions
- Fishing practices emitting the most CO_2

Value chains: How much of the export value are fishers actually getting for various species?



- Greater transparency about prices was needed
- Support to help 'upgrade' the position of fishers in value chains

Value chains: How much value of the product is taken by fishers compared to middlemen, exporters and retailers?



- Informing fishers about prices can empower them for bargaining with buyers
- Can highlight opportunities for capacity-building training

Capacity building workshops

Value-adding of trochus shells

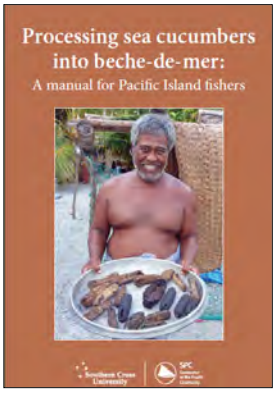
- 5-day workshops held in four locations in Samoa



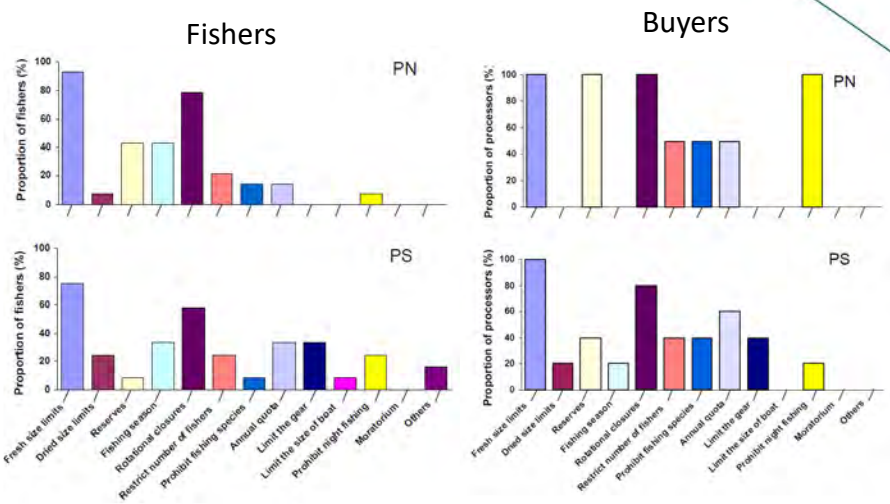

Capacity building workshops

Postharvest processing of sea cucumbers

- 1½ day workshops held in 90 villages in Fiji, Tonga and Kiribati

What regulations are most favoured by fishers and buyers?



- Shows which regulations are most compatible with fishers and buyers

Identify data needs

- Fishing practices/methods
- Fishing areas and habitats
- Experience
- Perspective on stock health/abundance
- Gender representation and roles
- Catch volume and catch composition
- Catch-per-unit-effort
- Travel and fishing costs
- Boat type and carbon emissions
- Postharvest processing
  - Methods used
  - Existing training and future needs
- Income from sea cucumbers and other fishing
- Rank dependency
- Income from non-fishing sources
- Expenditure of fishing income
- Value-chain and supply-chain analysis
  - Time spent processing
  - Who is product sold to
  - Problems with sales
  - Prices at sale
  - Satisfaction with income
  - Interviews with buyers
- Views on current management of fishery
- Preferences for regulations
- Recall of catch rates in past

Advancing this work

2022	Agree upon the key data/information needs, fishers to target
2023	Identify funding sources and secure financial support
2023/2024	Conduct socioeconomic surveys of fishers
2023/2024	Value-chain study: data on fish receivers, buyers, exporters
2024	Analyse data and identify opportunities to improve the value chain
2025	Commission an extension project to enhance value chains
2027	Collect data on socioeconomic outcomes from extension project

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Balancing the Dimensions of Sustainable Beche de Mer (BDM) Fisheries Management:

