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CSIRO's submission to Commonwealth Fishery Harvest Strategy Policy and Commonwealth Fishery Bycatch Policy review

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Glossary

AFMA: Australian Fisheries Management Authority

B_{MEY}: Biomass at Maximum Economic Yield

B_{MSY}: Biomass at Maximum Sustainable Yield

CFBP: Commonwealth Fisheries Bycatch Policy

CFHSP: Commonwealth Fisheries Harvest Strategy Policy

CKMR: Close-Kin Mark-Recapture

CSIRO: Commonwealth Scientific and Industrial Research Organisation

DAFF: Department of Agriculture, Fisheries and Forestry

DCCEEW: Department of Climate Change, Energy, the Environment and Water

EPBC Act: Environment Protection and Biodiversity Conservation Act

ETBF: Eastern Tuna and Billfish Fishery

ETP Species: Endangered, Threatened and Protected Species

FRDC: Fisheries Research and Development Corporation

HCR: Harvest Control Rules

LRP: Limit Reference Point

MEY: Maximum Economic Yield

MICE: Models of Intermediate Complexity for Ecosystem assessments

MSE: Management Strategy Evaluation

NER: Net Economic Returns

NPF: Northern Prawn Fishery

RU: Research Unit

SAFE: Sustainability Assessment for Fishing Effects

SEA-MES: South-East Australian Marine Ecosystem Surveys

SESSF: Southern and Eastern Scalefish and Shark Fishery

SBT: Southern Bluefin Tuna

TAC: Total Allowable Catch

TRP: Target Reference Point

Executive Summary

The attached document is a draft report for the Commonwealth Fisheries Policies Review 2024. Its primary purpose is to review and provide recommendations for the Commonwealth Fisheries Harvest Strategy Policy (CFHSP) and the Commonwealth Fisheries Bycatch Policy (CFBP). The review aims to ensure these policies remain effective and relevant in addressing emerging challenges in Australia's fisheries management.

CSIRO is generally supportive of the proposed recommendations from the draft Commonwealth Fisheries Policies Review; however, there are some areas where the inclusion of approaches that either currently exist in Commonwealth managed fisheries or that allow flexibility for the inclusion of new approaches that will become available in the future are not included.

The CFHSP review has focused on assessing the performance of harvest strategies relative to biomass-based, target and limit reference points. While this is appropriate for some fisheries, there are alternative approaches currently being used in several Commonwealth fisheries that need to be accommodated. The CFHSP explicitly states Commonwealth fisheries should seek to maximise the net economic return (NER) to Australia, however, very few fisheries formally estimate maximum economic yield (MEY) and instead use proxies. The limiting factor to estimating MEY in more fisheries is cost effective data collection. A recommendation to investigate putting in place systems to collect economic data would greatly benefit the ability to meet the objective of maximising the NER to Australia. Such systems would be particularly relevant for multi-species fisheries, where using a common proxy for all species results in sub-optimal outcomes.

It is noted that the CFHSP review recommendations do allow for alternative target reference points (TRPs), but advice on how these should be derived is not provided. This is important as there are now methods for identifying species of ecological significance where higher TRPs are needed given the ecological role of the species. This would then be in line with First Nations' request for higher TRP for cultural reasons in some fisheries.

Managing fisheries that are impacted by climate change is a relatively recent research area globally, with several new approaches developed in recent years. The CFHSP review focuses on one of these approaches, dynamic B_0, as the key mechanism for incorporating changing productivity into management advice. However, dynamic B_0 is not a general approach to providing management advice under changing productivity conditions and we recommend dynamic B_0 be replaced with more generic terminology. There is no discussion of what to do if it is not possible (due to environmental influence) to ensure a stock remains about the limit reference point (LRP). In terms of rebuilding stocks, how to manage multi-species fisheries when the productivity of a choke species has declined due to environmental change needs to be determined.

Nevertheless, the need for broader data collection is fundamental. It is noted that "other users of the marine estate should be encouraged to collect additional data which could then feed into the ERA process". This should be a headline recommendation as there is an increasing need to consider beyond fisheries to system-level use.

Relating to the CFBP, a scientific basis for minimising the ecological impacts and enhancing sustainable practices in Commonwealth fisheries is required. To this end, the policy needs to remain objective focused and not prescribe the means to achieve outcomes as the most effective methods are likely to be case-specific. Enhanced sampling requirements are required and would result in more robust assessments and increased confidence in both the status of bycatch populations and in the associated fisheries management and conservation outcomes. A stricter requirement and minimum standards for data collection is an obvious change which would facilitate sustainable management practices.

Introduction

CSIRO welcomes the opportunity to provide input to the Department of Agriculture Fisheries and Forestry (DAFF) consultation into the Commonwealth Fisheries Policies review (DAFF 2024). The review by DAFF considers the Commonwealth Fisheries Harvest Strategy and Bycatch policies (CFHSP; CFBP; Department of Agriculture and Water Resources 2018a, b) and the associated Guidelines documents that assist in their interpretation (Department of Agriculture and Water Resources 2018c, d). The CFHSP and CFBP specify how all species that interact with Commonwealth fisheries are to be managed. The review makes a total of 36 recommendations regarding the CFHSP and CFBP, the inclusion of First Nations interests into both plans and the incorporation of important aspects of the Guidelines documents (Department of Agriculture and Water Resources 2018c, d) into the CFHSP and CFBP.

CSIRO is a world leader in fisheries and ecosystem research and a key agency for research to support the management of Commonwealth Fisheries, both domestic and international. CSIRO developed the ecosystem-based management frameworks (Smith et al., 2007, Fulton et al., 2011) that were considered key to the implementation of the first CFHSP (Smith et al., 2008; Smith et al., 2014). CSIRO has also designed decision support tools (FishPath) used to assist with the development of harvest strategies for data-limited fisheries (Dowling et al., 2023), as well as novel and pragmatic stock assessment approaches for such fisheries (e.g., SAFE (Zhou and Griffiths 2008); empirical indicator frameworks (Harford et al. 2021)). CSIRO has led the development of empirical harvest strategies for the sustainable management of tropical rock lobster in the Torres Strait (Plagányi et al. 2018), and for tropical tuna fisheries in Indonesian archipelagic waters for data-limited fisheries (Hoshino et al. 2020). CSIRO has also led research into the redesigning of harvest strategies to ensure robustness to extreme climate (Blamey et al. 2022).

CSIRO has developed and operationalised novel methods for assessing the status of both target and bycatch populations, including Close-Kin Mark-Recapture (CKMR; Bravington et al., 2016a), a method which relies on genetic relatedness among sampled fish to provide fisheries-independent estimates of spawning stock abundance. This method was instrumental in revising our understanding of the stock status of southern bluefin tuna (Bravington et al., 2016b) and has since been applied to endangered and harvested elasmobranchs (Patterson et al., 2022; Thomson et al., 2020). CSIRO has also recently developed large scale genetic techniques ("gene tagging") for determining recruitment strength in a highly migratory tuna (Preece et al., 2022). Both gene tagging and CKMR are now routinely used within the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) Management Procedures[1] (https://www.ccsbt.org/en/content/management-procedure), which are used to set the total allowable catch (TAC). The CKMR method is currently being applied to assess abundance of several priority Endangered, Threatened and Protected Species (ETP Species) in the priority species list of the Department of Climate Change, Energy, the Environment and Water (DCCEEW), including Maugean skate, grey nurse shark and freshwater sawfish (https://www.dcceew.gov.au/environment/biodiversity/threatened/action-plan/priority-fish).

