Australian Government
Australian Fisheries Management Authority

Torres Strait Hand Collectables Resource Assessment Group

Meeting No. 2

27–28 September 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 meeting was opened in prayer by Harry Ghee at 8:51am.
2. The Chair welcomed members and observers to the second meeting of the Torres Strait Hand Collectables Resource Assessment Group (the RAG). The Chair acknowledged the Traditional Owners of the land on which the meeting was being held, as well as the lands and seas which the meeting was due to discuss, and paid respect to Elders past, present and emerging.
3. The Chair provided an overview of the role of the RAG and obligations on members. The Chair acknowledged the impact of climate change in Torres Strait fisheries and the region more generally as highlighted by the recent finding made by the United Nations Human Rights Committee that the Australian Government's failure to protect Torres Strait Islanders from the impacts of climate change had violated their human rights.
4. The Chair emphasised that input from observers was welcome at the RAG and noted that final decision making and primary advice was the responsibility of members. The Chair also noted that whilst the RAG seeks to make consensus recommendations to the Protected Zone Joint Authority (PZJA) and Hand Collectables Working Group (HCWG), from time to time members may have dissenting views. When consensus cannot be reached the views of each member will be recorded.
5. The Chair noted the following apologies:
    a. Assoc. Prof. Steven Purcell; and
    b. Mr Ned David, Chairperson of Malu Lamar (Torres Strait Islander) Corporation RNTBC.
6. The Chair noted that the Queensland Department of Agriculture and Fisheries (QDAF) Member, Ms Jenny Keys, would be participating via video link and that Mr Daniel Takai, Chief Executive Officer of Zenadth Kes Fisheries Limited, would be joining the meeting after lunch time on day one.

1.2 Adoption of agenda

7. The RAG adopted the draft agenda with the addition of a presentation from the Torres Strait Regional Authority (TSRA) titled "Understanding the Dimensions of Sustainable BDM Fisheries Management" under Agenda Item 9.

1.3 Declarations of interest

8. 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 (the BDM Fishery) at the commencement of the meeting.
9. Where it is determined that a direct conflict of interest exists, the RAG 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.
10. Declared interests are detailed in **Table 1** below. Each group of members and observers with similar interests were 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.
11. The scientific members removed themselves from the meeting while the remaining members discussed their participation in the meeting. The Chair and members recognised that although the scientific members may have a real or perceived conflict of interest when discussing research

priorities and needs, they have research expertise and knowledge relevant to the fishery that is valuable to the development of the RAG's advice on those priorities. They agreed that, if a research project was to be considered, the scientific members should participate in the discussions but not in the recommendation making process.

12. Government officials exited the room while the remaining members discussed their participation in the meeting. The Chair noted that all meeting participants attended the meeting in the interests of the fishery, in line with the objectives of the RAG, and all meeting participants were expected to declare if a direct or perceived conflict were to arise.
13. The RAG discussed the role of Zenadth Kes Fisheries Limited and potential conflicts that may arise with some Government officials and all TIB industry representatives having a connection to the industry body. The AFMA Member acknowledged that this was the first RAG meeting to include Traditional Inhabitant members who were appointed through Zenadth Kes Fisheries Limited and therefore, new territory that the RAG must carefully work through. The AFMA Member advised the meeting that their understanding was that, although Zenadth Kes Fisheries Limited facilitated the nominations process, they were not there to represent the commercial interests of Zenadth Kes Fisheries Limited and this understanding was confirmed by the Traditional Inhabitant members. The AFMA Member echoed the Chair and agreed that it was in the best interests of the fishery that all members declare conflicts of interest as they arise and the RAG agreed to proceed on this basis.
14. The industry members that hold a fishing licence, including the TSRA observer, left the meeting room and the remaining members discussed whether they should be present for the discussion and recommendation of items where they may have real or perceived conflicts of interest. The Chair and remaining members agreed that it is important for industry members to be part of the discussion and the recommendation making process as their expertise is valuable to the development of the RAG advice that impacts the industry as a whole. Once more, the meeting agreed that all members are expected to declare conflicts of interest as they arise.
15. The Papua New Guinea National Fisheries Authority (PNG NFA) invited participant advised the RAG that he would be happy to exit the meeting during confidential discussions.
16. The RAG agreed to address any additional conflicts of interest should they arise throughout the discussion of agenda items.

Table 1. Declared interests from each attendee.

Name	Position	Declaration of interest
Members		
Sian Breen	Chair	Employed by QDAF. No pecuniary interest in Torres Strait fisheries but from time to time other staff members may work on fishery research projects in the Torres Strait (not occurring now).
Tim Skewes	Scientific Member	Independent consultant. Previously employed by CSIRO. Previous principal scientist and co-investigator for Torres Strait Scientific Advisory Committee (TSSAC) and TSRA funded projects focused on the sea cucumber, tropical rock lobster, finfish and traditional fisheries in the Torres Strait. Member on the TSSAC. Involved in the TSSAC endorsed research project 'Measuring non-commercial fishing catches (traditional subsistence fishing) in the Torres Strait in order to improve fisheries management and promote sustainable

Name	Position	Declaration of interest
		livelihoods' which is funded by the Fisheries Research and Development Corporation (FRDC).
Eva Plaganyi-Lloyd	Scientific Member	Employed by CSIRO and from time to time receives funding to undertake research relating to Torres Strait fisheries as well as other Australian and international fisheries. Scientific Member on the Tropical Rock Lobster (TRL) and Northern Prawn RAGs. Lead scientist for PZJA funded TRL research projects conducted by CSIRO. Co-investigator on the TSSAC project 'Understanding climate variability and change relevant to key fisheries resources in the Torres Strait and adaptation and mitigation strategies' that is currently seeking FRDC funding.
John Tabo	Traditional Inhabitant Member, Kemer Kemer Meriam	TIB licence holder with finfish, BDM, TRL and trochus entries. Zenadth Kes Fisheries Limited member.
Toshie Kris	Traditional Inhabitant Member, Maluialgal	TIB licence holder with TRL and Spanish mackerel entries. Zenadth Kes Fisheries Limited member.
Nicholas Pearson	Traditional Inhabitant Member, Kulkalgal	TIB licence holder with BDM and TRL entries. Family owns a TRL and BDM commercial fishing company. Zenadth Kes Fisheries Limited member.
Pabai Pabai	Traditional Inhabitant Member, Gudumalulgal	Previously held a TIB licence and is considering renewing. Interested in taking up commercial fishing in the future. Zenadth Kes Fisheries Limited member.
Graham Hirakawa	Traditional Inhabitant Member Kaiwalagal	TIB licence holder with Spanish mackerel, pearl shell and TRL entries. Member of Zenadth Kes Fisheries Limited.
Joseph Posu	PNG NFA Member	Employed by the PNG Government. PNG shares some fish stocks with Australia and both countries have the option to enter into catch sharing arrangements for Article 22 fisheries under the Torres Strait Treaty. Nil financial interests in Torres Strait fisheries.
Emma Freeman	AFMA Member	Employed by AFMA, no pecuniary interests or otherwise.
Nicholas Richards	TSRA Member	Employed by TSRA, no personal pecuniary interests or otherwise. TSRA holds finfish and TRL quota on behalf of Traditional Inhabitants.
Executive officer		
Danait Ghebrezgabhier	Executive Officer, AFMA	Employed by AFMA, no pecuniary interests or otherwise.

Name	Position	Declaration of interest
Observers and invited industry participants		
Damian Miley	Program Manager, TSRA	Employed by TSRA. No personal pecuniary interests or otherwise. TSRA holds finfish and TRL quota on behalf of Traditional Inhabitants.
Nicole Murphy	CSIRO employee	Employed by CSIRO and from time to time receives funds to undertake research relating to Torres Strait fisheries. Scientific Member on the HCWG. Principal Investigator on the project black teatfish sampling and stock assessment, white teatfish stock assessment and the development of conversion ratios for curryfish projects.
Quinten Hirakawa	Senior Project Officer, TSRA	Employed by TSRA and TIB licence holder with TRL, BDM, Spanish mackerel and reef line entries. TSRA holds finfish and TRL quota on behalf of Traditional Inhabitants.
Michael Passi	Invited industry participant (Mer Island)	Holds a TIB licence and owns a private fishing business. Traditional Owner on Mer Island.
Simon Naawi	Invited industry participant (Masig Island)	Commercial fisher and TIB licence holder with BDM and TRL entries.
Harry Ghee	Invited industry participant (Erub Island)	Commercial fisher and TIB licence holder with TRL, Spanish mackerel, BDM and pearl shell entries.
Ian Butler	Australian Bureau of Agriculture and Resource Economics (ABARES)	Employed by the Australian Bureau of Agricultural and Resource Economics and Science (ABARES), Department of Agriculture, Forestry and Fisheries (DAFF). No pecuniary interests or otherwise.

1.4 Action items from other meetings

17. The RAG noted the completed action items. In relation to action item 5, the RAG noted that Charles David has responded to AFMA's invitation to the HCRAG meeting with a counter invite to Iama Island to discuss further sandfish research. The RAG deferred further discussion on this matter to *Agenda Item 6 – Fishery Research Priorities*. AFMA noted the importance of RAG members and representatives of the Iama community to work together on these matters.

18. With regards to the ongoing action items, the RAG noted the following updates:

    a. Action item 3 – this item to be marked as completed.

    b. Action item 6 – With regards to better understanding crab stocks in the Torres Strait, the RAG noted the TSRA advice that interest in commercial crab fishing is likely to increase when infrastructure is established on the top western islands. The RAG Chair also highlighted the Queensland Government's recent funding commitment to support fishing opportunities in Cape York and advised that a Working Group had recently been established to consider how to grow economic opportunities for Traditional Owners interested in the fishing sector. This action item is to be revisited when the stock assessments for Queensland mud crab fishery stocks are finalised.

1.5 Out of session correspondence

19. The RAG noted a list of correspondence circulated out of session since its first meeting on 6-7 October 2021.

2 HCRAG Updates

2.1 Papua New Guinea National Fisheries Authority

20. The RAG noted the following updates from the PNG NFA representative, Mr Joseph Posu:

    a. The BDM Fishery is not an Article 22 fishery under the Torres Strait Treaty and therefore not subject to catch sharing arrangements.

    b. PNG's most recent Beche-de-mer Fishery opening was in 2020 and it has since been closed pending a stock assessment.

    c. Within the Western Province, the fishery was open in 2019 and has been closed in 2020. During 2019, the season was open from 17 August to 18 September and the total allowable catch (TAC) within the Western Province was 3.5 tonnes although export figures indicate that 17 tonnes of BDM valued at PNGK 200-300 million was exported.

    d. The fishery is somewhat challenging to manage as it is a lucrative product that attracts significant local and external interest and faces significant challenges including fishing during closures, stockpiling and TAC overshoot due to significant lag in catch reporting.

    e. The PNG NFA is working collaboratively with AFMA and the Australian Border Force to deter border incursions within Australia's area of jurisdiction. The jail on Daru is run down and offenders are on house arrest while their fishing equipment is seized to deter illegal fishing activities.

    f. Niue Treaty discussions are underway and will lead to increased collaboration between PNG and Australia.

    g. PNG NFA is also seeking further guidance and specialist advice from AFMA regarding the management of shared sea cucumber stocks and stock assessments.

21. The RAG discussed illegal fishing within PNG's waters and the PNG NFA advised buyers are setting up on the PNG coastline and interacting directly with sellers, making the activity very hard to detect. The RAG also discussed illegal fishing by PNG boats on Warrior Reef for BDM and TRL. The PNG NFA advised that they work closely with AFMA to combat illegal fishing activities in this area. AFMA advised it works with partner agencies to undertake compliance operations where priorities and resources allow. AFMA continues to collect intelligence on illegal activities to inform operations. It was noted that illegal catch should be taken into account in stock assessments (e.g. sandfish).

2.2 Industry members

22. The RAG noted the following updates from Traditional Inhabitant members:

    a. The Traditional Inhabitant Member from Maluialgal commented that there is need for more data and science to develop and grow fisheries as it is not viable for the industry to rely on one species given running costs due to the increase in fuel cost ($2.70 – $3.70 per litre).

    b. The Traditional Inhabitant Member from Kaiwalagal commented that he is not aware of any full time BDM fishers from Thursday Island but reiterated that the cost of fuel to travel to the fishing grounds in the eastern region is prohibitive and is supportive of BDM fishing being predominantly accessed by fishers from the central and eastern islands.

    c. The Traditional Inhabitant Member from Kulkalgal advised that it has been a good fishing season as Poruma fishers have an agreement with Iama to access curryfish grounds in their

sea country (e.g. Dungeness) as the Cumberland fishing grounds are farther and hence more expensive to get to.

d. The Traditional Inhabitant Member from Gudumalulgal advised that fishing from top western islands tends to be very seasonal and mainly focused on fishing for TRL during August to November when the waters are clear. Other key species of focus include barramundi, crab, prawns and other species that were raised with AFMA during their recent community consultation visit on Boigu (i.e. salt water mussels). However the lack of infrastructure is very limiting and there is currently work underway to set up facilities. The recent review of the Western Line Closure opens up more fishing opportunities for the top western islands.

e. Traditional Inhabitant Member from Kemer Kemer Meriam advised that a new small BDM fishing company has commenced operations on Mer and there is continually increasing interest in black teatfish fishing.

23. The RAG noted that there is potential for other lower value sea cucumber species to be fished and industry interest in undertaking more research in the fishery to support its growth and increase economic opportunities.

Damian Miley joined the meeting at 11:15am and declared his interests as reflected in Table 1.

24. The additional industry participants were also invited to provide updates to the RAG as follows:

    a. Michael Passi, Mer

        i. Only two fishers have been active on throughout the season on a full-time basis on Mer.

        ii. The season has been slow, due mostly to rough weather.

        iii. As prices dropped during COVID, fishers are looking for options to work smarter and not harder by maximising the value of the product (e.g. drying) and connecting directly with exporters in Cairns.

        iv. Fishing for prickly redfish has been good and it is still available on the fishing grounds. White teatfish catches continue to be low as it is limited by depth although some free dive fishing is still occurring at 15-20m depth. Black teatfish have come up to the top of the reef since the opening in May.

    b. The RAG noted that there is currently a gentlemen's agreement between western and eastern communities for fishers to refrain from using hookah in eastern Torres Strait waters and this may need to be revisited should the use of hookah be permitted to harvest deep water sea cucumber species.

    c. Harry Ghee, Erub

        i. Erub fishers would prefer an earlier (March-April) black teatfish opening due to the weather, while still keeping to a neap tide, and to better align with events that generate more favourable market demand and prices (e.g. Chinese New Year) as prices tend to drop throughout the rest of the year.

    d. The RAG noted that other considerations for the timing of the opening from industry's perspective would be to avoid spawning seasons.

    e. Simon Naawi, Masig

        i. There is huge potential for both commercial curryfish species if there is investment in value added product and in developing market opportunities and favourable business partnerships.

25. The RAG further noted the update from Dr Plaganyi on the presentation by Ray Hilborn and other panel discussions at the Seafood Directions conference on the factors that contribute to improved market access besides a sustainable stock for example marketing strategies (e.g. social media), low carbon footprint and developing/targeting niche markets. The RAG also discussed other

opportunities such as aquaculture noting that this is managed by Queensland and some of the candidate sea cucumber species such as sandfish are currently closed to fishing in the Torres Strait due to sustainability concerns. However, there is support and facilities available to guide the development of such initiatives in the Torres Strait such as the as development of the project proposal (not funded yet) in Ugar led by Rocky Stephens in conjunction with CSIRO and QDAF. The RAG agreed that the TSRA would liaise directly with QDAF in relation to aquaculture development opportunities and for an overview of the approval requirements.

ACTION – TSRA to liaise directly with QDAF on aquaculture development opportunities and for an overview of the approval requirements.

Daniel Takai joined the meeting as an observer at 12:10pm and declared his interests as outlined in Table 1.

2.3 Scientific members

26. The RAG noted the following updates from the Scientific Member, Dr Eva Plaganyi:
    a. There is a project on the horizon looking at climate change impacts on Torres Strait fisheries and the project team is after feedback from industry on any changes on the water to sea cucumber composition given their sensitivity to climate change.
    b. There is a CSIRO strategic research project underway on improving supply chain resilience to climate change with the TRL Fishery being a case study. This project extends on a previous supply chain study that was done for the TRL Fishery. Any lessons or outcomes from this project will be provided to the HCRAG. Any interested stakeholders are also invited to contact Dr Plaganyi or Dr Jess Melbourne-Thomas.
27. The RAG noted the following updates from the Scientific Member Tim Skewes:
    a. Recently worked on sea cucumber fisheries in the Seychelles. The black teatfish stock in that fishery is overfished and modelling indicates low to no recruitment of white teatfish. Prickly redfish stocks are robust similar to the BDM Fishery.
    b. There is currently a proposal for the CITES listing of prickly redfish and if this occurs a non-detriment finding assessment will need to be undertaken to continue to export the species from Australian fisheries.

2.4 Government Agencies

28. The RAG noted the update provided by AFMA as detailed in the agenda paper, in particular:
    a. The progress against the BDM Fishery Wildlife Trade Operation (WTO) conditions as at September 2022 to be included in the annual report to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) due on 30 November. With regards to the seasonal catch limits for black and white teatfish stipulated in the WTO conditions, the RAG asked AFMA to seek advice from DCCEEW on the process for varying those limits outside of the 3-year WTO reassessment cycle.

ACTION – AFMA to seek advice from DCCEEW on the process for varying the seasonal catch limits for black and white teatfish as stipulated in the WTO conditions, outside of the 3-year WTO reassessment cycle.

    b. AFMA's proposed approach to a legacy TVH licencing matter that is about to be considered by the PZJA at their upcoming meeting. AFMA will be recommending that these licences no longer be renewed once they expire due to inconsistency with PZJA policy to reserve expansion of effort to traditional inhabitants. The RAG further noted advice from the TSRA Member and the TSRA Board Fisheries Portfolio member that their advice to the PZJA will be to support the recommendation put forward to the PZJA.
29. The RAG noted the TSRA update that the Fisheries Section has currently had a turnover in staff and is working through the TSRA Board's Fisheries Advisory Committee's priorities which have been delayed due to COVID-19.

30. The RAG noted the QDAF update on the Queensland Sea Cucumber Fishery as follows:

    a. Black teatfish - although fishers have caught half of their black teatfish quota as provided in their licence conditions, they are not able to export it due to a negative non-detriment finding for the species due to its CITES listing. This has been a significant set-back for the industry as they can't access the export market and are currently restricted to selling domestically despite a rotational harvest system being used and significant investment in updating the research. The revised black teatfish stock assessment model indicates an increase in virgin biomass ratio of >50%, and whilst the stock assessment is considered sufficient overall, certain parameters are being questioned. The lack of historical fishery independent survey data means there is no reference point to which recent surveys can be compared to.

    b. White teatfish - the white teatfish quota is 40% caught and the survey and stock assessment for this species are considered to be adequate.

2.5 Native Title

31. The RAG noted the update provided in the agenda paper.

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

32. RAG members noted the points below and discussed the 2022 black teatfish and future openings as per the BDM Harvest Strategy (BDM HS) re-opening decision rule:

    a. the AFMA update on the outcomes of the 2022 black teatfish trial opening that took place on 9-12 May 2022 including catch and effort reporting by licenced fish receivers;

    b. a presentation by Nicole Murphy on the preliminary results of the CSIRO analysis of the catch, effort and size frequency sampling undertaken during the opening;

    c. a presentation by the Scientific Member Dr Eva Plaganyi of the preliminary results of the CSIRO update of the stock assessment model for black teatfish;

    d. information from Traditional Inhabitant members and invited industry participants that fished during the opening.

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

33. The RAG noted that the total reported catch of black teatfish during the 2022 trial opening was 17.06t which did not exceed the 20t TAC. Accordingly, the BDM HS recommendation that the fishery be automatically paused for the following year if the TAC is exceeded by more than 5 per cent does not apply.

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

Industry catch and effort reporting

34. The RAG noted AFMA's advice that it believes reported catches accurately reflect the total amount of black teatfish that was caught and landed during the opening due to the high level of industry compliance with the daily catch landing and reporting requirements that applied. AFMA however sought industry members' and observers' advice on whether they considered the catch landing data to be accurate. Traditional Inhabitant members and invited industry observers that fished during the opening agreed that the catch data was accurate based on their awareness of what was landed at their respective landing points.

Compliance

35. AFMA advised that it deployed a significant compliance presence throughout the region during the opening, including land-based officers on some of the key islands which were able to support and

assist industry to meet the licencing and reporting requirements. As per the 2021 trial opening, other Queensland and Federal enforcement agencies also assisted the AFMA Thursday Island Compliance team during the operation.

Industry feedback at meeting

36. Industry members and observers that fished during the opening reported that it was beneficial to have Compliance fisheries officers on ground on Mer Island and at Bourke Islet. As well as enforcing the regulatory arrangements for the opening, the compliance officers also supported fishers and fish receivers with the reporting and licencing requirements to be able to participate in the opening.

37. Industry are seeking further consultation on the timing of the opening with a view to bedding this down to occur during a period that is unlikely to result in a significant level of effort, preferably when other fisheries (e.g. TRL) are also open. Industry is also advised that the opening timings and arrangements should consider:

    a. spawning seasons;

    b. the weather. Earlier in the year (e.g. Feb – May) and during a neap tide is preferable. This would also work better around spawning times and better suit the fishers that have to travel further to get to the fishing grounds; and

    c. splitting the tonnage amongst the islands to be fished at ideal times but understand that management tools do not currently exist to effectively support such arrangements.

Size frequency sampling pilot project (CSIRO)

38. Four scientific fisheries observers undertook size frequency sampling during the entire period of the opening as part of the CSIRO-led research project. Length and weight measurements of landed product were taken on Erub and Mer Islands and to a limited extent on Bourke Islet. The observers were also able to support and assist industry with the catch reporting requirements for the opening. Nicole Murphy from CSIRO presented the preliminary outcomes of the analysis of catch, effort and size frequency sampling data collected during 2021 and 2022 which is provided as **Attachment A**. CSIRO will also provide a brief non-technical summary of the project results once completed.

ACTION – CSIRO to provide a brief non-technical summary of the black teatfish size frequency sampling project once completed.

39. The RAG noted the feedback from industry, CSIRO and AFMA that the pilot sampling program went well and was practically feasible to coordinate.

CONDITION 7 - Noting the TAC was not exceeded and reliable data were collected, the data needs 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

40. The RAG noted a presentation from Dr Plaganyi outlining the preliminary results of the updated black teatfish surplus production model used to support the 20t TAC for the 2021 and 2022 trial openings and the new age-structured model based on the size frequency data collected in 2022 (**Attachment B**). Although there are some assumptions in the new age-structured model that need to be tested with industry, both model results are consistent with previous outcomes that, based on the data currently available for the fishery, an annual 20t TAC continues to be sustainable, whereas an annual TAC of 30t is projected to lead to a constant decline after the first year of fishing. Future iterations of the model will benefit from:

    a. inclusion of missing historical catch data – invited industry observers confirmed that there is catch data missing for 1993 and 1996;

    b. articulation of species-specific harvest strategy reference points. There are no agreed B_{MSY} and B_{MEY} levels, although modelling indicates the stock is considered to be above the optimal target level and well above the precautionary proxy B_{LIM} of 40%; and

    c. data on larger individuals in the stock to provide some certainty on whether the stock's reproductive potential has recovered to that of pre-fished levels.

41. The RAG discussed the need to balance the current uncertainty in the stock assessment due to insufficient fishery data with a precautionary approach whilst also taking into account the importance of the resource to support Torres Strait Islander livelihoods. In particular, the RAG discussed the lack of very large black teatfish in the sampled catch and the 2019/20 scientific survey and whether this is likely to be due to the stock still recovering from being overfished or due to a permanent change in growth due to historical fishing pressure and/or other environmental factors such as climate change. The RAG reflected that in other fisheries this would generally be a warning sign and further reinforces the need to be precautionary and continue to build the data time series. Setting a TAC higher than 20t to meet the high level of interest in the fishery in the short-term risks depletion of the resource, resulting in the loss of the benefits to the industry in the long term and to future generations.

42. The RAG **RECOMMENDED** an annual 20t TAC for black teatfish on the basis that updated modelling analysis, inclusive of 2022 catch and sampling data, confirmed that it continues to be sustainable and would not lead to a consistent decline in black teatfish biomass after the first year of fishing. In contrast, all models found that catches of 30t could lead to a gradual depletion of the stock.

43. In making its recommendation, the RAG emphasised the importance of working on ensuring the full utilisation of the 20t TAC by working with industry to fine tune the catch reporting and by developing a logical and defensible mechanism to allow the carryover of undercatch between fishing seasons, including potentially reviewing the BDM HS to include such provisions.

44. The RAG **RECOMMENDED** that fishing for black teatfish can progress from being on a trial basis to a more consistent annual opening given the success of the 2021 and 2022 trial re-openings which have demonstrated that there are sufficient management, monitoring and compliance tools in place to mitigate the risk of overcatch. Black teatfish will continue to be assessed under the BDM HS. This will give industry better certainty to plan their operations.