……continuing the discussions

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TSRA and Fisheries Program

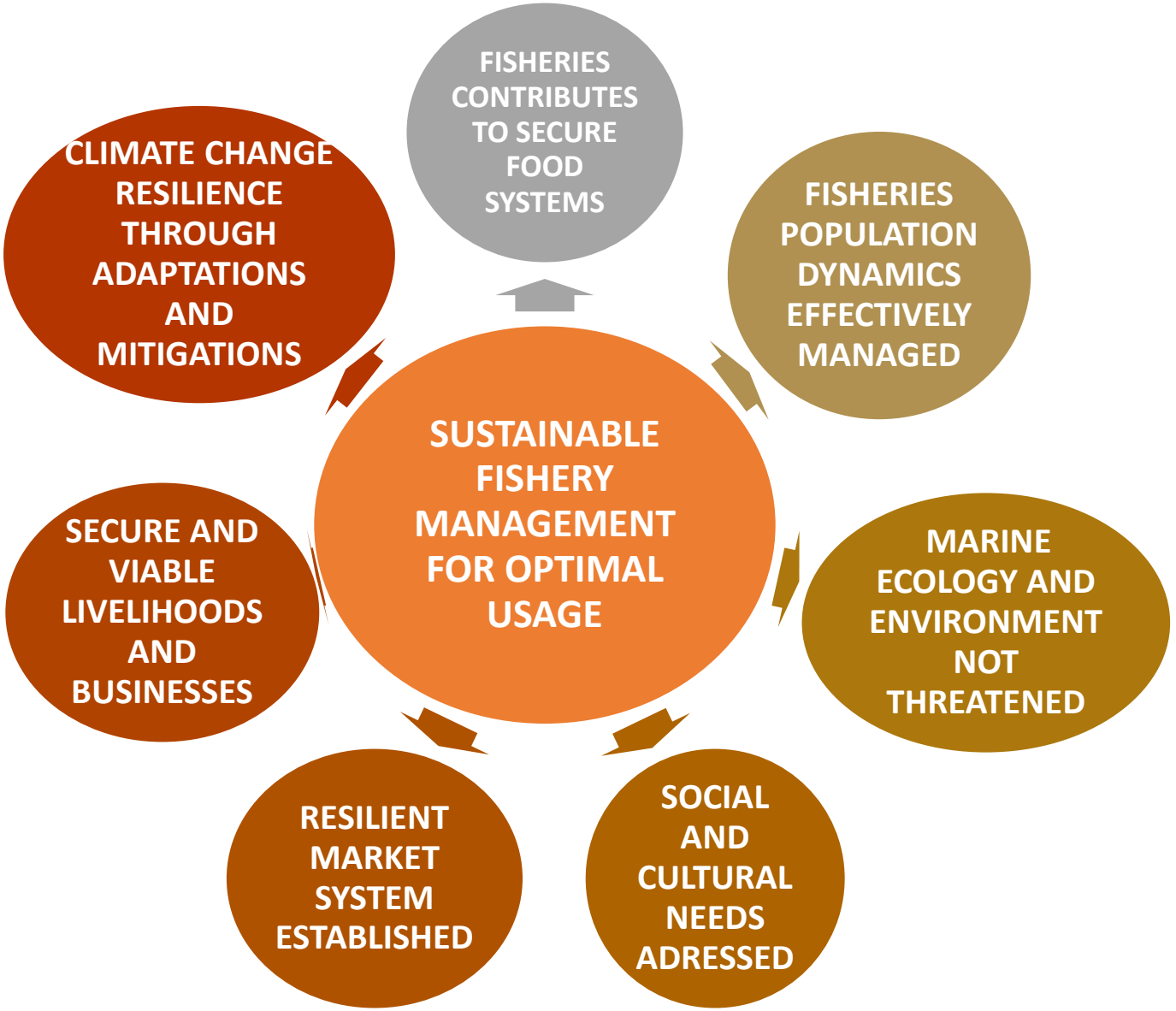
IMPACT:

Enhance the region's wealth by managing and maintaining sustainable fishing industries and increasing employment and economic opportunities for our people.

STRATEGIES

- 100% ownership of fisheries
- Increased access and capacity to use fisheries
- Contribute to sustainable fisheries management
- Improved engagement and effectiveness of fishers in fisheries management
- TS Communities, Infrastructure, Services And The Sea Are Climate Resilient

DIMENSIONS OF SUSTAINABLE FISHERIES



Highly Regulated Fishery Management

FISHERIES POPULATION DYNAMICS EFFECTIVELY MANAGED

- Three tiered system of harvest control via Torres Strait Beche de Mer Fishery Harvest Strategy 2019: graduated system of economic exploitation based on quality of data inputs and outputs
- Multi indicator framework for TAC decisions : CPUE, SIZE DISTRIBUTION, SPATIAL DISTRIBUTION, CATCH RECORDS
- Good history of stock assessment and density surveys : six since 1995 to 2021
- Input controls: no hookah, dinghy 7m, hand only
- 159 TIB licenced fishers connected to 80 BDM lic fish receivers
- Summary status defined for each key species
- Ecological Risk Assessment completed: no impacts

Sea Cucumbers: ecological services

- Sea cucumbers excrement may help to offset increased acidity from climate changes (release carbonates into water)
- Nutrient and organic matter recycling in sea beds and fish ponds: 'earthworms of the sea'
- Part of the food chain ecosystems: prey and predator
- Symbiotic relationships with molluscs and crustacea
- Promoting biodiversity in marine ecosystems
- The draft Ecological Risk Assessment assessed impacts on BDM Fishery as minor or negligible scores and the low overall risk for the ecological impacts for the effects of fishing:

  Selective hand collection, no by catch or by products

MARINE ECOLOGY AND ENVIRONMENT NOT THREATENED

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Torres Strait Islanders traditional owners of fisheries

SOCIAL AND CULTURAL NEEDS ADDRESSED

TOs own 100 % of the fishery

As owners they should:

- Benefit from the fishery economically through fishing and business activities
- Make decisions on the management of the fishery and regulations to control it
- Initiate and /or be actively engaged and approve changes to any decisions or rules
- Use traditional knowledge on harvesting and uses of the BDM species
- Apply customary and traditional laws as they need to