CSIRO has also led the development and implementation of Models of Intermediate Complexity for Ecosystem assessments (MICE), which include key species and their direct drivers (such as predators, prey, habitat, climate drivers and effort dynamics). These models are being applied to examine climate-associated questions (e.g. Plagányi et al., 2011; 2014) as well as resource-use trade-offs in regions of climate-extremes

[1] The term management procedure is used widely in international fisheries and is equivalent to a harvest strategy, for clarity we use the term harvest strategy throughout the remainder of this document.

(e.g. Plagányi et al. 2024), with MICE-type models that incorporate climate-stock relationships (Blamey et al., 2014; Plagányi et al., 2022; Tulloch et al., 2019).

The world leading end-to-end ecosystem model Atlantis has also been developed by CSIRO (Fulton et al., 2014). The representation of fishing dynamics in this model varies among applications, with some applications including sophisticated effort dynamics models with full representation of the management decision-making process (e.g. Fulton et al., 2024; Maury et al., 2024). This model has been used to consider the level of environmental (climate change) versus fishing influence on stocks, especially non-recovering stocks, in southeastern Australia (Fulton et al., 2024).

The CFHSP explicitly references the use of Management Strategy Evaluation (MSE) to test the performance of management procedures or harvest strategies as best practice. CSIRO has been critical in the design and implementation of MSE - where a model is used to represent one or more "virtual worlds" for testing management options (Punt et al. 2016). MSE includes full dynamic representation of the decision-making processes; from data collection and monitoring, updating of assessments through to control rules that determine management actions (such as TACs) (Smith et al., 1999; Punt et al., 2001). MSE is used in two key ways: firstly it can be used to test the performance of new assessment methods and harvest control rules (e.g. Bessell-Browne et al., 2024); secondly, it is used to test the performance of harvest strategies to ensure they perform as expected and are robust to key uncertainties, including specific fishery characteristics, before they are implemented (e.g. Plagányi et al. 2018; Hillary et al., 2019; Blamey et al., 2022).

The CFHSP also identifies a key management objective of maximising the Net Economic Returns (NER) to Australia, with maximum economic yield identified as the target reference point. CSIRO has been instrumental in the implementation of the NER policy, having developed bioeconomic models for the tiger prawn component of the Northern Prawn Fishery that is used to support management decisions (Punt et al., 2010). CSIRO also developed a catch rate trigger that ensures maximum economic yield is achieved in the banana prawn component of the fishery (Pascoe et al 2018a, 2024). CSIRO has been actively engaged in considering implications of alternative measures of NER as target reference points, particularly in multi-species fisheries (e.g., Pascoe et al 2018b, Pascoe et al 2023). As Australia is currently the only country where NER is a key management objective, this work is considered world leading.

CSIRO undertakes significant research into Endangered, Threatened and Protected (TEP) species. This is done through direct species-specific projects (e.g. using CKMR; Hillary et al., 2018; Patterson et al., 2022) and more broadly to provide tools for rapid assessment of the potential ecosystem effects of bycatch. This has been particularly through the development of Ecological Risk Assessments (ERAs; Hobday et al., 2011). In addition, CSIRO has put considerable effort into developing methods for identifying indicators of ecosystem structure and species with particular ecological significance (Fulton and Sainsbury, 2024), so that evidence-based management decision making (and reference points) can be set within an ecosystem context.

Here, CSIRO addresses the key recommendations made in the CFHSP and CFBP review documents, where they relate to our research. Where we agree with the recommendations we have made no comment. In some circumstances, where relevant, we have included additional information to clarify technical comments made within the review documents.

CSIRO does not address the Stakeholder feedback from October-November 2023 and September 2024 Stakeholder workshops, or the technical review (Smith and Gardner, 2024). The exception to this is where the advice from these documents has been incorporated into the Key Points or Recommendations from the CFHSP or CFBP reviews.

The CFHSP review gives considerable weight to the findings from the Technical Review Report (Smith and Gardner, 2024). This process appears to have resulted in the Technical Review Report focusing on the

identification and appropriateness of target reference points. CSIRO notes that there are other approaches that could be considered relating to the types of target reference points applied. We describe, below, where these are being applied in Commonwealth fisheries assessment and management.

Specifically, we suggest that more focus should be given to improving our understanding on how current harvest strategies will perform in the face of environmental uncertainty and the development of new harvest strategies that are robust to these changes. The relative performance of candidate harvest strategies in meeting various management objectives under alternative climate scenarios can be evaluated using MSE, rather than trying to estimate a single target reference point. In addition, we note the challenges surrounding testing harvest strategy performance in data-limited situations, particularly for multi-species fisheries.

DAFF (2024) makes a total of 36 recommendations regarding the CFHSP and CFBP, the inclusion of First Nations interests into both plans and the incorporation of important aspects of the Guidelines documents (Department of Agriculture and Water Resources 2018c, d) into the CFHSP and CFBP. The following sections detail CSIRO's response to the five main themes addressed in the review of the CFHSP (Setting Target Reference Points, Multi-species Fisheries, Impacts of Climate Change and Rebuilding Overfished Stocks), and the three main themes addressed by the review of the CFBP (Policy Purpose, Data and Reporting and Risk Equivalency and Assessment).

In the sections below we have included summary text and recommendations from the CFHSP and CFBP in blue boxes to provide context for our responses.

CSIRO's response to the Review of key policy settings of the Commonwealth Fisheries Harvest Strategy Policy

The [2005] ministerial direction required, amongst other things, that AFMA:

… must take a more strategic, science-based approach to setting total allowable catch and/or effort levels in Commonwealth fisheries, consistent with a world's best practice Commonwealth Harvest Strategy Policy that has the objectives of managing fish stocks sustainably and profitably, putting an end to overfishing, and ensuring that currently overfished stocks are rebuilt within reasonable timeframes...

Accordingly, the objective of the current Harvest Strategy Policy is:

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

The recommendations from the review of the Harvest Strategy Policy were:

Setting Target Reference Points: The review considered whether economic benefits beyond commercial profitability could also be considered when setting biomass target reference points for fish stocks. This included the economic benefits that could be derived from the fishery by recreational and Indigenous fishers, or Australian consumers.

The review recommends the policy's current default target reference point be retained as the starting point when setting target reference points for a stock, and suggests alternative targets be adopted if there is sufficient evidence available to suggest this would achieve better outcomes for multiple sectors.

Multi-Species Fisheries: The review recognises managing multiple stocks within a single fishery is challenging because catching one stock can affect the abundance or distribution of another. The review supports continued adoption of different target reference points within multi-species fisheries, providing all species are managed above limit reference points (minimum stock biomass to ensure ecological sustainability). The review notes new management approaches for multi-species fisheries are being trialled and suggests any new management arrangements be tested to ensure the objectives of the policy will be met before they are adopted.

Managing the Impacts of Climate Change: The review heard stakeholders and experts agree that changing ocean conditions due to climate change is influencing the abundance, distribution and resilience of fish stocks. The review finds the policy should continue to allow flexibility in approaches used to account for the impact of climate change. Where climate change is impacting stock abundance, the review considers it may be appropriate to change the baseline from which targets are set. However, further work is needed to develop a standard of evidence to conclude climate change is significantly influencing stock abundance and to ensure minimum stocks levels are protected.

Rebuilding Overfished Stocks: The review notes some stocks in Commonwealth fisheries have been managed under rebuilding strategies for many years without evidence of recovery. The reasons for this failure to recover are unclear, but in some instances the impact of climate change is likely to be a factor.

The review considers further work is required to understand why some stocks are not recovering and to determine next steps when failure to recover is found to be due to factors other than fishing. Methods to assess the extent to which spatial and temporal management tools can provide stock protection and support recovery need to be developed.

Balancing Risk, Cost, and Catch: The review notes the risk, cost, catch trade off provisions within the policy seek to balance the amount of resources invested in data collection and analysis with the level of catch and risk. The review heard loss of commercial catch data due to fishery closures and other access restrictions is contributing to reduced certainty in stock assessments. Less certainty leads to increased risk, requiring more precaution to be taken when setting catch limits.

