FRDC
FISHERIES RESEARCH & DEVELOPMENT CORPORATION

FINAL REPORT

2016-062

National Priority 1

Subprogram Coordination

(2017-2020)

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February 2022

FRDC Project No 2016-062

ISBN 978-0-6480476-2-9

Final Report: National Priority 1 Sub Program Coordination

2016-062

2022

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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Acknowledgements

Sincere thanks to the following:

- The many stakeholders in the seafood industry who helped guide Subprogram activities and as providing valued feedback.
- FRDC (Patrick Hone, Crispian Ashby, Kyaw Kyaw Soe Hlaing and Nicole Stubing) for their advice and guidance to the Subprogram.
- All members of the Key Projects [Steering Committee]: Cathy Dichmont, Alistair Hobday, Steve Kenelly, Roland Pitcher, Nick Rayns and Mark Boulter (also Co-PI for 1.5 years) for their constructive insights and guidance.
- Jodie Kuntzsch from OpenSeas New Zealand for excellent cross-Tasman collaboration.
- Alex Caveen from Seafish UK for sharing his experiences with risk assessment tools.

Abbreviations

AMCS: Australian Marine Conservation Society

B2B: Business to Business

COFI: FAO Committee on Fisheries

eNGO: Environmental Non-Government Organisation

FAO: United Nations Food and Agriculture Organisation

GSSI: Global Sustainable Seafood Initiative

IAFI: International Association of Fish Inspectors

ICFA: International Coalition of Fisheries Association

NP1: National Priority One

PI: Principal Investigator

RASS: Risk Assessment for Sourcing Seafood

RSS: Coles Brand Seafood Sustainability Assessment Procedure

SAFS: Status of Australian Fish Stocks

SSCI: Sustainable Supply Chain Initiative

WWF: World Wildlife Fund

Executive Summary

The FRDC's RD&E Plan 2015-20 focused on maximising impacts by concentrating on knowledge development around three national priorities including National Priority 1 (NP1): to ensure that Australian fishing and aquaculture products are sustainable and acknowledged to be so. To support research, development and extension funded under NP1, a Subprogram was created in December 2016.

Activities centred around four areas:

- Identifying priorities for NP1 investment
- Oversight of NP1 projects funded under the Subprogram
- Collaboration and partnership with international fisheries and aquaculture sustainability initiatives
- Providing collateral for communications about sustainability

Priorities for NP1 investments were identified in key NP1 project meetings, discussions and meetings with seafood supply chain stakeholders, FRDC stakeholder forums and through horizon scanning. Decisions on which projects to fund were made by FRDC; the Subprogram was not tasked with approving projects but rather provided review and recommendations.

A large proportion of Subprogram time was involved in coordination and oversight of NP1 projects aimed at delivering a Business to Business tool to assist seafood business to responsibly source non-certified seafood. A series of four projects were funded under the Subprogram to develop the risk assessment tool and undertake independent risk assessments trialled on twenty key Australian species and the fisheries and management associated with them:

- 2016-065: Pilot RASS assessment of Selected Australian and New Zealand Species
- 2016-174: Pilot Responsibly Sourced Seafood (RSS) Risk Assessments for Australian Seafood Species
- 2019-087: Update of Whichfish Risk Assessments
- 2019-209: Developing a guidance document for Whichfish Risk Assessment

Risk assessments and risk scores were uploaded to a public website developed by FRDC: Whichfish.com.au enabling users to access assessment reports and risk scores. This was a pilot program –utilising the outputs of FRDC funded projects, including SAFS, and packaging these outputs in a format that could be used by seafood businesses and other interested users. Response from major seafood retailers and wholesalers was good and two major retailers specifically named Whichfish in their responsible sourcing policies as the tool they would use. Unfortunately, a number of setbacks in the development of the tool as well as delays in finalising assessment report updates slowed progress and has impacted further adoption. To reinvigorate Whichfish, information needs to be regularly updated and enable new species to be added and scope other elements to be included. Next steps should be to evaluate use, streamline assessment processes and reports and broadly disseminate Whichfish. For businesses which require more information than that provided by SAFS on stock status, there is additional demand for a method to convert risk ratings in Whichfish to a determination of "buy/not buy". Determination is not the role of FRDC, but there are opportunities to provide guidance or an online tool which allows users to input their risk tolerances in order to identify those species which are within range.

The Subprogram also included two projects focused on the adoption of codes of conduct and assurance of responsible fishing practices (on-water):

- 2017-221: Raise awareness of the guidelines developed by the AAWWG (Aquatic Animal Welfare Working Group) with industry and review their adoption, uptake rates and utility and animal welfare)
- 2013-023.20: Developing Code of Practice frameworks and assessing the need for an Australian Standard on Responsible Fishing Practices

Where there has been poor adoption of codes of practice, further work is needed to understand whether this is due to limited market demand for best practice assurance, low cost benefit ratios or poorly understood impediments to behavioural change. Preliminary scoping to develop tools to support businesses address reporting requirements under the *2018 Commonwealth Modern Slavery Act* was also undertaken.

For aquaculture, with the exception of the salmon industry, there is limited sustainability information in the public domain. Seafood buyers expressed a strong preference for credible third party certification, where available. A risk assessment tool, such as Whichfish, was considered inappropriate as information to undertake a risk assessment is commercial-in-confidence. Following consultations with stakeholders, a project was funded under the Subprogram to develop a tool to assess the cumulative risks to and from aquaculture to address the needs of regulators involved in marine estate planning and seafood businesses seeking information about potential supply or reputational risks in sourcing farmed product from a defined area. This project, 2018-145: Cumulative Impact Risk Assessment Tool for Aquaculture in Australia, is due for completion in mid-2022.

Communication and extension for Subprogram outputs was primarily undertaken by FRDC. The Subprogram supported these efforts through a jointly funded NP1/Human Dimensions Research Subprogram project which investigated the ways media influencers affect consumer attitudes about sustainability (2017-131: Media messages about sustainable seafood). Through media searches and focus groups, the project explored how key influencers in particular, chefs, have secured a greater share of media 'voice' on seafood sustainability. This project also produced a best practice guide for the seafood industry on media engagement.

The Subprogram fostered strong partnerships with entities working on similar issues in the UK, Norway, Iceland, USA and New Zealand as well as with international organisations: the FAO, the Global Sustainable Seafood Initiative and the Sustainable Supply Chain Initiative. Opportunities for future collaboration remain, and there is considerable interest in the development of a risk assessment tool which can be used globally. Collaboration has also led to greater sharing of information regarding emerging sustainability issues and dialogue regarding cooperative ways to address these issues.

Looking forward, the following recommendations are made:

1. Focus on the development of a single source of information about fisheries and sustainability so that stakeholders are able to easily access and make decisions on the same sets of data.
2. Evaluate Whichfish with business users and other relevant stakeholders. If positive, develop a program for updates and business user-pay options for funding the program into the future. If a decision is made to progress Whichfish, revise assessment reports to make them more streamlined and develop program management procedures to expedite updates and inclusion of new species.
3. Consider development of an online tool which enables business to input their risk tolerances to assist selection of species which meet these thresholds.

4. Collect data and develop risk assessment methodologies for emerging sustainability issues which are facets of responsible souring including animal welfare, human rights, nutrition, plastics usage, greenhouse gas emissions.
5. Further explore the feasibility of assurance tools to demonstrate best practice for fisheries and aquaculture enterprises including the use of behavioural incentives to encourage uptake.
6. Utilise NP1 outputs to inform any development of National Environmental Standards or national standards and support a Steering Committee around this concept.
7. Continue to actively engage with international initiatives which are benchmarking global performance in fisheries and aquaculture sustainability performance to ensure the most reliable and current sources of information are used for Australian fisheries and aquaculture.

Keywords

Sustainability, SAFS, Whichfish, best practice, risk assessment, cumulative risk assessment

1 Introduction

The FRDC's RD&E Plan 2015-20 focused on maximising impacts by concentrating on knowledge development around three national priorities including National Priority 1 (NP1): to ensure that Australian fishing and aquaculture products are sustainable and acknowledged to be so.

In 2015 and 2016, FRDC held two NP1 workshops to bring together Principal Investigators on projects which were of direct relevance to this priority. Participants at these workshops emphasised the need for a coordinated approach to address NP1 objectives and ensure that outputs and outcomes can be accessed and used by the community.

In response, this Subprogram was established at the end of 2016 to support NP1 research outputs (including the Status of Australian Fish Stocks) so that credible information on sustainability was easily accessible, regularly updated, and trusted as a source. The Subprogram was also tasked with identifying research which addressed emerging sustainability issues and the development of assurance tools. The expected users of Subprogram outputs and information included seafood businesses, fishers, aquaculture enterprises, government agencies and non-government organisations. An important component of the Subprogram was collaboration with international initiatives to ensure NP1 outputs were harmonised, aligned and/or exceeded international norms.

2 Objectives

1. Manage a portfolio of R&D projects that are directly concerned with National Priority 1 and are not managed by other FRDC Subprograms, RAC's or IPA's [excludes SAFS].
2. In consultation with key stakeholders develop strategic directions for R&D.
3. Facilitate the dissemination of outputs (information and results) from R&D projects to key stakeholders.
4. Collaborate closely with international initiatives on benchmarking and verification of the sustainability of commercial fisheries.

3 Methods

Two part-time coordinators (Sevaly Sen and Mark Boulter[1]) were appointed to manage the Subprogram. The Subprogram was not tasked with commissioning, requesting or approving projects under National Priority 1: this remained an FRDC function. However the Subprogram did provide advice on submitted applications.

Following Subprogram approval, and in consultation with the FRDC Program Manager, activities undertaken by the Subprogram were modified to reflect a greater focus on sustainability assessment and assurance tools.

The following activities were undertaken:

1. Management of the NP1 Projects [Steering Committee] Meeting (established prior to the Subprogram, in 2015) made up of 6 Principal Investigators of key projects directly contributing to relevant NP1 research outcomes, the Executive Manager, Fisheries Management Branch of the Australian Fisheries Management Authority and the FRDC. The Committee reviewed the direction of the Subprogram and identified longer term research priorities.
2. Regular liaison and consultation with stakeholders throughout the seafood supply chain, environmental NGOs, fisheries management agencies and third party certification schemes to ascertain whether research funded under the Subprogram was addressing their needs and/or to identify research gaps.
3. Partnership and collaboration with a number of international initiatives on sustainability assessment, benchmarking and equivalence including Seafish UK RASS, the Global Sustainable Seafood Initiative, Seafood New Zealand (OpenSeas.org.nz), the Sustainable Seafood Coalition and the Seafish UK Responsible Fishing Vessel Scheme in order to share experiences and expedite progress, if relevant, in Australia. This included communication of Australian research and initiatives to partners and collaborators.
4. Horizon scanning for upcoming issues relevant to NP 1 objectives and outcomes including international developments and initiatives in order to inform priority setting. Emerging areas are modern slavery, plastic usage, decarbonisation and animal welfare.

[1] Mark Boulter resigned in June 2018 due to other commitments.

5. Management and oversight of projects funded under the NP 1 Subprogram since commencement of the Subprogram (December 2016).
6. Review of research applications of relevance to NP 1 to ensure they were aligned with NP 1 objectives.
7. Attendance and presentation of NP 1 initiatives and research at relevant meetings and workshops and other FRDC Subprogram meetings.
8. Extension of National Priority 1 project outputs through provision of information to FRDC for use in external communications.

4 Results

FRDC funded a number of related but disparate projects under NP1 prior to and during the lifetime of the Subprogram. NP 1 projects not under the Subprogram were all projects which supported the delivery of the Status of Australian Fish Stocks (SAFS) and those which came under FRDC's communications functions (such as Seafood Escapes with ET, the Fish and Chips awards and consumer research and stakeholder perceptions surveys). Some of these projects were foundational to NP1 Subprogram activities.

Subprogram activities can be broadly grouped into four main areas:

1. Identifying priorities for NP1 investment.
2. Coordination and oversight of NP1 projects funded under the Subprogram.
3. Collaboration and partnership with international fisheries and aquaculture sustainability initiatives.
4. Providing collateral for communications about sustainability.

4.1 Identifying priorities for NP1 investment

4.1.1 NP1 Supply Chain Stakeholder Forum and Projects Meetings

A Stakeholder Supply Chain Forum was held in August 2017 (43 participants from major retailers, wholesalers and eNGOs) to provide strategic guidance to the Subprogram.

NP1 Projects Meetings (1.5- 2 days) were held in August 2017, February 2018 and November 2018. Operating as a *de facto* steering committee, projects meetings were discontinued once major projects were matured or completed. These meetings provided guidance to FRDC on priorities for

research investments to further inform the Australian community about seafood sustainability (Table 1).

Table 1: Priorities Identified and Subsequent Action

Priorities Identified	**Action**
2015-203: Best practice guidelines for Australian fisheries management agencies : Communication and extension required to encourage uptake	Workshops held with fisheries managers.
2016-060: Healthcheck Phase 2 realignment: Refinement a broad range of criteria and indicators for reporting the status of Australian fisheries and solidification of the indicators (and measurement	Refinements made.
Sustainability Risk Assessments: Develop a Business to Business tool.	Implemented. Project Numbers: 2016-065;2016-174;2019-087 ; 2019-209
2015-208 on bycatch reporting be extended to include all jurisdictions (4 additional case studies).	Approved. Project No: 2018-014.
The Subprogram work with members of the old Aquatic Animal Welfare Working Group and FRDC to organise workshops to assess the situation regarding the uptake of aquatic animal welfare guidance by industry.	Workshop held in September 2018. Project No; 2017-221
Cumulative Impact Risk Assessment for Aquaculture	Approved. Project 2018-145.
Media Influencers on Sustainability	Approved, Co-funded with the Human Dimensions Research Subprogram. Project: 2017-131.
Preparing Australian Seafood Businesses for Modern Slavery legislative requirements	EOI submitted in 2018. .SC decided that proposal should be put on hold until legislation in force and a local research provider could be identified.
Best Management Practices for Inshore Fisheries	Exploratory discussions held with Queensland and NT, but did not progress as divergent expectations of outcomes.
Provision of high resolution maps/data of fishing effort for public scrutiny.	Discussion but no action taken.