Climate change threats for BDM

KEY CHANGES EXPECTED FROM CLIMATE CHANGES in North Eastern Australia: based on high carbon emissions model RCP8.5, 2090

- Increased surface sea temperature: 2.2 to 5.7 degrees C
- Highly variable rainfall: -62% to + 44% changes
- Storms and cyclones : likely to intensify
- More acidic oceans, salinity increases
- Sea level rises 0.38 to 0.88 metres
- Changes in ocean currents and circulation
- Extreme rain and heat wave events
- BDM highly vulnerable to increased sea temperatures and increased acidity
- Some species in shallow water more susceptible to temperature increase

CLIMATE CHANGE RESILIENCE THROUGH ADAPTATIONS AND MITIGATIONS

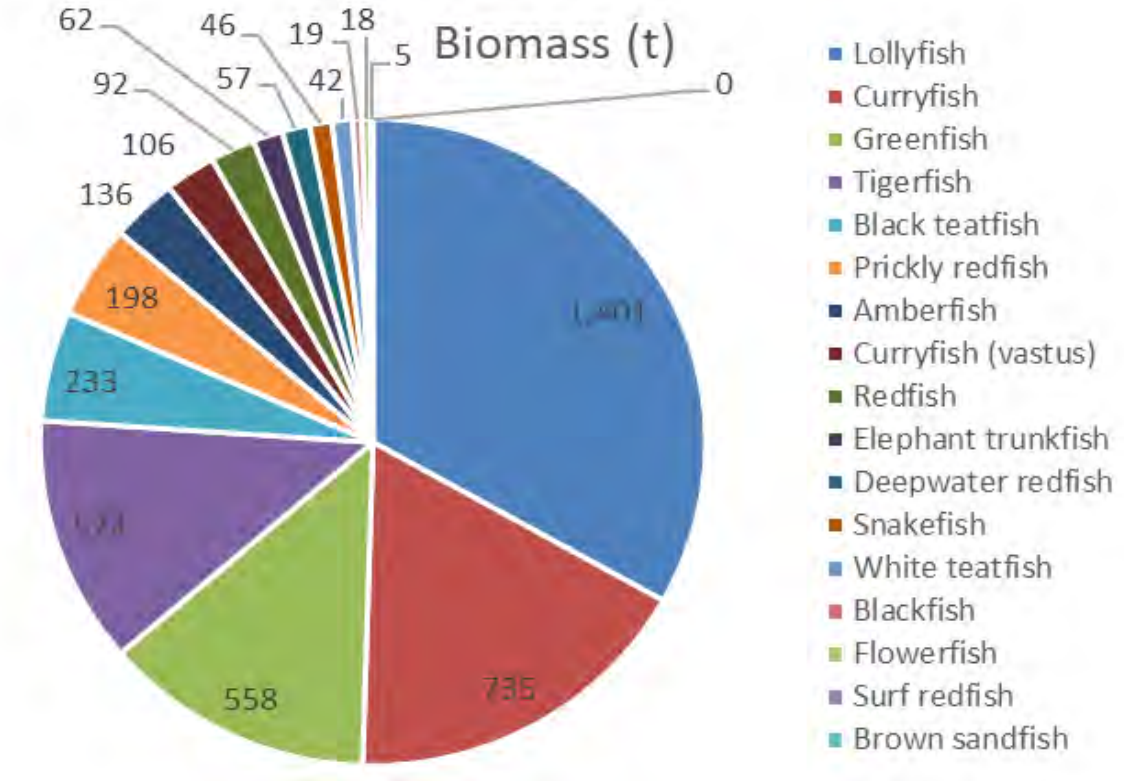
CLOSED: sandfish, surf redfish

TARGET SPECIES: black teat fish, white teat, prickly red, hairy black, green fish, deep redfish.