The review recommends the policy explicitly require the use of a buffer when setting catch limits commensurate with the level of uncertainty in stock assessments. Further work is also needed to improve estimates of other sources of mortality, including discards.

General comments

The review has focused on assessing performance of harvest strategies relative to biomass-based reference points. While this approach is valid and is applied in fisheries, such as the Southern and Eastern Scalefish and Shark Fishery (SESSF), there are other approaches currently being successfully applied within Commonwealth fisheries. An alternative approach to using stock assessment and HCRs linked with specific reference points is the use of MSE where the objectives (which may or may not be based on reference points and include risk thresholds and timeframes) are well defined and trade-offs are explored and accounted for in the selection of the harvest strategy (Butterworth 2007). In a number of Commonwealth fisheries, particularly those with international components, this approach has been successfully adopted, with examples provided below.

By not considering the full range of currently implemented approaches used in Commonwealth fisheries, the CFHPS review risks undermining Australia's ability to actively influence decisions within international fisheries and ecosystem management fora and potentially undermines existing harvest strategies within Australia's domestic fisheries. This is of critical importance given the number of Commonwealth stocks that are currently managed through Regional Fishery Management Organisations (RFMOs). Policy that restricts harvest strategy development would potentially limit Australia's influence in this area.

The CFHPS review notes that the number of stocks that are currently below their limit reference point (LRP) has increased since 2018. While this increase does not appear to be outside of the CFHSP requirement that stocks should be above their LRP at least 90% of the time, the failure of some stocks to recover within the specified rebuilding time frames is of concern and it is important to determine why this has occurred.

CSIRO supports the recommendation to undertake the formal evaluation of harvest strategies using MSE. The CFHSP review notes that most untested harvest strategies are in relatively small, low information fisheries. These fisheries often have empirical assessments linked to control rules whose performance can be hard to intuitively predict, making them among the highest need of formal evaluation. Unfortunately, they are generally low value and the resources required to evaluate their performance are unlikely to be able to be cost recovered.

Spatial and temporal management tools are commonly used in Australian Government managed fisheries, however, they are rarely included in harvest strategies. This is unfortunate because they can and do augment the dynamic management measures to achieve fisheries objectives. Both static and dynamic tools are used and while static tools are obviously not adjusted in response to the assessment outcomes, it is important to consider dynamic tools, particularly for sedentary species with volatile life histories (e.g. scallops).

In places, the review documents appear to contradict statements made in other sections. For example, the target reference point (TRP) section makes a number of statements about (presumably) single species B_{MEY}, implying all species should be managed to their single species B_{MEY} targets, while the multi-species section

states that individual species in multi-species fisheries can have different targets to enable the maximisation of total economic yield for the fishery.

1.1 Setting target reference points

Key Points

Target Reference Points (TRPs) express the desired biomass level for stocks in a fishery. The current Harvest Strategy Policy seeks to maximise net economic returns to the Australian community by pursuing TRPs that maximise fishery-wide commercial profitability – described as maximum economic yield.

Almost all fisheries use a proxy TRP because modelling maximum economic yield relies on data that is prohibitively costly to collect.

While the Harvest Strategy Policy Guidelines currently provide methodologies for consideration of the economic benefits of the recreational and Indigenous sectors, the review considered the Harvest Strategy Policy should specify that economic benefits beyond commercial profitability should be considered when setting TRPs. This includes the economic benefits that could be derived from the fishery by recreational and Indigenous fishers, or Australian consumers by setting different TRPs.

Notwithstanding this broader approach to setting TRPs, the review recommends the current default TRP of B_{48} be retained as the starting point for setting TRPs and suggests alternative TRPs should be adopted if there is sufficient evidence available to suggest this would achieve better outcomes.

The review gives a great deal of attention to the selection of target reference points and makes limited mention of fully specified management objectives. A clearly articulated TRP is where the value and the variable are both unambiguously defined (e.g. $0.48B_0$ with the meaning of B_0 well defined). The review focusses attention on the precise fraction of B_0 that should be used (0.48 or 0.5 or 0.4) instead of addressing the challenges of specifying TRPs in terms of biomass relative to B_0 – an inherently uncertain concept (Hilborn 2002, van Deurs et al., 2021) and one that assumes that stocks are at an unfished equilibrium prior to fishing, which, for many ecosystems has been demonstrated to be incorrect (Shannon et al., 2004, Fulton et al., 2022). Biomass based reference points are not appropriate for non-stationary stocks that have a high level of natural variation in stock size (i.e. a stock that will fluctuate above and below a LRP in the absence of fishing such as prawns, scallops and squid), or for stocks and species with limited data that preclude the estimation of a defensible biomass proxy. Moreover, climate induced changes in the productivity of several stocks are already demonstrated to have irrevocably altered the biomass to which the stock would return if all fishing were to cease. It also has the potential to create situations where it is impossible to ensure that "minimum stock levels are protected". The review does not acknowledge or discuss these potential situations.

Target reference points do not necessarily need to be defined in terms of biomass, but can include rates of fishing mortality, catch rates or even catch levels (Mace 1994, Pilling et al. 2016). As mentioned above, an alternative approach is the use of goals linked to management objectives rather than specific biomass-based TRPs. Numerous Commonwealth fisheries are managed to clearly defined management objectives and their related goals/targets, which are not necessarily prescribed biomass-based TRPs. These may or may not include TRPs but additionally include timeframes and risk criteria. For example, Southern Bluefin Tuna (SBT) uses no reference points in either the previous or current harvest strategy – the only time a reference point, as described in the CFHPS review, is used is to set the main primary management objective (Hillary et al. 2019). The same is true for Broadbill Swordfish in the Eastern Tuna and Billfish Fishery (ETBF) – where the harvest strategy is MSE tested and is optimised for average future CPUE levels, not to

reference points (Hillary 2020a). For the Macquarie Island Patagonian toothfish fishery there is currently a large scale MSE project underway to formally move away from using traditional biomass-based reference points but rather use a fully MSE tested HS tuned to management objectives based on target harvest rates.

Section 3.1 of the CFHSP review states that "Almost all fisheries use a proxy TRP because modelling maximum economic yield relies on data that is prohibitively costly to collect." Modelling MEY does require data that is not currently routinely collected. However, it is incorrect to say that this is prohibitively costly. South Australia has undertaken an economic data collection program that has run over 26 years covering all commercial fisheries (Carlin et al. 2024). The Northern Prawn Fishery undertakes an industry-led economic data collection program. Economic data collection is routine in the EU (European Commission Joint Research Centre et al. 2023) , Japan (Ministry of Agriculture, Forestry and Fisheries, http://www.maff.go.jp/j/tokei/kouhyou/gyokei/index.html) and the US (National Marine Fisheries Service 2024). Relative to the collection of logbook, observer and fishery independent data that is needed to support the development of stock assessment models, the collection of economic data can be relatively inexpensive. Currently, appropriate systems have not been developed in Australia, so that any data collection appears *ad hoc* and does not benefit from potential economies of scale that could be realised through a more systematic data collection program.

The potential for setting multi-objective target reference points has been explored for some fisheries and is achievable. The South Australian Harvest Strategy Policy (PIRSA 2015) explicitly states that ecological, economic and social objectives need to be identified for each fishery and the harvest strategy should aim to achieve each objective (Pascoe et al. 2019; Dowling et al. 2020). An approach for the incorporation of multiple objectives into harvest strategies has also been demonstrated for a key Queensland fishery, which also included recreational fishing benefits (Pascoe et al. 2019; Dowling et al. 2020).