4.1.2 Horizon scanning

Part of the role of the Subprogram was to keep abreast of international and national developments on sustainability assessment and assurances to help identify emerging issues as well as communicate FRDC's work in this area. Attendance at international meetings and major trade shows were found to be the most efficient and cost-effective way to undertake these activities, fostering good working relationships as a foundation for collaboration. At these meetings, Subprogram coordinators (often accompanied by FRDC staff) attended and held discussions with key international players including the Global Seafood Sustainability Initiative (GSSI), FAO, Alaskan Seafood Marketing Institute, Marine Stewardship Council (MSC), UK Sustainable Seafood Coalition, Seafish UK, Norwegian Institute of Food, , Fisheries and Aquaculture Research, Seafood New Zealand, Icelandic Responsible Fisheries Management Scheme, GU.L.F Certification Scheme and the Sustainable Supply Chain Initiative (SSCI). Meetings attended were:

- World Fisheries Congress and IAFI Conference, Iceland. 2017. Subprogram coordinator, Mark Boulter was current president of IAFI.
- World Ocean Summit, Bali 2017
- Seaweb Summit 2017 and 2018
- Seafood New Zealand Annual conference 2017-2019
- European Seafood Expo, Brussels 2019
- FAO Sub-Committee on Trade 2017,2019

The main issue regularly emerging from the horizon scan was that sustainability continues to expand in scope, incorporating human rights, animal welfare, greenhouse gas emissions, social impact, plastic reduction and waste reduction. Additionally, tools to assure provenance are growing in importance, particularly for higher value products.

4.2 Coordination and Oversight of NP1 projects funded under the Subprogram

4.2.1 A Business to Business (B2B) Risk Assessment Tool to enable Responsible Sourcing

Although credible (i.e. GSSI-recognised) third party certification provides assurance of environmental sustainability to seafood buyers and consumers, the supply of certified Australian seafood remains limited for a number of reasons including the cost of certification relative to the benefits (to the fisher). When the Subprogram began, wholesalers and retailers were looking for assessment tools for non-certified seafood in order to comply with their own responsible sourcing policies and assist in making decisions about which seafood to source. The supply chain stakeholder meeting held in mid-

2017 supported the continued development of a publicly available B2B tool with users hoping that this would also have the potential to reduce their due diligence costs.

There was also support for an Australian fisheries assessment tool from eNGOs, in particular WWF and AMCS, provided that Subprogram activities did not venture into determinations about buy/do not buy. The latter was core business for them, as advisers to seafood businesses or through, in the case of AMCS, the Good Fish Bad Fish consumer app.

From the Subprogram's perspective it was recognised that providing trusted sustainability information to actors in the seafood supply chain was a more effective way of improving perceptions about seafood sustainability than reaching consumers directly.

A B2B risk assessment tool which provided credible, defensible and independent assessments was considered the best approach. Compared to certification, an additional benefit was that this approach could be more adaptive and allow for emerging sustainability risks to be added relatively quickly, if required. Additionally, in discussions with international associates and partners, there was a general interest in the development of a single globally recognised risk assessment tool for responsible sourcing which could also be used to assist stakeholders considering third party certification identify any potential risks prior to entering into the certification process.

Such an approach also provided an opportunity to better utilise not only the outputs of the Status of Australian Fish Stocks (SAFS) report but other FRDC investments including projects funded under NP1 2016-060 Healthcheck Phase 2; 2017-180 Design and implementation of an Australian National Bycatch Report: Phase 1 – Scoping; and 2018-114: Completing Australia's First National Bycatch Report.

As a result of these discussions, NP1 provided management and oversight of four projects to develop and pilot a B2B risk assessment tool for responsible sourcing:

a) 2016-065: Pilot RASS assessment of Selected Australian and New Zealand Species
b) 2016-174: Pilot Responsibly Sourced Seafood (RSS) Risk Assessments for Australian Seafood Species
c) 2019-087: Update of Whichfish Risk Assessments
d) 2019-209: Developing a guidance document for Whichfish Risk Assessment

The objective of this set of projects was to provide an independent assessment of risks to the stock, bycatch, habitat and fisheries management based on publicly available information. The premise was based upon using existing risk assessment tools, the Seafish UK Risk Assessment for Sourcing Seafood tool (https://www.seafish.org/risk-assessment-for-sourcing-seafood) and the Coles Brand Wild

Caught Seafood Sustainability Assessment Procedure (known as RSS). Projects 2016-065 and 2016-174 assessed methodologies and piloted the preferred method on 20 species. When feasibility and end-user interest was established, projects 2019-087 and 2019-209 developed the B2B tool, Whichfish.com.au.

2016-065: Pilot RASS assessment of Selected Australian and New Zealand Species

The objective of this project was to evaluate two seafood risk assessment tools using only publicly available information (UK Seafish RASS and Coles/MRAG RSS) to determine which method was a better fit and most robust (and therefore defensible) for Australian and New Zealand fisheries. MRAG Asia Pacific was contracted to undertake the evaluation. Four case study fisheries were used to assess against Coles RSS and RASS methodologies (two from Queensland; two from New Zealand).

The Subprogram coordinated a technical workshop in January 2017 to discuss the results of the project and the way forward. It was concluded that there was evidence of good alignment between RSS and RASS; but RSS was more granular and being based on MSC Standard, there was considerable guidance on interpretation already available. Time to undertake a fishery assessment was about the same given the greatest time impost was gathering of information. Neither method took into account cumulative impacts to and from a fishery.

It was agreed at the workshop that the Coles RSS was a better fit for Australia and New Zealand with an additional components taken from RASS, an Outlook section. Coles, whose Responsible Sourcing Manager attended the workshop, encouraged this outcome and agreed that further testing of the RSS on a suite of Australian and New Zealand species should be part of a larger pilot of a B2B tool. Coles also supported further collaboration with FRDC with the ultimate aim of sharing the RSS method for public benefit. A further advantage was Coles' offer to make available in the public domain, their own assessment reports, subject to some form of no-cost licencing agreement.

2016-174: Pilot Responsibly Sourced Seafood (RSS) Risk Assessments for Australian Seafood Species

Following the recommendations of 2016-065, MRAG Asia Pacific was contracted to undertake risk assessments for 20 fisheries in Australia using the RSS with some changes made to the risk assessment framework to ensure that SAFS assessments were automatically included. Concurrently, OpenSeas NZ (under direction from Seafood New Zealand and Deepwater Group) contracted MRAG Asia Pacific to assess 20 New Zealand species using the same framework.

Responses were positive, with both Woolworths (advised by WWF) and ALDI South making written policy commitments to use Whichfish. There was also a positive response to the pilot from two large wholesalers (Bidfood and Sydney Fish Market). The reports can be found on whichfish.com.au.

Development of website: Whichfish.com.au

Following the completion of the pilot assessments, FRDC, under NP1 funding, developed a website, Whichfish.com.au to enable public accessibility to both the risk scores (in tabular and spreadsheet form) and the assessment reports. This was communicated to stakeholders through activities of the FRDC communications team. As a B2B tool, it was always expected that the number of users would be limited to seafood businesses and the number of "hits" would not be indicative of success. Uptake was assessed with discussions with actual and potential users – with Woolworths, WWF, Coles , de Costi, Harris Farms, Aldi and Sydney Fish Market expressing interest in continued development and a willingness to enter into a longer term pre-competitive collaboration arrangement including cost-sharing, once the program was established.

Simultaneously, the Subprogram entered into negotiations with Coles to licence the RSS and develop new processes to govern changes to the methodology and selection of species. Protracted negotiations followed, including, at the request of Coles, legal advice on whether Whichfish complied with the *Competition and Consumer Act* 2010 (it did). By 2019, despite considerable goodwill from a succession of Coles' Responsible Sourcing & Agricultural Managers and FRDC, both parties failed to reach an agreement and negotiations were abandoned. This can be largely attributed to Coles' concern around potential risks with regard to their commercial relationship with the MSC and FRDC's wish to be an active partner in methodology improvements.

Development of a new risk assessment framework

Given continued interest from Australian and New Zealand businesses for a B2B tool and despite the considerable temporal setback regarding the use of the Coles' RSS, the Subprogram began development of an alternative risk assessment methodology. This was an opportunity to develop a more adaptive risk assessment which drew heavily upon the substantial body of FRDC-funded research including outputs of other National Priority 1 funded projects (in italics):

- 2000-145: National ESD Reporting Framework for Australian Fisheries: The 'How To' Guide for Wild Capture Fisheries
- 2010-06: National Guidelines to Develop Fishery Harvest Strategies
- 2011-215: Principles and Guidelines in Support of Fisheries Inter-Sectoral Access and Allocation Decisions
- 2014-009: Research and science information guidelines for Australian Fisheries.

- *2015-208: Developing a National Bycatch Reporting System*
- *2015-200: Guidelines on a tiered, risk-based approach to bycatch management*
- *2015-203: Best practice guidelines for Australian fisheries management agencies*
- *2017-180: Design and implementation of an Australian National Bycatch Report: Phase 1 – Scoping*
- *2018-114: Completing Australia's First National Bycatch Report*

Development also enabled a risk assessment framework to be aligned with the Global Seafood Sustainability Initiative benchmarking criteria, reduce duplication that was present in existing risk assessment methods and allow for a modular approach so that emerging risk areas identified by the horizon scan could be incorporated.

The Subprogram drafted a risk assessment framework which was subsequently reviewed by a group of subject-matter experts. Further iterations of the framework were then discussed and revised during meetings with the PI, FRDC, Deepwater Group and Seafood New Zealand. The final version (v1.7) is attached as Appendix 1.

<u>2019-087: Update of Whichfish Risk Assessments</u>

The aim of this project was to update the Whichfish reports using the new risk assessment methodology developed by the Subprogram and provide feedback on the methodology to help inform the development of a guidance document. Bioinspecta a.g was contracted to undertake the work.

Risk assessments incorporated SAFS (i.e. if a SAFS status existed, no further assessment on stock status was required). For assessment of the environmental effects of fishing and fisheries governance and management, the assessments drew heavily upon information from FRDC-funded research (NP1 funded projects in italics) including:

- 2000-094: Maximising survival of released undersize west coast reef fish
- 2000-153: South East Fishery Mapping Project: Integrating fishing industry knowledge of fishing grounds with scientific data on seabed habitats for informed spatial management and ESD evaluation in the SESSF.
- 2000-169: Assessment of bycatch in the Great Australian Bight Trawl Fishery.
- 2001-010: Reducing the environmental impacts and improving the profitability of prawn trawling through a structured framework of anterior gear modifications.
- 2002-064: Northern Australian sharks and rays: the sustainability of target and bycatch species, phase 2.
- 2003-052: Spatial scales of exploitation among populations of demersal scalefish: implications for management. Part 2: Stock structure and biology of two indicator species, West Australian dhufish (*Glaucosoma hebraicum*) and pink snapper (*Pagrus auratus*), in the West Coast Bioregion.
- 2005-010: Determination of management units for grey mackerel fisheries in northern Australia.

- 2005-050: Effects of trawling on the benthos and biodiversity: Development and delivery of a spatially-explicit management framework for the Northern Prawn Fishery.
- 2005-053: Reducing the impact of Queensland's trawl fisheries on protected sea snakes.
- 2006-036: Supporting sustainable fishery development in the GAB with interpreted multi-scale seabed maps based on fishing industry knowledge and scientific survey data.
- 2008-019: Biological and economic management strategy evaluations of the eastern king prawn fishery.
- 2009-029: Ecological Risk Assessment for Effects of Fishing on Habitats and Communities.
- 2009-037: Sustaining productivity of tropical red snappers using new monitoring and reference points.
- 2013-00 Shark Futures: A report card for Australia's sharks and rays
- 2013-017: Optimising the management of tropical coastal reef fish through the development of Indigenous capability
- 2015-035: Critical knowledge gaps: estimating potential maximum cumulative anthropogenic mortality limits of key marine mammal species to inform management in the Small Pelagic Fishery area
- 2015-204: Realising economic returns of reducing waste through utilisation of discards in the GAB Trawl Sector of the SESSF
- 2012-046: Informing the review of the Commonwealth Policy on Fisheries Bycatch through assessing trends in bycatch of key Commonwealth fisheries
- 2014-024: Implications of current spatial management measures for AFMA ERAs for habitats.
- *2015-034 Status of Australian Fish Stocks (SAFS) reports 2016, and further development of the SAFS production and dissemination system.*
- *2016-039 Putting potential environmental risk of Australia's trawl fisheries in landscape perspective: exposure of seabed assemblages to trawling, and inclusion in closures and reserves.*
- *2015-203: Best practice guidelines for Australian fisheries management agencies.*
- *2016-060 Healthcheck Phase 2.*
- *2017-100 Status of Australian Fish Stocks (SAFS) reports 2018 and further development of the SAFS production and dissemination system.*
- *2018-114: Completing Australia's First National Bycatch Report*
- *2019-149: Status of Australian Fish Stocks (SAFS) reports 2020, and further development of the SAFS production and dissemination system.*

Draft reports prepared under this project highlighted issues with some aspects of the methodology and demonstrated the urgent need to develop a guidance document to assist assessors.

Following revision of the risk assessment framework (v.1.7), and development of a guidance document (see below) the assessment reports were redrafted and are currently being finalised.

2019-209 Developing guidance documents for Whichfish Risk Assessment

This project developed a guidance document to accompany the risk assessment framework in order to assist assessors apply the methodology (attached as Appendix 2). This document was used by Bioinspecta a.g. during their second revision of the reports.