CONDITION 8 - Additional data to be collected during future openings

Effort and catch location information

45. The RAG acknowledged the significant improvement in area reporting compared to the 2021 opening and reiterated its previous advice that the fishery is going to continue to need good area (location) and effort data reporting. This will inform the scientific assessment of the fishery and would go a long way towards addressing some of the existing uncertainties and supporting a potential increase to the TAC in the future.

Continuation of size frequency sampling during openings

46. The RAG discussed that the size frequency data has been critical in progressing the assessment in the fishery to an age-based model that gives more certainty that the current TAC is sustainable. In the long term this data will provide indicators that will support the BDM HS, resolve some of the uncertainties in the current assessment, help monitor changes in stock due to climate change impacts or other factors and so on.

47. The RAG noted the feedback from invited industry observers that that they enjoyed working with AFMA observers and are supportive of continuing the sampling program, however, it could benefit from better advance notice to communities and communication on the role of the observers.

48. The RAG **RECOMMENDED** that the size frequency sampling continues to be undertaken during future black teatfish openings taking into consideration the following refinements on the pilot project:

    a. facilitate sampling at Bourke Islet as it is identified to be a key catch landing location;

    b. capture anecdotal industry on-water observations in the absence of at-sea sampling and logbook reporting; and

    c. if feasible, collect other morphometric data (e.g. age at maturity) considered useful for monitoring changes to catches, and potentially the stock, such as gonad reproductive state.

49. Traditional Inhabitant members advised that Zenadth Kes Fisheries Limited would be happy to assist with sampling.

4 Total allowable catches for the 2023 fishing season

50. The RAG considered TACs for species other than black teatfish (which was considered under Agenda Item 3), for the 2023 fishing season commencing on 1 January 2023. The RAG applied the BDM HS low tier decision rule and took into account new data and information available for the fishery for the 2021 fishing season (as tabled in the species assessment sheets (SAS) at **Attachment C**) and HCWG18 recommendations for the RAG to:

    a. revisit its advice to increase the curryfish vastus basket trigger limit from 15t to 30t given the modest standing stock biomass from the survey, relative to the 60t TAC for the curryfish basket. The HCWG sought further detail from the RAG to justify its recommendation to increase the trigger limit;

    b. review the deepwater redfish and hairy blackfish TACs in light of the biomass results from the survey;

    c. assess golden sandfish in line with the BDM HS at a future meeting.

51. Given the large number of species, the RAG agreed to prioritise the assessment of species that may have exceeded their TACs or individual basket species trigger limits during the 2021 fishing season, of which there were none. The RAG therefore noted that the low tier overcatch deduction provisions in the BDM HS do not apply in recommending TACs for 2023. The RAG advised as follows with regards to the HCWG18's specific recommendations to the RAG:

    a. Increasing the curryfish vastus trigger limit – the RAG conceded that a lower trigger limit of 15t is more appropriate as there is currently no new information, including catch data, to support increasing it to 30t.

    b. Deepwater redfish and Hairy blackfish TACs – the RAG noted that:

        i. Catches to date have been low and the advice from industry that fishing for these species is heavily market driven.

        ii. The ABARES observer's comment that these species are classified as uncertain in the ABARES Fishery Status Reports due to a low biomass estimate for the species relative to the TAC, compared to historically higher biomass estimates.

        iii. The most recent biomass estimates for both species were obtained from a scientific survey that was not optimised for their patchy distribution and did not include areas where they are known to occur such as Warrior Reef (as also confirmed by fishers on the ground that it does occur here).

        iv. Previous advice from CSIRO (see page 8 of **Attachment C**) that there is no concern for the current level of TAC for deepwater redfish as catches remain low relative to biomass and the overall increasing trend in density.

        v. More targeted survey and/or sampling of hairy blackfish is required to get sufficient information to assess its status however current catches are too low to justify the substantial investment in research.

        vi. AFMA will continue to work with industry to improve the quality of catch reporting, particularly with regards to spatial reporting and specifies identification.

    c. Golden sandfish – the RAG noted that golden sandfish were hardly observed during the 2019/20 scientific sea cucumber or annual TRL surveys due to minimal overlap with their habitat and there is currently no new information, including catch data, to assess the species under the BDM HS.

52. The RAG **RECOMMENDED** that the current TACs as outlined in **Table 2** be rolled over to the 2023 fishing season.

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**

5 Update on climate change related work on Torres Strait Fisheries

53. The RAG noted the:

    a. Video presentation provided by Dr Leo Dutra (CSIRO) on the outcomes of the project *Climate variability and change relevant to key fisheries resources in the Torres Strait — a scoping study* (climate change scoping project).

    b. The update on one of TSSAC's recently supported projects, *Understanding climate variability and change relevant to key fisheries resources in the Torres Strait and adaptation and mitigation strategies* (climate change modelling project) which is a follow up project to the climate change scoping project mentioned above. This project is currently seeking FRDC co-funding.

    c. The update from AFMA's Climate Adaptation Senior Program Manager, Alice McDonald on a body of work that is looking to build climate change information into fisheries management advice and decisions in AFMA's other Commonwealth fisheries, with a view to implementing a similar process for Torres Strait fisheries (a copy of the presentation is provided as **Attachment D**).

54. Following the presentations, the RAG further noted that the TSRA is currently updating the Torres Strait Regional Adaptation and Resilience Plan, which aims to deliver on the actions identified in the Torres Strait Climate Change Strategy, by building resilience in Torres Strait communities and helping them prepare for the impacts that climate change and other drivers of change are likely to bring.

55. The RAG observed that the TRL Fishery is the only Torres Strait fishery at this point that integrates quantified climate change impacts into the stock assessment and that there is work underway for Queensland-managed fisheries to assess whether climate impacts are more appropriately accounted for at the stock assessment or management levels. There is also some work being done on the climate change driven range expansion of species.

56. The RAG reflected that there is great benefit in the various PZJA Agencies working together to better integrate the various work that they are currently doing on accounting for climate change impacts in the fisheries management and decision making process.

57. The Traditional Inhabitant Member for Gudumalulgal expressed concern about climate change driven sand incursions that are also affecting surrounding reefs and leading to loss of important fisheries habitat for mud crab, barramundi and dugong as well as having broader ecosystem impacts. The RAG noted that the TSRA will be able to provide Mr Pabai with information on the ecosystem and fisheries impacts of siltation.

ACTION – TSRA to provide the Traditional Inhabitant Member for Gudumalulgal with information on the impact of siltation of river systems on fisheries (mud crab, barramundi, dugongs) and the broader ecosystem.

58. The RAG thanked Alice McDonald for her presentation and is looking forward to continuing the conversation on climate change adaptation with PZJA Agencies.

6 Fishery research priorities

59. The RAG 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 RAG also considered the additional analysis and sampling needs identified during the black teatfish discussion to support ongoing assessment of the species under the BDM HS. The RAG discussed the merits of undertaking another update of the black teatfish stock assessment in 2023 and agree that this was not required given another year's worth of catch and/or size frequency sampling data is unlikely to result in a different outcome to the 2022 updated stock assessment.

ACTION – AFMA to develop a draft scope for HCRAG consideration for a black teatfish size frequency sampling project during the 2023 black teatfish opening.

60. With regards to a future sandfish survey, the RAG still considers it to be an important research requirement for the BDM fishery to be able to assess the status of the sandfish stock at Warrior Reef and enable consideration of a future opening to benefit Torres Strait Islanders. The RAG noted the sequence of events that resulted in the discontinuation of the sandfish component of the planned survey in 2019-20 and agreed that the TSRA would lead the initial engagement with Iama and Tudu Island Traditional Owners, fishers and other relevant stakeholders to re-confirm support, followed by engagement from AFMA, in conjunction with the Traditional Inhabitant Member for Kulkalgal, on the proposed approach and the project proposal that may be submitted.

61. The RAG agreed that the successful research provider will decide the composition of the research team to lead and undertake the project. The RAG also noted advice from the PNG NFA representative that they would consider co-funding a cross border sandfish project on Warrior Reef given it is a shared stock between the two countries.

ACTION – TSRA to lead initial engagement with Iama and Tudu Island Traditional Owners, fishers and other relevant stakeholders to re-confirm support for a sandfish stock survey.

ACTION – AFMA:

a. to develop a draft scope for the survey of sandfish, deepwater redfish, hairy black fish and other commercially relevant hand collectable species known to occur on Warrior Reef (e.g. pearl shell) for HCRAG and TSSAC consideration;

b. in conjunction with the Traditional Inhabitant Member for Kulkalgal, to continue engagement and consultation with Iama and Tudu Island Traditional Owners, fishers and other relevant stakeholders on the proposed approach and any project proposal submitted;

c. engage with the PNG NFA on potential cross-border collaboration and co-funding opportunities for sandfish stock survey on Warrior Reef.

62. The RAG deferred recommendations relating to socio-economic related priorities pending a presentation from Scientific Member Steven Purcell to the HCWG on how socioeconomic considerations can inform management. The RAG however noted advice from the TSRA Member to prepare a scope for research activity 9 in Table 3 on supply chains and provide some commentary on research activity 7 on socioeconomics.

ACTION – TSRA Member to prepare a scope for research activity 9 in Table 3 on supply chains and provide some commentary on research activity 7 on socioeconomics.

7 New application to undertake aquarium fishing in the Torres Strait

Dr Eva Plaganyi-Lloyd left the meeting at 3:30pm.

Mr Dean Pease, Aus Fish Coral Pty Ltd, joined the meeting at 3:45pm.

63. The RAG Chair welcomed Mr Dean Pease of Aus Fish Coral Pty Ltd who presented on the company's application to undertake aquarium fishing in the Torres Strait, the presentation is provided as **Attachment E**.

64. Following the presentation, the RAG sought clarification from Mr Pease on key elements pertaining to the proposed activity, noting that there aren't any established management arrangements currently to regulate the sustainable harvest of ornamental and aquarium species in the Torres Strait. Specifically, the RAG noted that the:

    a. value of the species proposed to be harvested is unknown and the company intends to test the market through a gradual introduction of the species proposed to be harvested in small quantities;

    b. company would be willing to engage with Torres Strait Islanders and any other relevant stakeholders on the proposed activity and area of operation which is currently indicated to be equivalent to the area of the entire TRL Fishery, including the outside but near area. Specific fishing areas and locations are yet to be identified;

    c. operation would consist of a vessel less than 10m in length with 2 crew;

    d. company would be willing to work towards creating employment opportunities for Torres Strait Islanders in the long term to undertake the fishing operations;

    e. Company currently holds a Queensland State fishing licence that does not allow the harvest of Tridacna crocea clam species, which would be the focus of the fishing activity proposed for the Torres Strait.

65. The RAG thanked Mr Pease for his time and presentation and he left the meeting at 4pm on 28 September 2022.

66. The RAG noted advice from the AFMA Member that there is a parallel broader licencing policy consideration underway by the PZJA that may impact whether the proposed new fishing activity can proceed. AFMA will continue to consult with affected licence holders on the PZJA's decision. AFMA will also consult with Aus Fish Coral Pty Ltd on any further information that the HCRAG and HCWG may require throughout the consultation process to develop appropriate monitoring, assessment and management arrangements for the proposed activity.

67. The RAG assessed the current application on its merits and recommended some minimum information and reporting requirements for the collection of ornamental species, in the absence of specific fishery and/or scientific information to set sufficiently precautionary catch limits. These being:

    a. The need for independent scientific advice on the species proposed to be harvested and the likely level of impact of the proposed activity on target and non-target species (e.g. corals) in

the Torres Strait, for example some of the proposed harvest levels are far less conservative than those for other established ornamental fisheries in Australia.

b. Additional information on specific areas to be fished.

c. Detailed catch reporting of individual species harvested as well as reporting of effort information.

68. The RAG advised that further information on how the company intends to engage and/or collaborate with Torres Strait Islanders would also be helpful to be able to gauge and assess the likely impact of the proposed activity on species of traditional significance and livelihoods.

69. The RAG requested to be consulted on any future EPBC Act approval submissions relating to aquarium and ornamental fishing activities in the Torres Strait and for a copy of the Aus Fish Coral presentation to be circulated to RAG members.

ACTION – AFMA to circulate a copy of the Aus Fish Coral Pty Ltd presentation to RAG members.

8 Other business

70. The RAG noted the advice from the TSRA Member to defer the presentation on "Understanding the Dimensions of Sustainable BDM Fisheries Management" to a future meeting.

71. There was no other business formally nominated for discussion however, the RAG, at the request of the Traditional Inhabitant Member from Kemer Kemer Meriam, revisited the discussion relating to access requirements for some sea cucumber fishing grounds in the Queensland State managed fishery (see action item 3 from HCRAG01). Specifically, clarification was sought from the Queensland Member on how Ashmore Reef might be accounted for appropriate sea country ownership by Mer and whether any other overlapping sea country claims have been identified.

ACTION – Queensland Member to clarify access requirements with the QDAF general fisheries permit (GFP) section for Ashmore Reef, in particular how this area might be accounted for appropriate sea country ownership by Mer and whether any other overlapping sea country claims have been identified.

9 RAG priorities and date for next meeting

72. The RAG agreed a discussion on additional priorities is currently not required as there are specific actions identified throughout the meeting that need to be progressed in the first instance.

73. The RAG further agreed that it did not need to meet prior to the 2023 black teatfish opening and tentatively schedule its next meeting for the second half 2023.

74. The Chair extended her gratitude and appreciation to all embers and observers for their contribution to a productive meeting. The TSRA Board Fisheries Portfolio member thanked the Chair for her running of the meeting.

75. Mr Simon Naawi closed the meeting at 5:05pm in Prayer.

List of attachments

Attachment A – Presentation on the results of the CSIRO analysis of data reported during the opening

Attachment B – Presentation on the outcomes of the CSIRO research project: 'Stock survey of Torres Strait Beche-de-mer species'

Attachment C – Species Assessment Sheets

Attachment D – Presentation on climate adaptation projects

Attachment E – Presentation from Aus Fish Coral Pty Ltd

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
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.
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 (**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.)	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 followed by subsequent consultation by AFMA on the draft project scope and potentially proposal following HCRAG review.

	Research activity	Detail	Status	Draft HCRAG02 advice
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.
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 that is resilient to fluctuating export market conditions.	Not scoped/not costed	Not prioritised – could benefit from better articulation to differentiate from a value chain issue and informed by any 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**.**

	Research activity	Detail	Status	Draft HCRAG02 advice
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.
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
13	Ecological Risk Assessment (ERA)	Conduct an ERA for the TSBDM Fishery	Final report completed on 21 Dec 2021	Noted
14	Climate Change impacts and vulnerability	Scoping study across all Torres Strait	Completed	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

Summary of actions arising from HCRAG 2

Action Item	Responsibility
TSRA to liaise directly with QDAF on aquaculture development opportunities and for an overview of the approval requirements.	TSRA
AFMA to seek advice from DCCEEW on the process for varying the seasonal catch limits for black and white teatfish as stipulated in the WTO conditions, outside of the 3-year WTO reassessment cycle.	AFMA
CSIRO to provide a brief non-technical summary of the black teatfish size frequency sampling project once completed.	CSIRO
TSRA to provide the Traditional Inhabitant Member for Gudumalulgal with information on the impact of siltation of river systems on fisheries (mud crab, barramundi, dugongs) and the broader ecosystem.	TSRA
AFMA to develop a draft scope for HCRAG consideration for a black teatfish size frequency sampling project during the 2023 black teatfish opening.	AFMA
TSRA to lead initial engagement with Iama and Tudu Island Traditional Owners, fishers and other relevant stakeholders to re-confirm support for a sandfish stock survey.	TSRA
AFMA: a. to develop a draft scope for the survey of sandfish, deepwater redfish, hairy black fish and other commercially relevant hand collectable species known to occur on Warrior Reef (e.g. pearl shell) for HCRAG and TSSAC consideration; b. in conjunction with the Traditional Inhabitant Member for Kulkalgal, to continue engagement and consultation with Iama and Tudu Island Traditional Owners, fishers and other relevant stakeholders on the proposed approach and any project proposal submitted; c. engage with the PNG NFA on potential cross-border collaboration and co-funding opportunities for sandfish stock survey on Warrior Reef.	AFMA
TSRA Member to prepare a scope for research activity 9 in Table 3 on supply chains and provide some commentary on research activity 7 on socioeconomics.	TSRA
AFMA to circulate a copy of the Aus Fish Coral Pty Ltd presentation to RAG members.	AFMA
Queensland Member to clarify access requirements with the QDAF general fisheries permit (GFP) section for Ashmore Reef, in particular how this area might be accounted for appropriate sea country ownership by Mer and whether any other overlapping sea country claims have been identified.	QDAF Member

Summary of HCRAG 2 recommendations

Agenda Item #	Recommendations
3	The RAG **RECOMMENDED** an annual 20t TAC for black teatfish on the basis that updated modelling analysis, inclusive of 2022 catch and sampling data, confirmed that it continues to be sustainable and would not lead to a consistent decline in

Agenda Item #	Recommendations
	black teatfish biomass after the first year of fishing. In contrast, all models found that catches of 30t could lead to a gradual depletion of the stock.
3	The RAG **RECOMMENDED** that fishing for black teatfish can progress from being on a trial basis to a more consistent annual opening given the success of the 2021 and 2022 trial re-openings which have demonstrated that there are sufficient management, monitoring and compliance tools in place to mitigate the risk of overcatch. Black teatfish will continue to be assessed under the BDM HS. This will give industry better certainty to plan their operations.
3	The RAG **RECOMMENDED** that the size frequency sampling continues to be undertaken during future black teatfish openings taking into consideration the following refinements on the pilot project: a. facilitate sampling at Bourke Islet as it is identified to be a key catch landing location; b. capture anecdotal industry on water observations in the absence of at sea sampling and logbook reporting. c. If feasible, collect other morphometric data (e.g. age at maturity) considered useful for monitoring changes to catches, and potentially the stock, such as gonad reproductive state.
4	The RAG **RECOMMENDED** that the current TACs as outlined in Table 2 be rolled over to the 2023 fishing season.

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.

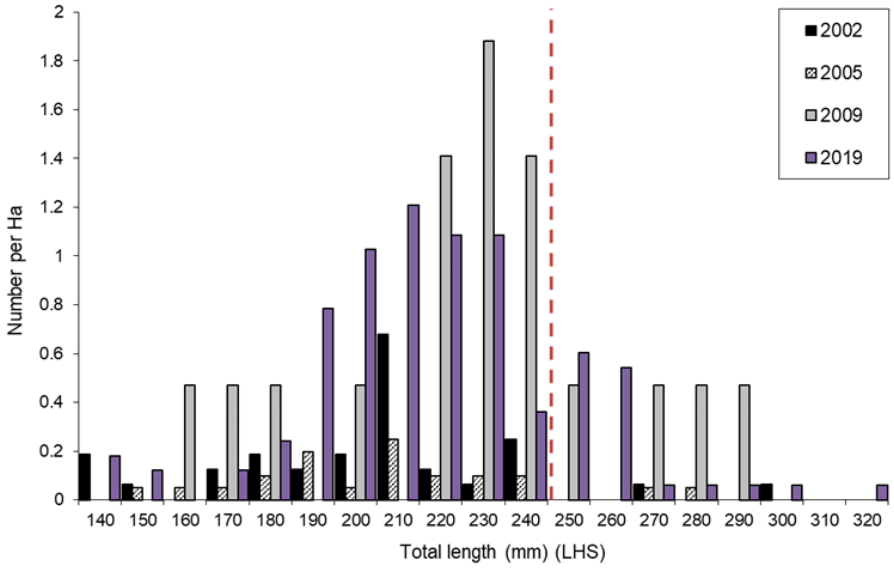


Figure 1. Length frequency for Black teatfish collected during population surveys in East Torres Strait in 2002, 2005, 2009 and 2019/2020. Minimum Legal Size (MLS) of 250 mm indicated; LHS = minimum size of bin range (Murphy et al. 2021).

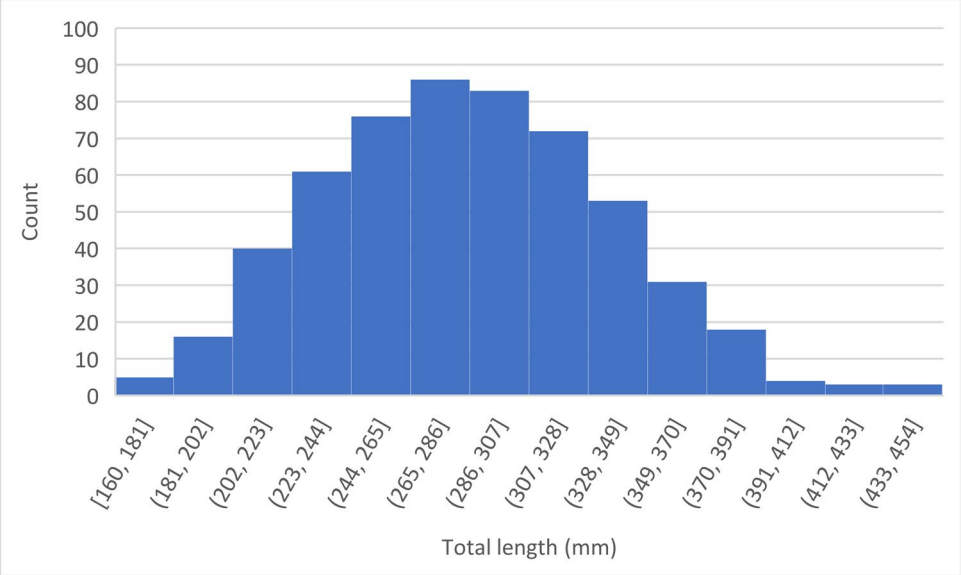


Figure 2. Length frequency measurements (whole) for Black teatfish for the 2022 fishery opening.

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).

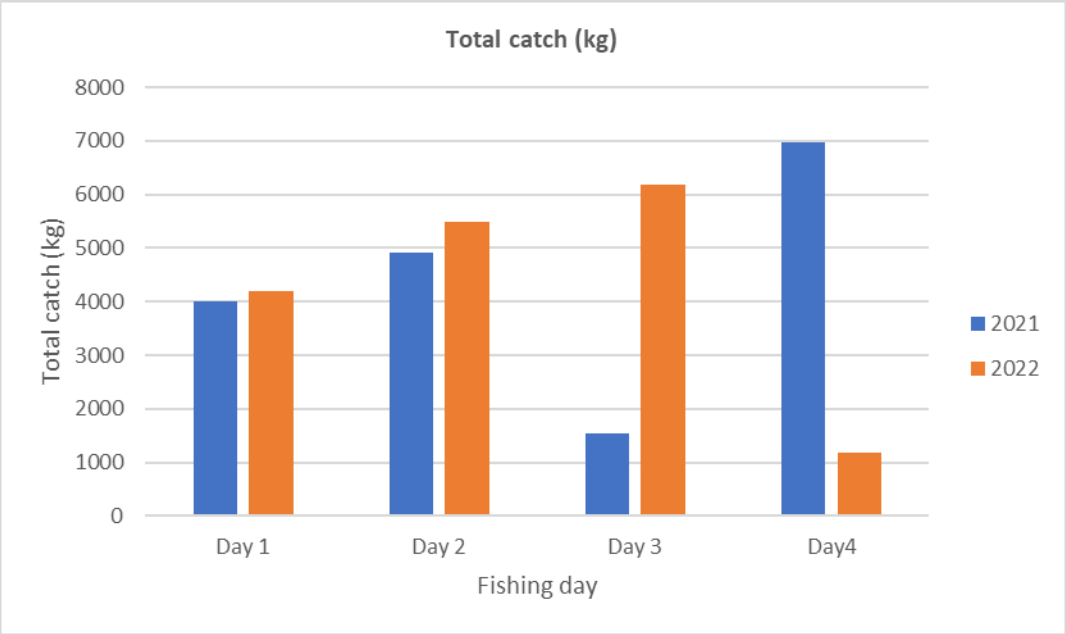


Figure 3. Total catch per day (gutted weight - kg).

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

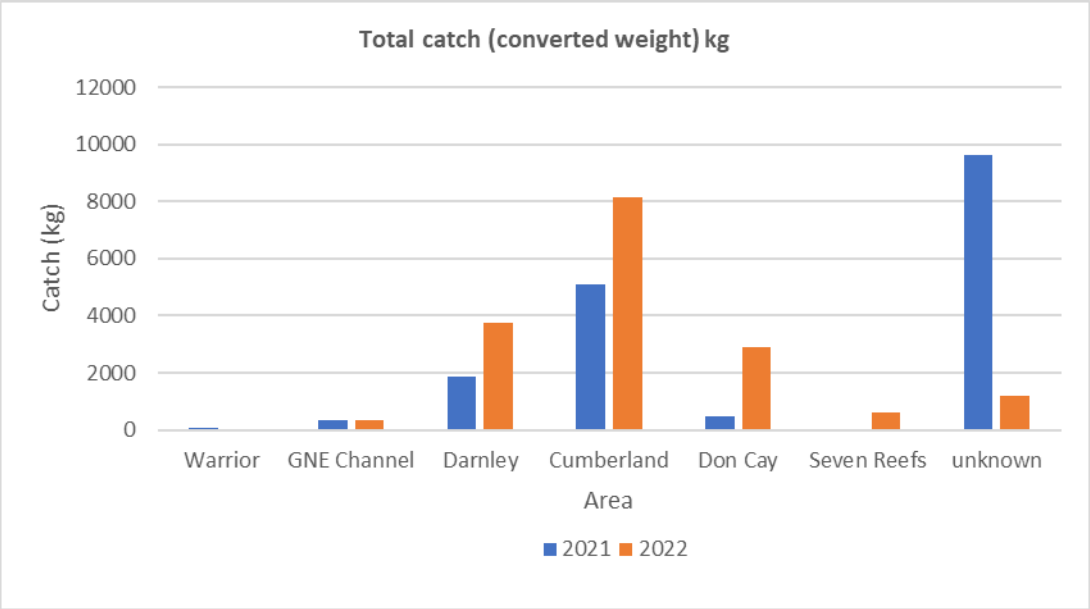


Figure 4. Total catch (converted weight - kg) for logbook zones between years.