For Commonwealth fisheries, taking into consideration consumer benefits is desirable if the objective is to maximise net economic returns (NER) to the broader community (Punt et al. 2013; Pascoe et al. 2015; Pascoe et al. 2023). However, we note that the NER approach may not be appropriate for all fisheries depending on specific characteristics. Where MEY results in a reduction in catches supplied to the domestic market, this results in higher prices to consumers and a transfer of consumer benefits to producers (Pascoe et al. 2018a). Appropriate TRPs can be derived accounting for both benefits to producers and consumers using bioeconomic models (Grafton et al. 2012; Pascoe et al. 2018a; Pascoe et al. 2023). It should also be noted that incorporating consumer benefits into TRPs is only relevant for fisheries that supply the domestic market; for export-based fisheries, benefits to Australian consumers are zero.

In terms of the recommendations, there is no encouragement given to modelling that would calculate species-specific MEY values to replace the default of $0.48B_0$. Without some form of commitment to improving economic monitoring, MEY calculations will always be seen as too complex. Ideally, a process such as the risk-cost-catch (or in this case, risk-cost-economic benefits) could be considered, exploring alternative options for systematic economic data collection.

Incorporating recreational benefits into the definition of TRPs is more complex. Allocation principles between recreational and commercial fisheries are well established (e.g., Edwards 1990). However, harvest strategies can be developed that include recreational fishing objectives, although including these into a biomass based TRP is usually not practical (Fowler et al. 2022). While not explicitly examined, it is likely that consideration of the benefits to First Nation fishers will also require different metrics. For example, the tropical rock lobster fishery has a TRP of B_{65} which has specifically been set taking into account First Nations fishers aspirations. Taking a broader perspective on potential indicators for use in TRP setting, there have been advances in terms of scientific methods for identifying species of ecological significance where more precautionary (higher TRPs) could be justified to ensure ecosystem structure and function (Fulton and Sainsbury, 2024).

A biomass based MEY target also does not necessarily guarantee that MEY or NER is achieved. MEY (despite its name) is the combination of catch, biomass and fleet structure that maximises economic profits in the fishery. Achieving an "optimal" biomass without the "optimal" fleet does not maximise economic profits nor NER. TRPs can potentially be achieved through substantial capacity underutilisation of an existing fleet, resulting in poor economic performance. Without some comparable fleet size target the biomass target is potentially misleading.

CSIRO supports the recommendations made in the CFHSP review around sustainable management approaches, noting the discussion above regarding reference points, particularly relating to alternatives to biomass-based reference points that are currently applied in many Commonwealth fisheries, both international and domestic. Specific comments on R1–3 are provided below. This need for flexibility is noted in the CFHSP review of the Guidelines R34 '*The Harvest Strategy Policy should maintain flexibility in regard to the use of modelling tools and assessment methods, noting these are subject to evolving understanding of best practice, data availability and resources*'.

R1) The Policy should reflect that a broader suite of economic benefits to the Australian community are incorporated into biomass TRPs (B_{TARG}), including for consumers, recreational and First Nations fishers.

R2) The starting point for setting the stock level target reference point (B_{TARG}), when this cannot be reliably modelled, should remain at B_{48}. The Policy should continue to allow for the adoption of a higher or lower TRP in fisheries where there is sufficient information available to demonstrate this would better pursue the objectives of the *Fisheries Management Act* 1991.

CSIRO agrees with R1, noting comments made above. We are concerned with the implication in R2 that by supporting a default TRP that there is no need for further work when recommending a default value. We suggest that routine economic data collection processes be developed. This also relates to comments made regarding biomass based TRPs above. We also note that methods exist for identifying TRP that account for species roles beyond single fishery and economic considerations.

R3) If the TRP for a stock is changed, the Policy should enable a transition period for implementation to allow the commercial sector to adjust.

CSIRO agrees, noting comments regarding TRP specification above. We also note that in some circumstances not all fishers will be able to adapt.

1.2 Multi-species fisheries

Key Points

Managing multiple stocks within a single fishery is challenging because catching one stock can affect the abundance or distribution of another. For this reason, the Harvest Strategy Policy allows stocks in multi-species fisheries to be managed to different TRPs.

Different tools and approaches for assessing and managing stock abundance in multi-species are being considered for the Southern and Eastern Scalefish and Shark Fishery. The outcomes of this work may help inform approaches in other multi-species fisheries.

The review supports continued adoption of different TRPs within multi-species fisheries, providing all species are managed above limit reference points (minimum stock biomass to ensure ecological

sustainability). New management approaches for multi-species fisheries must be tested to ensure the objectives of the policy will be met.

The use of the $1.2B_{MSY}$ or $0.48B_0$ proxy TRPs has been repeatedly demonstrated as flawed, particularly in multi-species fisheries (Pascoe et al. 2015, Pascoe et al. 2018b, Pascoe et al. 2020). Where bioeconomic models have been developed, these optimal ratios vary considerably by species and fishery depending on the contribution of the species to total fishery revenue, growth characteristics and costs of fishing (Punt et al. 2013; Pascoe et al. 2015; Pascoe et al. 2023). Trying to impose a common proxy TRP on all species within multi-species fisheries results in sub-optimal economic and stock outcomes (and in most cases is not feasible to achieve). It is noted that the CFHSP review recommendations do allow for alternative TRPs, but advice on how these should be derived is not provided.

CSIRO supports the recommendations made in the CFHSP review noting the discussions made regarding reference points above, particularly relating to alternatives to biomass-based reference points. Specific comments on R4–6 are provided below.

R4) The Policy should continue to allow for individual stocks in multi-species fisheries to be managed to different TRPs to achieve overall fishery-level objectives.

CSIRO suggests the following modification to R4: *The Policy should continue to allow for individual stocks in multi-species fisheries to be managed to different levels of relative exploitation to achieve overall fishery-level objectives.* We note that this suggestion would also benefit from explicit mention of ecosystem considerations.

R5) The Policy should specifically clarify that all stocks in multi-species fisheries must be maintained above the limit reference point (B_{20}) at least 90% of the time.

CSIRO agrees that all stocks in multi-species fisheries should be managed sustainably, however, we note the alternatives to reference points, as discussed above, and that the role of species in ecosystems may need to be reflected in the management methods and setting used to deliver that sustainability at a system level. In addition, we note that stocks impacted by environmental change (including via the creation of novel ecosystem structures that cause a change in ecosystem and fisheries catch composition), may eventually be classified as bycatch and managed using ERAs (as stated in R15 below).

R6) The effectiveness of novel management approaches for multi-species fisheries should be tested and compared using Management Strategy Evaluation methods (or a suitable alternative such as risk-based evaluation).

CSIRO supports this recommendation of MSE testing management approaches for multi-species fisheries. CSIRO notes that 'risk-based evaluation' is currently in the Policy and the Guidelines and without the method being defined. We recommend a definition of 'risk-based evaluation' should be provided in the Policy, including examples of how this should be applied in data-limited situations, particularly given risk-cost-catch capacity constraints, and the technically challenging nature of multi-species MSE.

1.3 Managing the impacts of climate change and shifting baselines

Key Points

Stakeholders and experts agree that changing ocean conditions due to climate change is influencing the abundance, distribution and resilience of fish stocks.

The current Harvest Strategy Policy requires that variability in ocean conditions - including the influence of climate change - is considered when developing harvest strategies, but there is no consensus on best practice. The policy should continue to allow flexibility in approaches used to account for the impact of climate change.

Where climate change is impacting stock abundance, it may be appropriate to change the baseline from which targets are set. However, further work is needed to develop a standard of evidence to conclude climate change is significantly influencing stock abundance.

Provisions within the policy may be needed to ensure minimum stock levels are protected if dynamic baselines are used to set limit reference points.