4.2.2 Responsible Fishing Practices

As a way for industry to demonstrate continuous improvement and responsible fishing practices, the Subprogram included two projects aimed at understanding progress on the uptake and adoption of responsible fishing practices which addressed other dimensions of sustainability (on-water behaviour and animal welfare):

- 2013-023.20**:** Developing Code of Practice frameworks and assessing the need for an Australian Standard on Responsible Fishing Practices
- *2017-221: Raise awareness of the guidelines developed by the AAWWG (Aquatic Animal Welfare Working Group) with industry and review their adoption, uptake rates and utility*

Project 2013-023.20 reviewed and catalogued existing codes of practice/conduct and environmental management systems and developed code of practice templates for responsible fishing practices . These were aligned with the FAO Code of Conduct for Responsible Fisheries and are able to be adapted for different fisheries as well as meet the requirements of certification/assurance schemes which require a code of conduct.

Under project 2017-221, a workshop was held to determine the level of knowledge and adoption and suitability/relevance of the suite of existing best practice documentation on handling, capture and dispatching aquatic animals developed by FRDC. Recommendations arising from the workshop primarily focused on extension and adoption including the re-establishment of a dedicated animal welfare committee/working group, a targeted communications strategy and support for a Seafood Industry Response Plan should issues arise.

Preliminary scoping to develop tools to support businesses address reporting requirements under the *2018 Commonwealth Modern Slavery Act* was also undertaken.

4.2.3 Cumulative risks to and from aquaculture

During the development of Whichfish, consideration was given to the inclusion of farmed product. Seafish UK had found that risk assessments at farm level were more challenging as relevant information is commercial-in-confidence. A similar challenge faced Australian farmed seafood. Subprogram discussions with wholesalers and retailers found a clear preference for third party

certification for farmed produce. However they identified a need for a better understanding of cumulative risks to and from an aquaculture in a region/area (e.g. Macquarie Harbour) to assess potential supply or reputational risks. Additionally, regulators expressed interest in understanding cumulative risks to assist with marine estate planning.

A project, 2018-145: Cumulative Impact Risk Assessment Tool for Aquaculture in Australia was subsequently funded to address this need and is due for completion in 2022. Case studies to test the framework are being undertaken in Tasmania and South Australia.

4.2.4 Impact of Media Influencers on the Sustainability Dialogue

As discussed earlier, the Subprogram did not undertake any consumer facing activities, preferring to work with seafood businesses as influencers of consumers. However, it was considered important to invest in a better understanding of who influenced sustainability messaging to the Australian public, and seafood consumers in particular. A project , jointly funded with the Human Dimensions Research Subprogram , investigated how key influencers were impacting the sustainability dialogue (2017-131 Media messages about sustainable seafood: how do media influencers affect consumer attitudes?). Through media searches and focus groups, the project explored how key influencers in particular, chefs, have secured a greater share of media 'voice' on seafood sustainability. The project also produced a best practice guide for the seafood industry on media engagement. Results of the survey, the best practice guide and the final report of the project can be found here.

4.3 Collaboration and partnership with international fisheries and aquaculture sustainability initiatives

Extensive discussions with Seafood New Zealand led to ongoing collaboration in the development of the Whichfish risk assessment framework and its subsequent use by OpenSeas (www.openseas.org.nz). Mirroring activities in Australia, OpenSeas undertook pilot assessments of 20 New Zealand species, actively participated in the revision of the risk assessment framework through attendance at joint FRDC/OpenSeas/Seafood New Zealand meetings and also contributed to the external review of the framework by providing funds for an external reviewer.

Although OpenSeas has a different target audience for the risk assessments (largely marketing collateral for New Zealand exporters), the benefits of using the same methodology was seen as an opportunity to encourage broader acceptance of the risk assessment framework by businesses in both countries (given Australia is a significant importer of New Zealand seafood) and it was hoped,

create momentum for adoption into other countries. As with Whichfish, OpenSeas is in the process of updating assessment reports using the new methodology developed by this Subprogram.

The Subprogram also collaborated with the GSSI during the development and application of their benchmarking tool for third party seafood sustainability certification schemes. This included attendance at their annual stakeholder meetings held during Seafood Expo Global and on-going discussion on how to benchmark "beyond certification" assessment schemes/tools, such as Whichfish. The PI was also a member of the GSSI-SSCI Technical Oversight Committee for At-Sea Operations Social Benchmarking Criteria during 2019 and 2020.

The PI participated in the 16th and 17th sessions of the FAO/COFI Sub-Committee on Trade as part of the delegation of the International Coalition of Fisheries Associations (ICFA). ICFA is a coalition of the national fish and seafood industry trade associations from the worlds' major fishing nations of which FRDC is a member. FAO requested ICFA (including the Subprogram leader) to lead a Side Event on Advancing Blue Growth in fisheries: Social and human rights issues and access to trade at the 16th session of the Sub-Committee on Fish Trade.

As president of the International Association of Fish Inspectors (IAFI), the co-PI attended the 2017 World Seafood Congress taking the opportunity to discuss sustainability initiatives with colleagues worldwide.

Over the course of the Subprogram there was ongoing collaboration regarding issues, approaches and communications on seafood sustainability with the following organisations:

- Seafish UK
- US National Fisheries Institute, Seafood
- GSSI
- SSCI
- WWF Australia
- ICFA
- UK Sustainable Seafood Coalition
- Hong Kong Sustainable Seafood Coalition
- Fishwise
- Marine Stewardship Council
- Alaska Seafood Marketing Institute
- Iceland Responsible Fisheries Scheme
- NOFIMA (Norwegian Food Research Institute)
- AMCS
- Coles Supermarkets
- Woolworths Supermarkets
- ALDI South
- Sydney Fish Market
- Harris Farm Markets
- De Costis

4.4 Communications about sustainability

Dissemination of outputs (information and results) was undertaken through FRDC stakeholder briefings, stakeholder workshops and through FISH magazine. Other Subprogram coordination activities included attendance and presentations at workshops/meetings to discuss National Priority 1 objectives and activities and provide technical expertise into discussions at the following:

- FRDC Stakeholder Meeting, 2017
- Seafood Directions 2017
- EO/PIRSA Industry Meeting on Certification, 2017
- FRDC National Technical Workshop - Measuring social and economic contributions of fisheries and aquaculture, 2017
- SAFS Advisory Group Meeting, 2017
- WWF Harmonisation Workshop, 2017
- WWF Traceability Workshop 2017
- AFMA/CSIRO Strategic Directions Science Research Meeting 2017
- ISO 20400 Sustainable Procurement Briefings 2017
- •FRDC RD&E planning workshop for the Human Dimensions Subprogram 2017
- •ISO20400 Sustainable Procurement Briefings 2017
- •Food Agility Workshop 2018
- •WWF/Fishwell Consulting Traceability Next Steps Meeting 2018
- •Building Trust in Agriculture 2018
- •HDR Engagement Research Workshop 2018
- •FRDC RD&E planning workshop for the Human Dimensions Subprogram 2018
- •Agrifutures Consumers Perceptions Working Group, Canberra 2018
- •Social Science and the Australian Seafood Industry: Our Past, Our Future, Melbourne 2018
- •Steering Committee Member FRDC/WAFIC Project SeSAFE 2018
- •ABARES Resource Sharing Workshop 2019;
- •FRDC Stakeholders Forum 2019
- •HDR Non-Market Values Workshop 2019
- •FAO Sub-Committee on Trade 2017, 2019

5 Discussion and Conclusions

The Subprogram was active during a time of increasing interest in seafood sustainability as well as a general expansion of the definition of sustainable seafood. One of the imperatives of the Subprogram was to try and maximise the use of information generated under NP1 (as well as other FRDC projects) by meeting the information needs of stakeholders regarding seafood sustainability. Table 2 summarises the results of discussions with stakeholders as to their information needs. Overall, projects funded under NP1 have provided “pieces” of the sustainability information picture. For most projects, linkages between some NP1 projects could have been stronger if they had formed part of an initial overarching strategy better informed by user needs.

Initial plans to fast-track development of Whichfish utilising an existing risk assessment framework developed by Coles Supermarkets did not work. The failure to reach agreement meant that progress was slowed significantly in both the release of the pilot tool and the subsequent update because new methodology had to be developed. However, this also presented an opportunity to develop a more streamlined risk assessment framework which was more agile and market responsive which would allow for additional risk assessments to be added such as for human rights, plastic usage, waste reduction, animal welfare and greenhouse gas emissions. It is also anticipated that the risk assessment methodology could form the basis of development of formal standards should the market demand these.

Of concern is that delays in finalising updates have resulted in Whichfish assessments being out of date, and thus losing relevance to businesses which demand and need contemporaneous information. The opportunity of having widespread uptake (by these businesses and their suppliers and distributors) may therefore have been lost. This may be mitigated by providing planned Whichfish report updates in early 2022, through re-engagement with major retailers and the increasing need for such a B2B tool by small, medium and digital seafood business requiring information to meet market expectations regarding the sustainability of the products they sell. Additionally, if Whichfish is to remain relevant and useful, an expedited process for more rapid and timely assessment updates will have to be developed in combination with a fast track process to include new species and rationalisation and simplification of assessment reports in order to speed up report preparation and review.

An unmet need often raised, particularly by businesses without the resources to undertake their own due diligence, is a method to convert multiple risk scores into a determination (buy/don't buy). For those who require stock status only, the colour coding in SAFS may be sufficient e.g green is buy; other colours is don't buy. However there is growing interest and concern about other facets of sustainability and businesses do not have the expertise or the resources to understand and weight various risks into a single "answer." Businesses are asking for a simple scoring system. FRDC, however, is not in a position to make a determination given each business and their customers have different risk appetites. Consideration could be given to an online tool that allows for users to input their risk tolerances for the various facets of sustainability and based, on these, outputs a list of species which meet these thresholds.

Table 2 Summary of stakeholder information needs on sustainability

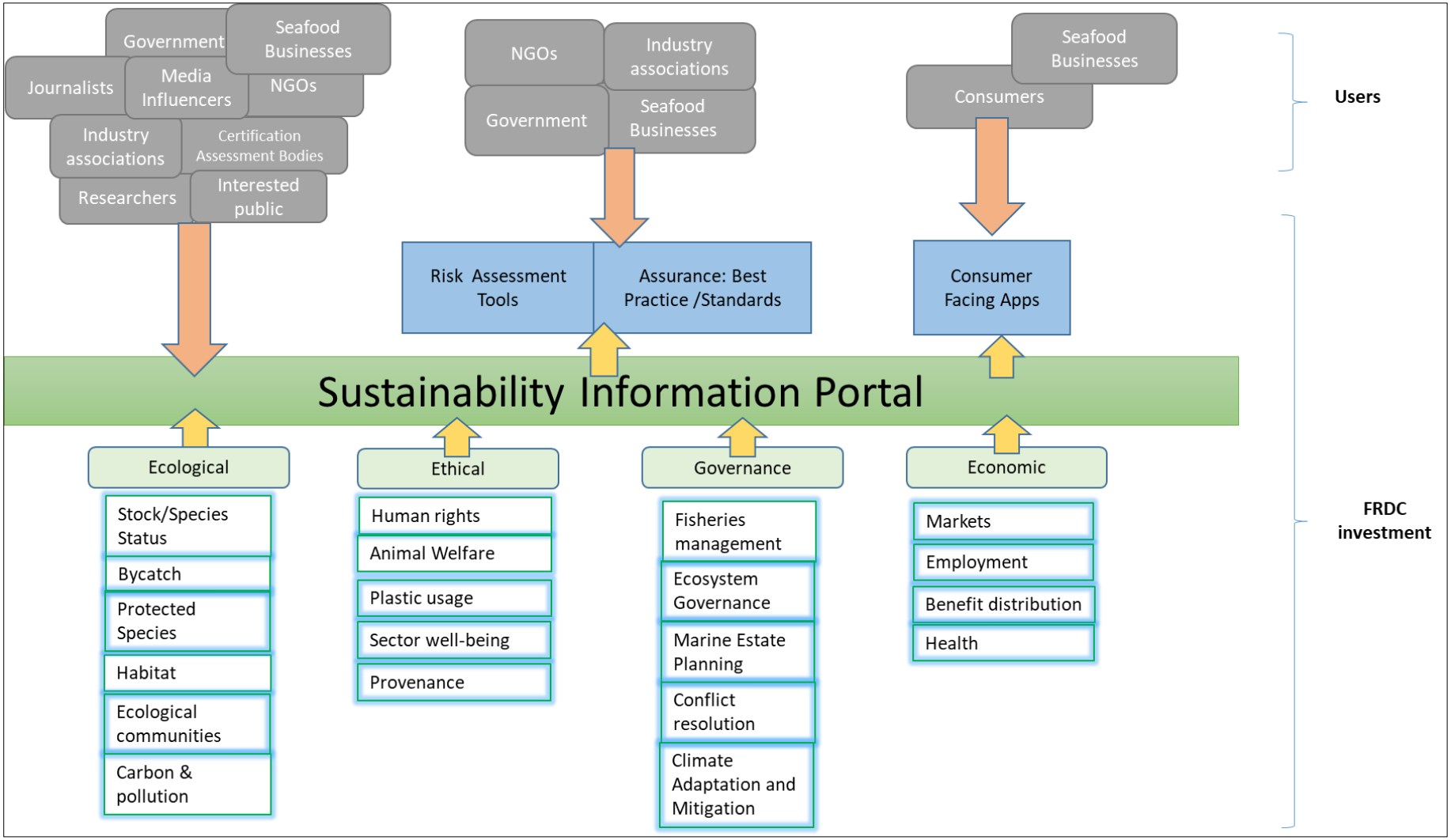
	Fisheries Management agencies	Other government agencies	Research community	NGOs	Certification bodies	Harvest Sector	Post harvest sector	Consumers (most)	Consumers (some)	Journalists	Advocates	Other influencers e.g.chefs
Application	Reporting	Information and data					Inform purchase decision			Influencers		
Sustainability of species	x	x	x	x	✓	x	✓	✓	✓	✓	✓	✓
Sustainability of stock	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Bycatch non TEPS	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Bycatch TEPS	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Management	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Cumulative risks of/to aquaculture	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Social Benefits	✓	✓	✓	x	x	✓	x	x	x	✓	✓	x
Economic benefits	✓	✓	✓	x	x	✓	x	x	x	✓	✓	x
CO2 emissions	x	x	✓	x	x	✓	✓	x	✓	✓	✓	x
Animal welfare	x	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Labour welfare	✓	✓	✓	✓	✓	✓	✓	x	✓	✓	✓	✓
Nutrition	x	x	x	x	x	✓	x	x	✓	✓	✓	✓

Additionally, there still remains an opportunity to continue development of a one-stop shop/single source of truth for sustainability information portal for the different user groups. The information in such a portal would be sourced from FRDC research outputs and other credible sources of information such as ABARES, CSIRO, Australian Bureau of Statistics, AusTrade etc. This would meet multiple user needs but must be flexible enough to address the continuous expansion of the definition of "sustainable." It will also require the development of good governance procedures (to decide which information is credible) and processes that enable timely updates. Figure 1 provides a schematic of such a sustainability information portal, the types of information and how it is accessed and by which user group. Some users (grey-shaded boxes) will want to have access to information directly, and some users (could be in the same user category) may wish access to more synthesized information (blue-shaded boxes).