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.

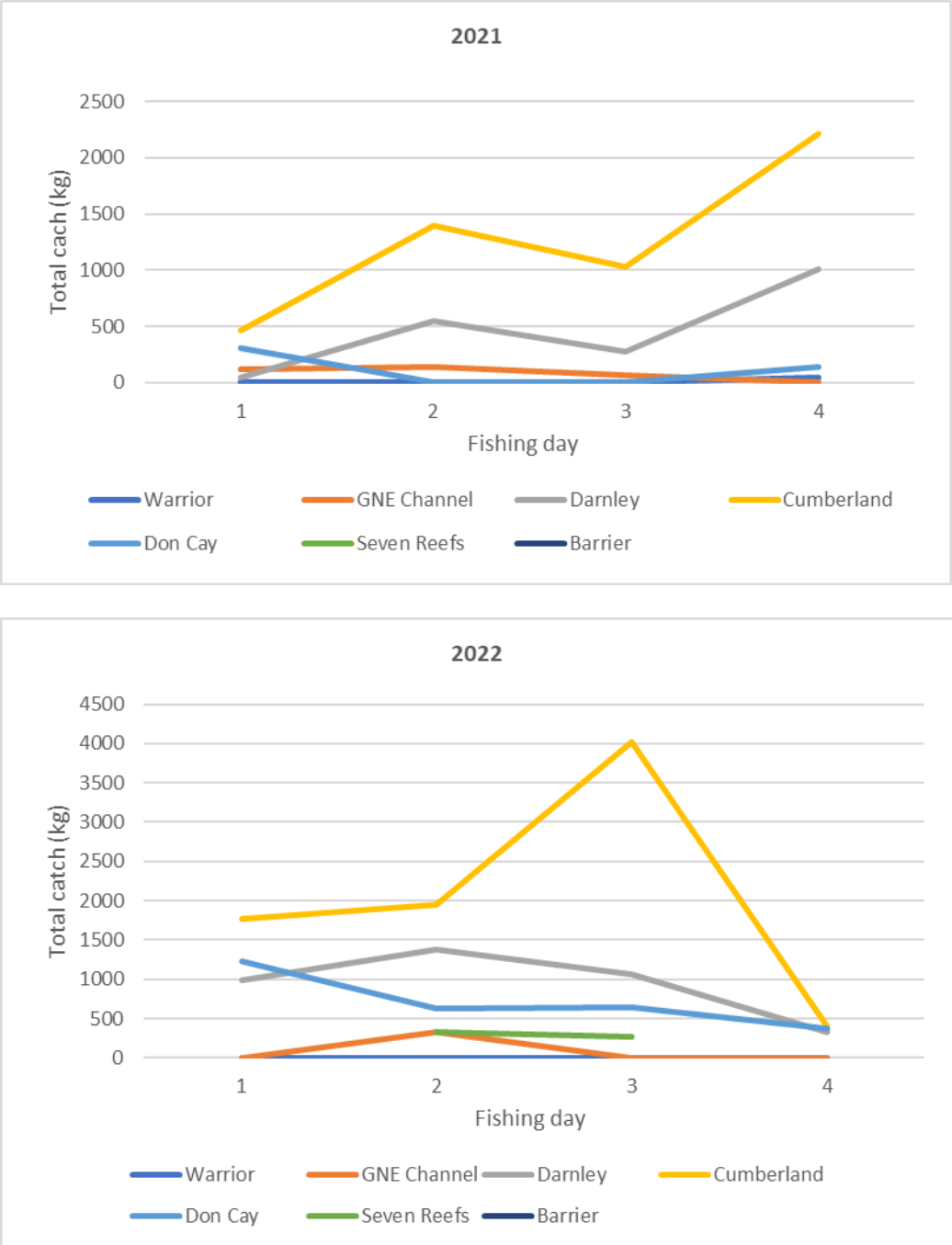


Figure 5. Total catch (converted weight - kg) for logbook zones for each fishing day for 2021 (top) and 2022 (bottom).

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).

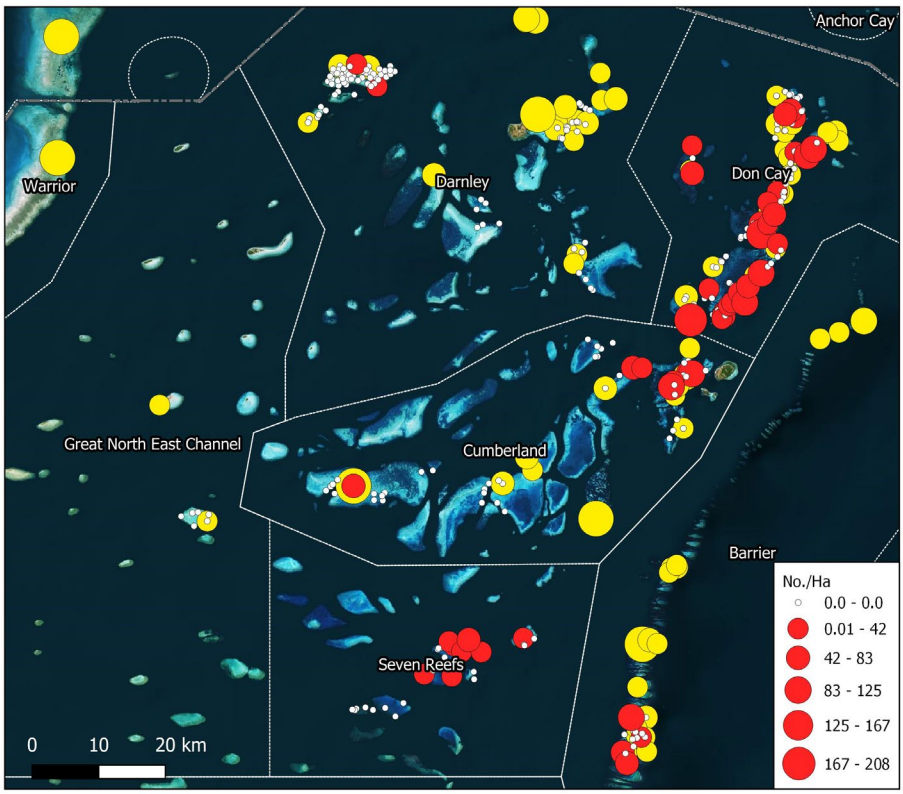


Figure 6. Density of Black teatfish (*H. whitmaei*) at individual survey sites during surveys in East Torres Strait from 1995 to 2009 (yellow) and 2019 (red).

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).

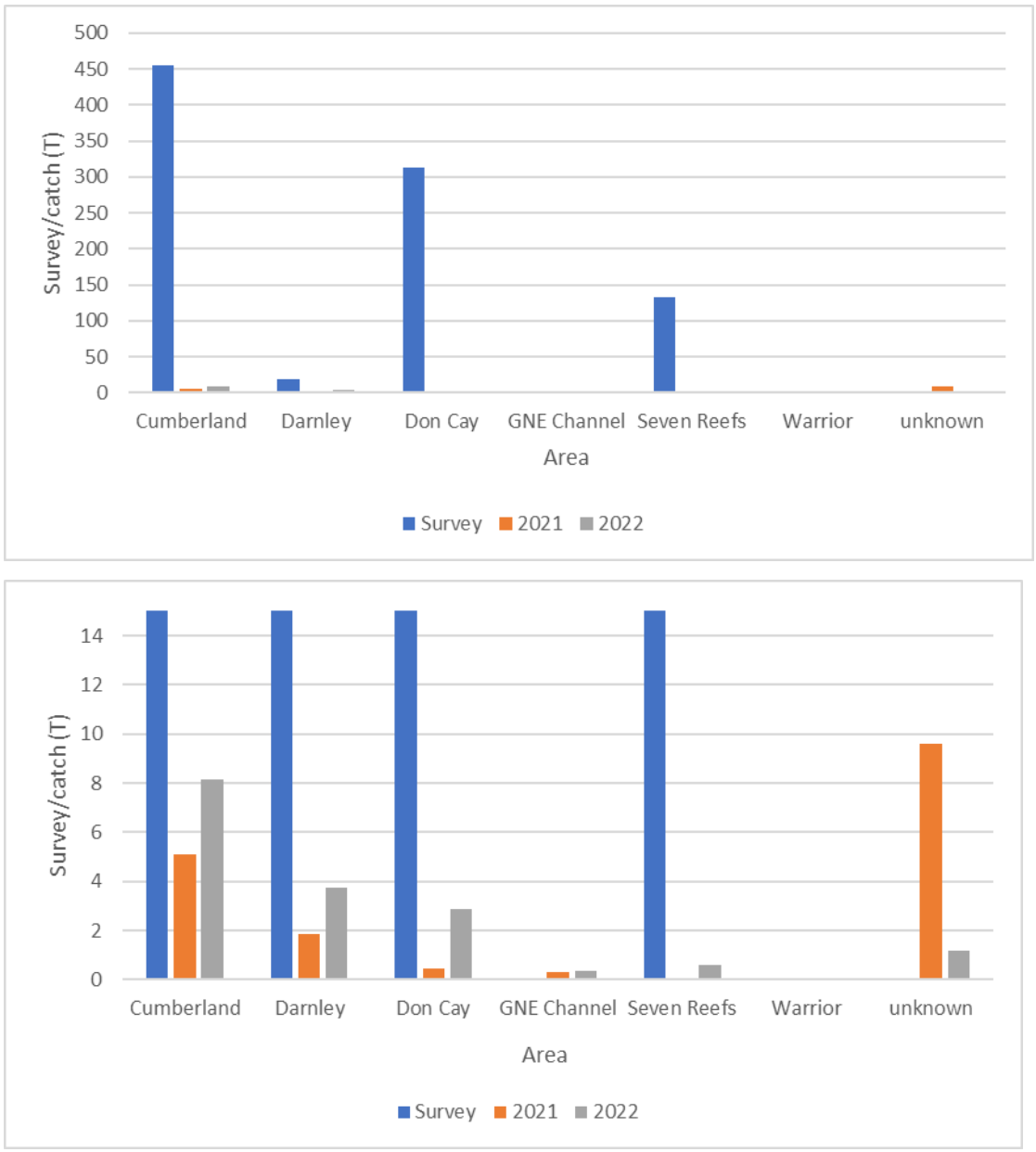


Figure 7. Survey estimates (gutted weight - t) and catch (gutted weight - t) for logbook zones (bottom graph is the same at the top with a reduced (Y) scale).

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).

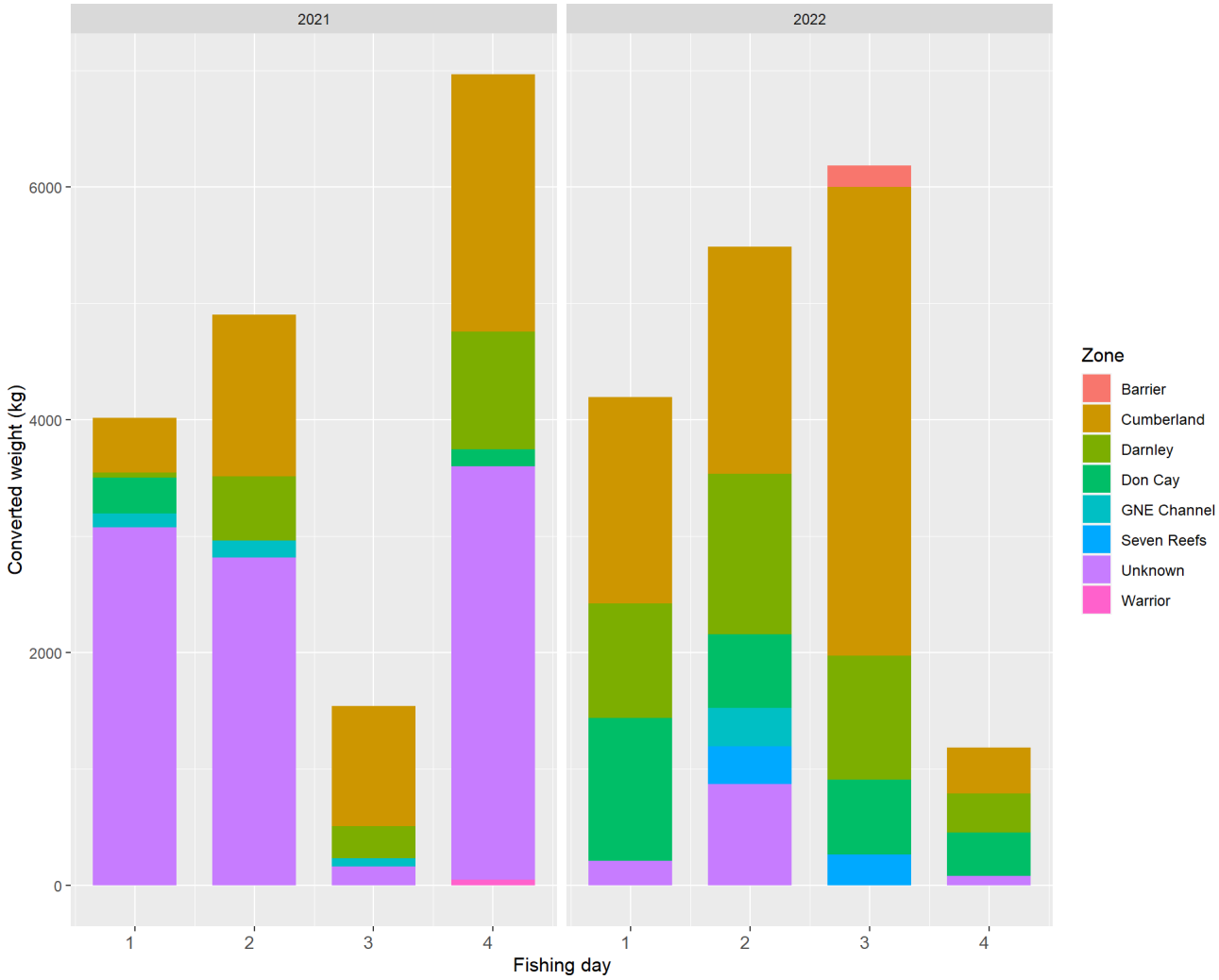


Figure 8. Total daily catch (converted weight – kg) across logbook zones for days fished, between years.

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).

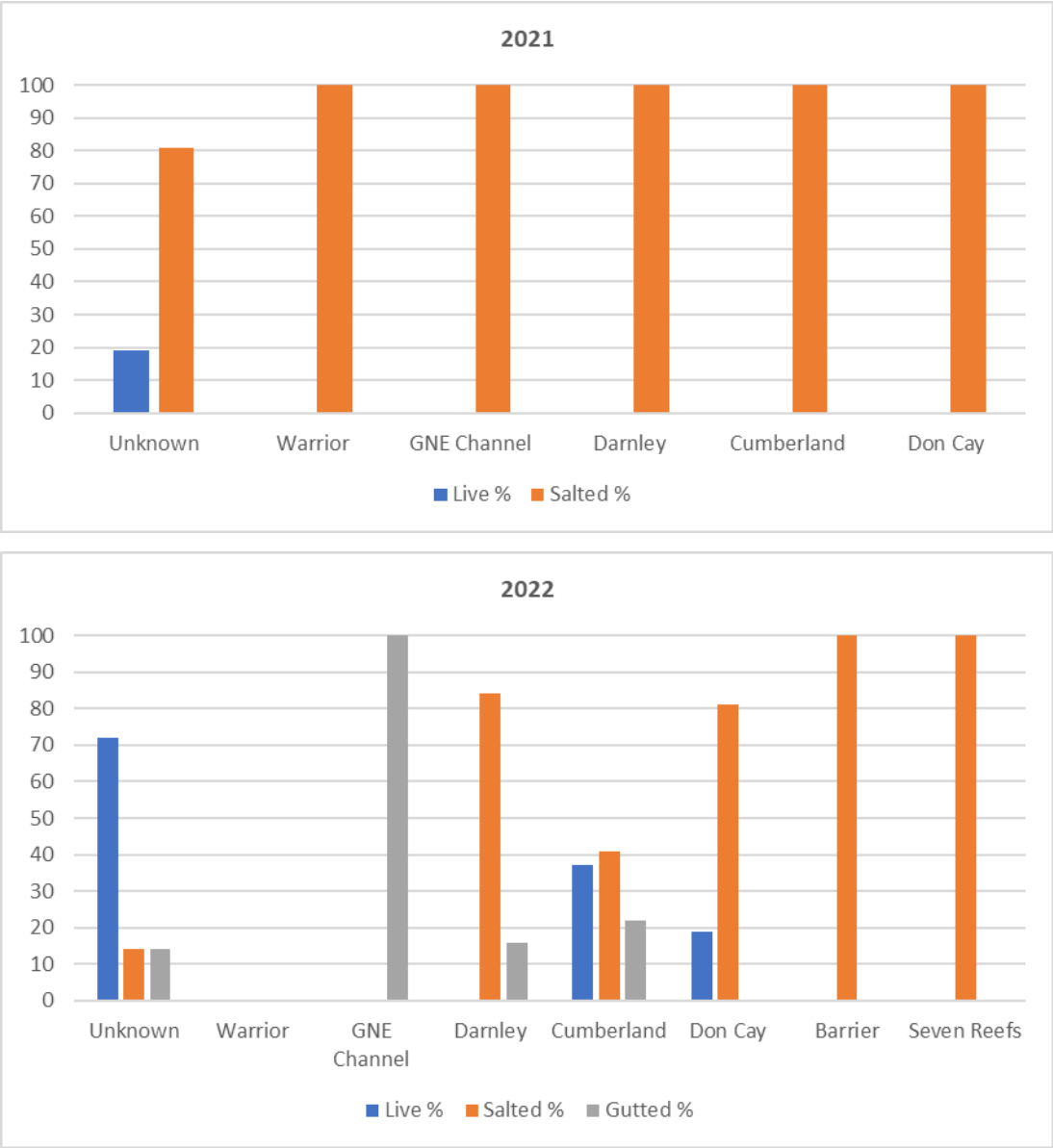


Figure 9. Percent product form of catch landed at fish receivers, also showing logbook zones for 2021 (top) and 2022 (bottom).

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.

CSIRO acknowledges the Traditional Owners of the land, sea and waters, of the area that we live and work on across Australia. We acknowledge their continuing connection to their culture and we pay our respects to their Elders past and present.

Stock assessment for Torres Strait Black teatfish

Éva Plagányi, Nicole Murphy, Tim Skewes

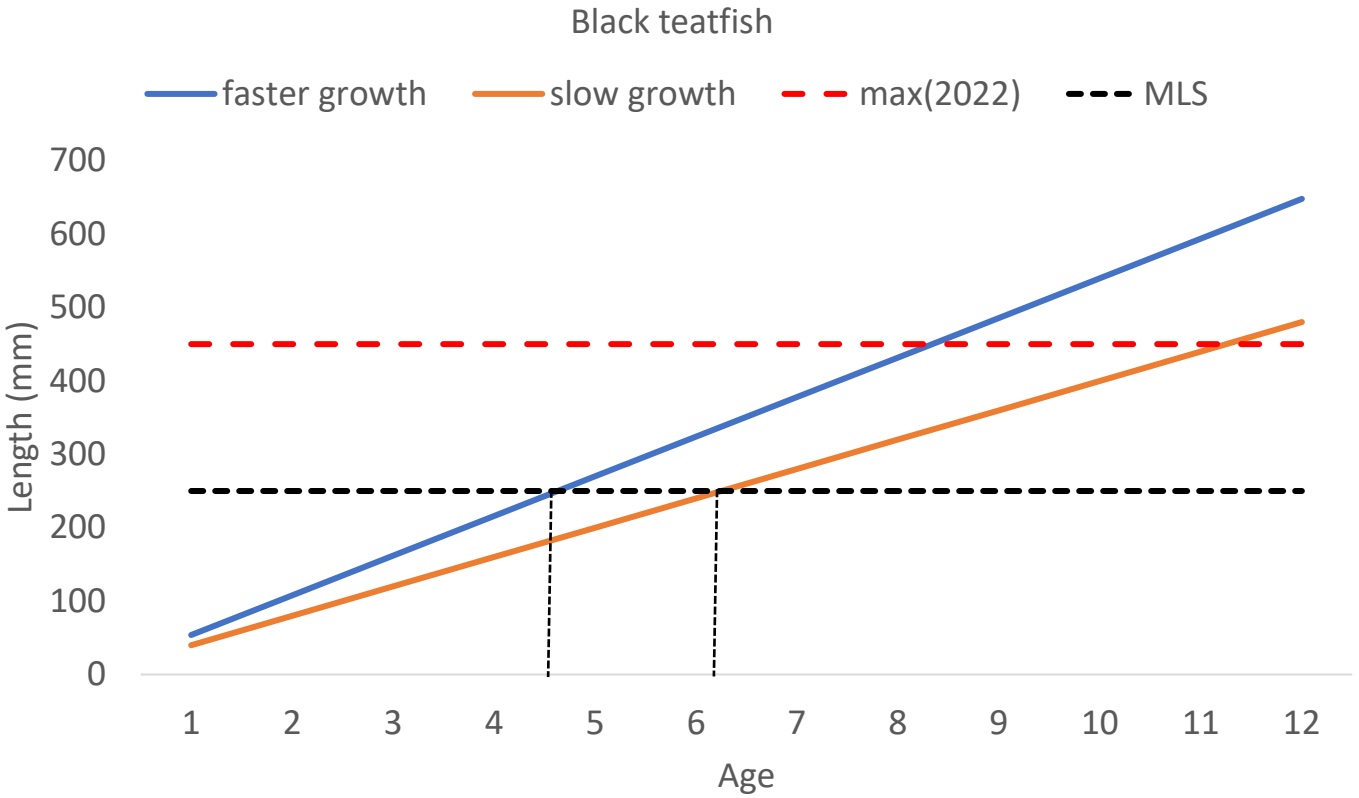
|Sept 2022

HCRAG

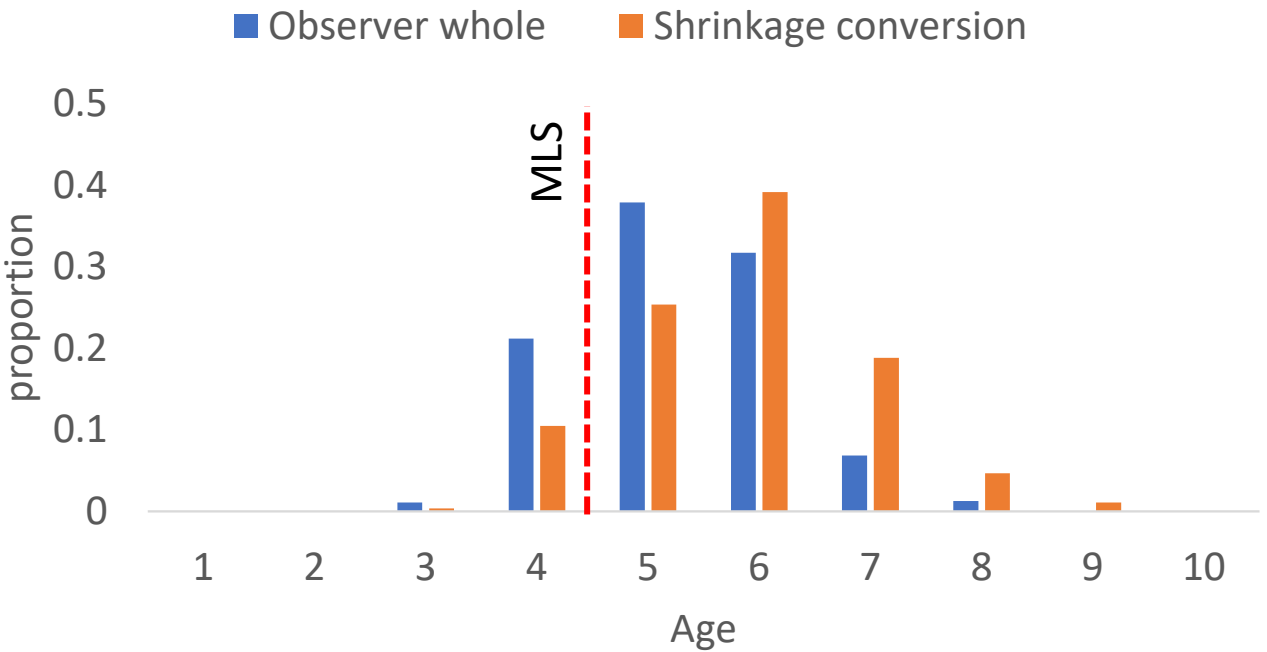
Australia's National Science Agency

Overview

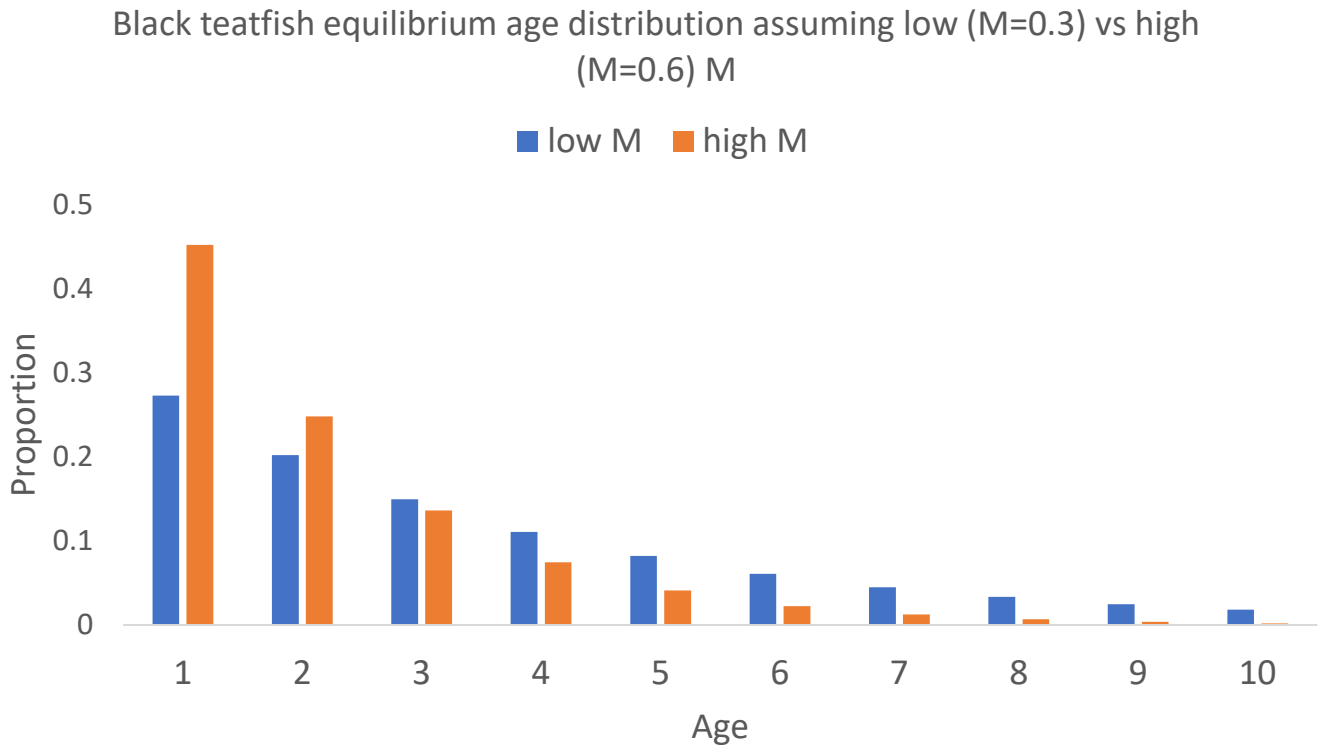
1. Data overview
2. Why Modelling?
3. Models and the Harvest Strategy
4. Surplus Production Model
5. **Age-structured model (new)**