Managing fisheries that are impacted by climate change is a relatively recent area of research globally, with several new approaches being developed in recent years. The CFHSP review focuses on one of these approaches, dynamic B_0, as the key mechanism for incorporating changing productivity into assessment-based management advice. However, dynamic B_0 is a specific method that is focused on the impact of non-random recruitment dynamics (such as strong directional trends or regime shifts) on productivity through time. It is specifically tailored for this purpose and is not a general approach to providing management advice in a situation of shifting baselines in stock dynamics and reference points. A number of fisheries are already using a range of approaches to shifting baselines and have been for some time. For example, SBT deals with regimes in B_0 and recruitment specifically and in its MSE since 2004 (Hillary et al. 2019). Swordfish in the ETBF specifically uses dynamic B_0 in its spatial operating models as well as climate-driven changes in migratory behaviour which result in time-varying RPs (Hillary 2020b).

These examples highlight that dynamic B_0 is different to using dynamic refence points –and this should be clarified throughout this section of the CFHSP review. This is because:

(1) Even in situations where the biology and fishing selectivity are constant within an assessment, the relative catch and effort between assessments changes and alters estimates of any MSY reference points, so even in this case they are not static.
(2) There are a number of assessments that assume either time-varying selectivity and or growth (e.g. SBT has both) but uses static B_0 as well as clearly estimated time-varying reference points.

This highlights the mistaken understanding of dynamic reference points in general. For example, even with a static B_0 and/or unfished recruitment, changes in growth result in the “effective” unfished spawning stock biomass changing through time (though to be clear this is not dynamic B_0 in the way interpreted in this document). In addition, estimates of static B_0 have been found to change through time as assessments are updated (Bessell-Browne et al. 2024). Therefore, it is not just the MSY reference points but biomass-based reference points that are not static even though B_0 is static within an assessment framework.

CSIRO has undertaken considerable testing of dynamic B_0 harvest control rules using MSE (e.g. Bessell-Browne et al. 2022; 2024; Penney et al. 2024) that has demonstrated adverse performance under declining productivity conditions. This does not mean that dynamic B_0 should not be used, rather, that further work is required to develop control rules that perform as desired given management objectives under changing productivity conditions, as has been successfully demonstrated in the SBT example described above.

There are a range of approaches that can be used to incorporate the impacts of changing climate conditions on productivity in assessments and management. An overview of approaches in use globally has highlighted that there is no internationally agreed best practice approach (Bessell-Browne et al. in review). The approach chosen will need to be determined on a case-by-case basis and the appropriate solution will

depend on specific fishery and policy characteristics (e.g. data availability, available funding and risk tolerance).

Successful examples of incorporating climate impacts within harvest strategies, that do not use dynamic B_0, include testing the performance of harvest strategies to expected future environmental conditions to ensure that they continue to perform as expected using MSE. This has been successfully completed and implemented for redleg banana prawns in the Northern Prawn Fishery (NPF; Blamey et al. 2022) and SBT (Hillary et al. 2019). Another example is the use of recent recruitment projections in the SESSF for stocks with ongoing below average recruitment.

There is also no consideration of the influence of species with shifting distributions resulting from climate change. New species (or even novel ecosystem structures) are entering jurisdictions without any historical baseline (i.e. B_0) and this situation is not recognised in the CFHSP review. As to the standard of evidence needed to conclude environmental factors are driving stock abundance, in most instances, Australia has not collected sufficient information on stocks historically to be able to do that, so alternative approaches will be required.

There is considerable research currently underway into a broad range of methods that can be used to incorporate climate change impacts within stock assessments and harvest strategies. This research is also addressing how to assess species without historical baselines as described above. It is important to acknowledge the range of approaches available and that the best solution will vary on a case-by-case basis. For example, there is currently a project underway developing HCRs that could be used without an estimate of B_0 (e.g. FRDC 2022-006, https://www.frdc.com.au/project/2022-006). It is, therefore, important that any changes to the policy considered here should allow sufficient flexibility for new methods to be adopted following sufficient testing of performance.

CSIRO agrees R9 and R11 remain as written in the CFHSP review but remove the reference to dynamic B_0 as an example approach. Text in the Policy guidelines could outline the range of possible approaches to account for climate change within harvest strategies and avoid confusing dynamic B_0 with dynamic reference points. Such examples include extended stock assessments, MICE, dynamic reference points and MSE testing robustness of harvest strategies to anticipated future conditions.

R7) The Policy should explicitly recognise that baselines are changing for many species and that harvest strategies should adapt accordingly.

CSIRO agrees with the recommendation but advises that ‘baselines’ be replaced with ‘productivity’. It would also be useful for the review to explicitly mention how to deal with species for which there is no historical baseline - either because the species is a new entrant to the system, or because no information was collected historically, or because there has been sufficient modification to the system to render historical information of limited utility.

R8) The Policy should continue to allow flexibility in approaches used to account for environmental factors such as climate change in harvest strategies.

CSIRO agrees with this recommendation, albeit with the caveat that defensible evidence underpins the decision for applying flexibility.

R9) Further work is needed to determine the standard of evidence required to conclude environmental factors are the primary driver of stock abundance, if this is being used to support use of an alternative management approach, such as dynamic B_0.

CSIRO suggests removing the reference to 'such as dynamic B_0' as outlined above.

R10) When setting LRPs, the Policy should require a minimum absolute biomass beyond which targeted fishing must cease. This could be expressed in terms of absolute biomass, relative abundance, or fishing mortality.

CSIRO notes that this recommendation is prescriptive and in conflict with the need for flexibility outlined in R8. It also conflicts with suggestions made regarding reference points above. We suggest removing this recommendation.

R11) Novel approaches for taking the influence of environmental factors such as climate change into account in harvest strategies – such as the use of dynamic B0 - should be tested using MSE or other appropriate methods to confirm compliance with the Policy objective.

CSIRO suggests removing the specific reference to dynamic B_0 from this recommendation as outlined above and adding it to the Guidelines or alternative clarification document along with other potential methods to accommodate environmental factors such as climate change.

1.4 Rebuilding overfished stocks

Key Points

When fish stocks are assessed as overfished or subject to overfishing, the Harvest Strategy Policy requires the stock be managed under a rebuilding strategy.

Some stocks in Commonwealth fisheries have been managed under rebuilding strategies for many years without evidence of recovery. The reasons for this failure to recover are unclear, but in some instances the impact of climate change is likely to be a factor.

The review considers further work is required to understand why some stocks are not recovering and to determine next steps when failure to recover is found to be due to factors other than fishing. Methods to assess the extent to which spatial and temporal management tools are contributing to stock protection and recovery need to be developed.

There are two issues that need to be clarified regarding rebuilding stocks moving forward. First, how to manage multi-species fisheries where the productivity of a choke species[2] has declined due to environmental change. Should harvest of the target species be severely restricted, or should the choke species become a bycatch species, which is not directly assessed and is instead monitored using an ERA? Second, it must be recognised that considerable resourcing will be required to undertake the work recommended in R12–13, 15–16. CSIRO is currently undertaking the South-East Australian Marine Ecosystem Surveys (SEA-MES) to monitor how climate change is impacting the ecosystem and how this may be influencing the failure of some stocks to rebuild in the SESSF.

CSIRO supports recommendations R12–16 noting the discussion above. Some additional clarification is provided below.

[2] A choke species is one that is caught incidentally while targeting other species and, if caught in excess of its sustainable harvest, can trigger restrictions to fishing on the target species.

R12) Recognising some stocks are currently failing to recover, further work is required to understand why - including whether underestimated discards, other non-commercial sources of mortality, or environmental factors are contributing factors.