Whilst progress was made in understanding adoption (or not) of responsible fishing practices (on-water; animal welfare; traceability), questions remain regarding the relevancy and salience of some existing codes of practice and the benefits of adopting best practice by users. During the lifetime of the Subprogram, there was no apparent market demand for responsible fishing practice or animal welfare assurance (such as the RSPCA Approved Farming Scheme) although this may change in the future. However, the projects did highlight the need for a greater understanding of the incentives required for adoption.

With regard to assessment of the cumulative risks to and from aquaculture, early indications are that the investment in this area will produce a useful tool for both government and industry. How it will be used by seafood buyers remains untested. Although controlling the risks to aquaculture goes beyond the remit of aquaculture regulators, understanding these risks is useful for the businesses purchasing products from a particular region both in terms of supply and reputational risks.

Figure 1 Schematic for a Sustainability Information Portal



One of the challenges of the Subprogram was finding a common pathway to achieve NP1 objectives utilising the outputs from a number of disparate projects and to align activities and extension with other FRDC investments being funded under NP1 but not under this Subprogram. A more coordinated approach to priority setting and investments would have been beneficial –as would have internalising communication and extension within the Subprogram, to ensure consistent messaging about sustainability information. It would also have helped stakeholders understanding of NP1 - which often suffered from conflicting messaging and confusion about the scope of NP1 and the Subprogram.

Information generated by projects managed under the NP1 Subprogram and from horizon scanning were used in the preparation of the FRDC Fish Forever 2030 document and the in the development of the FRDC 2020-2025 Research and Development Plan.

The Subprogram collaborated closely with the GSSI, OpenSeas New Zealand, International Association of Fisheries Associations, the Sustainable Seafood Coalition, UK Seafish, WWF Australia, Woolworths Supermarkets, Coles Supermarkets, Aldi South, Sydney Fish Market and the Sustainable Supply Chain Initiative. Good links have been established as a foundation for future collaboration.

6 Publications/Products

1. PowerPoint presentations on National Priority 1:

    - UK RASS Technical Workshop
    - Workshop on Undefined Species
    - Using SAFS information in a B2B tool for Australian seafood, SAFS Advisory Group Meeting, March 2017
    - International Responses to Social Acceptability and Engagement Challenges, FRDC HDR Planning Workshop, May 2017
    - Traceability and Fraud Initiatives, WWF National Traceability Workshop, August 2017
    - Whichfish.com.au: A B2B risk assessment tool for responsible seafood sourcing, Seafood Directions September,2017
    - The Role of GFSI and GSSI and Their Potential Adoption by the Australian Seafood Sector. Seafood Directions, September 2017
    - Third Party Sustainability Certification for Seafood, PIRSA, 2017
    - AFMA/CSIRO workshop, April 2018
    - Socially Responsible Supply Chains, AFMF Workshop 2019
2. Draft risk assessment methodology, governance and MOU (Appendix 1)
3. FRDC FISH magazine:Vol 25(4): Risk reviews beyond fish stocks

7 Recommendations

1. Focus on the development of a single source of information about fisheries and sustainability so that stakeholders are able to easily access and make decisions on the same sets of data.
2. Evaluate Whichfish with business users and other relevant stakeholders. If positive, develop a program for updates and business user-pay options for funding the program into the future. If a decision is made to progress Whichfish, revise assessment reports to make them more streamlined and develop program management procedures to expedite updates and inclusion of new species.
3. Consider development of an online tool which enables business to input their risk tolerances to assist selection of species which meet these thresholds (based on Whichfish risk scores).
4. Collect data and develop risk assessment methodologies for emerging sustainability issues which are facets of responsible souring including animal welfare, human rights, nutrition, plastics usage, greenhouse gas emissions.
5. Further explore the feasibility of assurance tools to demonstrate best practice for fisheries and aquaculture enterprises including the use of behavioural incentives to encourage uptake.
6. Utilise NP1 outputs to inform any development of National Environmental Standards or national standards and support a Steering Committee around this concept.
7. Continue to actively engage with international initiatives which are benchmarking global performance in fisheries and aquaculture sustainability performance to ensure the most reliable and current sources of information are used for Australian fisheries and aquaculture.

Appendices

I. Project Staff

Sevaly Sen, Principal Investigator, Oceanomics P/L

Mark Boulter, Co-Investigator, Safe Sustainable Seafood P/L resigned, June 2018

II. Intellectual Property

No intellectual property was developed under this project and any knowledge gained through this project is available to the broader Australian fishing and seafood industry.

III. References

Hobday, A.J., Hartog, J.R., Ogier, E., Thomas, L., Fleming, A. and Hornborg S., 2019, Healthcheck Phase 2, CSIRO Oceans and Atmosphere. CC BY 3.

Kennelly, S. J. (undated), Australia's First National Bycatch Report. IC Consulting.

Intuitive Solutions/FRDC, 2018. Community Perceptions of the Sustainability of the Australian Fishing Industry

Phillipov, M, Farmery, A & Gale, F, 2019, Media messages about sustainable seafood: how do media influencers affect consumer attitudes? Canberra, Fisheries Research and Development Corporation

Fielding, V., 2020. Media Engagement A Best Practice Guide For The Australian Seafood Industry.

IV. Whichfish Risk Assessment Methodology

RISK ASSESSMENT

FOR

RESPONSIBLE FISHERIES MANAGEMENT

OF

WILD CAUGHT[2] SPECIES IN AUSTRALIA AND NEW ZEALAND

DRAFT 1.0 v7 September 2020

[2] **Wild caught includes any fish caught in the wild - including enhancement of fish population through stocking and the taking of juveniles for ranching.**

Contents

Component 1: Status of Assessed Species

C.1.1 Stock status of Assessed species

C1.1 Stock status	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The stock is above the Point of Recruitment Impairment (PRI) and fishing mortality (*F*) is below the level that would cause the stock to fall below the PRI.	Highly Likely	Likely	Unlikely
C1.1 Scoring Criteria (where no published assessment)	**1**	**2**	**3**
a. Biomass is above PRI (or appropriate proxy)	Highly likely	Likely	Highly Unlikely
b. Given the current stock status, the current level of fishing mortality from the assessed fishery is causing recruitment to be impaired	Unlikely	Likely	Highly Likely
c. Data and information to inform determination	Allows for scientifically robust determination of the state of the stock	Sufficient but less than comprehensive	None/Limited

C1.2 Assessment Process and Information

C1.2 Assessment Process and Information	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
There is robust assessment of the dynamics and status of the stock(s) under consideration	Highly likely	Likely	Unlikely
C1.2 Scoring Criteria	**1**	**2**	**3**
a. All fishery removals from the stock(s) are taken into account (including retained catch and discards in target and non-target fisheries)	High level of confidence	Some knowledge or estimation but with moderate uncertainty	No or limited knowledge or estimation
b. The main sources of uncertainty are known and addressed within the assessment process	Highly likely	Likely	Unlikely
c. Assessment report reviewed	External expert and independent reviews	Internal expert review	No review

Component 2: Fishery Impacts on the Ecosystem

C2.1 Non-Assessed Species (not ETPs)

C2.1 Stocks of Non-Assessed Species (not ETPs)	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
Stocks of Non-Assessed Species are above the Point of Recruitment Impairment (PRI) and fishing mortality is below the level that would cause the stock to fall below the PRI	Highly likely	Likely	Highly Unlikely
C2.1 Scoring Criteria	**1**	**2**	**3**
a. Biomass is below PRI (or proxy) and recruitment is or is likely to be impaired	Highly Unlikely	Likely	Highly Likely
b. The level of fishing mortality attributable to the assessed fishery has caused depletion below PRI, or is preventing recovery to and above PRI	Highly Unlikely	Likely	Highly Likely
c. Information available to support the determination	Quantitative and scientifically robust	Partially quantitative and/or robust	Minimal or qualitative

C2.2. Endangered, Threatened and Protected (ETP) Species (flora and fauna)

C.2.2. Endangered, Threatened and Protected (ETP) Species (flora and fauna)	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The fishery does not hinder the recovery of ETP species populations or sub-populations	Highly Likely	Likely	Highly Unlikely
C2.2 Scoring Criteria	**1**	**2**	**3**
a. Status of all ETP species (populations or sub-populations) known or likely to interact with the fishery is understood.	Detailed information is available about the ETP species PBRs or equivalent, including acceptably low uncertainty.	Some data available; moderate uncertainty	No or limited data available, high uncertainty.
b. The recovery of ETP species' population (status and trend) is not materially hindered by the assessed fishery	High confidence	Moderate confidence	Low confidence OR Insufficient information to assess impacts.
c. Where measures are needed, the measures applied avoid, minimise or mitigate any slowly reversible or irreversible impacts	Demonstrably effective or not needed	Partial and/or moderately effective	None and/or insufficiently effective

C2.3 Habitat Impact

C. 2.3 Habitat Impact	LOW: 3	MEDIUM: 4-6	HIGH: 7-9
The fishery does not cause irreversible or slowly reversible harm to commonly encountered and vulnerable benthic habitats	Highly Likely	Unlikely	Likely
C2.3 Scoring Criteria	**1**	**2**	**3**
a. The types and spatial distribution of commonly encountered and vulnerable benthic habitats are identified both within and outside of the fishery area.	Detailed knowledge, of medium or high quality and known uncertainty	Broadly understood	No or limited qualitative information
b. Assessment of the impacts of fishing activity on benthic habitats.	Highly likely to not cause irreversible or slowly reversible harm	Unlikely to cause irreversible or slowly reversible harm	Likely to cause irreversible or slowly reversible harm
c. Where measures are needed, the measures applied avoid, minimise or mitigate any slowly reversible or irreversible impacts	Demonstrably effective or not needed	Partial and/or moderately effective	None and/ ineffective

Component 3: Fisheries Governance and Management

C3.1 Fisheries Governance

C3.1 Fisheries Governance	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
An effective legal and administrative framework for fisheries resource management is in place.	Highly likely	Likely	Unlikely
C3.1. Scoring Criteria	**1**	**2**	**3**
a. Fisheries management frameworks are consistent with international agreements and national/state regulatory requirements.	Consistent, well administered and legally established	Mostly consistent but deficient in one of the following: defined powers or functions specified or objectives clearly stated in law	Not consistent and/or poorly administered and/or not legally established
b. There are laws and policies in the definition, allocation and administration of access for all resource users	Clear evidence each of these exist and have been implemented and are complied with	Mostly exist but track record of implementation or compliance is inconsistent or intermittent	Not available or cannot be identified and/or no evidence of implementation or compliance
c. Governance and administrative processes are participatory and transparent. Responsibilities are clearly defined.	Clear evidence these elements exist and have been effectively implemented	Mostly exist but track record of implementation is inconsistent or intermittent	No or insufficient evidence of implementation, opportunity to participate, transparency or defined responsibilities

C3.2 Fisheries Management System

C3.2 Fisheries Management System	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
Effective, appropriately resourced and operational fisheries management system is in place.	Highly likely	Likely	Unlikely
C3.2 Scoring Criteria	**1**	**2**	**3**
a. Mechanisms for effectively resourcing fishery management functions	Available and/or identifiable with consistent track record of implementation	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified
b. Institutional arrangements, legislation, regulations and other instruments, are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.	Periodic reviews occur and implementation of outcomes is comprehensive	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified
c. Science and information to inform management are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.	Periodic reviews occur and implementation of outcomes is comprehensive	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified

C.3.3 Fishery specific management objectives

C 3.3 Fishery Specific Management	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The fishery is effectively managed.	Highly likely	Likely	Unlikely
C.3.3. Scoring Criteria	**1**	**2**	**3**
a. There is a management plan (or equivalent) to achieve Component 1 and 2 outcomes	Management plan is documented, objectives are appropriate, actions are specified and responsive.	Management objectives and actions only partially specified and/or partially responsive.	No or insufficient evidence of objectives or actions
b. Actions specified in the management plan (or equivalent) are implemented, including appropriate monitoring and enforcement	Sufficient evidence	Inconsistent or intermittent	No or unconvincing evidence
c. Relevant, comprehensive reviews are undertaken and changes made where appropriate	Reviews completed, findings considered, stakeholders consulted and changes are implemented in a timely manner	Occasional or partial reviews undertaken, limited stakeholder consultation and late/inadequate change implementation	No evidence of regular review or any recommendations being implemented

Outlook

The outlook section provides a forecast for each Component on whether the risk scores are likely to 'improve', remain 'stable' or 'deteriorate' over the next several years. Outlook is determined according to the independent assessor's expert judgement but must be justified and based on initiatives underway. Suggestions by managers, regulators or other interested parties as to what could be done in a fishery should not be taken into account.