Curry fish

BASKET SPECIES: all others

SECURE AND VIABLE LIVELIHOODS AND BUSINESSES



From TS BDM harvest strategy Nov 2019

TAC INCREASES possible for white teatfish,

NO CONCERN FOR TAC FOR: deepwater redfish, amberfish, leopard fish

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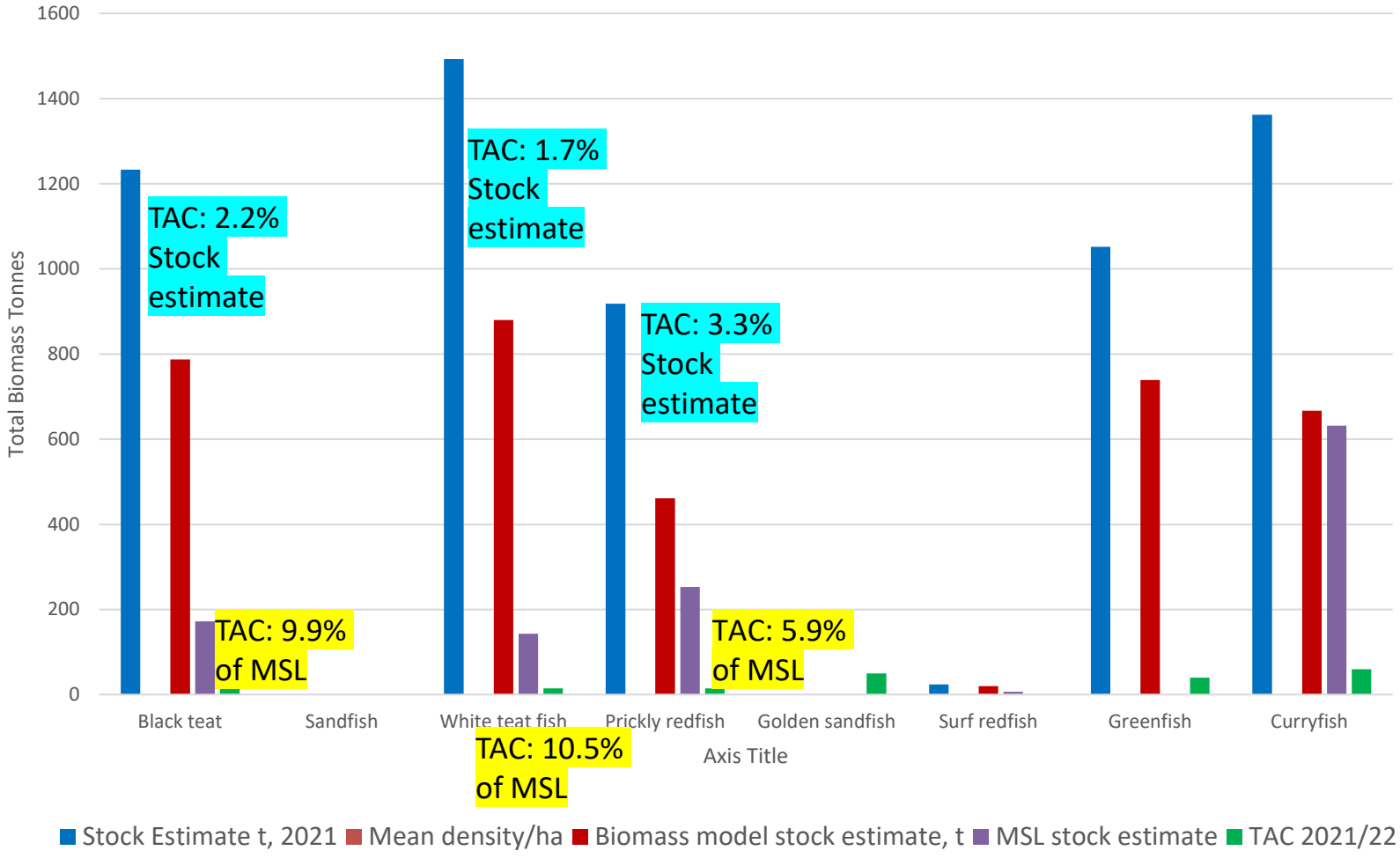
Measures of BDM stock estimates



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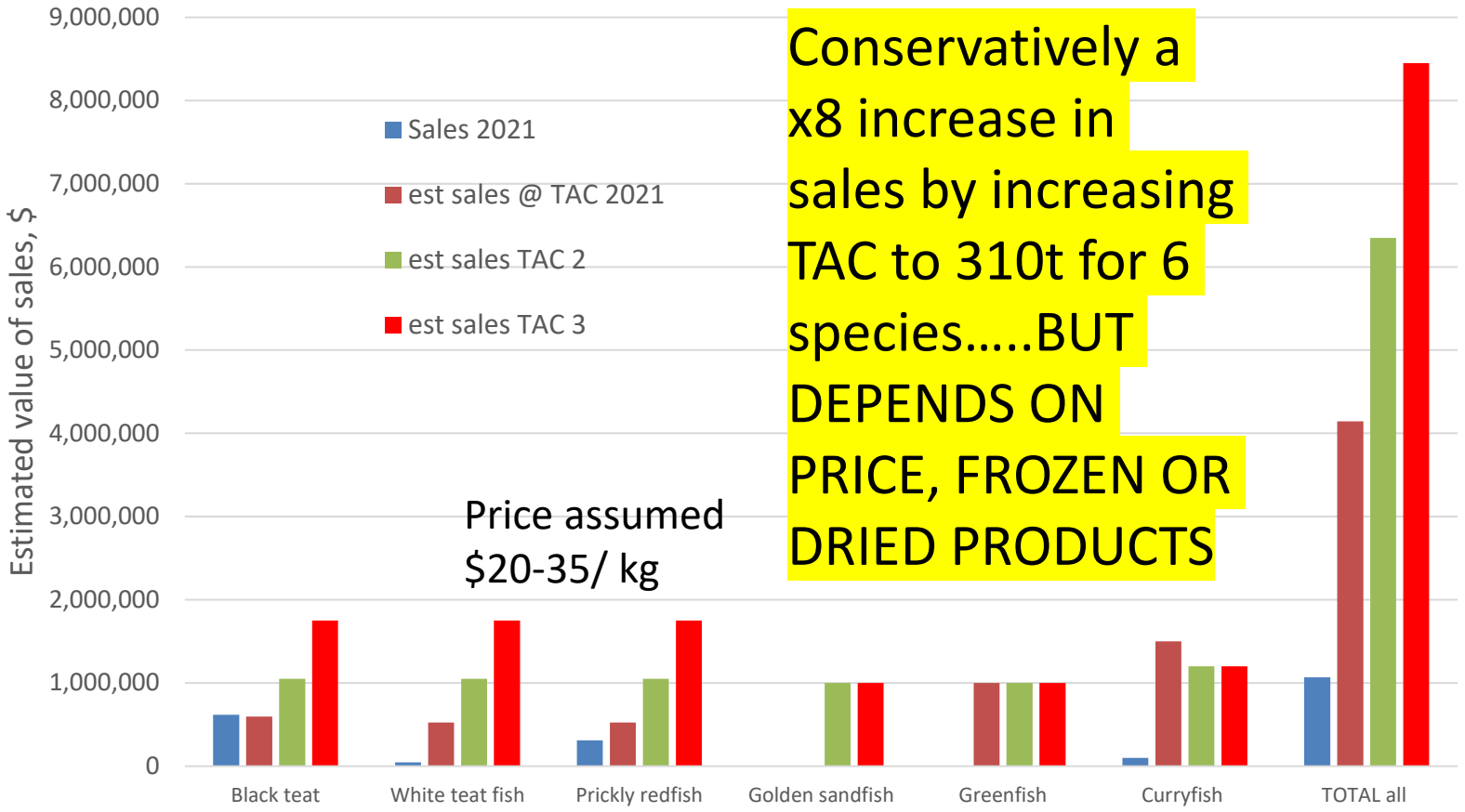
Estimated value of sales for different TAC scenarios