Black teatfish
faster growth
slow growth
max(2022)
MLS
Length (mm)
0
100
200
300
400
500
600
700
1
2
3
4
5
6
7
8
9
10
11
12
Age

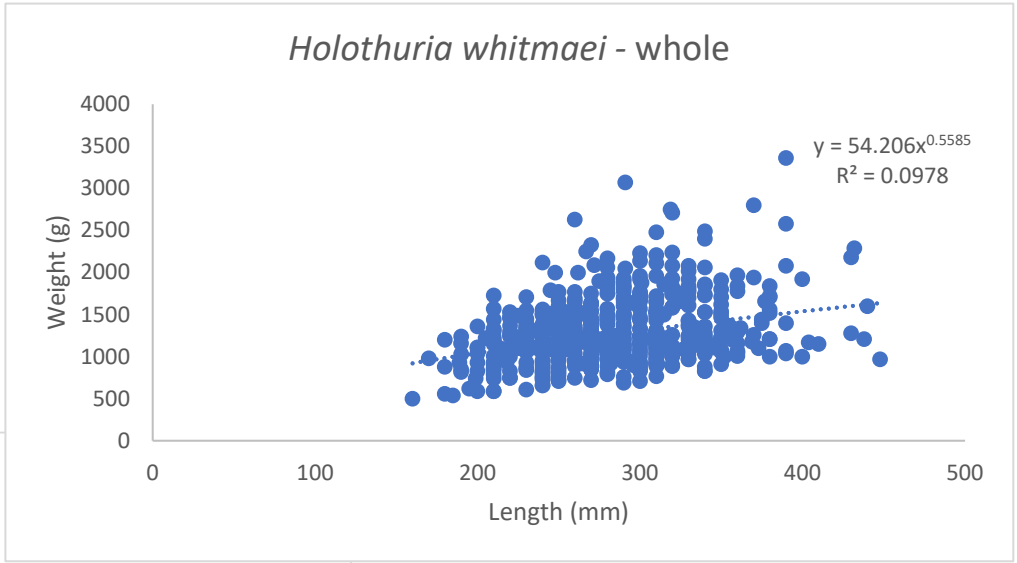
Using shrinkage factor (10%) to adjust length frequency

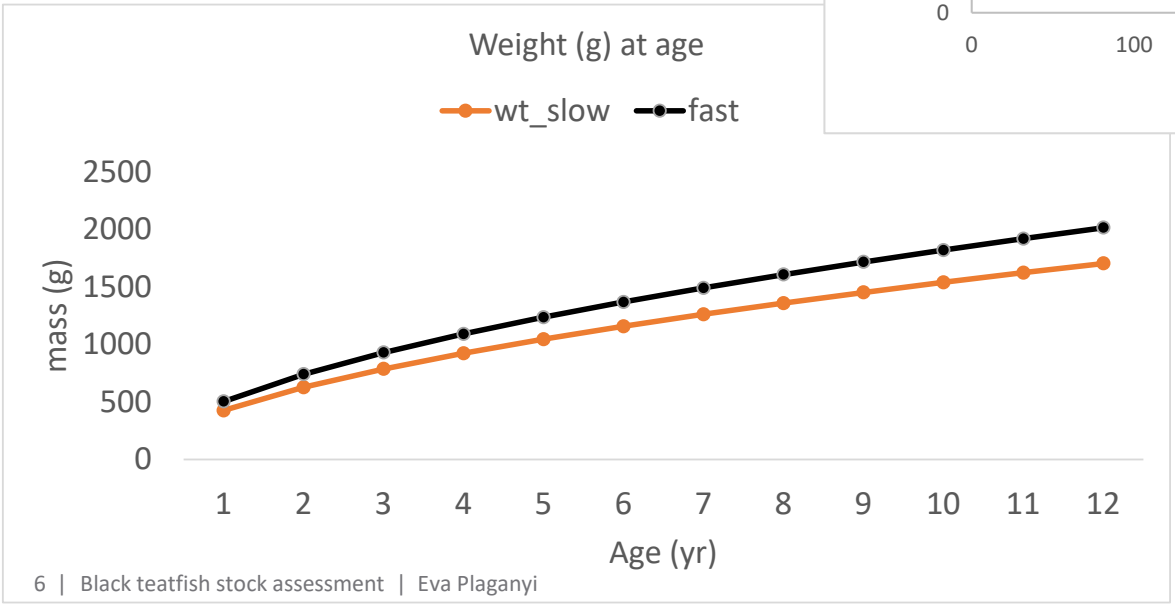


Applying shrinkage reduces proportion under-size (<MLS) from 27% to 10%


Black teatfish equilibrium age distribution assuming low (M=0.3) vs high (M=0.6) M
low M
high M
Proportion
0.5
0.4
0.3
0.2
0.1
0
1
2
3
4
5
6
7
8
9
10
Age

Morphometrics





Why Modelling?

- Objective way to explore the population dynamics and to see which life history parameters are consistent with the trends in the data
- Provides a dynamic (i.e. changing over time) picture of a species and hence informs on not just standing biomass but also what the likely productivity (i.e. turnover rate) is to help inform on sustainable fishing levels
- Formal model selection methods (eg likelihood ratio test, AIC criterion) can be used to select the most parsimonious model, i.e. the model which most reasonably explains the data without adding an unnecessarily large number of parameters that can’t be estimated reliably

Model limitations

- As with any model, model outputs are only as good as the data that are used (GIGO – Garbage In = Garbage Out)
- Few values in the BTF time series (i.e. 5 survey points) but some contrast in the time series (i.e. a downward trend followed by a recovery) is key to being able to estimate productivity
- Biomass dynamic models such as used here are simple models that use lumped biomass but are a useful first step (ideally alternative formulations should be considered in future, such as the age-structured models with associated uncertainties used in the previous MSE* project)

*MSE: Management Strategy Evaluation

How does the modelling relate to the new Harvest Strategy (HS)

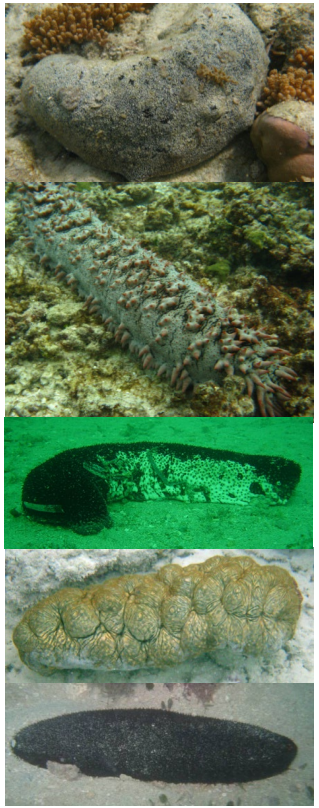
- The modelling is used to corroborate or shed additional light on analyses of the survey data to provide insights into stock status and sustainable yield
- Modelling can explore a range of alternative scenarios with different levels of precaution added
- Consistent with the HS philosophy of being able to improve and refine management advice as more data become available, models will also be able to refine and improve their estimates as more data become available

Reminder: How does it work for different stocks with more or less information and data

- If we have less data then assessments need to be simpler and the harvest strategy needs to be more precautionary eg the aim might be to maintain catch rates at historical levels

- With better information and data for a stock, a stock assessment model that uses all the information can be used

- But stock assessments also differ – can be high quality vs more uncertainty in stock assessment:
  - when more certain can approach more robustly
  - but when less certain about stock status then need to be more precautionary as you have less certainty about stock status

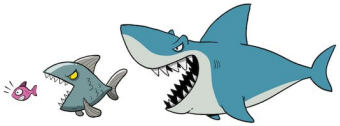


Total Biomass vs Available biomass

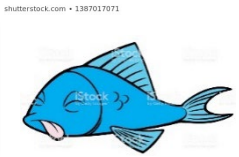
- The biomass of a fishery that is “available” to be caught is calculated as the biomass above the MLS (minimum legal size)
- If possible, this is the best quantity to use to calculate the sustainable yield, and is the biomass measure used in age-structured and size-structured fisheries models such as for TRL
- The biomass dynamics model used here can only consider total biomass but more complicated models can refine this
- Available biomass is a better measure than total biomass for stocks that are recovering because it takes into account the lag time for recovery to occur and hence for sufficient animals to grow larger than the MLS and be available to the fishery. If the age-structure is skewed towards incoming recruits, total biomass can overestimate the sustainable yield.

Modelling Basics

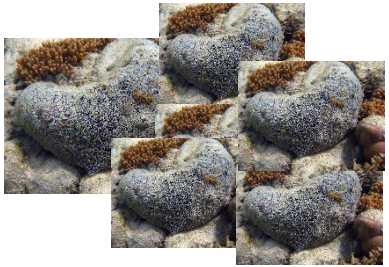
How many animals this year and hence how many can be caught sustainably?



Subtract those that die due to natural causes (natural mortality M) and fishing (fished proportion F)



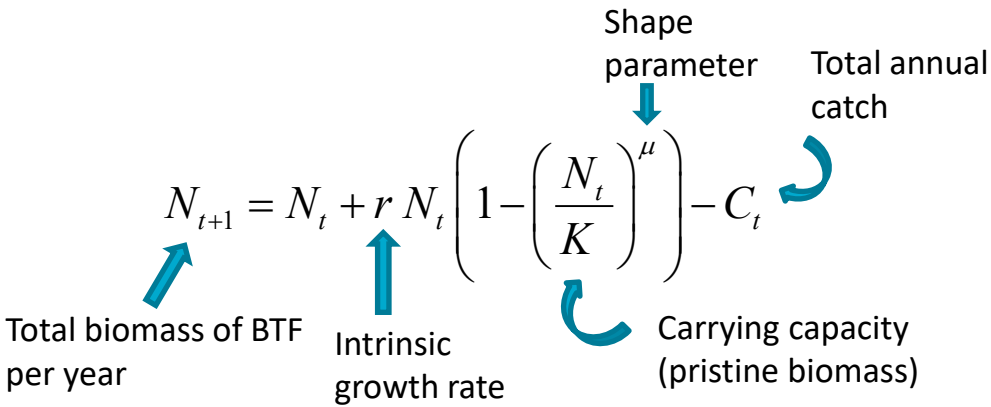
How many are left to breed : calculate recruitment and add to population numbers, allowing time to grow



Update model population estimates

Check how model estimates compare with actual observations – adjust population parameters (e.g. M) to improve explanation of data

Surplus Production Model: Pella-Tomlinson equation

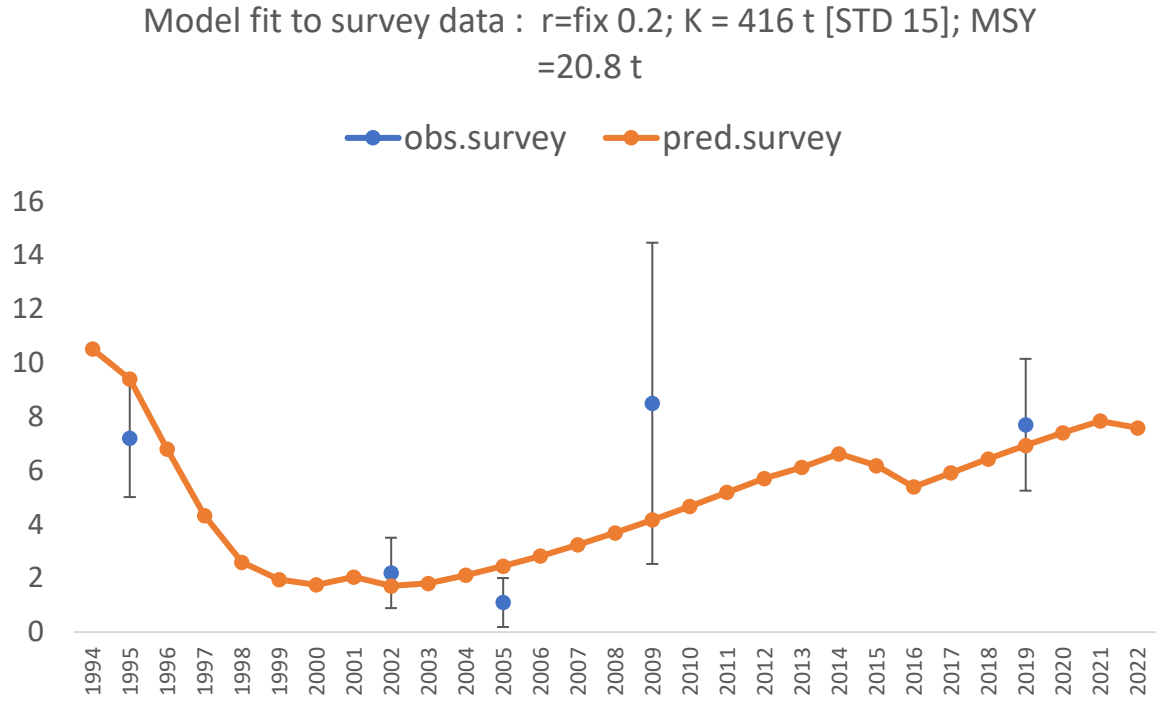


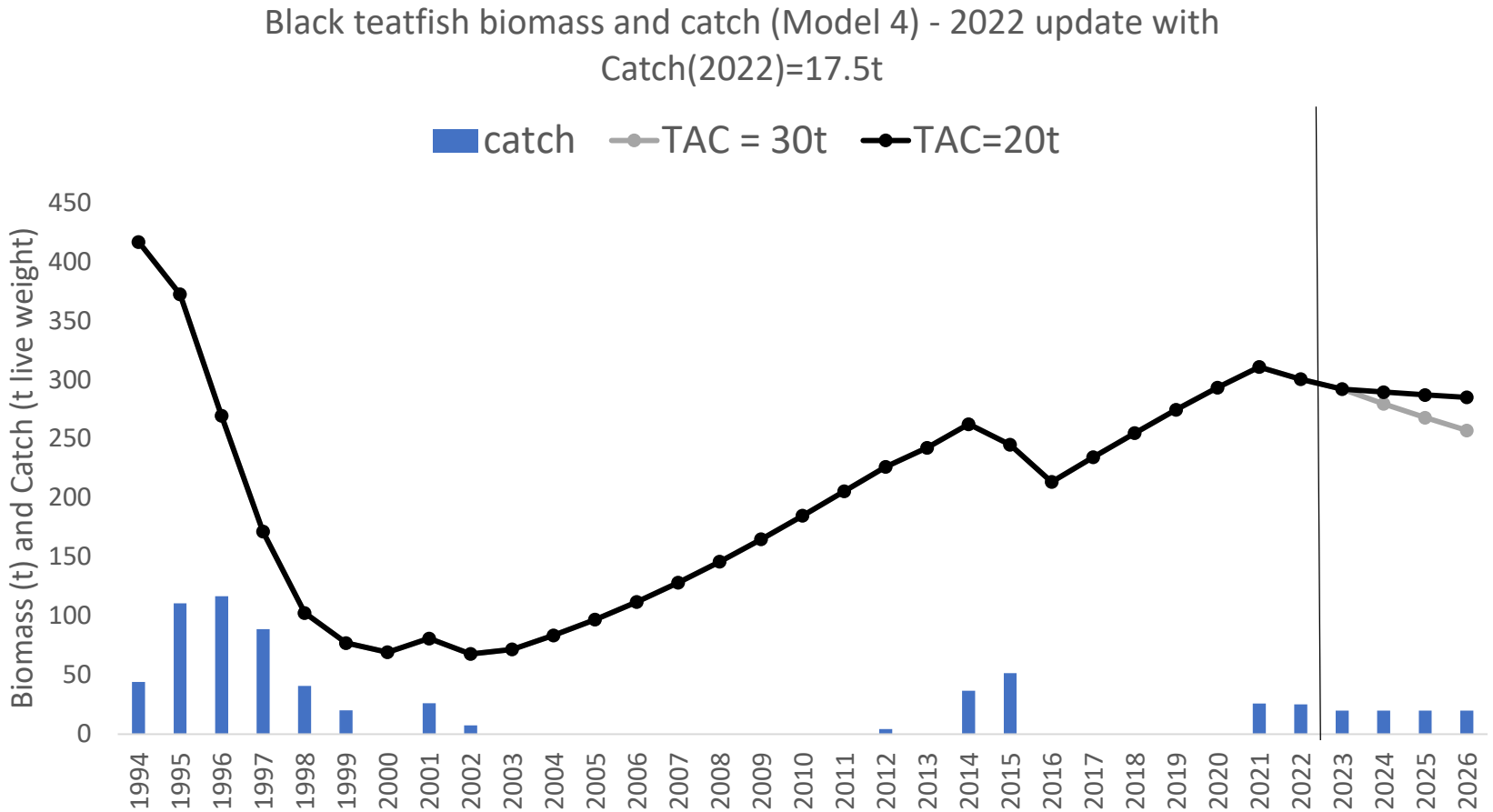
- Lumped biomass model
- Assumes growth is density-dependent
- The combination of *r* and *K* is more robust than these parameters on their own and informs on sustainable/replacement yield
- Implemented in ADMB

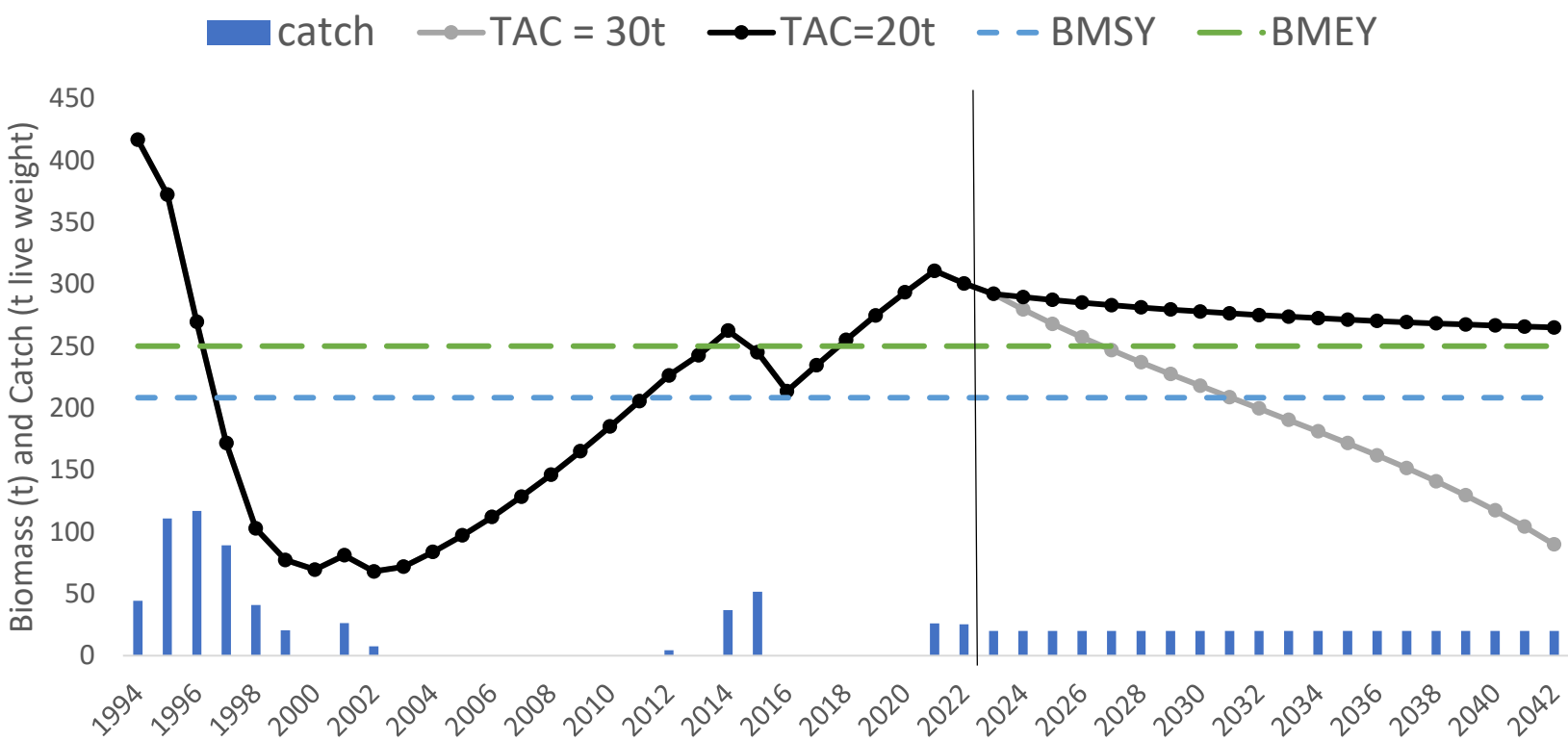
Model Results Summary – 2021: preferred model was Model 4 below (fix r; use Schaefer production form) hence used again as Reference Case

	Description	No.pars	r & [STDEV]	K (t) & [STDEV]	q	-lnL	AIC
Model 1	S; fix r	1	0.15	490.7 [67]	0.014	-2.336	-2.672
Model 2	double surv(95)	1	0.15	450.0 [257]	0.0233	-3.552	-5.104
Model 3	S; fix r	1	0.1	600.9 [172]	0.01	-1.605	-1.21
Model 4	S; fix r; dbl	1	0.2	416.6 [150]	0.025	-4.442	-6.884
Model 5	S; est r,K	2	0.29 [0.13]	391.8 [60]	0.017	-3.173	-2.346
Model 6	S; est r,K; dbl	2	0.25 [0.08]	396 [35]	0.025	-4.665	-5.33
Model 7	P; est r,K,mu; dbl; mu=3.5	3	0.25 (0.08]	396 [35]	0.025	-4.665	-3.33
Model 8	Fix K, est r	1	0.097 [0.08]	820.6	0.0068	-1.23	-0.46