IV. Whichfish Guidance Document

Which Fish/OpenSeas Guidance for Risk Assessment Tool

Version 1.0 September 2020

Contents

• Background

Which Fish and OpenSeas uses a risk assessment tool designed to use a range of existing publicly available information on the biological status of fish stocks and their respective management as well as evaluating potential impacts of fishing for the assessed stock on the wider environment. The tool is not intended to replace formal certification programmes or to be a conservation or management tool. It is intended as a risk-based screening, business-to-business tool to allow seafood retailers and wholesalers to make more informed responsible sourcing choices.

Which Fish? Assesses risk in three components;

***Component 1 (C1):* Status of Assessed Species**

Assessed Species are species retained by the fishery for commercial purposes that users have requested to be assessed. There may be numerous Assessed Species retained by the fishery. Each Assessed Species must be scored separately. This component assesses the species status and determines if undesirable impacts from fishing are occurring (e.g. overfishing). For depleted populations, the fishery must be conducted in a way that leads to their recovery.

Component 2 (C2):

Assesses whether fishing operations allow for the maintenance of the structure, productivity, function and diversity of the ecosystem (including endangered, threatened and protected species, habitat and associated dependent and ecologically related species) of which the target stock is an integral part.

***Component 3 (C3):* Fisheries governance and management**

Assesses whether the fishery is subject to an effective management system that respects customary norms and agreements and local, national and international laws and standards and incorporates institutional and operational frameworks that, working together, require use of the resource to be responsible and sustainable.

• Scoring risks

Each component has a number of sub-components that are separately assessed against Scoring Criteria. The assessor assigns each sub-component a risk score according to how well the fishery performs against the criteria (Figure 2 *Risk Assessment Hierarchy and Scoring Criteria*. These scores are then added to give an overall score for each Scoring Criteria. Depending on the score, a risk category is assigned (Figure 2 *Risk Assessment Hierarchy and Scoring Criteria*

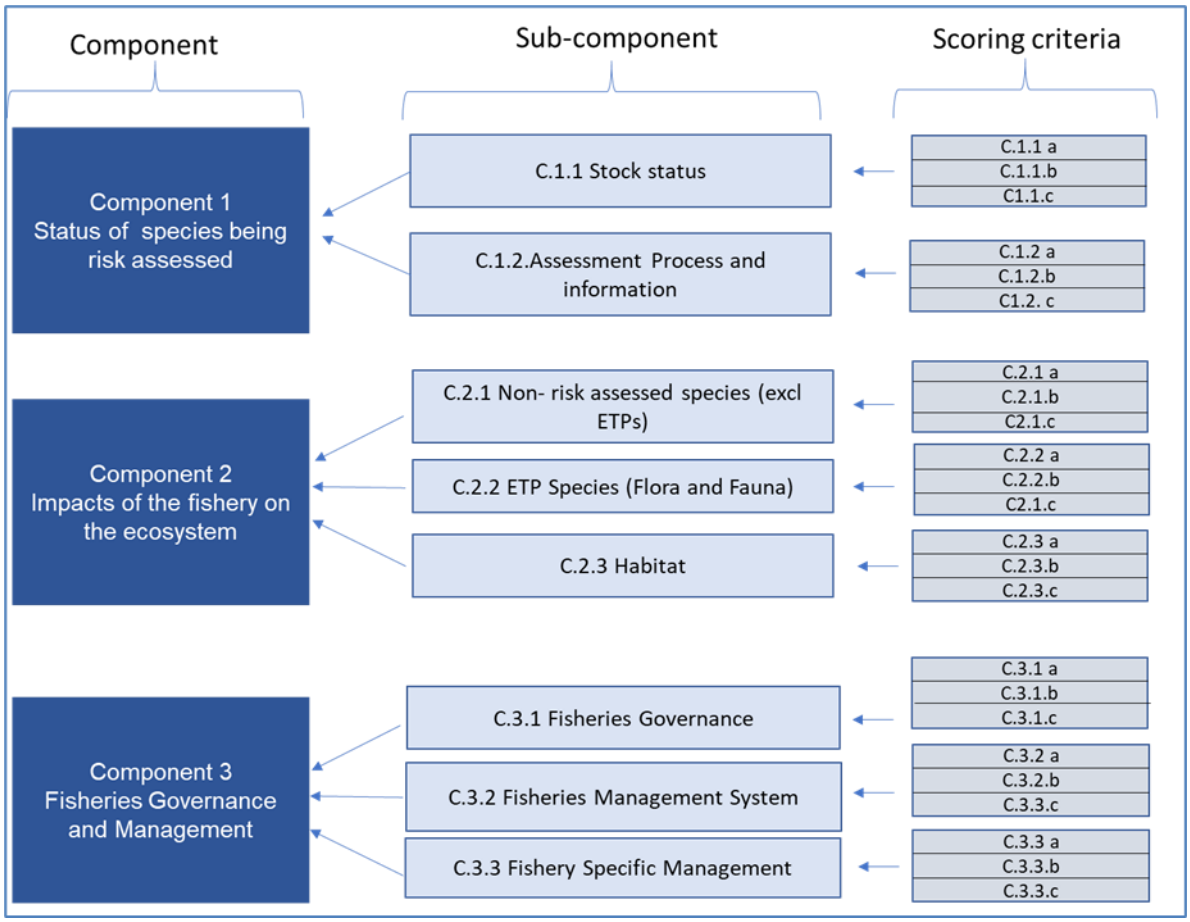


Table 3). An example of how risks are scored is provided in

Figure 3.

Figure 2 Risk Assessment Hierarchy and Scoring Criteria

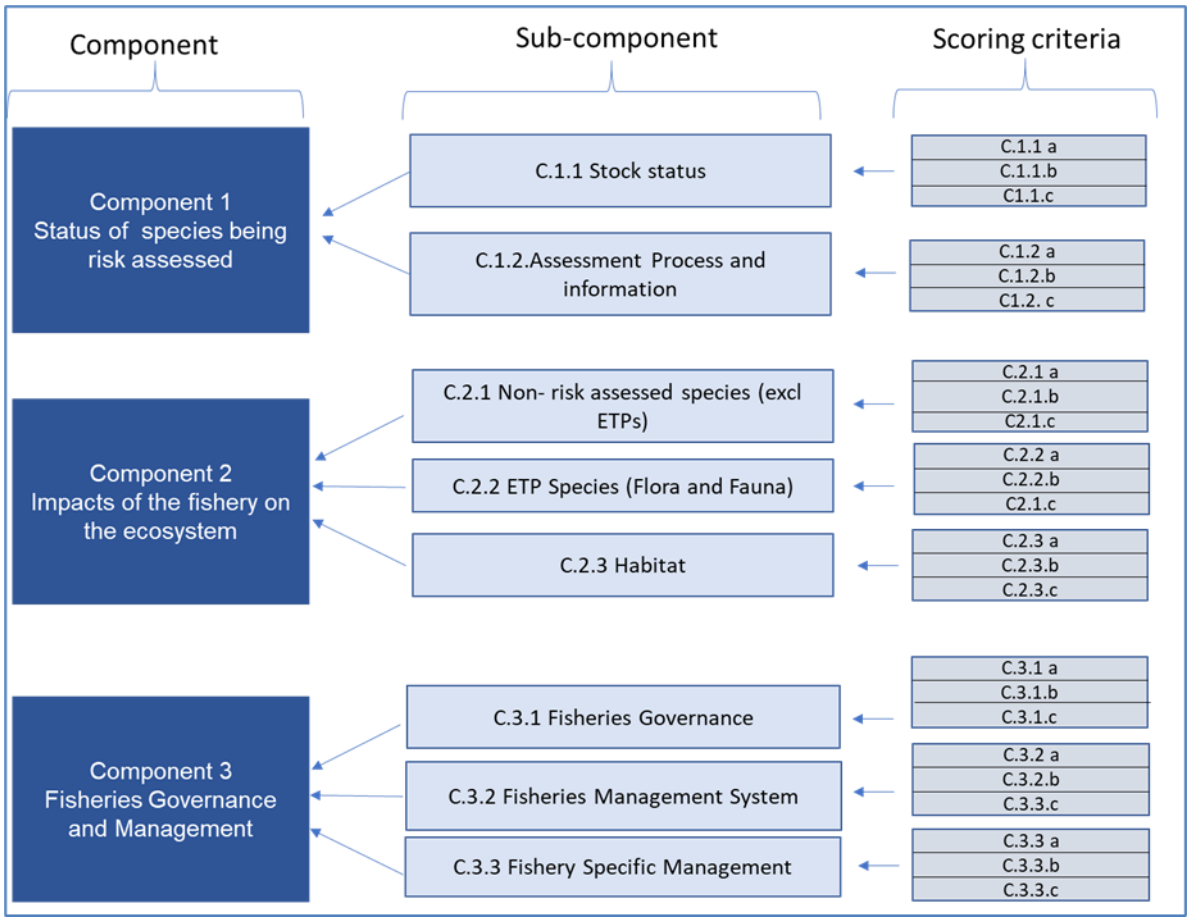
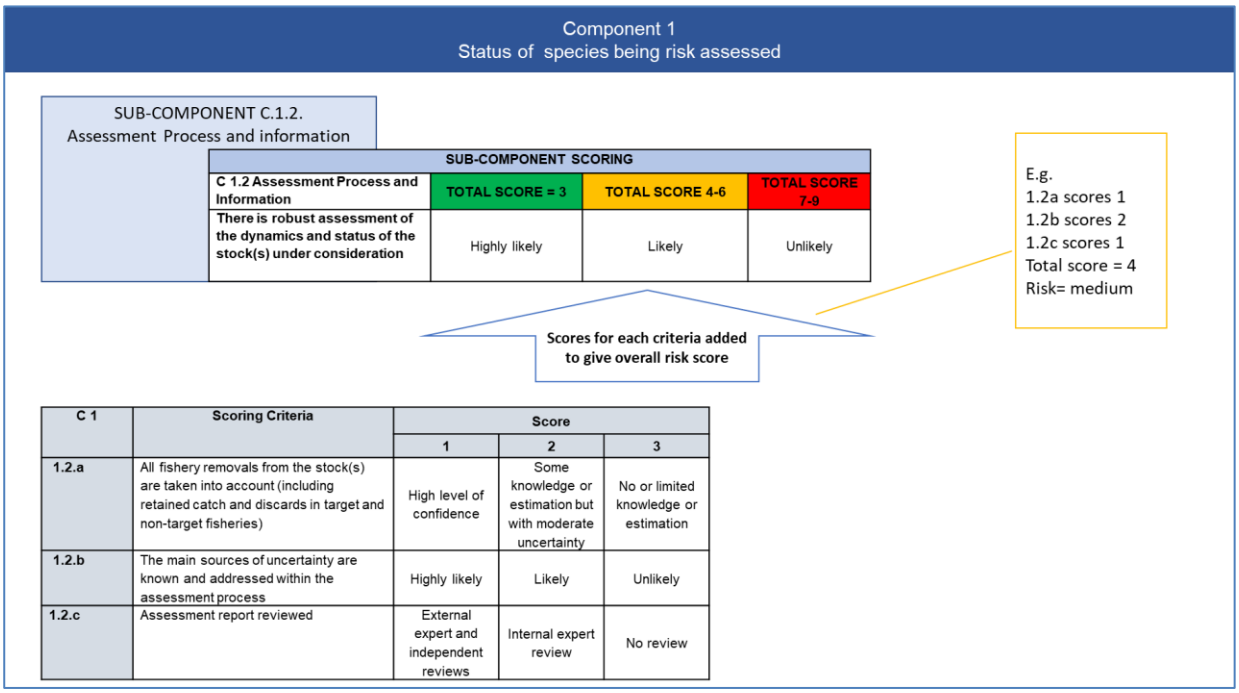


Table 3 Risk categories used in Which fish?

Risk	Total Score for each Sub-component	Risk Category
Highly likely	3	LOW
Likely	4-6	MEDIUM
Unlikely	7-9	HIGH

Figure 3 Example of Scoring



• Sources of Information

Existing information from publicly available sources (e.g. local, regional and national government documents, peer reviewed articles and credible NGO sources [MSC]) should be used to support the scoring.

Risk scores are assigned based on the evidence available to the assessor at the time of assessment.

A rationale, including supporting references, must be provided to justify the assigned risk score.

• Guidance vs compulsory requirements

This document is intended as a guidance document for assessors to highlight issues for consideration and to clarify the intent of the scoring criteria by providing examples. The extent to which assessors follow the guidance, tables and examples is at the assessors' discretion, with the following exceptions:

1. Each Assessed Species MUST be assessed separately (see C.1 for definition of Assessed Species)
2. All documentation used to conduct the assessment **MUST** be publicly available, this can include documents that may be available on request rather than readily publicly available e.g. on the internet
3. Assessors **MUST** provide supporting rationale for each scoring criteria, including relevant references to support the outcome.
4. Where assessors deviate from the guidance, rationale to support the deviation including relevant references, **MUST** be provided. For example, where retained species that do not comprise >5% of the total catch are assessed.

• Component 1: Status of Assessed Species

Definitions for C1

Assessed Species – species retained by the fishery for commercial purposes that users have requested to be assessed. There may be numerous Assessed Species retained by the fishery. Each Assessed Species must be scored separately.

Other retained species – species retained by the fishery for commercial purposes that users have NOT requested to be assessed under Component 1

Discards – individuals of normally retained species caught by the fishery that are returned to the water as they are unwanted (e.g. damaged) or prohibited (e.g. undersized or egg bearing).

Bycatch – species that are not normally retained; species returned to the water as they have no commercial value or where there are prohibitions on retention or landing e.g. not permitted under management plan or licence conditions.

C1 only applies to the stock status of Assessed Species, all other retained species, discards and bycatch are scored under C2.1.