Actual catch 2021TOTAL 39 TONNES (6 SPECIES)

Scenario TAC 2021/22 197 tonnes

Scenario 2: TAC 2 250 TONNES

Scenario 3 TAC 3 310 TONNES

Australian Government

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Market system constraints and opportunities

RESILIENT MARKET SYSTEM ESTABLISHED

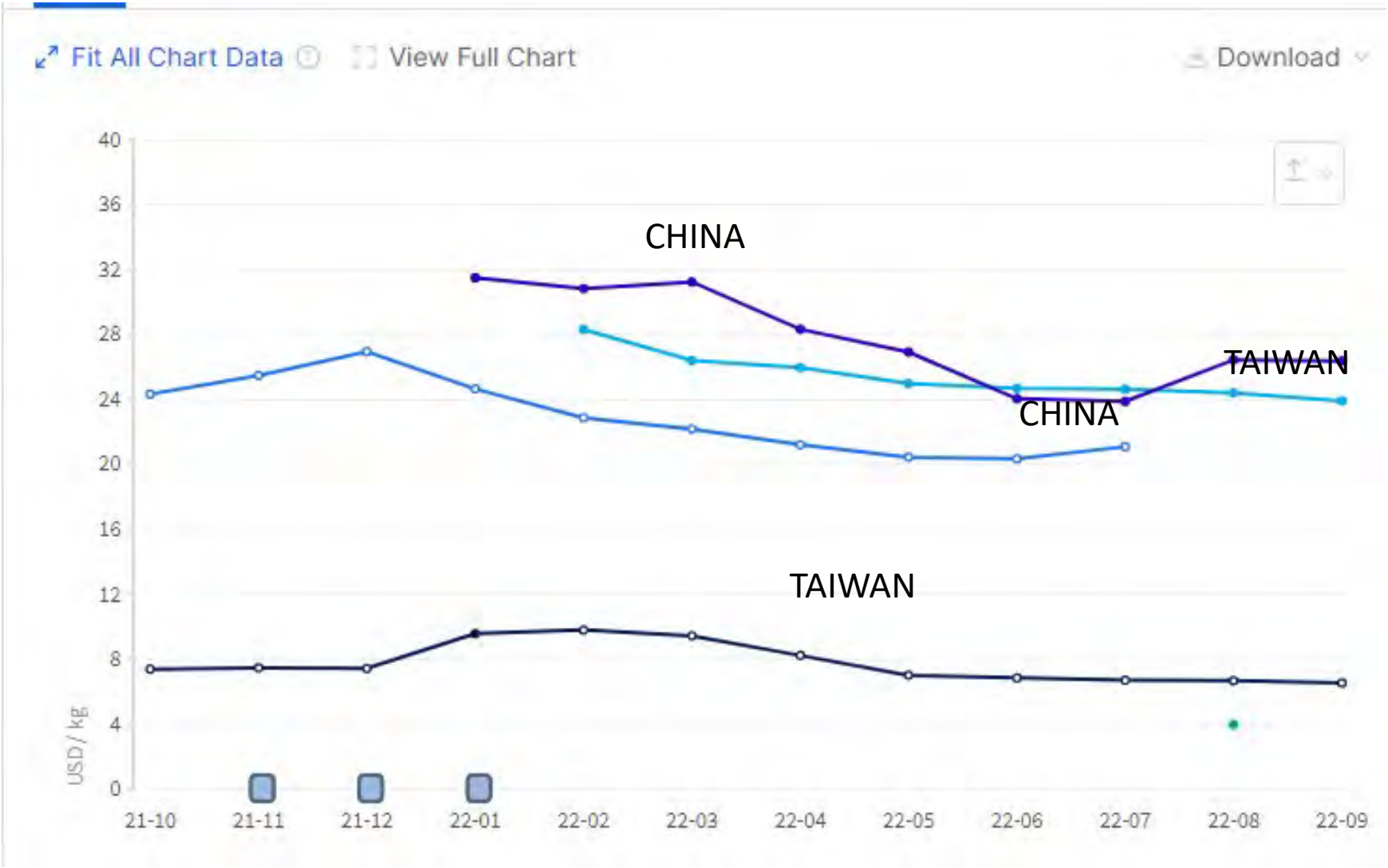
FROM FRDC Report 2019:Market constraints TS