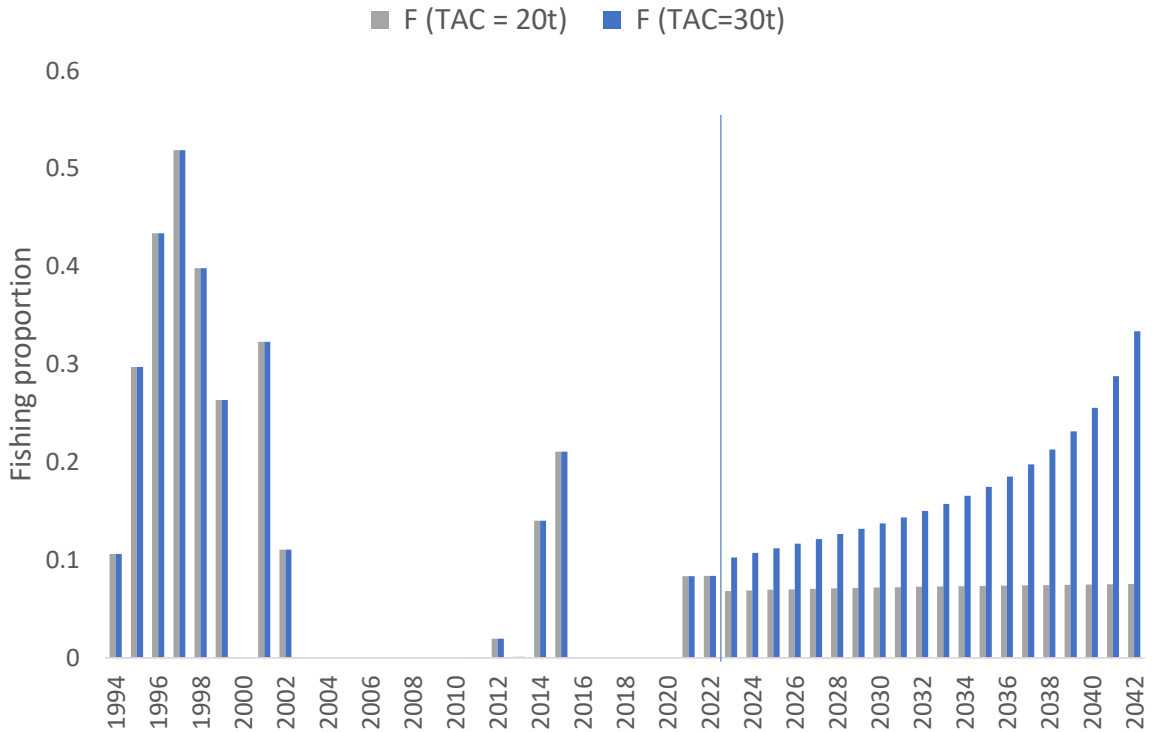
Schaefer base model fit to survey data




Black teatfish biomass and catch (Model 4) - 2022 update with Catch(2022)=17.5t
catch
TAC = 30t
TAC=20t
Biomass (t) and Catch (t live weight)
0
50
100
150
200
250
300
350
400
450
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026


Black teatfish biomass and catch (Model 4) - 2022 update with Catch(2022)=17.5t
catch
TAC = 30t
TAC=20t
BMSY
BMEY
Biomass (t) and Catch (t live weight)
450
400
350
300
250
200
150
100
50
0
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042

Fishing proportion (F) estimates*

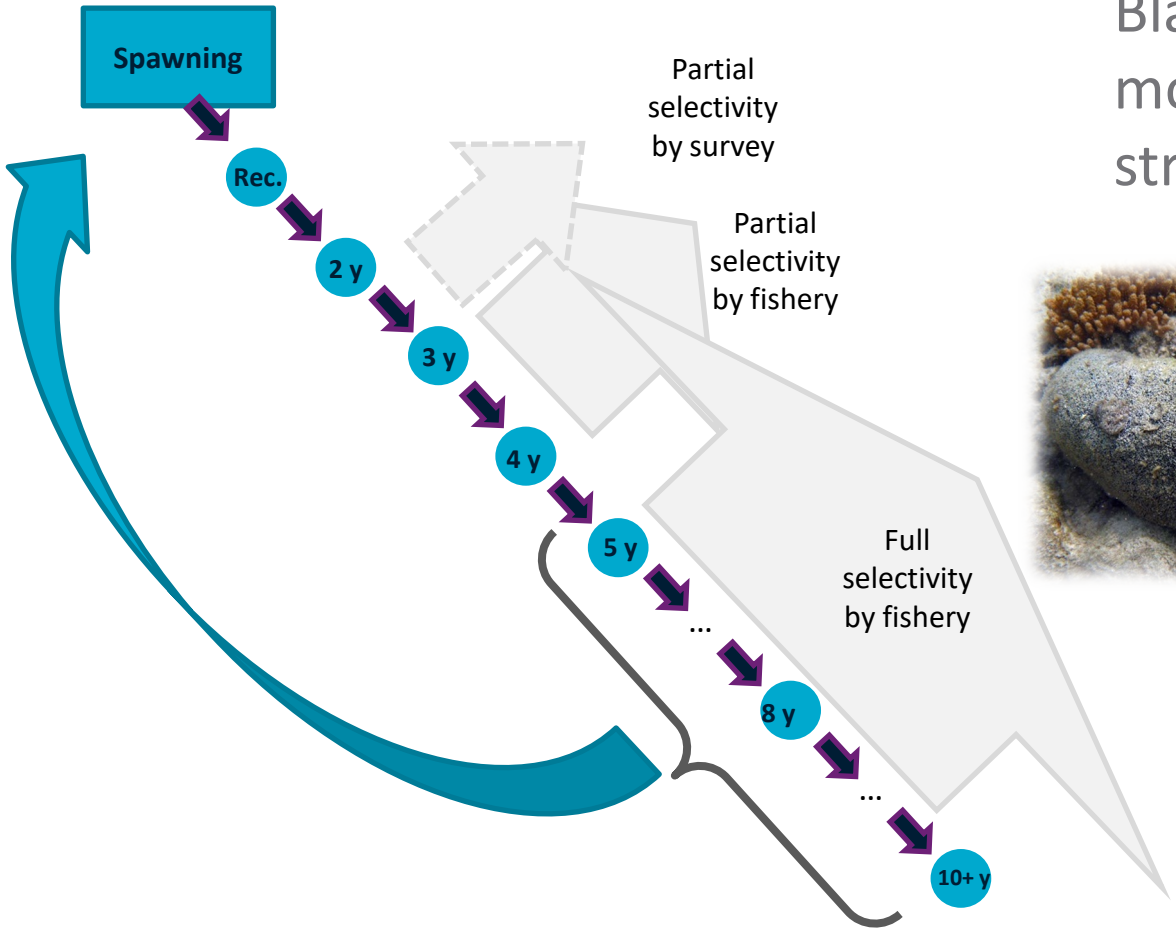


Technical note: this is F applied to total biomass, not commercially available biomass as per age-structured model

Age-Structured Production Model

- Age Structured model is similar to that used in previous Management Strategy Evaluation (MSE) models (Plaganyi et al. 2013, 2015)
- Integrated assessment with everything included in the same DYNAMIC framework
- Widely used approach for providing TAC advice with associated uncertainties
- Can fit to all data including Survey, Age-length frequency and (eventually) standardised CPUE data
- Converting lengths to ages helps inform on the lags and time needed for animals to mature and grow above MLS (minimum Legal Size)

Black teatfish model structure



Natural mortality estimates

Table S5. Mortality rates for species used in the MSE operating model (Plagányi et al. 2015)

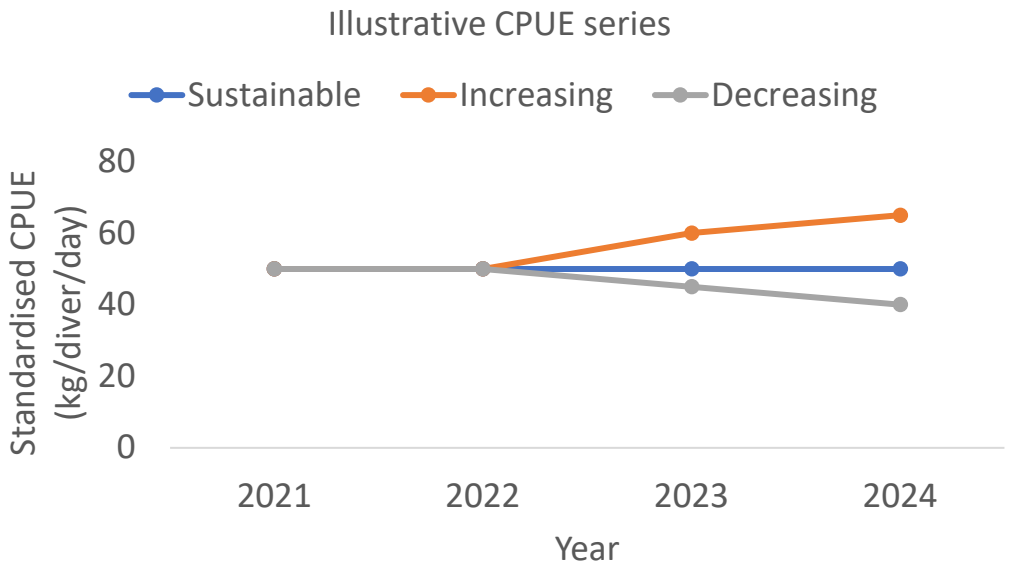
Species	Natural mortality Hoenigs	Natural mortality MSE (min)	Natural mortality MSE (max)
Black teatfish	**0.44**	**0.3**	**0.6**
Brown sandfish	0.73	0.4	0.8
White teatfish	0.44	0.3	0.6
Prickly redfish	0.44	0.3	0.6
Golden sandfish	0.73	0.4	0.8
Curryfish herrmanni	0.62	0.4	0.8
Curryfish vastus	0.73	0.4	0.8
Blackfish	0.73	0.4	0.8
Burrowing blackfish	0.73	0.4	0.8

Data used in model

- Historical catches
- Survey index (1995,2002,2005,2009,2019)
- Survey length frequency measurements (2002,2005,2019)
- Observer length frequency measurements (2022)

surveys	2002	2005	2009	2019
Number length samples	26	20	18	127

Building a CPUE index of abundance

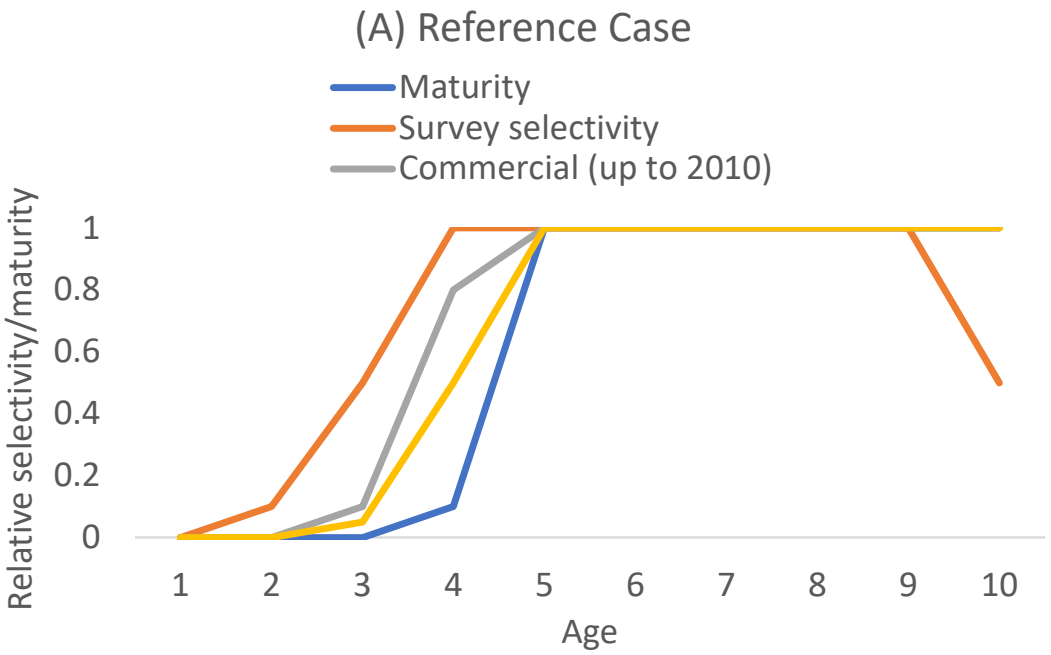


- Effort measured in days, need to adjust for part-day fishing (bottom time per diver would be ideal)
- Given more data, can use statistical approaches to standardise using diver and area etc
- Will also analyse CPUE per area

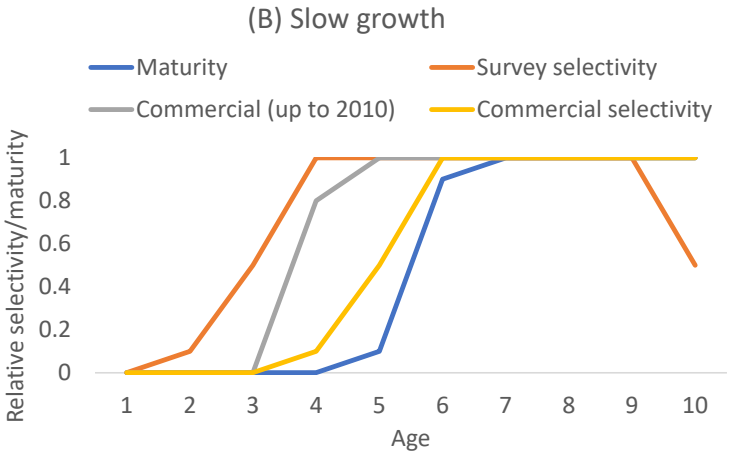
Model assumptions

- 2002 Length frequency adjusted using shrinkage conversion of 10%
- Historical catches (pre 2019) assumed 1.5 larger than available records (due to catch reporting being voluntary/discarding)
- 1995 survey estimate doubled and additional variance (2.5) applied

Maturity-at-age and Selectivity



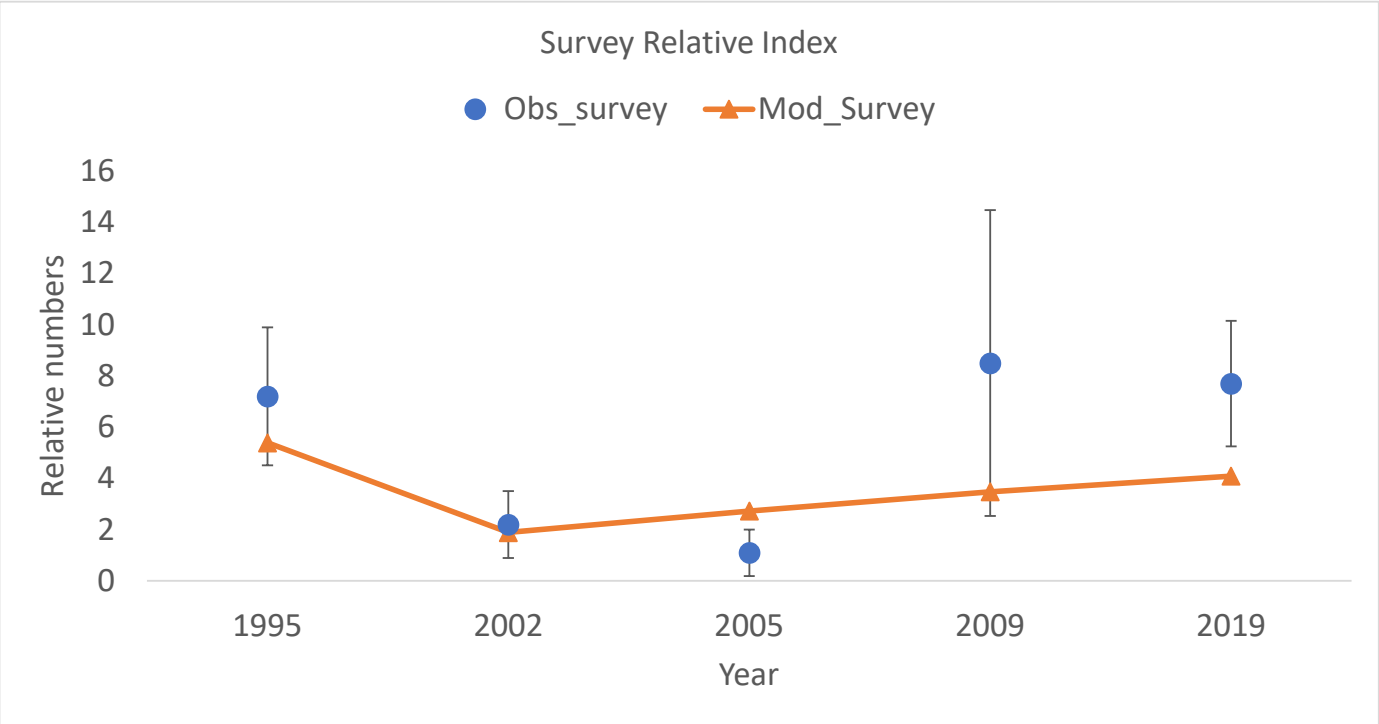
- Survey not targeted hence misses some large animals
- Assume early period selectivity included smaller animals



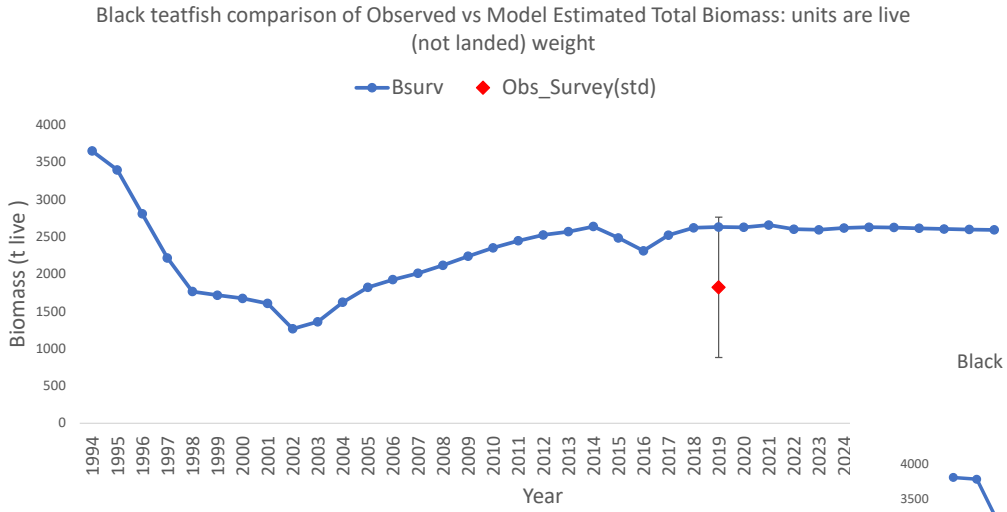
Sensitivities

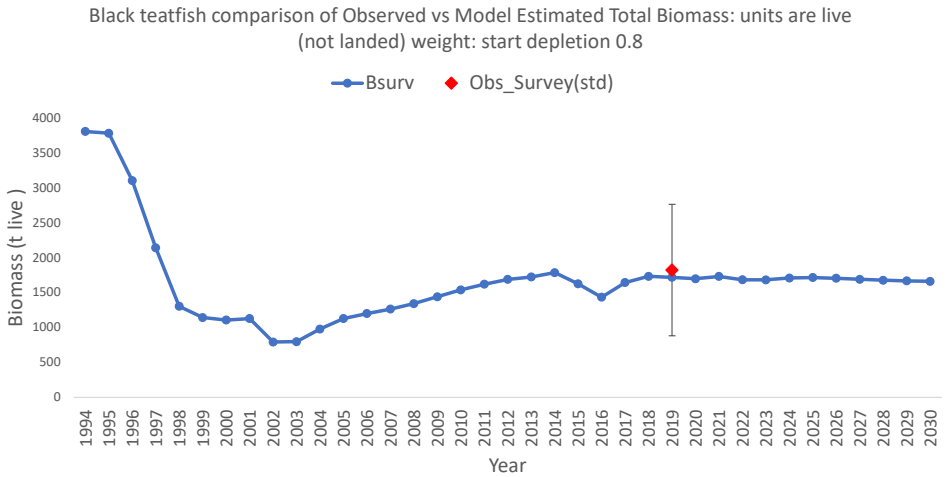
- Fast growth vs slower growth
- Fix (e.g. 2t/yr) or estimate “missing” historical catches
- Fixing K, M
- Estimating h, starting depletion (set at 0.8K)
- Estimate gamma (stock-recruitment)