• C.1.1 Stock status of Assessed species

•

C1.1 Stock status	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The stock is above the Point of Recruitment Impairment (PRI) and fishing mortality (*F*) is below the level that would cause the stock to fall below the PRI.	Highly Likely	Likely	Unlikely
C1.1 Scoring Criteria (where no published assessment)	**1**	**2**	**3**
a. Biomass is above PRI (or appropriate proxy)	Highly likely	Likely	Highly Unlikely
b. Given the current stock status, the current level of fishing mortality from the assessed fishery is causing recruitment to be impaired	Unlikely	Likely	Highly Likely
c. Data and information to inform determination	Allows for scientifically robust determination of the state of the stock	Sufficient but less than comprehensive	None/Limited

C1.1 Definitions

A biological stock - Genetically or functionally discrete population that is largely distinct from other populations of the same species and can be regarded as a separate homogeneous group for management or assessment purposes (Stewardson, et al., 2018). Some species form a single stock (e.g. southern bluefin tuna) while others are composed of several stocks (e.g. albacore tuna in the Pacific Ocean comprises separate northern and southern stocks). Use of the term "stock" implies that the particular population is a biologically distinct unit (FAO, 2020).

A management unit – is typically defined in terms of the people involved, the species caught, the area of water or seabed fished, fishing methods and the types of boats used (Stewardson, et al., 2018). Designed for practical management purposes and may represent only part of a biological stock or a number of biological stocks. There may also be multiple management units for a single biological stock within a jurisdictional level

Jurisdictional level – refers to all biological stocks or management units of a species that are managed by a particular State or Territory. Common in Australia, where individual States and/or Territories may have different management measures or strategies in place for portions of the same biological stock e.g. Eastern King Prawn - Eastern King Prawn are harvested in Queensland and New South Wales fisheries and are considered a single multi-jurisdictional biological stock (Stewardson, et al., 2018).

Point of recruitment impairment – the point at which a stock is considered to be recruitment impaired is the point at which biomass has been reduced through fishing so that average recruitment levels are significantly reduced. Reduction in stock size to, or below, PRI can occur due to a number of factors, including fishing, natural environmental effects, or other non-fishing anthropogenic effects (Stewardson, et al., 2018).

The Precautionary Approach – is defined as being cautious when information is uncertain, unreliable or inadequate and that the absence of adequate scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. For example, when the status of a stock has a high level of associated uncertainty, management and/or mitigation implemented in the fishery should act in a precautionary manner i.e. manage according to the highest risk (FAO, 1996).

C1.1 Stock status – general guidance

The stock is above the Point of Recruitment Impairment (PRI) and fishing mortality (F) is below the level that would cause the stock to fall below the PRI

Stock status must be scored for each Assessed Species.

For a multispecies fishery, stock status may have to be scored for multiple species depending on what species within the fishery have been requested to be included as Assessed Species.

Where possible, stock status will be scored based on the entire biological stock of the species.

Where the biological stock is unknown or uncertain, stocks may be assessed at either jurisdictional level or management units (see Stewardson, et al., 2018).

A rationale, including supporting references, for level at which each stock is assessed (i.e. biological, jurisdictional or management) must be provided.

The stock status of Assessed Species must be scored using stock assessments recognized and used for management purposes (e.g. Status of Australian Fish Stocks; SAFS; Fisheries New Zealand

Fishery Assessment Plenary). Stock assessments used for assessing Assessed Species must be no older than ten years.

Both quantitative and qualitative approaches to stock assessment are permitted.

Scoring stock status with assessments available

For Australian stocks;

The primary source of stock status information is the Status of Australian Fish Stocks (SAFS: www.fish.gov.au).

If the Assessed Species is not included in SAFS, assessments conducted by State or Commonwealth Agencies can be used or any stock assessments that are recognized by a fisheries regulatory authority and used for management purposes e.g. may be published in grey literature (see Table 2 for scoring conversions).

For New Zealand stocks;

The primary source of stock status information is Fisheries New Zealand Fisheries Plenary Assessment (https://www.mpi.govt.nz/dmsdocument/38960/direct) (see Table 2 for scoring conversions).

Table 4 Scoring conversions for Australian and New Zealand stock status terminology

Country	Source document	Source terminology	Which Fish? Risk Category
Australia	SAFS	Depleted	High
		Depleting / recovering	Medium
		Sustainable	Low
	Commonwealth and State assessments	Below F_{lim} and below B_{lim}	High
		At F_{lim} and below B_{lim}	High
		Above F_{lim} and below B_{lim}	High
		Above F_{lim} and at B_{lim}	Medium
		Above F_{lim} and above B_{lim}	Medium
		At F_{lim} and at B_{lim}	Medium
		At F_{lim} and above B_{lim}	Low
		Below F_{lim} and above B_{lim}	Low
New Zealand	Fisheries New Zealand Fisheries Plenary Assessment	Below soft limit	High
		Between soft limit and target (or lower bound of target range)	Medium
		At target (or lower bound of target range) or above	Low

Scoring in the absence of formal assessments

If acceptable assessments are not available, use the scoring guidance in Table **C1.1** (see above).

For data limited stocks or stocks without formal assessments a weight-of-evidence approach may be used to supporting scoring

Weight-of-evidence approach - The systematic consideration of a range of biological and fisheries information, as proxies for biomass status and/or levels of fishing mortality, to support a status determination. Lines of evidence used in the weight-of-evidence approach may include empirical indicators (catch, effort, catch rate, size- or age-based indicators, spatial and temporal distribution of the fishery), risk assessments, fishery-independent surveys, quantitative stock assessment models and harvest strategies (Stewardson, et al., 2018).

C1.1a. Biomass is above PRI (or proxy)

Proxies for stock status can be used where the precise values of PRI, B_{msy} and F_{msy} are not known or where these are management quantities and are set precautionarily above where the precise values are likely to be. Both qualitative and quantitative proxies are permitted. However, justification that both the proxies and the time periods over which they are being assessed are appropriate for the species being assessed must be provided.

For example, there is evidence that consideration of relevant information such as the biology of the species (longevity, breeding strategy, growth rate), spatial and temporal history of fishing pressure, and the robustness and responsiveness of the management system have been taken into account.

Examples of proxies for stock status

- time series of CPUE, using fishery-dependent or -independent data, provided that temporal and spatial changes in fish behaviour, fishing, and catchability of fishing gear have been adequately considered, and that the CPUE has been peer-reviewed and is demonstrably likely to represent an index of abundance.
- based on some time-defined historical state, the position of the stock at that time should be considered relative to the unexploited level and the likely proximity to B_{msy}. Evidence should be presented that the stock was not over-exploited at the historical reference time and that the catch was sustainable and highly productive (See Box 1)
- Size compositions over a timespan relevant to the longevity of the species and representative of the stock (catch at age and length-frequency data).

Where proxies are used to score stock status, higher scores should be assigned where greater confidence is provided by the proxy information e.g. where multiple proxies are used as a cross check, where extended time periods of consistent proxy data are available or where there is evidence that the proxies are highly precautionary.

Where higher scores are justified by the use of more than one proxy, proxies should be independent of each other.

For example, following scoring in **Table C1.1** using proxies a species may be scored as;

Highly likely – If no decline has been observed in one or more proxies for one generation time (or 5 years for short- lived species) and at least one proxy indicates that the stock is at a highly productive level.

Likely- If no decline has been observed in one proxy for at least one generation time (or 5 years if short-lived species) and the proxy indicates that the stock is likely above the PRI (Box 1).

Box 1: Example of scoring C1.1a using proxy to illustrate that fishery is above PRI, including rationale.

Score Category 2 - Likely (Medium Risk)
Peel Harvey Blue Swimmer Crab Fishery Extract from SCS Global Services, 2016a The commercial and recreational fisheries target the same stock of Blue Swimmer Crabs. The status of the stock is assessed using the standardised catch rate from the commercial trap fishery and has been relatively stable and within (or slightly above) the target range since the mid-1990s. The species is short lived and the fishery depends on annual recruitment. The 30-year history of the fishery being reliant on this regular recruitment indicates that it is highly likely that there has been no recruitment impairment during this period (SCS Global Services, 2016a).

For data-limited fisheries or where insufficient time series are available (e.g. new or developing fisheries) qualitative or semi-quantitative risk assessments (e.g. Productivity Susceptibility Analysis (PSA)), may be used to provide a stock status score.

Where data-limited approaches are used, a precautionary approach needs to be applied to compensate for the added uncertainty caused by the lower information availability.

Adequate rationales for scores need to be provided, including references where appropriate.

C1.1b. Given the current stock status, the current level of fishing mortality from the assessed fishery is causing recruitment to be impaired

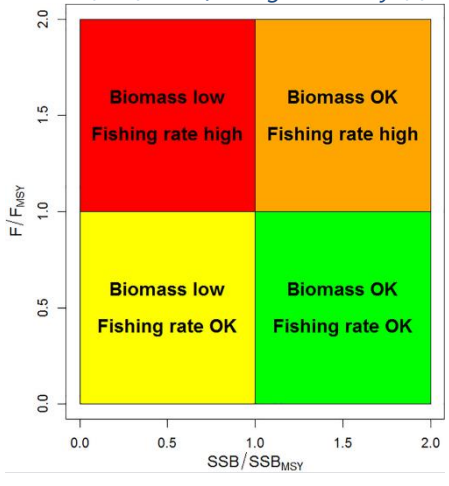
In some fisheries there may be the scenario where the biomass (or proxy) is not yet depleted and recruitment is not yet impaired i.e. fishery is above PRI. However, fishing mortality (or proxy) is too high (i.e. overfishing is occurring) and the stock is moving in the direction of becoming recruitment impaired (see Figure 4).

Therefore, management is required to reduce fishing mortality and ensure that the biomass does not become depleted in the future i.e. that PRI threshold is not breached.

Issues to consider to determine the responsiveness of the management system to reduce fishing mortality and ensure that the biomass does not become depleted

- Is there a Harvest Strategy (HS) with Harvest Control Rules (HCRs) in place?
- Are there a range of tools available to control effort?
- Are the tools available appropriate for the species being assessed and for the type of fishery?
- Is there evidence of the available tools being implemented effectively within this fishery or in a similar fishery in the same management jurisdiction?
- Is there evidence, from this fishery or in a similar fishery in the same management jurisdiction, of the implemented tools producing the desired outcome in controlling fishing mortality?

Figure 4 Stock status based on biomass (SSB) and fishing mortality (F). Colour coding green = not



overfished/no overfishing (low risk), orange = not overfished, overfishing occurring (medium risk), red = overfished and overfishing occurring (high risk), and yellow = overfished, not overfishing (medium risk) (Source: Carvalhoa et al., 2018)

To score a species, assessors can use the following as a guide;

Unlikely - Current $F < F_{msy}$

Likely – Current $F = F_{msy}$

Highly likely – Current $F > F_{msy}$

It is recognised that $F = F_{msy}$ will rarely occur, however if the guide above is used in conjunction with Figure 1 so that the combination of stock status from C1.1a and current F means that one of the 4 boxes in Figure 4 and the associated risk level is representative of the fishery.

Assessors must provide a rationale and supporting evidence to justify the assessment of risk associated with current level of F.

Box 2: Example of scoring C1.1b, including rationale.

Score Category 2 - Likely (Medium Risk)
Southern and Eastern Scalefish and Shark Fishery (SESSF) - Blue-eye Trevalla Extract from MRAG, 2017a Blue-eye Trevalla is caught by the Scalefish Hook Sector (SHS) component of the Southern and Eastern Scalefish and Shark Fishery (SESSF) which is managed by the Australian Fisheries Management Authority (AFMA) on behalf of the Australian Government. Blue-eye Trevalla is categorised as a Tier 4 stock under the SESSF Harvest Strategy Framework (HSF). The Tier 4 analysis determines a Recommended Biological Catch (RBC) by selecting CPUE reference points that are taken as proxies for the estimated B_{lim} and B_{targ}. This is done by assuming that the CPUE is proportional to stock abundance, an assumption that is made in most SESSF assessments. The recommended maximum fishing mortality rate for Tier 4 is F_{MSY} (the default proxy for which is F_{40}). This represents the fishing mortality rate that would cause the spawning biomass to decline to its maximum sustainable biomass B_{MSY} (the default proxy for which is B_{40}). Tools in the form of quota adjustments are in place to ensure exploitation can be reduced as PRI is approached. Well-defined Harvest Control Rules and tools are in place which ensure exploitation is reduced as PRI is approached and are expected to keep the stock fluctuating at target levels consistent with MSY or above. The 2017 stock assessment estimated the stock to be between the limit and target reference points. Although catch rate has declined over the past two years, catches have been below RBC which should lead to stock growth towards the target reference point (MRAG, 2017a).

C1.1c. Data and information to inform determination

Issues to consider in scoring;

Range of information

- Knowledge of biology of species
- Knowledge of fleet, including recent and current operational details
- Knowledge of the management system with respect to monitoring

Monitoring of catch/fishery

- Is there reporting (e.g. catch returns) and is the reporting regulated or not regulated;
- Is there monitoring in place and is the monitoring fishery-dependent or independent.
- Range of data available – fishery-dependent/independent, variety of metrics e.g. catch, effort, CPUE, size composition, age composition, spatial and temporal distribution of effort and catch
- Frequency of reporting and monitoring – daily, monthly, annually
- Robustness of reporting and monitoring – e.g. are some or all data validated or cross-checked

Timing and frequency of assessment in relation to biology of species

- Long-lived species (>20 years) such as orange roughy may require less frequent monitoring and assessment, depending on the scale and intensity of the fishery and the status of the stock.
- Short-lived species (< 5 years) such as blue swimmer crabs require more frequent monitoring and assessment

Box 3: Example of scoring C1.1c, including rationale.