CSIRO agrees that a better understanding of why some stocks are failing to recover is required, however, we note that disentangling the impacts of imprecision in total fishing mortality (i.e. discards and other non-commercial sources of mortality) from environmental factors is a resource intensive process.

R13) The impact of environmental factors should be considered when testing whether fisheries management responses (such as reduced TACs, gear changes, spatial closures) are likely to reverse declines and recover stocks above the LRP.

- Consideration should be given to the standard of evidence required to conclude factors other than fishing are the primary driver of stock decline or failure to recover.

CSIRO agrees with this recommendation.

R14) Rebuilding strategies should continue to be developed for stocks managed under the Harvest Strategy Policy when they fall below the LRP, unless there is sufficient evidence to indicate fishing has not contributed to stock decline and continued fishing would not hinder recovery. Rebuilding strategies should continue to:

- be focused on recovering stocks above the LRP
- outline the expected time to recovery to the LRP relative to the time it would take to recover the stock in the absence of any fishing
- consider the impact of all sources or mortality, including those that cannot be managed or constrained by the Australian government
- outline performance measures and how these will be monitored and assessed.

CSIRO agrees with the intent of this recommendation, however, we advise modifications to permit alternatives to reference points as discussed above.

R15) Where there is sufficient evidence to indicate fishing would not hinder recovery, and there is no realistic prospect of returning the stock to a level that could be fished under the provisions of the Harvest Strategy Policy, the stock would be classified as 'bycatch' and managed under the Commonwealth Fisheries Bycatch Policy and relevant provisions of the EPBC Act.

- The Harvest Strategy Policy should articulate the circumstances under which a stock should be re-categorised as a bycatch species

CSIRO agrees that the HSP articulates the circumstances under which a stock should be re-categorised as a bycatch species and requests that these criteria are specified and reviewed before they are adopted in the revised Policy.

R16) Further work across relevant government agencies is required to consider appropriate steps for protecting stocks that have declined below the LRP and are failing to recover primarily due to factors other than fishing. For stocks in this category, management strategies should:

- focus on protecting the remaining stock to the extent possible
- outline recovery trajectories expected in the absence of any fishing
- consider the impact of other sources or mortality that cannot be managed or constrained by the Australian government
- consider whether spatial and temporal management tools could be relied upon to protect non-recovering stocks
- outline performance measures and how these will be monitored and assessed
- identify how implementation of the management strategy will be resourced.

CSIRO agrees with the intent of this recommendation, however, we advise that 'management strategy' be replaced with 'rebuilding strategy' to avoid confusion with 'management strategy evaluation'.

1.5 Balancing risk, cost and catch

Key Points

The risk, cost, catch trade off seeks to balance the amount of resources invested in data collection and analysis with the level of catch while ensuring the appropriate level of risk to fish stocks is not exceeded. Risk in this context is both the risk of breaching the LRP and risking recruitment impairment and the risk of not maximising net economic returns to the Australian community.

Reduced data contributes to reduced certainty in stock assessments. Less certainty leads to increased risk, requiring more precaution to be taken when setting catch limits.

The policy should explicitly require the use of a buffer when setting catch limits commensurate with the level of uncertainty in assessments. Further work is also needed to improve estimates of other sources of mortality, including discards.

The review supports the use of non-conventional stock assessments in the absence of commercial catch data provided their effectiveness is appropriately tested.

The challenges outlined to traditional stock assessment methods in the CFHSP appear to be concentrated on those faced by the SESSF. In recent years, a number of high value Commonwealth fisheries have seen increases in both overall quotas and fishery size, as well as actual expansions in their habitable area and fishery range. For toothfish and some large pelagic fisheries (especially SBT) cost-effective large-scale monitoring programs have been developed where extensive experimental design and MSE work was used to both optimise the costs of the programs and establish their potential long-term economic benefits.

CSIRO suggests that the CFHSP include expansion of examples to the successful implementation of the risk-cost-catch framework outside of the SESSF. In addition, where harvest strategies have been developed through MSE that accommodates risk appropriately, then this should be considered a sufficient alternative to a formal buffer on catch. While MSE testing is likely the most appropriate method to evaluate potential harvest strategies for relatively high value fisheries, data-limited fisheries are likely to be more challenging.

Data-limited harvest strategies are often underpinned by empirical assessments and decision frameworks that are more challenging to specify models for and usually cannot be easily accommodated within existing generic MSE packages (Dowling et al., 2008). Due to these challenges and general capacity restraints on MSE testing within Australia, there are very few examples of MSE testing of data-limited harvest strategies in Australia. Further work is required to determine the best approach when applying the risk-cost-catch framework for data and capacity-limited fisheries.

The review notes that there is increasing appetite for multi-sector ocean-wide monitoring and data collection framework to reduce reliance on commercial catch data as a means for overcoming a cost constrained environment. We note that integrated ocean management approaches offer a way ahead in unified data collection.

CSIRO's responses to the individual recommendations around balancing risk, cost and catch are provided below.

R17) The Policy should recognise the spatial squeeze and consequent access restrictions on commercial fishers is impacting the collection of data to inform fisheries assessments and changing the risk posed by fisheries.

CSIRO suggests that recommendation 17 be revised to acknowledge that there is a range of spatial squeeze impacts across Commonwealth fisheries, as detailed above. We also suggest it would be useful to clarify what actions would result from this recognition being added to the Policy in supporting documentation.

R18) The Policy should specifically include a requirement to incorporate a buffer when setting TACs to achieve risk equivalency based on the level of uncertainty in stock assessments, including uncertainty associated with discard mortality.

CSIRO proposes the following modification to the recommendation: *The Policy should specifically include a requirement to formally account for uncertainty within harvest strategies when setting catch limits, or alternative management advice, to achieve risk equivalency based on the level of uncertainty in harvest strategies, including uncertainty associated with discard mortality along with recreational and indigenous catches*.

R19) The Policy should require that harvest strategies include a procedure for considering and responding to exceptional circumstances, including timeframes for specific actions.

CSIRO supports this recommendation, however, clarity on what constitutes exceptional circumstances and subsequent specific actions should be provided in the Policy, or the Guidelines.

R20) While beyond the scope of the Harvest Strategy Policy, this review notes there are growing calls for a multi-sector ocean-wide monitoring and data collection framework to reduce reliance on commercial catch data.

CSIRO agrees this is beyond the scope of the Policy, however, we do not have a view as to whether this recommendation is included in the Policy document.

CSIRO's response to the Review of key policy settings of the Commonwealth Fisheries Bycatch Policy

Background

Bycatch is defined as the incidental catch of species that are not retained.

The objective of the Bycatch Policy is:

… to minimise fishing-related impacts on general bycatch species in a manner consistent with the principles of ecologically sustainable development and with regard to the structure, productivity, function and biological diversity of the ecosystem.

The recommendations from the review of the Bycatch Policy were:

Policy purpose: The review found the Bycatch Policy remains an important tool for providing overarching guidance on the management of bycatch in Commonwealth fisheries. The review notes requirements for the management of bycatch species listed under EPBC Act are set out within that legislation, however considers it is valuable for the policy to continue to describe those requirements noting the risk-based approach considers all bycatch species. The Bycatch Policy should be outcomes-focused and flexible, allowing appropriate prioritisation resources to implement the requirements of the policy.

Data and Reporting: While reporting obligations are currently being met, consultation suggested enhancing performance reporting for better transparency and confidence in bycatch management. While independent auditing and data collection are mandated, there's room for improvement in meaningful and transparent reporting. Recommendations include collecting detailed species-level data on bycatch and ensuring reliable information to guide management decisions.