Fit to survey index of abundance

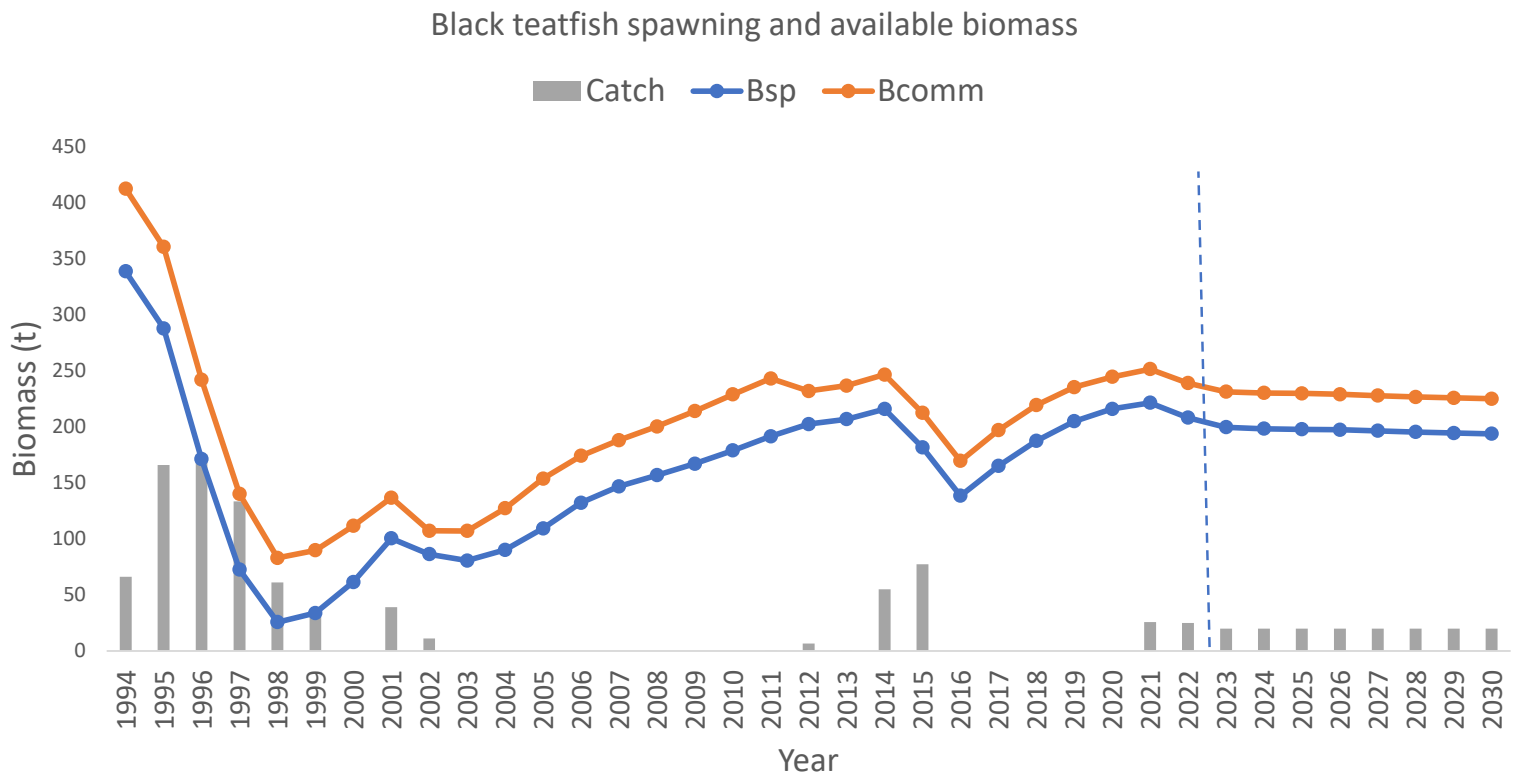


Compare absolute biomass estimate

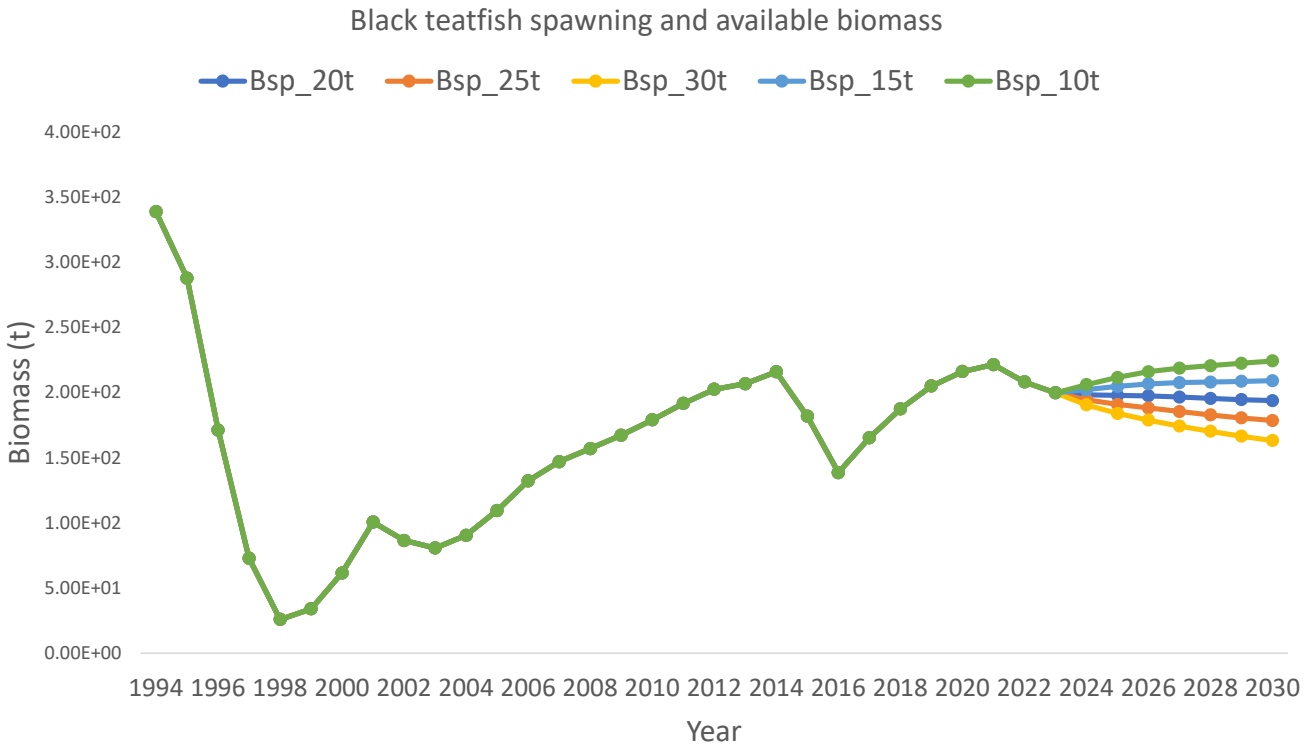




Projection with TAC = 20t

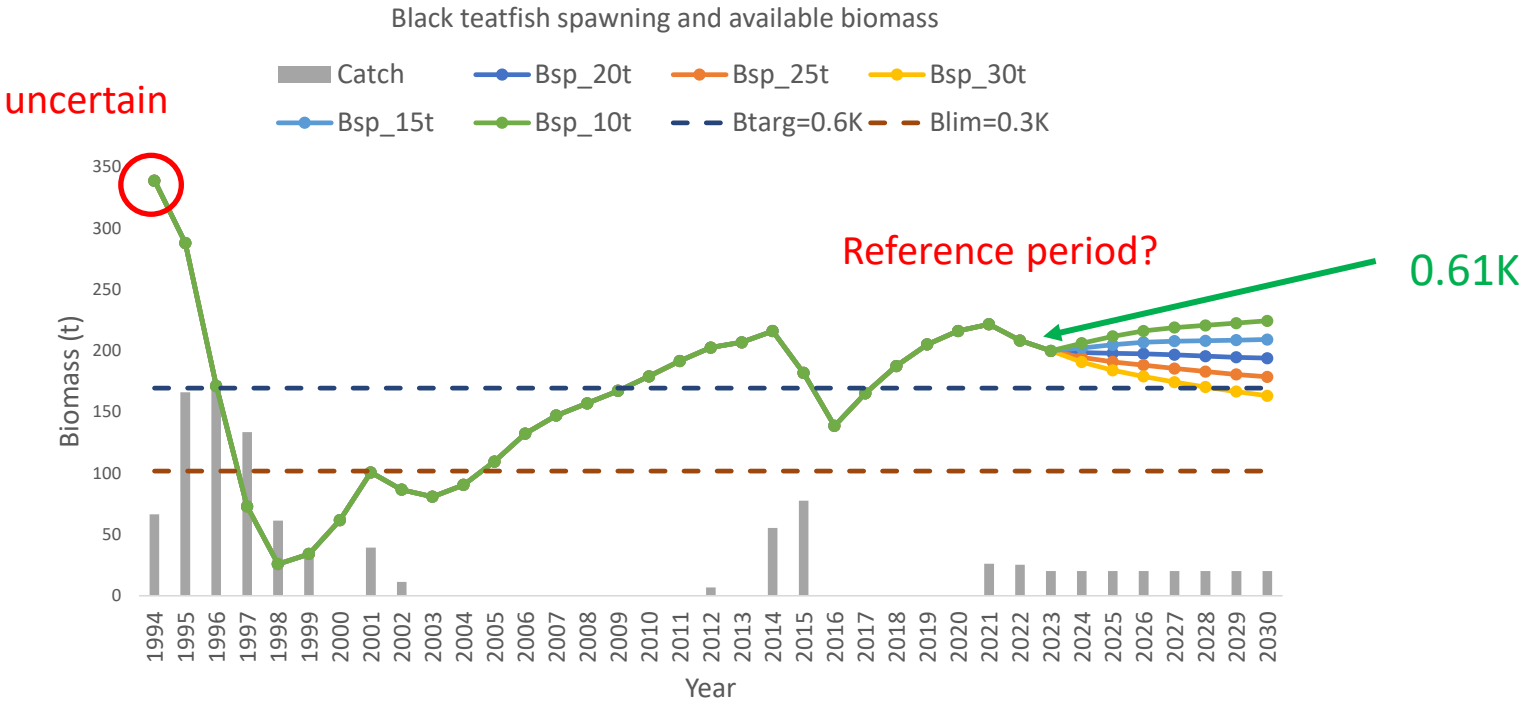


Model (A)



Target spawning biomass level?
Use recent period as reference?

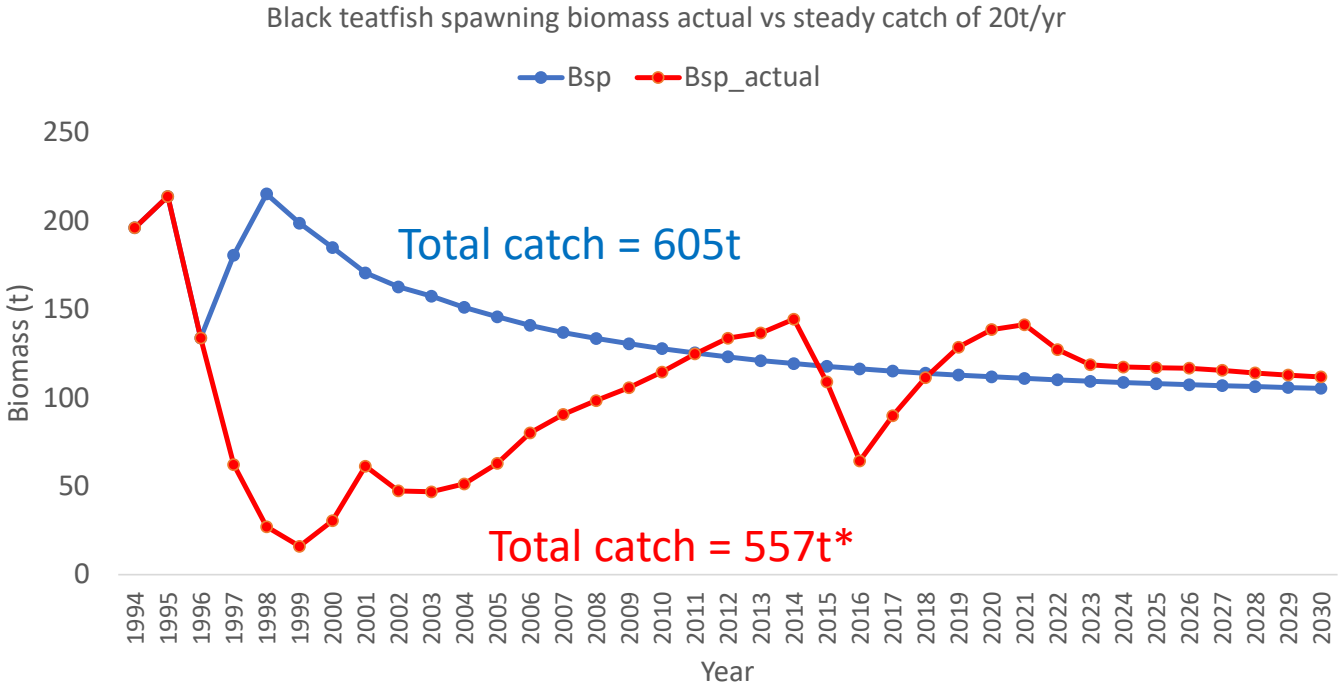
Illustrative Reference Levels



Part 2: Black teatfish stock assessment

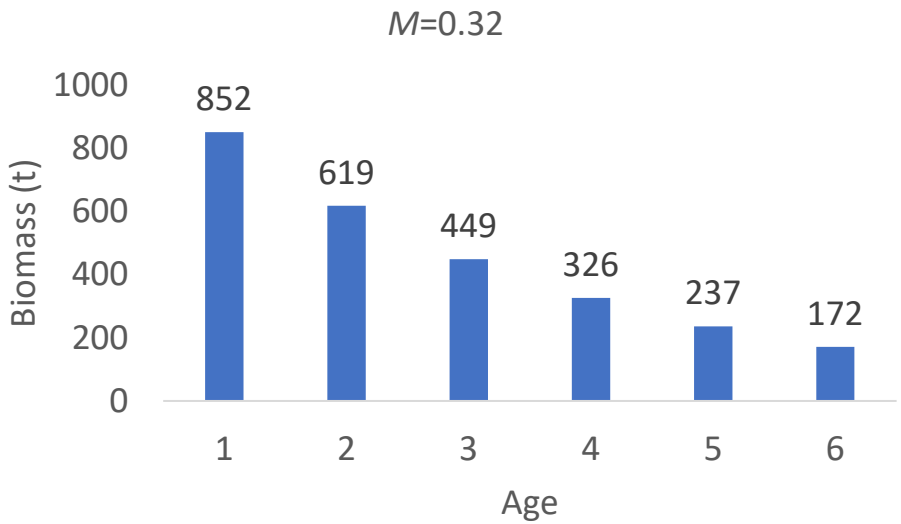
Would we have done better overall if we fished sustainably (e.g. 20t/yr) throughout history? YES!

Start constant TAC in 1996



Note recorded total catch (1994-2020) = 371t but we assume actual total was 1.5x371t=557t

How does the total biomass of young animals compare with the spawning biomass?
A simple illustration below why a big total biomass is needed to maintain a spawning biomass



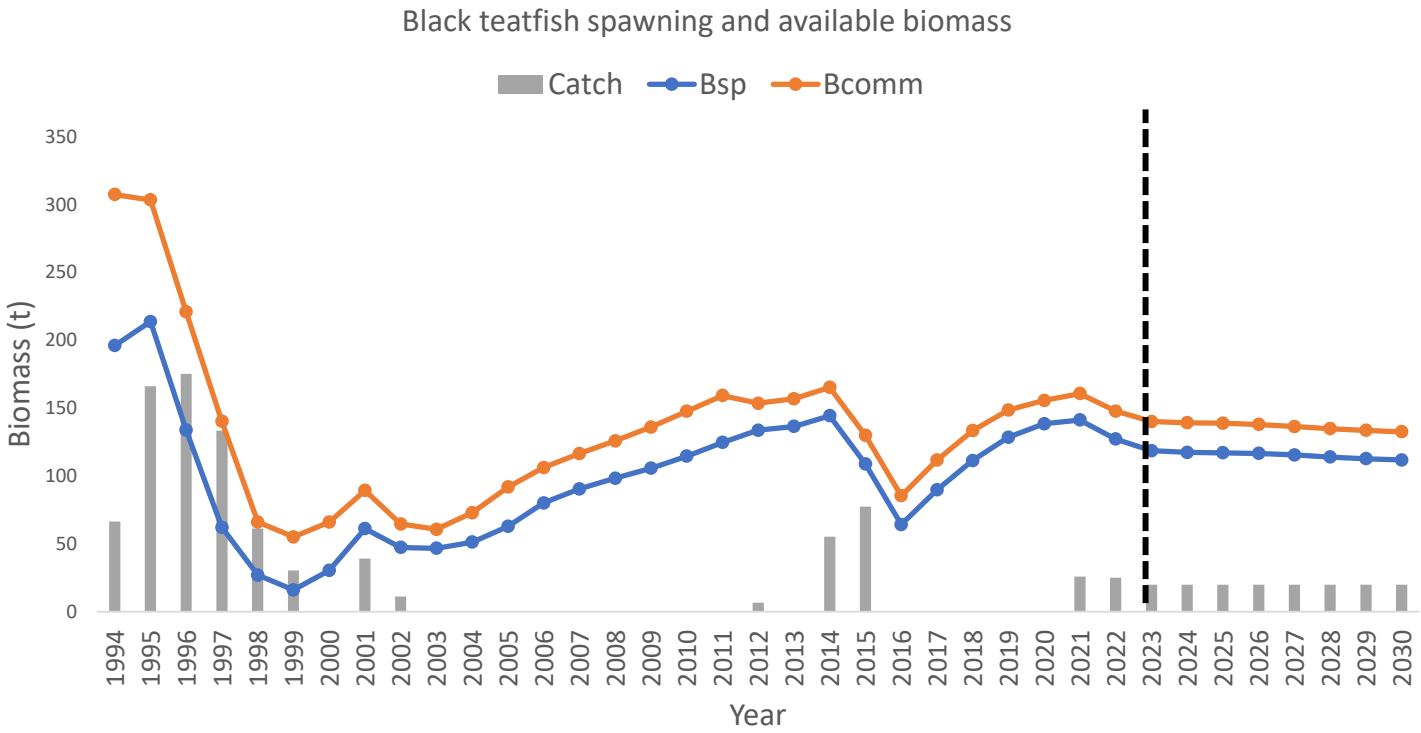
- Assume M=0.32 (model best estimate)
- Assume we have 172t of spawning size black teatfish all age 6 (i.e. usually some are older than this)
- If no fishing occurs on animals aged 1-5 yrs, then the biomass of 1 yr old BTF needed so that after 5 years 172t have survived is 852t
- If there is some fishing on ages 4-5yr (as is the case), then an even bigger age 1 biomass is needed to maintain a spanwing biomass of 172t

Technical: $B1=B6*\exp(5*M)$

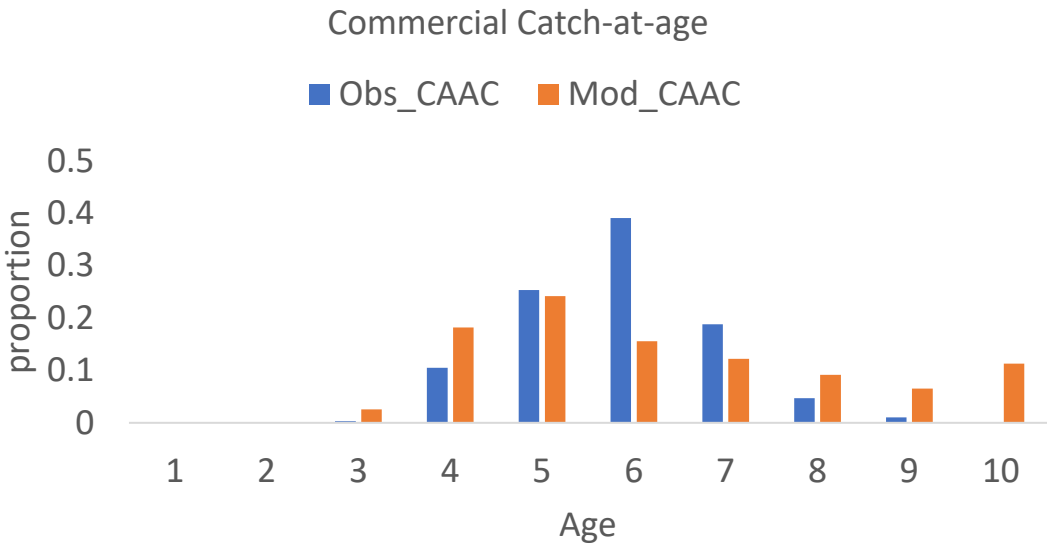
Other Questions

- Reference level to aim (Btarg) and avoid (Blim) for black teatfish
- Shrinkage conversion factor
- Historical catches – what's missing?
- CPUE – how to standardise?

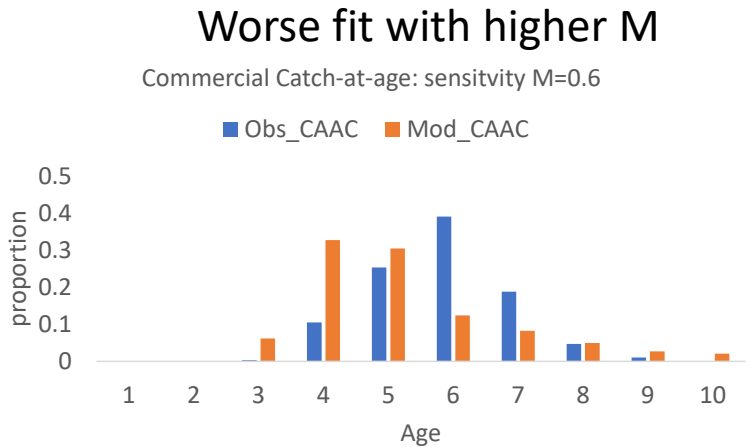
Projection with TAC = 20t: start depletion 0.8 sensitivity



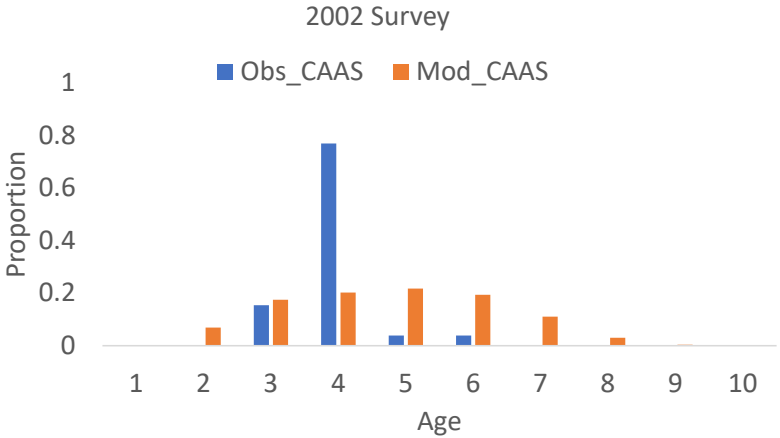
Fit to 2022 Observer/Commercial Length frequency converted to age

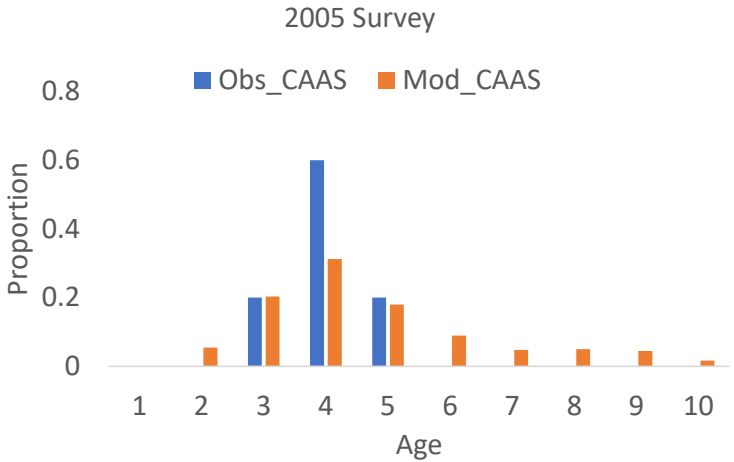


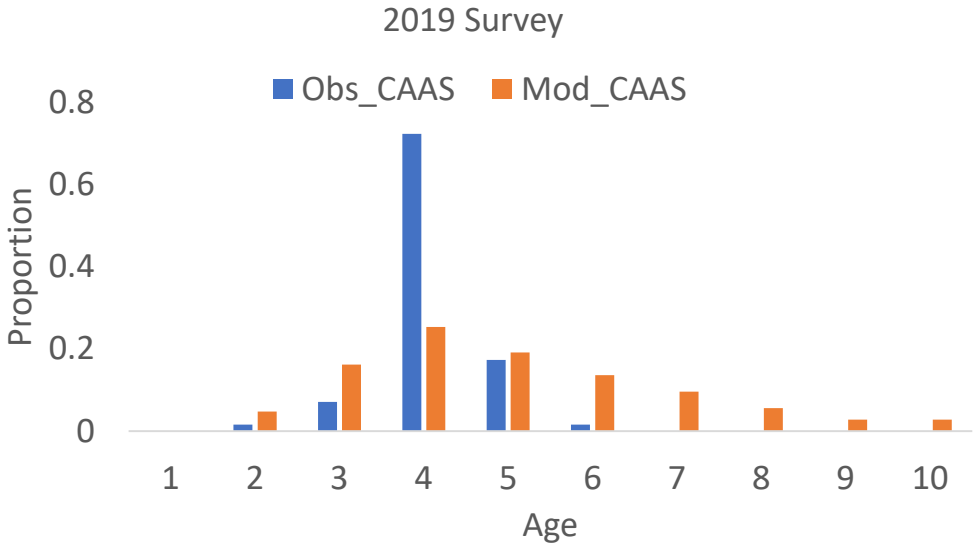
Worse fit with higher M



Fit to survey length frequency after converting to age







Model estimates and sensitivity tests

	(A) Reference Case			(B) Start depletion 80%			(C) Start depletion 50%			(D) Estimate steepness h			(E) Additional Past Catch		
Parameter	**Value**	**90% CI**		Value	90% CI		Value	90% CI		Value	90% CI		Value	90% CI	
B(1973)^{sp} (tons)	208	104	312	127	122	132	71	42	101	71	42	101	127	122	132
M	0.33	0.00	0.67	0.32	0.09	0.55	0.38	0.18	0.58	0.30	0.26	0.34	0.32	0.09	0.55
h	fixed 0.7			fixed 0.7			fixed 0.7			**0.72**	**0.29**	**1.00**	1.00	1.00	1.00
Catch_multiplier	1.5			1.5			1.5			1.5			1.5		
"Missing" catch (t/yr)	0			0			0			0			**2**		
Additional var (1995)	2.5			2.5			2.5			2.5			2.5		
Start depletion	1			**0.8**			**0.8**			0.8			0.8		
Model estimates and depletion statistics															
Bsurv(live) (2019) (tons)	2630			1718			1309			1845			1718		
Bcomm(2022)(tons)	239			148			88			174			148		
Bsp(2022) (tons)	208			127			71			153			127		
Bsp(2022)/Bsp0	0.61			0.65			0.84			0.76			0.65		
F(2022)	0.11			0.17			0.29			0.14			0.17		
RY(2023) model (t)	20			20			20			20			20		
Likelihood contributions		**Sigma**	**q**		Sigma	q		Sigma	q		Sigma	q		Sigma	q
-lnL:Survey Index	1.44	from data	1.439E-05	1.35	from data	########	1.55	from data	########	1.42	from data	########	1.35	from data	########
-lnL:CAA(2022)	14.06	1.13		14.40	1.18		15.09	1.31		14.07	1.13		14.40	1.18	
'-lnL:CAAsurv	18.12	1.34		17.66	1.34		16.96	1.34		17.77	1.34		17.66	1.34	
No. parameters estimated	2			2			2			3			2		
'-lnL:overall	33.62			**33.41**			33.59			33.26			33.41		
AIC	71.24			**70.82**			71.18			72.53			70.82		

Summary

- Across most model versions, projections suggested that a constant annual TAC of 30t may not be sustainable, whereas a TAC of 20 t was sustainable across all model versions run.
- As more data become available, it will be possible to refine and substantially improve modelling results.
- Could account for variability in weight vs length
- Ongoing Observer length frequency measurements are helpful to improve estimates of the stock productivity and e.g. to estimate recruitment residuals – especially important given recruitment can be sporadic and can try account for this in future modelling
- CPUE data (standardised) could also be used in the model once a time series becomes available
- Accurate spatial recording of spatial location of catch could be used in future spatial analyses
- Given the large number of uncertainties, a MSE modelling approach is preferred
- Related: white teatfish modelling to start soon

Thank you

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Acknowledgements
Nicole Murphy
Tim Skewes

Funding
CSIRO
AFMA
TSRA

Australian Government

Australian Fisheries Management Authority

Torres Strait Bêche-de-mer (BDM) Fishery

Species Assessment Sheets - 2022

Hand Collectables Resource Assessment Group (HCRAG) Meeting No.2

27-28 September 2022

Thursday Island

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Purpose

This document is intended to be used in conjunction with the *Torres Strait Beche-de-mer Harvest Strategy 2019* (the Harvest Strategy), applicable species stock assessments and annual catch and effort summaries.