Score Category 2 - Likely (Medium Risk)
Queensland Coral Reef Fin Fish Fishery – Coral Trout Extract from MRAG, 2017b Coral trout, is caught as part of the Queensland Coral Reef Fin Fish Fishery using lines. Coral Trout are protogynous hermaphrodites and aggregate to spawn during spring and summer and can grow to 5 kg and 18 years of age. The biological stock structure of Coral Trout species is spatially complex and remains uncertain. Therefore, status is typically reported at the management unit level rather than for individual biological stocks which is sufficient to support the harvest strategy. Good information is available on the fleet structure of the commercial and charter sectors. Sufficient information is available on the fleet structure and catches in the recreational sector to periodically estimate catch. Stock abundance and removals are monitored through commercial and charter logbooks, commercial quota catch documentation and periodic stock assessments (Leigh et al., 2019). Recreational catch is monitored periodically (every 3-5 years). Standardised commercial CPUE is monitored annually consistent with the requirements of the Harvest Control Rules. There are likely to be limited removals from the stock, other than from the commercial, recreational and charter sectors (MRAG, 2017b).

- ## C1.2 Assessment Process and Information

C1.2 Assessment Process and Information	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
There is robust assessment of the dynamics and status of the stock(s) under consideration	Highly likely	Likely	Unlikely
C1.2 Scoring Criteria	**1**	**2**	**3**
a. All fishery removals from the stock(s) are taken into account (including retained catch and discards in target and non-target fisheries)	High level of confidence	Some knowledge or estimation but with moderate uncertainty	No or limited knowledge or estimation
b. The main sources of uncertainty are known and addressed within the assessment process	Highly likely	Likely	Unlikely
c. Assessment report reviewed	External expert and independent reviews	Internal expert review	No review

The method of assessment is commensurate with the size and scale of the fishery in relation to the stock size and spatial distribution.

C1.2a All fishery removals from the stock(s) are taken into account (including retained catch and discards in target and non-target fisheries)

The assessment sufficiently considers all fishery removals of the assessed stock by both the target and other fisheries, including where data may be missing or inaccurate.

Removals may include;

- Retained catch and discards, illegal, unreported, unregulated (IUU), recreational and customary catches, as well as incidental mortality and predation mortality
- Other fisheries (i.e. other than the target fishery) may include;
- commercial, recreational and customary fisheries

A clear understanding of the available data on removals and sources of mortality are considered or used in the assessment and an evaluation of their accuracy and completeness should be provided.

When evaluating accuracy and completeness of data, the following factors may be considered;

- What is monitored – catches, measures of effort, discards
- How is it monitored- fishery-dependent (e.g. logbooks, catch returns) or independent (observers, cameras)
    - Spatial and temporal coverage of data collection - entire spatial and temporal extent of a single fishery or across multiple fisheries, across a portion or entire distribution of stock and some or all of the fishing period
    - Frequency of data collection - daily, weekly, monthly, annually

- Data validation – is the information validated? If validated, how is the information validated, is there external data validation e.g. validation of catch returns by cross checking with processor unloads, is validation conducted for all or only a proportion of the catch volume?

Box 4: Example of scoring C1.2a, including rationale.

Score Category 1 - High level of confidence (Low Risk)
South East Australia Small Pelagic Fishery Extract from MRAG Americas, 2019 Catch and effort data in the South East Australia Small Pelagic Fishery is recorded in commercial logbooks and validated through Catch and Disposal Records (CDRs). The composition of the broader fleet is well understood and all vessels in the fishery are required to use VMS and there is 100% electronic monitoring of the catch. Discards of Blue Mackerel by the fishery are very low and uncommon (MRAG Americas, 2019). The majority of removals of Blue Mackerel from the stock are harvested by the South East Australia Small Pelagic Fishery. However, there are small catches of the species from New South Wales (NSW) ocean fisheries, NSW Estuary General Fishery, Victorian Ocean Purse Seine Fishery and the Tasmanian Scalefish Fishery. Catches of the species from other jurisdictions are incorporated into the fishery assessment and the TAC setting process (Ward & Grammer, 2018). Recreational catches of the species have also been determined through National surveys and some state-based surveys and are also incorporated into the fishery assessment (Ward & Grammer, 2018).

C1.2b. The main sources of uncertainty are known and addressed within the assessment process.

There is evidence that the sources and magnitudes of relevant uncertainties pertinent to the stock assessment are taken into account.

Uncertainty can be related to a number of factors, including but not limited to:

- Stock structure
- Species identification
- Data collection (e.g. bias or unrepresentative sampling)
- Catch history errors, including illegal, unreported and unregulated (IUU) catches
- Ageing errors and growth estimates
- Estimates of natural mortality
- Recruitment variability; and / or
- Model structure uncertainty

Scoring of uncertainty should incorporate consideration of the following factors (see Table 5 and Box 5 for scoring guidance):

- Does the assessment stipulate the bounds of probability/certainty accepted for key indicators and performance measures?
- The quality of indicators of stock status that are monitored and used to inform decisions e.g. robustness of the indicator, including sensitivity of the indicator to a change in status and proportion of the stock the indicator is monitoring
- Frequency of monitoring of indicators (needs to be aligned with the sensitivity of the indicator)
- Does the assessment compare status against reference points in a probabilistic manner?

Table 5 Scoring category and corresponding types of information required

Scoring category	Examples of Criteria
Unlikely	No or unreliable indicators are available and used appropriately No or only 1 source of major uncertainty are considered No bounds of acceptability levels of uncertainty are identified for any indicator Monitoring of all indicators used is appropriate to the life-history of the species*
Likely (see Box 5)	At least 1 reliable indicator is used and other less reliable indicators available and used appropriately Sources of uncertainty are identified and considered Bounds of acceptability levels of uncertainty are identified for at least the major indicator Monitoring of all indicators used is appropriate to the life-history of the species and broadly aligned with the scale and intensity of the fisheries and the timing of stock assessments* Stock status is compared to established reference points Alternative hypotheses of stock structure are considered
Highly Likely	At least 1 highly reliable indicator is used and other less reliable indicators available and used appropriately Multiple sources of uncertainty are identified and considered Bounds of acceptability levels of uncertainty are identified for all indicators used At least 1 highly reliable indicator used and other less reliable indicators available Monitoring of all indicators used is fully appropriate to the life-history of the species, the scale and intensity of the fisheries and the timing of stock assessments* Comparison of stock status to established and appropriate reference points is done in a probabilistic way Alternative hypotheses of stock structure are rigorously explored

* Indicators may be monitored more frequently than stock assessments are conducted and should be so if assessments are not conducted annually. The monitoring of indicators (e.g. catch, CPUE, survey indices) should be conducted between stock assessments, be subject to peer review and publicly available.

Box 5: Example for C1.2b, including rationale

Score Category 2 - Likely (Medium Risk)
South Australian Sardine Fishery Extract from MRAG Americas, 2018a Stock assessment reports identify the major sources of uncertainty. Both the model outputs and estimates of spawning biomass are presented as mean values with 95% confidence limits. Both methods explicitly take uncertainty into account in a transparent manner that is regularly reported. Management Strategy Evaluation approach to population modelling has been undertaken. In comparison to modelling outputs, the current HCRs in the fishery are conservative. However, despite their conservative nature, the Limit Reference Point and Target Reference Point are established against mean estimates of spawning biomass, and thus uncertainty is not built explicitly into the reference points in a probabilistic way (MRAG Americas, 2018a).

C1.2c. External and/or Independent Reviews:

Scoring should be in accordance with the principles in the Research and Information Standard for New Zealand Fisheries (Ministry of Fisheries, 2011) for New Zealand fisheries or the Research and Science information Guidelines for Australian Fisheries (Penney, et al., 2016) for Australian fisheries.

Examples may include reviews by:

- Internal peer review – reviews by appropriately qualified members of staff of the research/management organisation that have not otherwise been a party to the assessment. Not independent.
- External peer review – reviews by appropriately qualified individuals or groups, including a majority (or at least a significant proportion) of people external to the research/management organisations. Independent or semi-independent.
- Scientific Advisory or Working Groups and Committees – reviews by formally constituted groups of appropriately qualified people. Independent or semi-independent.
- Expert reviews and workshops – reviews by standing or ad hoc expert groups. May be national or international depending on the make-up of the group. Usually independent.
- Publications in peer-reviewed journals – Independent.
- International peer review – reviews by specifically constituted review panels of global subject leaders. Independent.

Box 6: Examples for scoring C1.2c, including rationale

Score Category 1 - External expert and independent reviews (Low Risk)
Northern Prawn Fishery Extract from MRAG, 2018b The stock assessment is carried out by the Commonwealth Scientific Industrial Research Organization (CSIRO) under contract from the Australian Fisheries Management Authority (AFMA). It is conducted by a team of data, information and stock assessment specialists including part-time input from an expert from the University of Washington. Modelling results are then reviewed by the Northern Prawn Resource Assessment Group (NPRAG), which is comprised of scientists, economists, fishery managers, fishing representatives, and environmentalists. Peer-group review of the actual assessments is provided by two independent stock assessment experts within the NPRAG. The methods and results of the assessments are also published in peer reviewed scientific journals. The assessment was externally peer-reviewed in 2002 by an independent stock assessment expert who concluded that the assessment was world-class but also recommended the inclusion of fishery dependent data; a recommendation that has been followed (MRAG Americas, 2018b).

• Component 2: Fishery Impacts on the Ecosystem

• C2.1 Non-Assessed Species (not ETPs)

• C2.1 Stocks of Non-Assessed Species (not ETPs)	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
Stocks of Non-Assessed Species are above the Point of Recruitment Impairment (PRI) and fishing mortality is below the level that would cause the stock to fall below the PRI	Highly likely	Likely	Highly Unlikely
C2.1 Scoring Criteria	**1**	**2**	**3**
a. Biomass is below PRI (or proxy) and recruitment is or is likely to be impaired	Highly Unlikely	Likely	Highly Likely
b. The level of fishing mortality attributable to the assessed fishery has caused depletion below PRI, or is preventing recovery to and above PRI	Highly Unlikely	Likely	Highly Likely
c. Information available to support the determination	Quantitative and scientifically robust	Partially quantitative and/or robust	Minimal or qualitative

C2.1 General Guidance

All other captured species (i.e. species not assessed under C1.1) should be assessed under C2.1 with the exception of ETPs.

By definition, all other captured species includes all retained species not assessed under C1.1 (i.e. species retained by the fishery for commercial purposed that were not included in C1.1) discarded and bycatch species, that contribute ≥ 5% of the total catch of the fishery.

For less resilient species (e.g. elasmobranchs) the threshold is ≥ 2% of the total catch of the fishery as the risk of overfishing these species is inherently greater.

Assessors may still include species, even if it does not meet the thresholds of ≥5% or ≥2%, as long as a plausible rationale is provided as to why the species should be included.

For example,

- a stock might be so depleted that all impacts are important or
- total catches of Assessed Species in the fishery are extremely large, in which case very large catches of Non- Assessed species would be required to achieve the ≥5% threshold e.g. NZ Hoki

To assess which species comprise ≥ 5% of the total catch, reliable, recent catch composition data are required. In addition,

- Where catch composition data are not available at species level, species or family groups may be used. In these cases, the quality of the data is clearly lower and a precautionary approach must be used.
- To ensure catch composition data are spatially and temporally representative, available data may be averaged over several years (e.g. average catch by species over up to the last 5 years) but annual extremes of species catches must also be taken into account.
- Species that are assessed as overfished/depleted (in publicly available stock assessment documents) should also be assessed even if they do not comprise more than the threshold percentage of the total catch of the fishery. This ensures that vulnerable or less resilient species are appropriately considered.
- For fisheries that use bait (e.g. baited traps, longlines), either purchased or caught by the fishery and then used, the bait species should also be assessed under C2.1 if the quantity of bait is ≥ 5% of the total catch of the fishery or ≥ a lower threshold determined and justified by the evaluator.
- Species with formal stock assessments should be assessed as per C1.1 using the documents in Table 2 or the original, published full assessment reports.

For species for which formal stock assessments are not available, scoring table C2.1 is to be used.

Each captured species that meets the definition of a Non-Assessed Species, should be scored individually, with a rationale provided to support the assigned score.

An overall score for the fishery is then developed based on the precautionary approach, whereby the highest risk category of all Non-Assessed Species is assigned as the overall score for C 2.1.

For example, if two species meet the definition of captured species under C2.1 and Species 1 was assessed as Low Risk but Species 2 was assessed as Medium Risk, the overall risk score would be Medium Risk.

C2.1a. Biomass is below PRI (or proxy) and recruitment is or is likely to be impaired

For a species with an accepted stock assessment refer to guidance provided in C1.1, including guidance on the use of proxies.

For stocks without formal stock assessments, quantitative or qualitative risk assessment can be used to evaluate the potential impact of the fishery.

Where an existing risk assessment is not available the likelihood that a fishery is having an impact on a species may be based on the species inherent vulnerability using FishBase (https://www.fishbase.se/home.htm) and fishing effort.

If the species-specific inherent vulnerability is not available using FishBase the score for a closely related species or a species with a similar lifestyle or ecological niche may be used.

Alternatively, vulnerability can be based on life history characteristics such size/age at maturity, fecundity and/or natural mortality rate e.g. Productivity Susceptibility Analysis (PSA)

Adequate rationales, including references where appropriate, for scores need to be provided. Where proxies are used, a precautionary approach must be used and the highest risk score adopted.

The individual risk scores for all species must be reported.

Box 7: Example for scoring C2.1a, including rationale

Score Category 2 – Highly Unlikely (Low Risk)
Northern Territory Offshore Net and Line Fishery

Extract from MRAG, 2017c

Grey Mackerel formed the bulk of the harvest (78 %) followed by the Blacktip Shark group (7 %) and Spot-Tail Sharks (2 %). The primary byproduct species were Spanish Mackerel (5 %), Longtail Tuna (1 %). Bycatch (by weight) was less than 1 % of the harvest during 2015. Therefore, the species assessed under this scoring component, aside from the target species (Grey Mackerel) are Spanish Mackerel, Blacktip and Spot-Tail Sharks.

Blacktip Sharks as a multi-species group, based on the three biological stocks. In 2011 the biomass of The North west Coast stock was 80 % of the unfished 1970 level, with current harvest rates for all species within the complex less than 20 % of that required to reach MSY (Johnson, et al., 2018).