- Direct exporting is the preferred model with value benefits to fishers limited.
- Profits tend to be made by the ‘middle man’ or the wholesaler who buys direct from the TSF and then on-sells product to domestic or Chinese buyers
- Lack of market differentiation and branding of product in domestic markets or overseas export markets
- No control over where or how the product is marketed, no market information, poor market linkages
- Key barrier to development of TS fishery is the additional cost of reaching markets and the cost of doing business from a remote location

MARKET NOTES Purcell et al 2018

- Consumer demand for healthy and safe foods in China has expanded the markets for mid- and low-value beche-de-mer consumed in everyday meals.
- Largest proportional increases in prices were for previously low- and medium-value species such as Curry fish, Brown sandfish and Elephant trunkfish
- Retail prices high-value beche-de-mer species White teatfish Golden sandfish and Sandfish increased exponentially with body length
- The higher values attained for large individuals of several high value species should provide adequate economic rationale for implementing large minimum size limits for several sea cucumber species harvested from the Indo-Pacific region.

WHOLESALE MARKET PRICES PAST 12 MONTHS SEA CUCUMBER dried. tridge.com/intelligences/sea-cucumber



FRDC, Honey and Fox 2019: The product/market priority ranking resulting from the assessment of attractiveness and difficulty

Product (species and form)	Market	Ranking
ROCK LOBTER LIVE	CHINA/HONGKONG	1
SEA CUCUMBER DRIED AND SALTED	HONG KONG /SINGAPORE	2
FINFISH FROZEN, CHILLED	AUSTRALIA DOMESTIC	3
ROCK LOBSTER FROZEN TAILS	CHINA/HONGKONG	4

Historical Research on TS Fishery Market Development

- Honey and Fox studies and reports for TSRA

Cultural Insights Desktop Market Research
Business Model and Stakeholder Analysis Market Research
Supply Chain Analysis Report (Public Version)
Torres Strait Brand Strategy
Torres Strait Brand Concepts
Product Marketing Priorities
TSF Infrastructure Review and Gap Analysis
Torres Strait Exporters Handbook

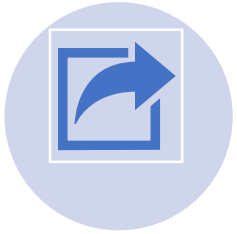
- Aquaculture studies and reports TSRA/ FRDC …aquaculture new ventures and potential
- FRDC Report May 2019. Assessing Direct Export Feasibility, Marketing and Branding Opportunities for Torres Strait Fisheries Derived Products

Marketing and Branding Strategy ALLREADY DEVELOPED

- A luxury differentiation strategy was determined as the best strategy for Torres Strait products due to the unique selling propositions of the following;
- • Hand caught – natural harvesting
- • Ecological sustainability
- • History and culture
- • The stories – 100 islands, 100 totems

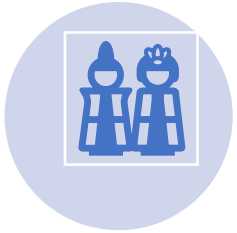
FRDC report and Honey and Fox studies (2019) demonstrated that:

There is an opportunity and a willingness to develop a unified collaborative brand for the Torres Strait fisheries