Risk equivalency and assessment: The Bycatch Policy must address ongoing data collection challenges impacting risk assessment and management. Solutions include focusing on mitigation measures, efficient risk management methods, addressing data gaps for high-risk stocks, and defining unacceptable risks. The necessity of accurate and timely data collection to monitor outcomes and inform adaptive management strategies has been made clear. By integrating robust data systems, the policy can be more responsive and dynamic, aligning with the overarching goals of sustainability and resource management. The precautionary principle is crucial, especially when data is lacking, to prevent environmental degradation.

1.6 Policy Purpose

Key Points

The Policy is an important tool, and the objective of minimising bycatch remains current. EPBC-Listed Species should continue to be referenced in the policy.

The policy should continue to be outcomes focused allowing for flexibility in delivery while continuing to provide overarching guidance.

The Harvest Strategy Policy is being reviewed at the same time as the Bycatch Policy. There is a need to ensure alignment with the recommendations arising from both policies in relation to the categorisation of species managed under each policy.

CSIRO has been developing new scientific approaches to assessing bycatch ETP species in more rapid time frames and with a higher degree of accuracy. Experience shows that ongoing uncertainty can lead to management inertia and inaction that in turn leads to declines in the stock status of the threatened bycatch species over time. CSIRO research is underway to address data gaps and to understand both the populations themselves (e.g. https://www.nespmarinecoastal.edu.au/project/4-14/; (https://www.nespmarinecoastal.edu.au/project/1-25/) and the factors that impact their dynamics (Pillans et al., 2022).

There are significant bodies of work being undertaken with FRDC, DCCEEW and AFMA support that are aiming to estimate abundance of bycatch species and improve data collection and management (e.g. https://www.frdc.com.au/project/2021-015). Crucially, methods such as CKMR allow rapid estimation of population status (e.g. Patterson et al. 2022), negating the need to defer management action for substantial time periods, in some cases decades, as would be the case from many traditional methods. Furthermore, there is ongoing work on integration of CKMR into management decision making processes (https://www.frdc.com.au/project/2022-006).

The risk-based approach implemented currently considers all bycatch species. However, explicit mention of EPBC Act listed species is particularly important for related points on improved data collection. Improved monitoring standards would allow quicker and more robust characterisation of the status of EPBC listed bycatch species. For some ETP species there is clear evidence that fisheries bycatch is significantly compromising their viability despite the provisions of the bycatch policy with regard to the EPBC Act. There is a need scientifically for improved data standards and targets for bycatch reduction and ETP species recovery targets which are linked to best-practice methods for assessment of ETP species. The lack of standards and targets was highlighted by the recent review of the EPBC Act (https://www.dcceew.gov.au/environment/epbc/our-role/review/epbc-review-2020).

CSIRO's responses to the individual recommendations around the Bycatch Policy purpose are provided below.

R21) The policy should be retained, and objective should remain the same.

CSIRO agrees with retaining the policy. The goals and objectives of the bycatch policy are supported by CSIRO and are aligned with many elements of CSIRO research which seek to provide a scientific basis for minimising the ecological impacts and enhancing sustainable practices in Commonwealth fisheries.

R22) Ensure the policy remains outcomes focussed, that is, determining the outcomes sought to be achieved (consistent with the policy objectives) rather than prescribing the means to achieve them. This allows for flexibility in delivery while continuing to provide overarching guidance.

CSIRO agrees with the recommendation that the policy remains objective focused and does not prescribe the means to achieve outcomes because the most effective methods for understanding and addressing bycatch are likely to be case-specific.

R23) The policy should continue to make reference to EPBC Act-listed species within the policy, noting the risk-based approach considers all bycatch species.

CSIRO notes and supports the reference to the EPBC provisions and sees merit in more explicit consideration of EPBC listing with regards to data standards to support assessment and recovery of EPBC Act-listed species.

R24) The Policy should align with the recommendations arising from the review of the Harvest Strategy Policy in relation to the categorisation of species managed under each policy. This could include information provided in Chapter 7 of the Bycatch Policy Guidelines which gives examples of how species may move between the two policies. Any changes should also be consistent with the EPBC Act.

CSIRO does not have a view on this recommendation.

R25) The definitions and terminology used in the policy should be reviewed to ensure consistency across policies, government and jurisdictions.

- The definitions of Endangered, Threatened and Protected Species (ETP Species), Bycatch, Key commercial, and Byproduct should be reviewed to ensure consistency with international and industry standards.

CSIRO agrees with this recommendation.

1.7 Data and Reporting

Key Points

The Policy is an important tool, and the objective of minimising bycatch remains current. EPBC-Listed Species should continue to be referenced in the policy.

The policy should continue to be outcomes focused allowing for flexibility in delivery while continuing to provide overarching guidance.

The Harvest Strategy Policy is being reviewed at the same time as the Bycatch Policy. There is a need to ensure alignment with the recommendations arising from both policies in relation to the categorisation of species managed under each policy.

Enhanced sampling requirements would result in more robust assessments and increased confidence in both the status of the bycatch population but also enhanced confidence in the associated fisheries management and conservation outcomes. A stricter requirement and minimum standards for data collection is an obvious change which would likely facilitate more sustainable management practices. We note and support that poor reporting, including a lack of species-specific reporting, and an inability to collect the data required for management have been recognised in the CFBP review as restricting the ability to undertake high quality ERAs.

To this end, development of standards for data collection would aid in ensuring robust and comparable metrics of performance in specific fisheries aiming to reduce their impact and highlight industry sectors where more change is required. The CFBP review does not comment on data standards for bycatch despite the quality of data being central to assessment of bycatch and target species alike. For example, an agreed AFMA and DCCEEW data standard would allow for better alignment of management and listing decisions – and address current needs for ad hoc data sources to inform listing measures and inform Australia's broader international obligations (e.g. International Plan of Action for Conservation and Management of Sharks see https://www.fao.org/ipoa-sharks/en/). This could include minimum standards of reporting and

targets for sample collection (which could facilitate ongoing use of CKMR to resolve uncertainty around population status for key bycatch species).

As is noted in the CFBP review, the quality and availability of data is currently hampering our ability to determine what constitutes a sustainable interaction rate. For the highest-level assessment of ERA (level 3 quantitative): "*A range of methods and approaches already exists at this level, but there remain challenges in finding methods that can work within the constraints of limited data and time for analysis*." (Hobday et al., 2011). Viable routes for better data collection in Commonwealth fisheries that would allow a quantitative population assessment are currently rare. Therefore, the requirements of ERA approach will remain unmet in most cases. Nevertheless, despite the lack of data to determine the status of a species, mitigation measures may well be enacted. Although, due to the insufficient data collection, there is no way to determine in a robust manner whether the mitigation measures have achieved their desired effect.

CSIRO's responses to the individual recommendations around data and reporting of bycatch are provided below.

R26) Explore options to make reporting more effective.

- The review process found that reporting could be improved potentially leading to increased confidence in the management of bycatch, public trust and social licence.
- This could extend to focussing on the effectiveness of mitigation measures for high-risk species.

CSIRO agrees with the recommendation noting that, in general, data required for robust assessment of bycatch, even priority bycatch species that are highly listed under EPBC, are not available.

R27) ERA process should remain agile.

- This would allow for all relevant available data to be utilised to ensure adequate information is used to inform ERAs. Other users of the marine estate should be encouraged to collect additional data which could then feed into the ERA process.

CSIRO suggests that the term 'agile' to be defined here, presuming it is intended to mean making incremental changes to adapt to challenges as they are identified.

1.8 Risk equivalency and assessment

Key Points

There are continuing challenges associated with collection of the necessary data to implement bycatch plans and undertake ERAs, resulting in an increased level of risk and assessment challenges. The policy needs to remain strong on its approach to risk with a focus on outcomes to allow for adaptive management and adaptation as methodologies improve.