The individual species assessment sheets (SAS) are aimed at guiding the Hand Collectables Resource Assessment Group's (HCRAG) assessment of commercial sea cucumber species in the BDM fishery in line with the Harvest Strategy, and to determine the recommended biological and/or total allowable catches for the fishing season commencing on 1 January each year.

The SAS provide a stepped application of the harvest strategy decision rules to recommend RBCs and/or TACs for each species, taking into account the latest scientific and fishing information available. The SAS also provides a summary of the basic information on stock status and assessment details for each species.

This resource is also intended to be used by the HCRAG to identify information gaps and research needs for each species that can feed into the TSSAC research need identification and prioritisation process for Torres Strait Fisheries.

Individual target species

White teatfish

HCRAG Species Assessment Sheet						
Common names	White teatfish – *Holothuria fuscogilva*					
Pre-HS TAC	15 tonnes					
Status open/closed	Open					
Current TAC	15 tonne	Based on harvest strategy starting TAC				
Basket trigger	N/A					
Minimum size limit	32cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	880	142.9	Yes		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	No	*Review current hookah prohibition*		
Comments on scientific survey findings	CSIRO analysis: Deepwater survey undertaken for the first time in 2019/20. Confident that white teatfish population for East Torres Strait has been quantified. Survey trend for shallow reef population fairly constant over time. Review TAC – potential to increase, however some population modelling and/or fishery dependent data required. .					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data (as advised by industry at HCRAG 1 meeting)	Beach price is $30/kg (salted), $40 - $50/kg (gutted and salted)					
Any other changes in the fishery?	None identified					
Any other sources of mortality apart from fishing?	None identified					
Other information	Listed on Appendix II of CITES. Listed as vulnerable on the IUCN Red list due to a decreasing population trend globally.					
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	1.77	15	11.8 %	TAC: No Basket: N/A	N/A
	2021	1.96	15	13.1 %	N/A	N/A

	2022	1.86	15	12.4%	N/A	N/A
Decision rules	No concerns from RAG and additional industry members regarding the total reported catch.					

Species specific data gaps and needs

General need to improve area and effort reporting in catch disposal records.

Species Specific Research and Priorities

Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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. Modelling analysis to inform a sustainable TAC increase for white teatfish.

HCRAG 2 recommendations	**Fishing season**	**RBC (t)**	**Overcatch to be discounted (t)**	**Other source(s) of mortality (t)**	**TAC (t)**
	2023				

Insert HCRAG 2 recommendations

HCRAG Species Assessment Sheet		
Common names	Prickly redfish – *Thelenota ananas*	
Pre-HS TAC	15 tonnes (changed from 20 tonnes to 15 tonnes in 2017)	
Status open/closed	Open	
Current TAC	15 tonnes	Based on harvest strategy starting TAC
Basket trigger	N/A	
Minimum size limit	35cm	

New information

	Year	Standing stock biomass (90th percentile) (t)	Standing stock biomass above min species size limit (t)	Is standing stock biomass above the default limit reference point?
Latest scientific survey data	2019/20	461	253.3	Yes
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	Yes	No	Yes	*HCWG to discuss*

Comments on scientific survey findings	CSIRO analysis: Slight decline (in slope – density over time), suggesting some concern given reports of sustained high catches. Close monitoring recommended. Stock assessment needed.
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)
Price data (as advised by industry at HCRAG 1 meeting)	Beach price is $61-$85/kg (clarify product type)
Any other changes in the fishery?	Industry use a voluntary rotational harvesting approach.
Any other sources of mortality apart from fishing?	None identified.
Other information	On the list for possible CITES listing consideration in the future and listed as endangered on the IUCN red list.

Low Tier

	Fishing season	Catch (t)	TAC (t)	% TAC caught	TAC or basket trigger exceeded?	% of TAC overcatch
Total catch data	2020	15.65	15	104.36 %	TAC: Yes Basket: N/A	4.36%
	2021	14.85	15	99 %	N/A	N/A
	2022	8.72	15	58.11%	TBA	TBA
Decision rules	No concerns from RAG and additional industry members regarding the total reported catch.					

	Reported overcatch does not trigger any of the overcatch decision rules (refer to section 2.11.1.1 of the harvest strategy).
	RAG advised that a TAC reduction may need to be considered if the species continues to be overcaught in subsequent fishing seasons.

Species specific data gaps and needs

General need to improve area and effort reporting in catch disposal records.

Species Specific Research and Priorities

Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

HCRAG Species Assessment Sheet		
Common names	Deepwater redfish – *Actinopyga echinites*	
Pre-HS TAC	Part of 80t basket species TAC	
Status open/closed	Open	
Current TAC	5 tonnes	Based on harvest strategy starting TAC
Basket trigger	N/A (previously 5t basket trigger limit)	
Minimum size limit	20cm	

New information

	Year	Standing stock biomass (90th percentile) (t)	Standing stock biomass above min species size limit (t)	Is standing stock biomass above the default limit reference point?
Latest scientific survey data	2019/20	66	55	No evidence that the species is below the default LRP
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	Yes	No	No	*HCWG to discuss*

Comments on scientific survey findings	CSIRO analysis: Catches low relative to biomass. Increasing overall trend in density. No concern for TAC.
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)
Price data (as advised by industry at HCRAG 1 meeting)	Not targeted much due to low beach price of 3/kg (wet), $7/kg (boiled) and $80-$100/kg (dried)
Any other changes in the fishery?	None identified
Any other sources of mortality apart from fishing?	None identified
Other information	Assessed as Uncertain by ABARES in the 2020 Fishery Status Reports – given its low density it is unclear if catches of this species would impede effective recruitment and recovery of the species. The species is listed as vulnerable on the IUCN red list.

Low Tier

	Fishing season	Catch (t)	TAC (t)	% TAC caught	TAC or basket trigger exceeded?	% of TAC overcatch
Total catch data	2020	0	5	0 %	TAC: No Basket: N/A	N/A
	2021	0.031	5	0.61 %	N/A	N/A
	2022	0	5	0	TBA	TBA

Decision rules	No concerns from RAG and additional industry members regarding the total reported catch.

Species specific data gaps and needs

General need to improve area and effort reporting in catch disposal records.

Species Specific Research and Priorities

Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

HCRAG Species Assessment Sheet						
Common names	Hairy blackfish – *Actinopyga miliaris*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	5 tonnes	Based on harvest strategy starting TAC				
Basket trigger	N/A (previously 5t basket trigger limit)					
Minimum size limit	22cm					
New information since the TAC was last considered (in this it was the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Landed (wet gutted) weight (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	15	-	*Insufficient information to assess the status of the stock in relation to the LRP*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Limited	No	Yes	*HCWG to discuss*		
Comments on scientific survey findings	CSIRO analysis: Status still remains relatively unknown. Possible decline or natural variability. Stock assessment needed. Targeted survey sampling may need to be factored into future fishery surveys.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data (as advised by industry at HCRAG 1 meeting)	Has a low beach price of $3 – $7.50/kg but dry product can fetch up to $80-100/kg. $15/kg (frozen whole? Seek clarification from industry)					
Any other changes in the fishery?	None identified					
Any other sources of mortality apart from fishing?	None identified					
Other information	Assessed as Uncertain by ABARES in the 2020 Fishery Status Reports – given its low density it is unclear if catches of this species would impede effective recruitment and recovery of the species. The species is listed as vulnerable on the IUCN red list.					
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	1.4	5	28 %	TAC: No Basket: N/A	N/A
	2021	0.5	5	10 %	N/A	N/A
	2022	0.58	5	11.6%	TBA	TBA

Decision rules	No concerns from RAG and additional industry members regarding the total catch.

Species specific data gaps and needs

General need to improve area and effort reporting in catch disposal records. Potential for cryptic behaviour to impact on surveys.

Species Specific Research and Priorities

Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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

HCRAG 2 recommendations	**Fishing season**	**RBC (t)**	**Overcatch to be discounted (t)**	**Other source(s) of mortality (t)**	**TAC (t)**
	2023				

Insert HCRAG 2 recommendations

Greenfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Greenfish – *Stichopus chloronotus*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	40 tonnes	Based on harvest strategy starting TAC				
Basket trigger	N/A					
Minimum size limit	nil					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	739	N/A	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	No	*RAG to discuss*		
Comments on scientific survey findings	CSIRO analysis: Catches low. Generally increasing density trend. No concern for TAC.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information	**RAG members to provide advice**					
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	0.015	40	0.04 %	TAC: No Basket: N/A	N/A
	2021	0	40	0	N/A	N/A
	2022	0	40	0	TBA	TBA
Decision rules	Is the total catch reliable? **RAG members to provide advice**					
	Not overcaught so overcatch decision rules not triggered (refer to section 2.11.1.1 of the harvest strategy).					

	For species with an individual TAC, should the TAC be reduced or maintained (refer to section 2.11.1 of the harvest strategy)? **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC (t)
HCRAG 2 recommendations	2023				

General RAG comments

Basket species – curryfish

Curryfish common

HCRAG Species Assessment Sheet					
Common names	Curryfish common – *Stichospus herrmanni*				
Pre-HS TAC	Part of 80t basket species TAC				
Status open/closed	Open				
Current TAC	60 tonnes (Curryfish basket TAC)	Based on harvest strategy starting TAC			
Basket trigger	N/A				
Minimum size limit	31cm				
New information					
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**	
	2019/20	667	632.4	Yes	
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**	
	Yes	No	Yes	*HCWG to discuss*	
Comments on scientific survey findings	CSIRO paper: Possible decline (noting fairly negative trend fitted to survey data). Stock assessment needed. Close monitoring recommended – part of 'Curryfish mixed' (catch split 50:50 between Curryfish species when not identified). Appears that the *herrmanni:vastus* split is changing over time, with higher proportion of vastus. Could be an identification problem with *S. Vastus* during the 1995/96 survey.				
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)				
Price data (as advised by industry at HCRAG 1 meeting)	Beach price $15-22/kg (boiled and salted), $150/kg (dried)				
Any other changes in the fishery?	While common curryfish used to make up most of the catch in the past, industry reported noticing a generally even split between the two curryfish species with some regional differences.				
Any other sources of mortality apart from fishing?	None identified. Previously recorded high discard levels have reduced due to more appropriate species processing methods.				
Other information	Listed as vulnerable on the IUCN red list				

Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	0.6 10.5 (mixed)	60	1 % 17.5 % (mixed)	TAC: No Basket: N/A	N/A
	2021	4.05	60	6.75% 11.15% (mixed)	N/A	N/A

		6.69 (mixed)				
	2022	0.4 1.53 (mixed)	60	0.7% 2.55% (mixed)	TBA	TBA
Decision rules	No concerns from RAG and additional industry members regarding the total catch. The RAG agreed to consider the need for a trigger limit for the species.					

Species specific data gaps and needs

RAG agreed it is a high priority to improve species differentiation in catch disposal records as well as general improvements to area and effort reporting.

Species Specific Research and Priorities

The RAG further noted the ongoing research need to develop conversion ratios for curryfish species. Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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

HCRAG 2 recommendations	**Fishing season**	**RBC (t)**	**Overcatch to be discounted (t)**	**Other source(s) of mortality (t)**	**TAC (t)**
	2023				

Insert HCRAG 2 recommendations

HCRAG Species Assessment Sheet		
Common names	Curryfish vastus – *Stichopus vastus*	
Pre-HS TAC	Part of the 80t basket species TAC	
Status open/closed	Open	
Current TAC	60 tonnes (Curryfish basket TAC)	Based on harvest strategy starting TAC
Basket trigger	15 tonnes species trigger limit	
Minimum size limit	15cm	

New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)

	Year	Standing stock biomass (90th percentile) (t)	Standing stock biomass above min species size limit (t)	Is standing stock biomass above the default limit reference point?
Latest scientific survey data	2019/20	168	168	Yes
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	Yes	No	Yes	HCWG to discuss

Comments on scientific survey findings	CSIRO analysis: Higher ratio of curryfish vastus observed in 2019 survey. Close monitoring recommended – part of 'Curryfish mixed' (suggest splitting catch 50:50 between curryfish species when not identified).
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)
Price data (as advised by industry at HCRAG 1 meeting)	Beach price $15-22/kg (boiled and salted), $150/kg (dried)
Any other changes in the fishery?	Industry reported noticing a generally even split between the two curryfish species with some regional differences and increasingly more curryfish vastus.
Any other sources of mortality apart from fishing?	None identified
Other information	

Low Tier

	Fishing season	Catch (t)	TAC (t)	% TAC caught	TAC or basket trigger exceeded?	% of TAC overcatch
Total catch data	2020	0.15 10.5 (mixed)	60 (15t trigger limit)	0.25 % 17.5 % (mixed)	TAC: No Basket: No	N/A
	2021	1.86 6.69 (mixed)	60 (15t trigger limit)	3.1% 11.15% (mixed)	N/A	N/A
	2022	0.4 1.53 (mixed)	60 (15t trigger limit)	0.7% 2.55%	TBA	TBA

				(mixed)		
Decision rules	No concerns from RAG and additional industry members regarding the total catch. The RAG recommended increasing the trigger limit to 30t.					

Species specific data gaps and needs

RAG agreed it is a high priority to improve species differentiation in catch disposal records as well as general improvements to area and effort reporting.

Species Specific Research and Priorities

The RAG further noted the ongoing research need to develop conversion ratios for curryfish species. Consistent with the BDM harvest strategy and where there is sufficient information available, the RAG recommended a tactical research project 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

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

Basket species

Elephant's trunkfish

HCRAG Species Assessment Sheet						
Common names	Elephant trunkfish – *Holothuria fuscopunctata*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	15 tonnes					
Minimum size limit	24cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	451t	-	Not assessed		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	Yes	*HCWG to discuss*		
Comments on scientific survey findings	CSIRO analysis: Catch rates low. Possible decline or natural variability. Stock assessment needed.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data (as advised by industry at HCRAG 1 meeting)	Beach price $2/kg (wet-gutted)					
Any other changes in the fishery?	None identified					
Any other sources of mortality apart from fishing?	None identified.					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50	-	TAC: No Basket: No	N/A
	2021	No catch reported	50	-	N/A	N/A
	2022	No catch reported	50	-	TBA	TBA

Decision rules	No concerns from RAG and additional industry members regarding the total catch.

Species specific data gaps and needs

General improvements to area and effort reporting.

Species Specific Research and Priorities

None identified

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

HCRAG Species Assessment Sheet		
Common names	Lollyfish – *Holothuria atra*	
Pre-HS TAC	Part of 80t basket species TAC	
Status open/closed	Open	
Current TAC	Part of 50t basket species TAC	Based on harvest strategy starting TAC
Basket trigger	40 tonnes	
Minimum size limit	15cm	

New information since the TAC was last considered (in this it was at the implementation of the Harves Strategy)				
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**
	2019/20	5,668	-	Yes
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	Yes	No	Yes	*HCWG to discuss*
Comments on scientific survey findings	CSIRO analysis: Noted catch increase. Possible decline or natural variability. Stock assessment needed.			
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)			
Price data (as advised by industry at HCRAG 1 meeting)	Beach price $2-$5/kg (wet-gutted)			
Any other changes in the fishery?	Further information required from Poruma fishers on reduced catches to ascertain whether this is due to home reef depletion given its susceptibility to being caught.			
Any other sources of mortality apart from fishing?	None identified			
Other information				

Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	1.3	50 (40t basket trigger limit)	2.6 %	TAC: No Basket: No	N/A
	2021	0.42	50 (40t basket trigger limit)	0.84%	N/A	N/A
	2022	0	50 (40t basket trigger limit)	TBA	TBA	TBA
Decision rules	No concerns from RAG and additional industry members regarding the total reported catch.					

Species specific data gaps and needs
General improvements to area and effort reporting.
Species Specific Research and Priorities
None identified

HCRAG 2 recommendations	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
	2023				
Insert HCRAG 2 recommendations					

Burrowing blackfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Burrowing blackfish – *Actinopyga spinea*					
Pre-HS TAC	Part of the 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of 50 tonne basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	5 tonnes					
Minimum size limit	22 cm					
New information since the TAC was last considered (in this it was the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	N/A	N/A	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	N/A	N/A	N/A	*RAG to discuss*		
Comments on scientific survey findings	CSIRO paper (**attachment B of agenda item 5**): N/A					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50 (5t trigger limit)	No catch reported	TAC: No Basket: No	N/A
	2021	No catch reported	50 (5t trigger limit)	No catch reported	N/A	N/A
	2022	0	50 (5t trigger limit)	TBA	TBA	TBA
Decision rules	Is the total catch reliable? **RAG members to provide advice**					
	Not overcaught so overcatch decision rules not triggered (refer to section 2.11.1.1 of the harvest strategy).					

	For species with individual triggers within a basket with a joint TAC, should the joint TAC or individual triggers be changed (up or down) (refer to section 2.11.1.2 of the harvest strategy)? **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

Deepwater blackfish

HCRAG Species Assessment Sheet						
Common names	Deepwater blackfish – *Actinopyga palauensis*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	0.5t					
Minimum size limit	22cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Landed weight (wet gutted) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	104	-	*Not assessed*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Limited	No	Yes	*HCWG to discuss*		
Comments on scientific survey findings	CSIRO analysis: Status still remains relatively unknow. Stock assessment needed. Targeted survey sampling may need to be factored into future fishery surveys.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data (as advised by industry at HCRAG 1 meeting)	Beach price $15/kg (wet-gutted)					
Any other changes in the fishery?	None advised					
Any other sources of mortality apart from fishing?	None identified					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	0.17	50 (0.5t trigger limit)	0.34 %	TAC: No Basket: No	N/A
	2021	0.18	50 (0.5t trigger limit)	0.36%	N/A	N/A

	2022	0.42	50 (0.5t trigger limit)	TBA	TBA	TBA
Decision rules	No concerns from RAG and additional industry members regarding the total reported catch.					

Species specific data gaps and needs

General improvements to area and effort reporting.

Species Specific Research and Priorities

May benefit from a dedicated survey in the future.

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

Insert HCRAG 2 recommendations

Golden sandfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Golden sandfish – *Holothuria lessoni*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	0.5 tonnes					
Minimum size limit	22cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	Not included in 2019-20 survey	-	-	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	No	N/A	N/A	*RAG to discuss*		
Comments on scientific survey findings	N/A					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50 (0.5t trigger limit)	-	TAC: No Basket: No	N/A
	2021	No catch reported	50 (0.5t trigger limit)	-	N/A	N/A
	2022	No catch reported	50 (0.5t trigger limit)	-	TBA	TBA
Decision rules	Is the total catch reliable? **RAG members to provide advice**					
	Not overcaught so overcatch decision rules not triggered (refer to section 2.11.1.1 of the harvest strategy).					

	For species with individual triggers within a basket with a joint TAC, should the joint TAC or individual triggers be changed (up or down) (refer to section 2.11.1.2 of the harvest strategy)? **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC (t)
HCRAG 2 recommendations	2023				

General RAG comments

Brown sandfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Brown sandfish – *Bohadschia vitiensis*					
Pre-HS TAC	Part of the 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of the 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	3 tonnes					
Minimum size limit	25cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	Not included in 2019-20 survey	-	-	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	-	-	-	*RAG to discuss*		
Comments on scientific survey findings	N/A					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50 (3t trigger limit)	N/A	TAC: No Basket: No	N/A
	2021	No catch reported	50 (3t trigger limit)	N/A	N/A	N/A
	2022	No catch reported	50 (3t trigger limit)	TBA	TBA	TBA
Decision rules	Is the total catch reliable? **RAG members to provide advice**					
	Not overcaught so overcatch decision rules not triggered (refer to section 2.11.1.1 of the harvest strategy).					

	For species with individual triggers within a basket with a joint TAC, should the joint TAC or individual triggers be changed (up or down) (refer to section 2.11.1.2 of the harvest strategy)? **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

General RAG comments

Leopardfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Leopardfish – *Bohadschia argus*					
Pre-HS TAC	Part of the 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of the 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	40 tonnes					
Minimum size limit	30cm					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	508	-	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	No	*RAG to discuss*		
Comments on scientific survey findings	Catches low. Generally increasing density trend. No concern for TAC.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data	$15/kg (gutted-salted), $120/kg (dried)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	0.2	50 (40t basket trigger limit)	0.4%	TAC: No Basket: No	N/A
	2021	0.2	50 (40t basket trigger limit)	0.4%	N/A	N/A
	2022	0	50 (40t basket trigger limit)	TBA	TBA	TBA

Decision rules	Is the total catch reliable? **RAG members to provide advice**
	Reported overcatch does not trigger any of the overcatch decision rules (refer to section 2.11.1.1 of the harvest strategy).
	For species with individual triggers within a basket with a joint TAC, should the joint TAC or individual triggers be changed (up or down) (refer to section 2.11.1.2 of the harvest strategy)? **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

General RAG comments

Pinkfish

HCRAG Species Assessment Sheet						
Common names	Pinkfish – *Holothuria edulis*					
Pre-HS TAC	Part of 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	N/A					
Minimum size limit	N/A					
New information						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	85	-	*Not assessed*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	Yes	*HCWG to discuss*		
Comments on scientific survey findings	CSIRO paper: Possible decline or natural variability. Stock assessment needed.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Price data (as advised by industry at HCRAG 1 meeting)	Currently no market demand for the species					
Any other changes in the fishery?	None identified – this species is hardly fished					
Any other sources of mortality apart from fishing?	None identified					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50	N/A	TAC: No Basket: N/A	N/A
	2021	No catch reported	50	TBA	TBA	TBA
	2022	No catch reported	50	TBA	TBA	TBA
Decision rules	No concerns from RAG and additional industry members regarding the catch data.					