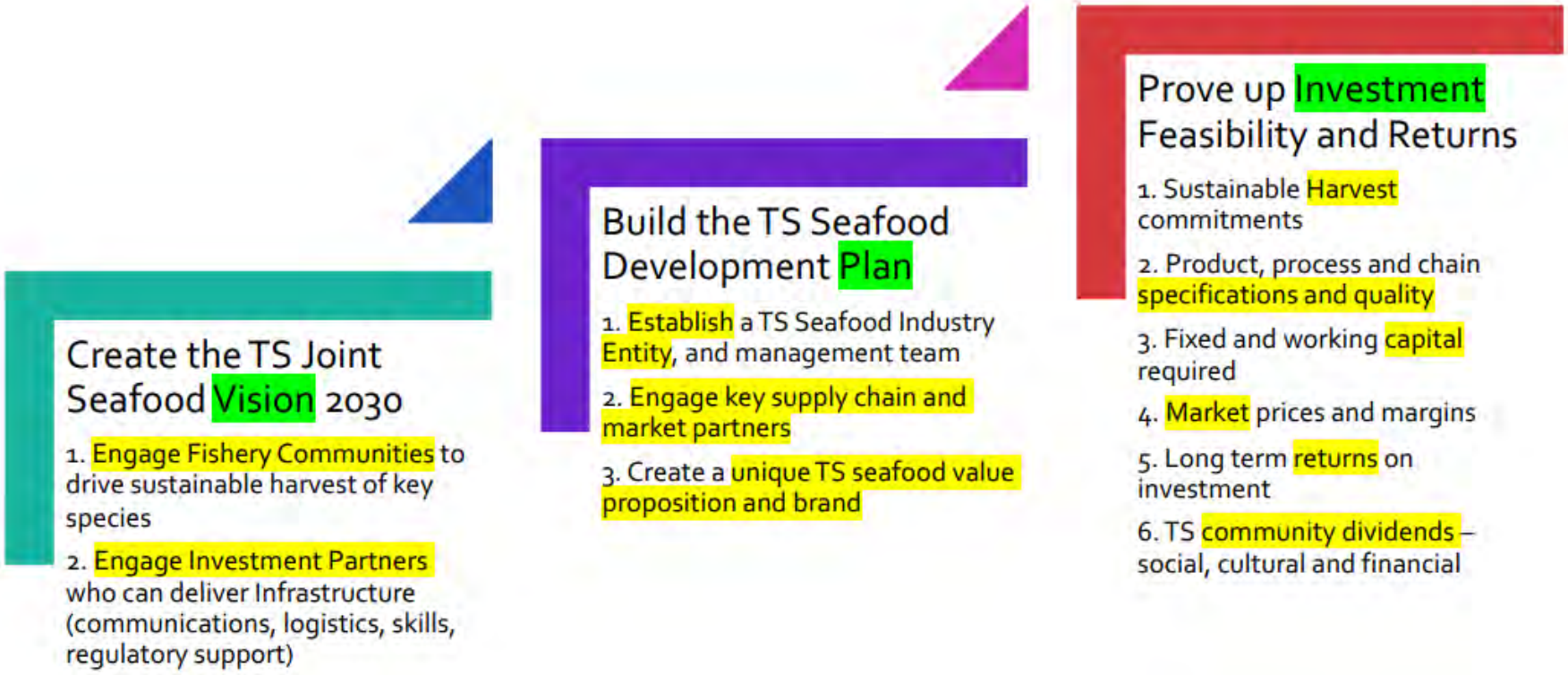
Direct export is possible, but it will require investment in market development, supply chain establishment, export infrastructure and capacity building

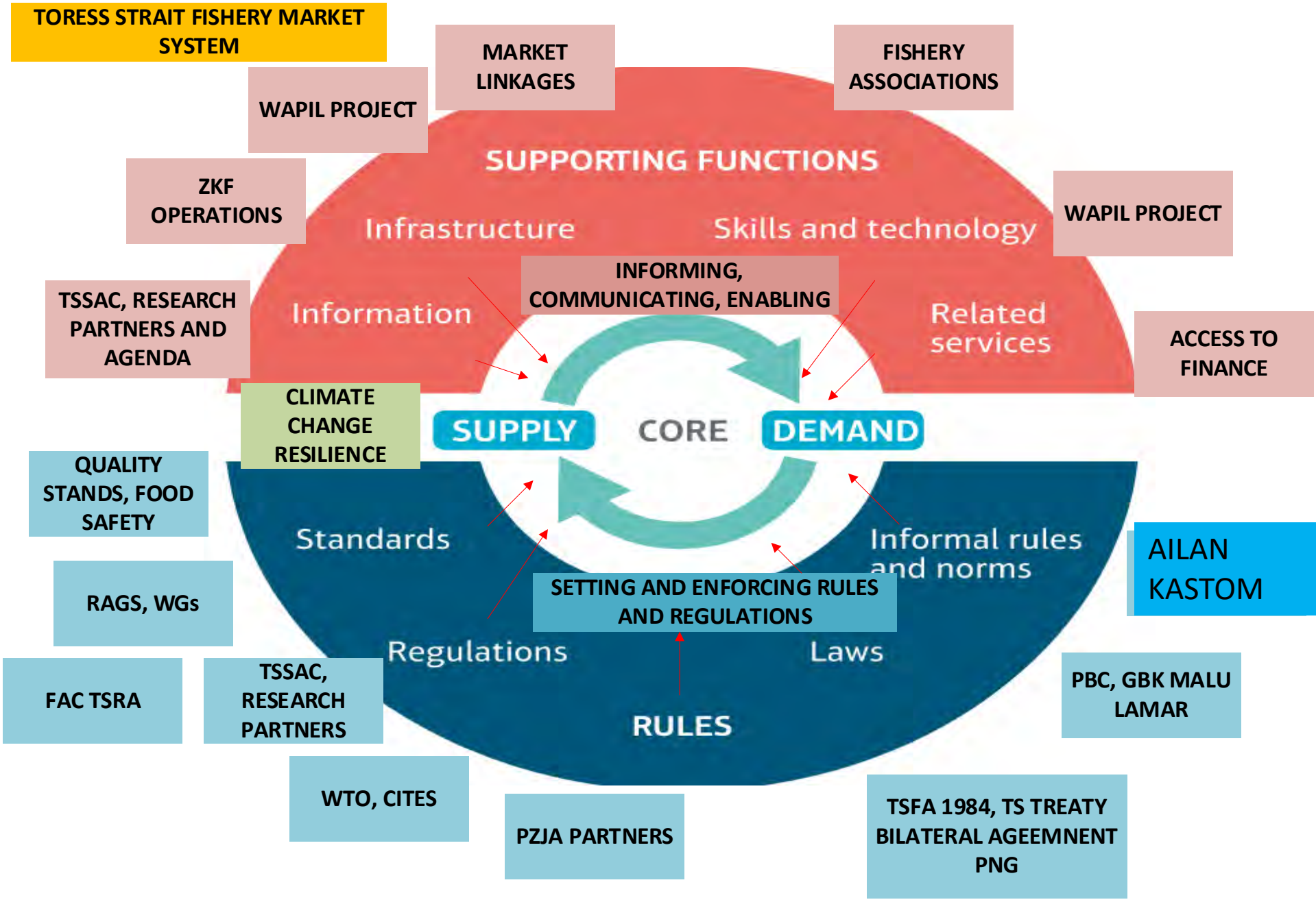
The cost-benefit analysis shows that investing in these areas will provide a positive rate of return.