The precautionary principle plays a critical role in the policy's objective, particularly where there is a lack of data or certainty. The lack of data should not be a reason for postponing a measure to prevent degradation.

The review found there is a need for greater direction within the policy in relation to risk equivalency and assessment, and that there is more work to done to address cumulative impact assessments.

CSIRO notes that a fundamental point which is not considered in the CFBP review are clear definitions around what might constitute 'sustainable' management of EPBC Act listed species. It would be useful if the CFBP summarised what the "certain requirements on Commonwealth Fisheries" in this space are, and how these might interact with DCCEEW assessments on EPBC listed species. This would enable a review of the consistency and efficacy of policies in relation to the bycatch of ETP species.

Relating to the implementation review findings, it is incorrect to say that there has been no implementation of cumulative risk assessments across multiple fisheries sectors. For example, FRDC project 2018-020 (https://www.frdc.com.au/project/2018-020) saw an Australia-wide cumulative effects assessment (the more recent terminology for a cumulative risk assessment) that focused specifically on the effects of commercial fisheries for at risk species spanning State and Commonwealth jurisdictions (Fulton et al., 2023).

CSIRO's response to the recommendation around risk equivalency and assessment of bycatch is provided below.

R28) Where the Bycatch Policy Guidelines provide more clarity on the assessment of risk, these sections should be elevated to the policy proper.

- This should include assessment of mitigation measures, cumulative risk, a changing marine environment and data deficient stocks.

-5 (as pertaining to the assessment of mitigation measures)

-10 (as pertaining to cumulative risk)

-11 (as pertaining to the changing marine environment)

-12 (as pertaining to data deficient stocks)

CSIRO agrees with this recommendation, noting the details provided above.

1.9 First Nations interests

Background

The current Harvest Strategy Policy articulates a requirement for the interests of First Nations sectors to be considered when developing harvest strategies for commercial fisheries. The review of the Harvest Strategy and Bycatch Policies is considering how First Nations interests can be better recognised in both policies.

CSIRO is supportive of the inclusion of First Nations interests in the updated Harvest Strategy and Bycatch Policies. Below we request additional clarification on the aspects of the recommendations that would support the interpretation and application of both Policies.

CSIRO's responses to the individual recommendations around including First Nations interests in the Harvest Strategy and Bycatch Policies are provided below.

R29) The Harvest Strategy Policy should articulate principles to be considered and standards that must be met with respect to engaging First Nations groups in the development of harvest strategies.

CSIRO supports this recommendation, but requests that the Department provide clarity on how the interests of First Nations groups can be accommodated in the development of harvest strategies in either the Harvest Strategy Policy or the Guidelines document, including existing FRDC funded studies.

R30) The Bycatch Policy should articulate principles to be considered and standards to be met with respect to considering the interests of First Nations groups. This should include when undertaking ERAs.

CSIRO supports this recommendation, but requests that DAFF provide clarity on how to include First Nations interests when undertaking ERAs in either the Bycatch Policy or the Guidelines document.

R31) The Harvest Strategy Policy should recognise a range of First Nations interests may exist in Commonwealth fisheries, and require these interests to be identified and considered in the development of fishery-specific harvest strategies.

- This may include more conservative TRPs for species of importance to Indigenous fishers where it can be demonstrated that a higher biomass target would better supports their interests.
- Where a formal resource sharing arrangement is in place that allocates a share of the fisheries resource for First Nations interests, this should be used as the basis for considering whether it is appropriate to implement a higher TRP for the relevant fishery.

CSIRO supports the recommendation that First Nations interests be identified and considered, however, we request that more generic terms than TRP and biomass targets be used, consistent with our advice in Section 1.1. CSIRO does not have a view on the allocation of resources among different sectors.

R32) There is in principle support for development of a schedule of species of importance to First Nations people that must be considered when developing and implementing harvest strategies and implementing the Bycatch Policy.

- Further work is required to determine the practicalities of how the schedule would be developed and implemented, including how principles and priorities for the inclusion of species on the schedule would be determined.
- Consideration of any additional management and/or data collection arrangements will be required as a pre-requisite for adopting TRPs higher than the default TRP to enhance abundance of species on the schedule.
- Any formal allocation of the recommended biological catch of species identified as important to First Nations people should continue to be considered in accordance with the Commonwealth Fisheries Resource Sharing Framework 2020.

CSIRO supports this recommendation requests that the specific mention of biomass targets and TRPs be modified, consistent with our advice in Section 1.1.

1.10 Consideration of the Harvest Strategy Policy Guidelines

Background

The Guidelines for the Implementation of the Commonwealth Fisheries Harvest Strategy Policy (the Harvest Strategy policy Guidelines) aim to provide practical assistance in the development of fishery-specific harvest strategies to meet the intent of the Harvest Strategy Policy. They provide contextual information to assist interpretation of the Harvest Strategy Policy and guidance to support development and implementation of fishery-specific harvest strategies.

R33) Important elements of the Harvest Strategy Policy Guidelines, including interpretation of the Harvest Strategy Policy's key provisions and minimum implementation requirements, should be brought into the Policy.

- Remaining elements of the Guidelines should be discontinued.

CSIRO does not have a formal view on where the information currently in the Guidelines document resides, but requests that detailed guidance be retained, either in the Policy, or an alternative document.

R34) The Harvest Strategy Policy should maintain flexibility regarding the use of modelling tools and assessment methods, noting these are subject to evolving understanding of best practice, data availability and resources.

- Modelling tools and assessment methods should be tested to ensure they deliver on the policy objectives and requirements.

CSIRO agrees with this recommendation that the Harvest Strategy Policy maintains flexibility around tools and methods and notes this aligns with our advice regarding biomass targets and assessments. We note the technical challenges and capacity constraints around formally evaluating harvest strategies for low-value, data- and capacity-limited fisheries.

1.11 Consideration of the Bycatch Policy Guidelines

Background

The Guidelines for the Implementation of the Commonwealth Fisheries Bycatch Policy (Bycatch Policy Guidelines) aim to provide assistance to Australian Government entities (principally AFMA but also bodies (industry or otherwise) AFMA outsources to, including industry-based co-management arrangements) in interpreting and implementing the requirements of the Bycatch Policy. As with the policy, the Bycatch Policy Guidelines only provide guidance for general bycatch species and do not aim to influence or alter the management of EPBC Act-listed species. These species are principally managed under Australia's environment legislation and guidance is provided by the Department of Climate Change, Energy, the Environment and Water.

The previous review of the Bycatch Policy highlighted the need for more detailed guidance and clearer explanation of bycatch requirements, which led to the development of the Bycatch Policy Guidelines. This document is quite detailed and lengthy, and feedback received from AFMA and other stakeholders as part of the current review process indicates the Bycatch Policy Guidelines are not effectively their intended purpose.

CSIRO generally agrees with the proposal to move components of the Guidelines document into the CFBP Policy.

CSIRO's responses to the individual recommendations around the Bycatch Policy Guidelines document are provided below.

R35) Important elements of the Bycatch Policy Guidelines, including interpretation of the Bycatch Policy's key provisions and minimum implementation requirements, should be brought into the policy.

- Remaining elements of the Guidelines should be discontinued, providing sufficient key guidance can be included in the policy without making the policy itself too long and complicated.

CSIRO does not have a view on the recommendation.

R36) The Bycatch Policy should maintain flexibility in regard to the use of modelling tools and assessment methods, to ensure maintenance of best practice approaches, given data availability and resources.

- Making amendments to ensure the policy is outcomes focussed (while maintaining consistency with the precautionary principle) would allow AFMA to better allocate resources to implement the requirements of the policy while remaining compliant.

CSIRO agrees with this recommendation that the Bycatch Policy maintains flexibility around tools and methods and notes this aligns with our advice regarding biomass targets and assessments.

References

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