Species specific data gaps and needs
N/A

Species Specific Research and Priorities
None identified

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				
Insert HCRAG 2 recommendations					

Amberfish (not assessed by HCRAG)

HCRAG Species Assessment Sheet						
Common names	Amberfish – *Thelenota anax*					
Pre-HS TAC	Part of the 80t basket species TAC					
Status open/closed	Open					
Current TAC	Part of the 50t basket species TAC	Based on harvest strategy starting TAC				
Basket trigger	N/A					
Minimum size limit	N/A					
New information since the TAC was last considered (in this it was at the implementation of the Harvest Strategy)						
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**		
	2019/20	478	-	*RAG to discuss*		
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**		
	Yes	No	No	*RAG to discuss*		
Comments on scientific survey findings	Catches low. No concern for TAC.					
Catch data	Available for 2020, 2021 and 2022 (as at 22 September 2022)					
Any other changes in the fishery?	**RAG members to provide advice. For example, fishing behaviour/market demand? **					
Any other sources of mortality apart from fishing?	**RAG members to provide advice**					
Other information						
Low Tier						
Total catch data	**Fishing season**	**Catch (t)**	**TAC (t)**	**% TAC caught**	**TAC or basket trigger exceeded?**	**% of TAC overcatch**
	2020	No catch reported	50	-	TAC: No Basket: N/A	N/A
	2021	No catch reported	50	TBA	TBA	TBA
	2022	No catch reported	50	TBA	TBA	TBA
Decision rules	Is the total catch reliable? **RAG members to provide advice**					

	Not overcaught so overcatch decision rules not triggered (refer to section 2.11.1.1 of the harvest strategy).
	For species with individual triggers within a basket with a joint TAC, should the joint TAC or individual triggers be changed (up or down) (refer to section 2.11.1.2 of the harvest strategy). **RAG members to provide advice**

Species specific data gaps and needs

to be completed at the meeting

Species Specific Research and Priorities

to be completed at the meeting

	Fishing season	RBC (t)	Overcatch to be discounted (t)	Other source(s) of mortality (t)	TAC/trigger limit (t)
HCRAG 2 recommendations	2023				

General RAG comments

Closed species

Surf redfish (closed)

HCRAG Species Assessment Sheet				
Common names	Surf redfish – *Actinopyga mauritiana*			
Pre-HS TAC	0 tonnes			
Status open/closed	Closed since 2003 due to sustainability concerns			
Minimum size limit	22cm			
New information				
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**
	2019/20	20	6.7	*RAG to discuss*
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	Yes	No	No	*RAG to discuss*
Comments on scientific survey findings	Species remains closed – Harvest Strategy closed species rule applies.			
Catch data	This species is closed to fishing however ~200kg of catch was reported by a fisher in 2020. This matter was followed up by AFMA Compliance.			
Other information				
Re-opening Decision Rule (2.11.4 section of the harvest strategy) – this rule can only be applied if, using all available and reliable information, it can be established that the stock is above a limit reference point level.				
Species specific data gaps and needs				
to be completed at the meeting				
Species Specific Research and Priorities				
to be completed at the meeting				
General RAG comments				

Sandfish (closed)

HCRAG Species Assessment Sheet				
Common names	Sandfish – *Holothuria scabra*			
Pre-HS TAC	0 tonnes			
Status open/closed	Closed since 1998 due to sustainability concerns			
Minimum size limit	18cm			
New information				
Latest scientific survey data	**Year**	**Standing stock biomass (90th percentile) (t)**	**Standing stock biomass above min species size limit (t)**	**Is standing stock biomass above the default limit reference point?**
	Planned for but not included in 2019-20 survey	unknow	unknown	*RAG to discuss*
	Survey adequate for species	**Any unexpected results**	**Any concerns with biomass trend or absolute abundance**	**Need for management response**
	-	-	-	*RAG to discuss*
Comments on scientific survey findings	No survey undertaken. Harvest Strategy closed species rule applies.			
Catch data	This species is closed to fishing			
Other information	Assessed as 'Overfished' but 'Not subject to overfishing' by ABARES in the Annual Fishery Status Reports as no recovery in overall density was observed between 1998 and 2010, and there is no other robust information to inform stock status.			
Re-opening Decision Rule (2.11.4 section of the harvest strategy) – this rule can only be applied if, using all available and reliable information, it can be established that the stock is above a limit reference point level.				
Species specific data gaps and needs				
to be completed at the meeting				
Species Specific Research and Priorities				
to be completed at the meeting				
General RAG comments				

Australian Government

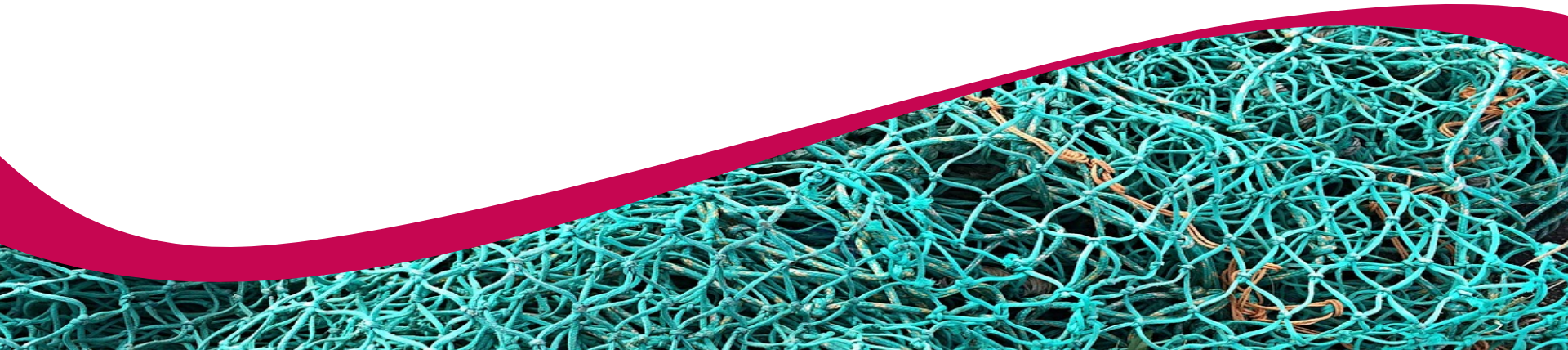
Australian Fisheries Management Authority

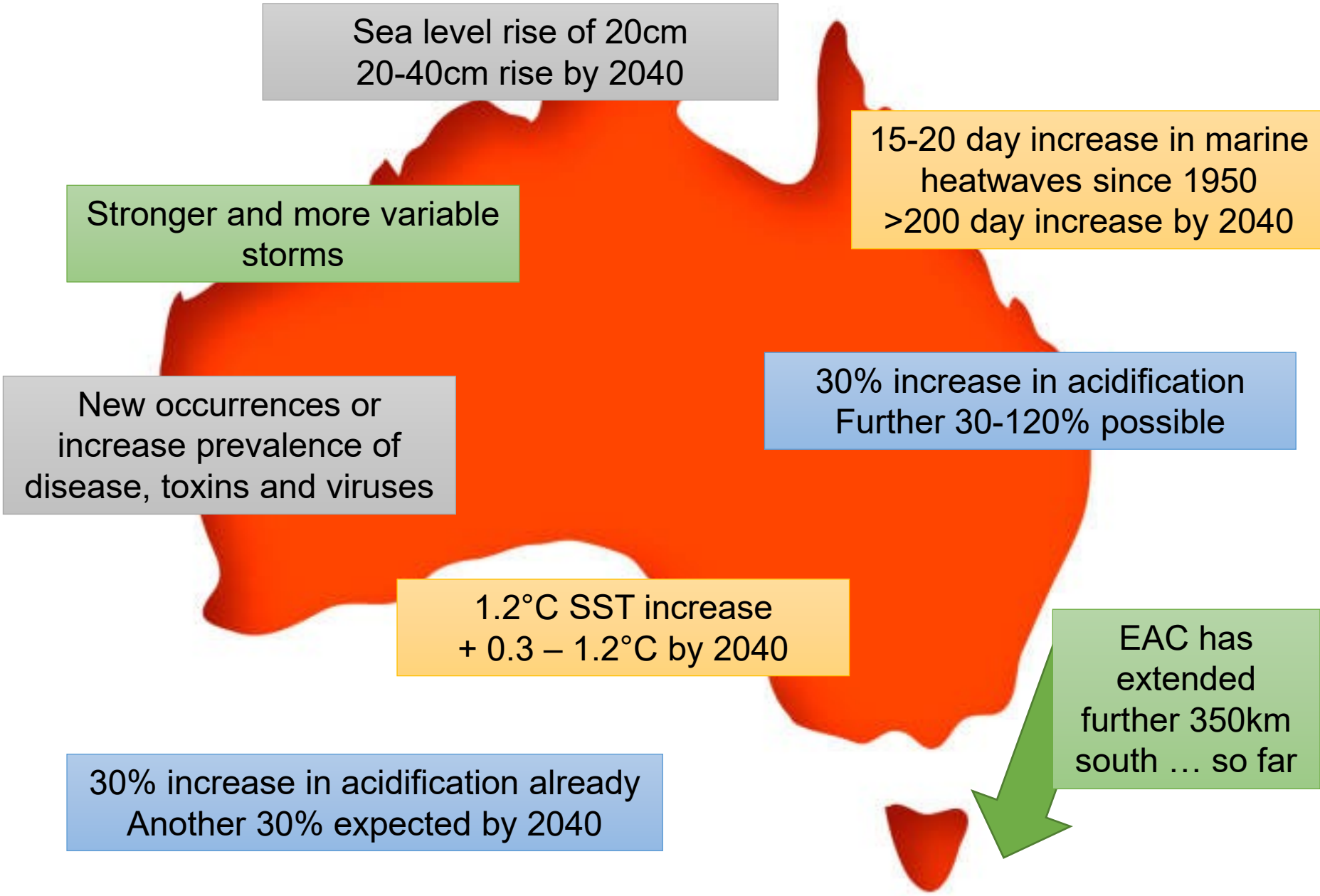
AFMA's Climate Adaptation Program

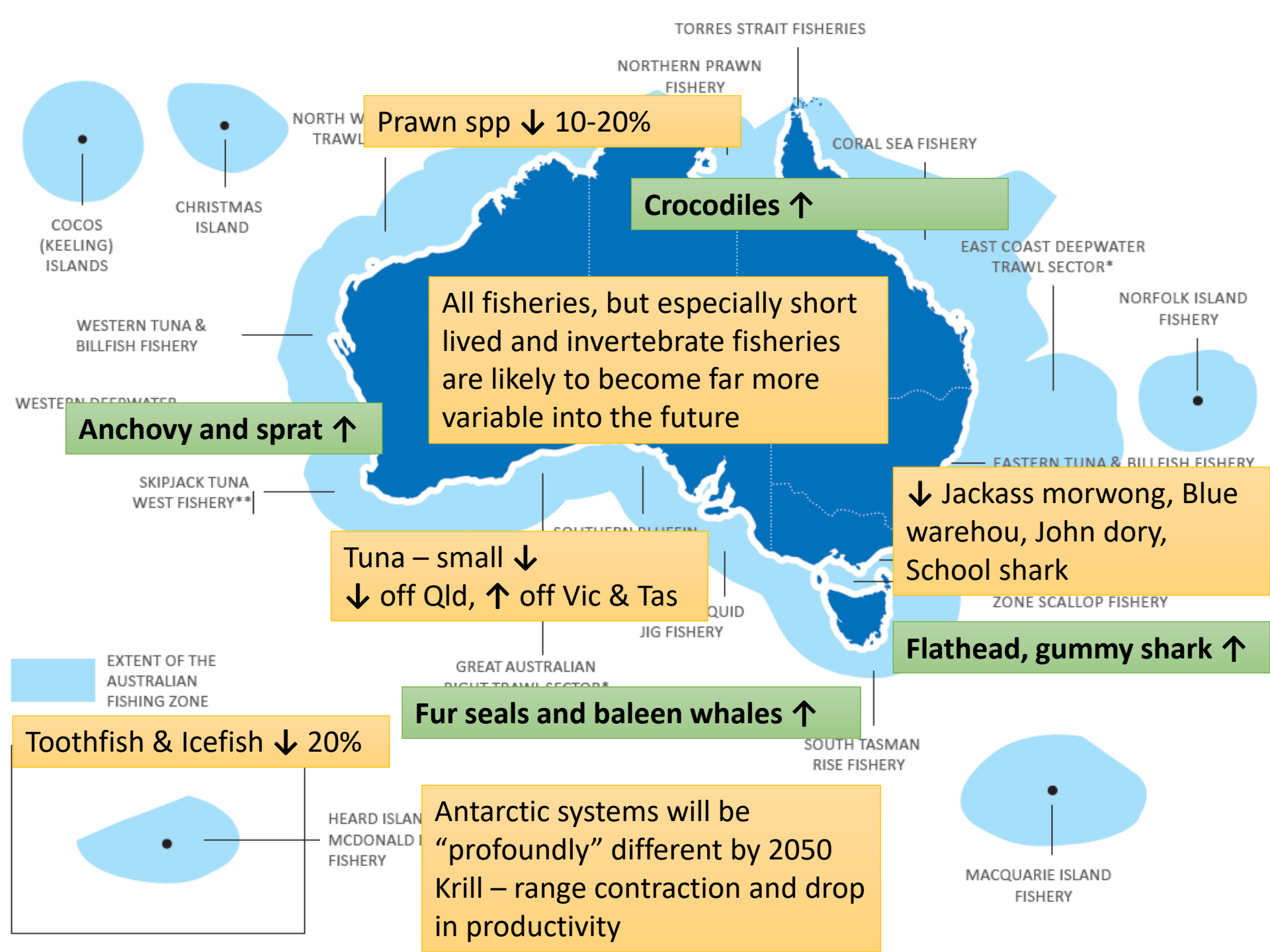
Adapting Commonwealth fisheries management to climate change

Torres Strait HCRAG

September 2022




Sea level rise of 20cm
20-40cm rise by 2040
15-20 day increase in marine heatwaves since 1950
>200 day increase by 2040
Stronger and more variable storms
30% increase in acidification
Further 30-120% possible
New occurrences or increase prevalence of disease, toxins and viruses
1.2°C SST increase
+ 0.3 – 1.2°C by 2040
EAC has extended further 350km south … so far
30% increase in acidification already
Another 30% expected by 2040


TORRES STRAIT FISHERIES
NORTHERN PRAWN FISHERY
Prawn spp ↓ 10-20%
CORAL SEA FISHERY
Crocodiles ↑
COCOS (KEELING) ISLANDS
CHRISTMAS ISLAND
EAST COAST DEEPWATER TRAWL SECTOR*
NORFOLK ISLAND FISHERY
All fisheries, but especially short lived and invertebrate fisheries are likely to become far more variable into the future
WESTERN TUNA & BILLFISH FISHERY
Anchovy and sprat ↑
SKIPJACK TUNA WEST FISHERY**
EASTERN TUNA & BILLFISH FISHERY
↓ Jackass morwong, Blue warehou, John dory, School shark
Tuna – small ↓
↓ off Qld, ↑ off Vic & Tas
ZONE SCALLOP FISHERY
JIG FISHERY
Flathead, gummy shark ↑
EXTENT OF THE AUSTRALIAN FISHING ZONE
GREAT AUSTRALIAN
Fur seals and baleen whales ↑
Toothfish & Icefish ↓ 20%
SOUTH TASMAN RISE FISHERY
HEARD ISLAN
MCDONALD I
FISHERY
Antarctic systems will be “profoundly” different by 2050
Krill – range contraction and drop in productivity
MACQUARIE ISLAND FISHERY

Fishery	Species	Sensitivity	Preliminary projection	Confidence in projection	Comments on projection
Torres Strait	Tropical Lobster		Uncertain		From ▼ >20-40%, but increase possible (food web and acidification dependent). Distribution could also change.
	Blue Endeavour Prawn		▼ >20%		
	Brown Tiger Prawn		Variable		Food web interactions and seagrass health affect make it uncertain. Variable due to rainfall influences (through salinity and plumes), major declines and high variability possible with extreme rainfall events/storms, could affect both abundance and catchability. Potential shift in timing of spawning etc due to changes in SST.
	Red Spot King Prawn		Steady		
	Snapper		Uncertain		▼ 40% to ▲ 40%.
Torres Strait	Maori Wrasse		▼ 10-20%		Declines stronger if habitat lost.
	Barracouta		Steady		
	Sharks		▼ up to 80%		
	Turtles		▼ 5-10%		Declines larger if lose nesting sites.
	Dugong		Uncertain		Steady through to ▼ 20-60% depending on food web interactions and predator abundance.
	Dolphins		▲ up to 20%		

Sensitivity	Low	Medium	High

Confidence	Low	Low-Med	Medium	High	Not Available

Impacts on fisheries resources

1. Distributional change
2. Productivity change
3. Species composition change

Distribution, productivity and species composition are key factors that underpin the way we manage our fisheries.

AFMA's Climate Adaptation Program

Integrating climate adaptation into the management of Commonwealth fisheries

- **Information and research on existing and predicted climate impacts are incorporated into decision-making processes**
  - Info / research already available and being used in some fisheries
  - More strategic / explicit approach to consideration of CC information in RAGs, MACs, Commission
  - Build our understanding and that of stakeholders
  - Identify critical gaps in knowledge
- **Fisheries management arrangements are adaptive**
  - Climate change impacts are considered in decisions
  - Developing adaptation options and management responses
  - Feeding into policy and legislative reviews (e.g. harvest strategy, rebuilding strategies, OCS)

Building climate change information into AFMA's decision-making processes

Actions endorsed by the AFMA Commission:

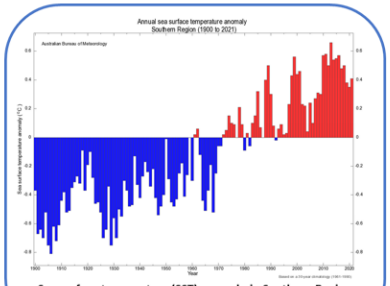
1. Standing agenda item "Climate and ecosystem update" for RAG and MAC meetings where TACs are being considered
2. Climate and Ecosystem Status Reports
   - Climate and ecosystem indicators update
   - Snapshot of fishery climate sensitivity analysis and species p
   - Collation of climate studies relevant to each fishery
3. Include climate sensitivity information and consi of climate impacts into species summaries (or sir
4. Qualitative assessment and incorporation of climate change information into decision-making

Rolling out across AFMA fisheries

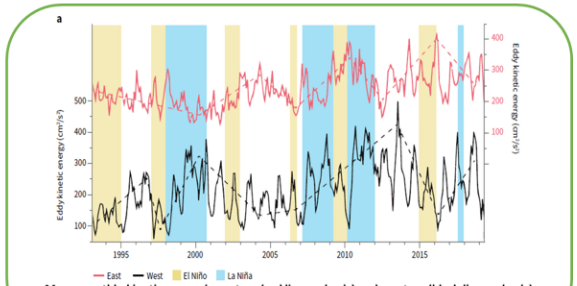
Keen to support action in Torres Strait fisheries

Attachment A: Climate and ecosystem indicators relevant to the SESSF (Draft for discussion)

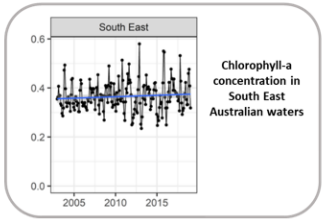
Hindcast [1]



Sea surface temperature (SST) anomaly in Southern Region (relative to 1961-1990 average)



Mean monthly kinetic energy in eastern (red line and axis) and western (black line and axis) Australia *(from Trebilco R et al, 2021)*

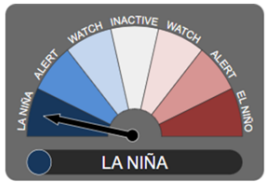


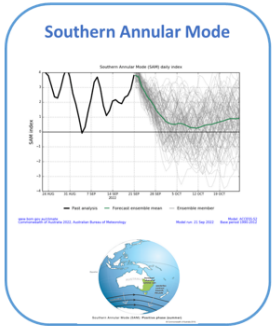
Chlorophyll-a concentration in South East Australian waters

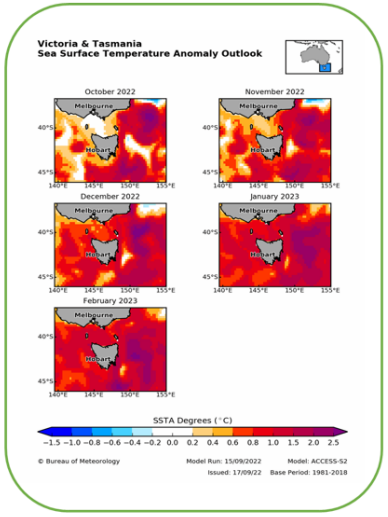
Hindcast Summary

Sea Surface Temperature (SST) in Southern Australian waters have increase significantly over time with temperatures over the last decade sitting around 0.5°C above the 1961-1990 average. Eddy kinetic energy (the flow of currents and eddys) in eastern Australia has seen a general increase over the last 30 years, as well as increased variability. Chlorophyll-a concentration (a measure of phytoplankton biomass) has been relatively stable in South East Australian waters over the past 20 years.

Seasonal forecast [1]







Forecast Summary

The declaration of La Nina, together with the positive Southern Annular Mode (SAM) index suggests increased rainfall in eastern Australia during spring and summer, below-average rainfall in western Tasmania and winds further south than normal.

The Sea Surface Temperature (SST) Anomaly Outlook project surface water temperatures of 1°C or more above historical averages throughout much of the fishery area over the next 6 months.

What other climatic indicators are relevant to the SESSF and should be included in the hindcast and forecast?

Species	Sensitivity	Preliminary projection	Confidence in projection	Comments on projection
Alfonsino	Low	▼ 20%	Medium	Spatially uniform.
Baleen whales	High	▲ 10-40%	Medium	Short term increases likely (recovering from past exploitation), but can be reversed depending on summer forage in the Antarctic.
Bight Redfish	Medium	Uncertain	Medium	▼ 20% through to ▲ 10%.
Blue Grenadier	Medium	Uncertain	Medium	▼ 15% through to ▲ 60%. Spatially uniform.
Blue Warehou	Low	▼ 15%	Medium	
Blue-eye Trevalla	Low	▲ up to >50+%	Medium	Decline more in the east, may increase in Bonney upwelling area.
Deepwater Flathead	Low	Uncertain	Medium	▼ 20% through to ▲ 10%.
Dolphins	High	▼ 20%	Low	
Eastern Gemfish	Low	Uncertain	Medium	▼ 20% through to ▲ 10%. Spatially uniform.
Eastern School Whiting	Medium	▲ 10-50%	Medium	
Elephantfish	High	▼ 30%	Low	Decline more in the northern extent of the fishery.
Frostfish	Medium	▼ 15%	Low	Spatially uniform.
Fur Seals	High	▲ 10-40%	High	Extend much further south and east.
Gould's Squid	Low	Variable	Low-Med	Strong increases and decreases through time.
Gulper Shark	High	▼ 40%	High	
Gummy Shark	Medium	▲ up to 5%	High	
Hapuku	Low	▼ 5-10%	Low	Spatially uniform.
Jackass Morwong	Low	▼ up to 20%	High	Patchy but decline more in th… extent of the…
John Dory	Low	▼ 40%	Low-Med	
Latchet	Low	▲ 10%	Low	
Mirror Dory	Low	▼ 15%	Medium	
Oarfish	Low	▼ 25%	Low	

Tailored for each fishery

Integrating climate adaptation into the management of Commonwealth fisheries

- **Information and research on existing and predicted climate impacts are incorporated into decision-making processes**
  - Info / research already available and being used in some fisheries
  - More strategic / explicit approach to consideration of CC information in RAGs, MACs, Commission
  - Build our understanding and that of stakeholders
  - Identify critical gaps in knowledge
- **Fisheries management arrangements are adaptive**
  - Climate change impacts are considered in decisions
  - Developing adaptation options and management responses
  - Feeding into policy and legislative reviews (e.g. harvest strategy, rebuilding strategies, OCS)

Adaptation of Fisheries Management to Climate Change Handbook

The Handbook sets out a three-step process :

Step 1: Consider the climate sensitivity of a fishery's management to physical and ecological change

Step 2: Consider how fishery operators are likely to respond and adapt

Step 3: Determine potential management responses and the cost and speed of response

Method: Engage a range of experts and stakeholders in the process

Output: Better understanding of the climate risks to a fishery and guidance on how to respond

"Even the best management will not stop environmental decline if we do not address climate change and cumulative effects"

- Australia State of the Environment Report 2021, Marine Chapter.

AUS FISH CORAL

HAND COLLECTION OF ORNAMENTAL MARINE SPECIES IN THE TORRES STRAIT

A member of

PROVISION REEF
Promoting Sustainable Reef Harvest

BACKGROUND

- Aus Fish Coral
  - QLD Coral Fishery
  - QLD Aquarium Fish Fishery
- Supplier of live coral, fish and invertebrates for aquariums
- Existing markets
  - Europe
    - Germany, Italy, France, Netherlands
  - United Kingdom
  - USA
  - SE Asia
    - Japan, China, South Korea
  - Australia

TORRES STRAIT LICENSING

- Aus Fish Coral purchased existing TVH Lic #123480 in February 2022
- Licence is authorised to take species not managed under a prescribed legislative instrument, for example:
  - Ornamental clams
  - Ornamental shrimp
  - Ornamental sea stars
  - Ornamental sponge
  - Ornamental snails

OUR TARGET SPECIES

- Ornamental clam
  - Tridcana crocea, maxima, squamosa, derasa
- Ornamental shrimp
  - Lysmata, stenopus
- Ornamental sponge
  - Trikentrion

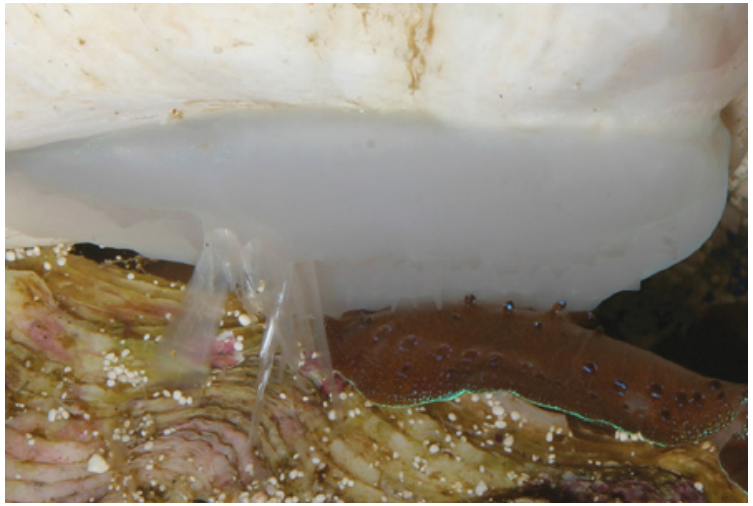
- Secondary species
  - Ornamental gastropods e.g. nassarius

SPECIES NOT PERMITTED

- Species with existing management arrangements, for example:
  - Fish
  - Lobster
  - Sea cucumber
  - Coral
  - Trochus
  - Pearl shell

PROPOSED FISHING METHODS

- Hookah diving
  - One vessel less than 10.0m in length
- Hand-held implements (dip-net, hammer, chisel)
  - Clams are harvested by removing small amount of substrate they are attached to by their byssal threads
  - Damaging byssal threads often results in mortality of the animal



PROPOSED PRECAUTIONARY LIMITS

- Ornamental clams
  - Max 5,000 individuals per year (all species combined)
  - Max size limit 15.00 cm
  - Traditionally important species no-take (Giant Clam - Tridacna gigas)
- Ornamental shrimp
  - Max 5,000 pairs
- Ornamental sponge
  - Max 250 kilograms
- Secondary Species
  - Max 5,000 individuals combined

COCOS (KEELING) ISLAND CLAM HARVEST

- Maximum Sustainable Yield of T. maxima estimated 55,271 individuals per year (2019 Tycraft WTO Assessment)
  - Calculated from standing stock biomass estimates
  - Lagoon habitat approx. 190 square kilometres

- Proposal to take 5,000 individuals per year from Torres Strait (significantly larger habitat area)

NEXT STEPS

- RAG advice on suitably precautionary harvest limits for the nominated species
- Develop management arrangements
- EPBC Act Part 13, 13A approvals
  - Authorised to harvest and sell to domestic and export markets

MANAGEMENT ARRANGEMENTS

- VMS
- HC Logbook
- Catch Disposal Record
- Catch Limits
- Size limits
- Vessel length limit
- Gear restrictions

QUESTIONS

- Contact
  - Dean Pease, owner Aus Fish Coral
- Email
  - dean@ausfishcoral.com.au