There is a willingness among the TSF to undertake direct export with a branded Torres Strait product

From Torres Strait Fisheries Summit 2018 Final Presentation




TORESS STRAIT FISHERY MARKET SYSTEM
MARKET LINKAGES
FISHERY ASSOCIATIONS
WAPIL PROJECT
SUPPORTING FUNCTIONS
ZKF OPERATIONS
Infrastructure
Skills and technology
WAPIL PROJECT
INFORMING, COMMUNICATING, ENABLING
TSSAC, RESEARCH PARTNERS AND AGENDA
Information
Related services
ACCESS TO FINANCE
CLIMATE CHANGE RESILIENCE
SUPPLY
CORE
DEMAND
QUALITY STANDS, FOOD SAFETY
Standards
Informal rules and norms
AILAN KASTOM
RAGS, WGs
SETTING AND ENFORCING RULES AND REGULATIONS
Regulations
Laws
FAC TSRA
TSSAC, RESEARCH PARTNERS
PBC, GBK MALU LAMAR
RULES
WTO, CITES
PZJA PARTNERS
TSFA 1984, TS TREATY BILATERAL AGEEMNENT PNG

THE SUPPLY CHAIN/ VALUE CHAN/ MARKET CHAIN

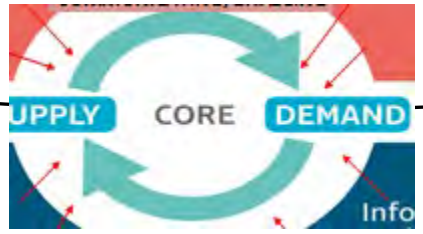
OPPORTUNITIES (DRIVERS FOR GROWTH)

Fishery VALUE CHAIN FUNCTIONS

Value transformation

SUPPLY People, position and influence **DEMAND**

Value chain linkages



CONSTRAINTS (BLOCKERS FOR GROWTH)

FOR ONGOING DISCUSSION

- Balancing sustainability dimensions
- As per HCRAG and HCWG research into socio economic analysis of BDM fisheries is HIGH PRIORITY
- Promoting lower and middle level valued BDMs having higher TAC values through improved market linkages and market information
- Information on markets and motivation for BDM fishing: low TAC catch rates
- Raising TACs for black teat and key BDM species
- Sandfish stock assessment Warrior Reef
- Aquaculture scoping studies for climate change adaptation and ecological management of BDM species

NEXT STEPS

- Ongoing review research papers FRDC, Honey and Fox on TS marketing strategy and branding
- DEVELOP DISCUSSION PAPER FOR BDM MARKET LINKAGES DEVELOPMENT
- DISTRIBUTE PAPER AND SEEK FEEDBACK
- COLLABORATION WITH STEVE PURCELL ON SOCIO ECON DATA COLLECTION CONCEPT
- PROMOTE DISCUSSION ON MARKET LINKAGES THROUGH WAPIL PROJECT AND ZKF
- TSRA FISHERY PROGRAM FOCUS: INDUSTRY DEVELOPMENT FOR OPTIMUM PRODUCTION AND VALUE
- MANAGING UNDERUTILISED QUOTA AND TAC EXISTING FISHERIES