In the Northern Territory, Spanish mackerel is assessed at the jurisdictional level. Spanish Mackerel stocks have been assessed at a territory-wide level Model outputs estimate that in 2015 biomass was at 72 % of unfished levels in 2015. Therefore, biomass levels are well within sustainable limits.

The most recent stock assessment of Spot-Tail Sharks estimates current biomass is 93% of the unfished level, with a 96% probability that overfishing is not occurring (Johnson, Braccini, Walton, & Peddemors, 2018).

Therefore, the biomass of all non-Assessed Species that comprise >5% of the total catch (or >2% for less resilient species such as sharks) is highly unlikely to be below PRI (MRAG, 2017c).

C2.1b. The level of fishing mortality from the assessed fishery has caused depletion below PRI, or is preventing recovery to PRI

Refer to guidance provided in C1.1

Box 8: Example for scoring C2.1b, including rationale

Score Category 2 – Highly Unlikely (Low Risk)
Northern Territory Offshore Net and Line Fishery Extract from MRAG, 2017c The target species for the fishery is Grey Mackerel (78 %) followed by the Blacktip Shark group (7 %) and Spot-Tail Sharks (2 %). The North West Coast stock of Blacktip Shark stock was 80 % of the unfished 1970 level, with current harvest rates for all species within the complex less than 20 % of that required to reach MSY (Johnson et al., 2018). The biomass of Spanish Mackerel stocks assessed at a territory-wide level was at 72 % of unfished levels in 2015. The most recent stock assessment of Spot-Tail Sharks estimates current biomass is 93% of the unfished level (Johnson et al., 2018). Therefore, it is highly unlikely the level of fishing mortality from the assessed fishery is causing depletion below PRI, or preventing recovery to PRI (MRAG, 2017c).

C2.1c. Data to inform determination

The methods of data collection, data and information available are all commensurate with the size and scale of the fishery in relation to the stock size and distribution.

What information is available on non-retained and discarded species in the fishery?

Information should include both observed and unobserved mortality arising from fishing in the fishery.

Issues to consider;

- Level of reporting e.g. logbook data, published reports with validated data
- The precision and reliability of the estimates (qualitative or quantitative)
- The extent to which the data are verifiable (on their own or in combination with other data sources)
- Potential bias in estimates and data collection methods
- Comprehensiveness and representativeness of available data
- The continuity of data collection.

The adequacy of information also needs to be considered in relation to supporting the management measures, partial strategy or strategy including the ability to detect any changes in risk level to species, due to changes in the environment, operation of the fishery or the effectiveness or implementation of the management system.

Box 9: Example of scoring for C2.1c, including rationale

Score Category 1 - Highly quantitative and scientifically robust (Low Risk)
South Australian Sardine Fishery (SASF) Extract from MRAG Americas, 2018a Catch and effort data is collected by the fishery and by independent observers who record the catch of both target species and other species (by-product). Daily and monthly catch and effort data are provided by licence holders through compulsory logbook returns to South Australian Research and Development Institute (SARDI) at the end of each month. SARDI maintains a comprehensive catch and effort database for the fishery using data collected from these returns, which includes target and byproduct species. Data provided in the logbook returns include: licence information, date(s), shot number, zone, start/end time (duration), GPS location, water temperature, estimated catch retained, estimated catch lost (usually in aborted shots), water temperature. Since 2004 the fishery has also had an independent observer program. Catch composition information, including bycatch, is obtained from samples provided to SARDI by independent observers. Collection data provided by observers (e.g. log sheet number) are used to link each sample to the data recorded in fishery dependent logbooks for each net-set. Logbook and observer catch composition data are stored in a database maintained by SARDI. The database includes data on numbers of bycatch species in catch samples. All species potentially caught by the SASF were subject of a qualitative risk assessment in 2013 at the Ecologically Sustainable Development (ESD) risk assessment workshop conducted by Primary Industries and Regions South Australia (PIRSA) and key stakeholders. In addition, information on the productivity, abundance, mortality of the minor secondary species was reviewed and used in modelling ecological change associated with the growth of the SASF (MRAG Americas, 2018a)

• C2.2. Endangered, Threatened and Protected (ETP) Species (flora and fauna)

•

C.2.2. Endangered, Threatened and Protected (ETP) Species (flora and fauna)	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The fishery does not hinder the recovery of ETP species populations or sub-populations	Highly Likely	Likely	Highly Unlikely
C2.2 Scoring Criteria	**1**	**2**	**3**
a. Status of all ETP species (populations or sub-populations) known or likely to interact with the fishery are understood.	Detailed information is available about the ETP species PBRs or equivalent, including acceptably low uncertainty.	Some data available; moderate uncertainty	No or limited data available, high uncertainty.
b. The recovery of ETP species' population (status and trend) is not materially hindered by the assessed fishery	High confidence	Moderate confidence	Low confidence OR Insufficient information to assess impacts.
c. Where measures are needed, the measures applied avoid, minimise or mitigate any slowly reversible or irreversible impacts	Demonstrably effective or not needed	Partial and/or moderately effective	None and/or insufficiently effective

C2.2 General Guidance

ETP species include species recognised by state or national legislation and / or binding international agreements to which the jurisdiction/s controlling the fishery under assessment are a party. Where only some populations of a species are defined as ETP (e.g. as commonly done for CITES), only those populations defined as ETP are considered here, otherwise they should be dealt with as non-ETP under an earlier Component.

For Australia;

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is the key legislation https://www.environment.gov.au/epbc/about

Where fisheries have been assessed under the EPBC Act for a Wildlife Trade Order (WTO) this assessment may be used as evidence the fishery does not hinder the recovery of ETP species populations or sub-populations

For New Zealand;

- The Marine Mammals Protection Act 1978 - protects all marine mammals.
- The Wildlife Act 1953 - protects all terrestrial vertebrate animals except those specifically excluded or limited in one of the schedules to the act. It also protects some invertebrate and marine fish species declared to be animals for the purposes of the act, including a number of marine corals. https://www.doc.govt.nz/nature/conservation-status

C2.2a Knowledge of the status of all ETP species (populations or subpopulations) known or likely to interact with the fishery are understood.

A subpopulation - is defined as a geographically or otherwise distinct group in the population between which there is little exchange (FAO, 2020).

Likely - is defined as likely based on some evidence or plausible, reasoned argument e.g. spatial and/or temporal overlap in the distribution of the species/population and the distribution of the fishery, recorded or anecdotal reports of interactions.

Box 10: Example for scoring C2.2a, including rationale

Score Category 2 - Likely (Medium Risk)
Western Rock Lobster Fishery The fishery interacts with a number of ETPs such as whales, Australian Sealions and turtles that are listed under the EPBC Act. The most commonly encountered whale species in the fishery is the humpback whale (*Megaptera novaeangliae*). Humpback whales are listed as: vulnerable under the EPBC Act. The population of humpback whales (Breeding Stock 'D') which migrates along the west coast of Australia is the largest population of humpback whales in the southern hemisphere. The current population size is estimated to continue to increase until at least 2020, when it is predicted to return to pre-whaling levels. Southern right whale (*Eubalaena australis*) is less frequently encountered (SCS Global Services, 2016b). The most commonly encountered turtle is the Leatherback Turtle (*Dermochelys coriacea*), who have a global tropical and temperate distribution. This species has an unusually wide latitudinal range as adults can withstand cold water. The Australian Sea-lion is the only pinniped endemic to Australia. The breeding range extends from Houtman Abrolhos, Western Australia (WA), to The Pages Island, east of Kangaroo Island, South Australia (SA). The species has also been recorded at Shark Bay, WA; the New South Wales coast; southern Tasmania; and Victoria. The range and distribution of all ETPs which the fishery interacts with are known and the information is publicly available (http://www.environment.gov.au/). There are a number of monitoring and research programs focused on monitoring and understanding the population size and dynamics.

C2.2b The ETP species' population (status and trend) is not hindered by the fishery

Issues/information to consider;

- What ETP species are found within the fishery boundaries (regardless of whether they interact with the fishery)?
- Are ETP species interactions with the fishery known and reports available (historical and current, with mortality if known).
- Based on these interactions, is the fishery considered to have any unacceptable impacts or significant detrimental direct (e.g. capture / mortality) or indirect effects (e.g. non-capture interactions, which do not result in mortality) on ETP species?

Box 11: Example of C2.2b, including rationale

Score Category 1- High confidence (Low Risk)
Heard Island and McDonald Islands (HIMI) Toothfish Fishery (Trawl) Extract from SCS Global Services, 2017a The HIMI fishery is a world leader in the quality of management measures for ETPs. The fishery does interact with some ETPs such as seabirds (Cape petrels, giant petrels and a rockhopper penguin), and seals (Antarctic fur seal - *Arctocephalus gazelle* and Elephant seal - *Mirounga leonine*). CCAMLR has conservation measures (Conservation Measure 25-03) for seabirds and marine mammals which provide guidance on mitigation measures for reducing interaction rates, along with a resolution (resolution 22/XXV) outlining its international standards in this respect for seabirds. The HIMI fishery is required to comply with these measures by the management agency (AFMA), with no reported compliance issues reported thus far. Seabird bycatch in the fishery remains low; no seabird mortalities have been reported in the trawl fishery since 2012/13. There has been no observed marine mammal interaction in the trawl since 2010. Indirect effects have been considered through a risk assessment process and although possible are highly unlikely for marine mammals. There is 100% observer coverage of the fishery, therefore there is a high level of confidence that the fishery is not hindering the recovery of ETPs (SCS Global Services, 2017a).

C2.2c Where necessary measures to avoid, minimise or mitigate impacts are in place and effective

Strategy

- Is there a strategy to manage the fishery's impact on and minimise mortality of ETP species?
- Is the strategy properly and fully implemented?
- Is the strategy demonstrably effective in meeting the management objectives (i.e. state, national and/or international requirements)?

Measures

- Are there appropriate measures available, if required?
- Are the measures being appropriately implemented?
- Are the measures demonstratively effective (e.g. plausible argument, objective basis, testing)?

Box 12: Example of scoring of measures to avoid, minimise or mitigate impacts with ETPs, including rationale

Score Category 1 - Demonstrably effective or not needed (Low Risk)

Heard Island and McDonald Islands (HIMI) Toothfish Fishery
Extract from SCS Global Services, 2017a

The fishery is compliant with domestic regulations; in particular, species recovery plans for seabirds and marine mammals. Moreover, the fishery complies with all management measures from Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) with respect to ETP species. The fishery has strategies in place to reduce the capture of seabirds, including controls on fishing practices, seasonal restrictions on gear use, temporal restrictions on gear use, and requirements for real time reporting of interactions along with development of management measures. Interactions with marine mammals were not identified as an issue in the ecological risk analysis, and thus there was no explicit strategy for their mitigation in the risk management plans. There is also a domestic Bycatch and Discard Workplan which was reviewed as part of a broader review of the Commonwealth Bycatch Policy in 2012. Finally, CCAMLR has developed conservation measures (Conservation Measure 25-03) for seabirds and marine mammals which provides guidance on mitigation measures for reducing interaction rates, along with a resolution (resolution 22/XXV) outlining its international standards in this respect for seabirds. The measures are reflected as conditions on Statutory Fishing Rights which the HIMI fishery is required to comply with by the management agency (AFMA). There have been no reported issues with compliance (SCS Global Services, 2017a).

- ## C2.3 Habitat Impact

C. 2.3 Habitat Impact	LOW: 3	MEDIUM: 4-6	HIGH: 7-9
The fishery does not cause irreversible or slowly reversible harm to commonly encountered and vulnerable benthic habitats	Highly Likely	Unlikely	Likely
C2.3 Scoring Criteria	**1**	**2**	**3**
a. The types and spatial distribution of commonly encountered and vulnerable benthic habitats are identified both within and outside of the fishery area.	Detailed knowledge, of medium or high quality and known uncertainty	Broadly understood	No or limited qualitative information
b. Assessment of the impacts of fishing activity on benthic habitats.	Highly likely to not cause irreversible or slowly reversible harm	Unlikely to cause irreversible or slowly reversible harm	Likely to cause irreversible or slowly reversible harm
c. Where measures are needed, the measures applied avoid, minimise or mitigate any slowly reversible or irreversible impacts	Demonstrably effective or not needed	Partial and/or moderately effective	None and/ ineffective

Definitions

Commonly encountered habitat – is defined as habitat that regularly comes into contact with a gear used by the fishery, considering the spatial overlap of fishing effort and the habitat's range within the area fished (MSC, 2014).

Vulnerable habitat - is defined as a habitat that have one or more of the following characteristics (as per MSC, 2014);

- Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems
- Functional significance of the habitat – discrete areas or habitats that are necessary for survival, function, spawning/reproduction, or recovery of fish stocks; for particular life history stages (e.g. nursery grounds) or for ETP species
- Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities
- Life-history traits of component species that make recovery difficult – ecosystems that are characterised by populations or assemblages of species that are slow growing, are slow maturing, have low or unpredictable recruitment, and/or are long lived
- Structural complexity – an ecosystem that is characterised by complex physical structures created by significant concentrations of biotic and abiotic features

Irreversible or slowly irreversible harm - is defined as reductions in benthic habitat structure and function so that the benthic habitats would be unable to recover at least 80% of its structure and function within 5-20 years, if fishing on the habitat were to cease entirely (MSC, 2014)

Fishing effort – is defined as the amount of fishing gear of a specific type used on the fishing grounds over a given unit of time e.g. hours trawled per day, number of hooks set per day or number of hauls of a beach seine per day (FAO, 2020).

Fishing intensity – is defined as fishing effort per unit area e.g. hours trawled per day in $1km^2$ area

C2.3 General Guidance

Benthic habitats are assessed in relation to the effects of the fishery on the structure and function of the habitats.

The assessment of potential habitat impact is commensurate with the size and scale of the fishery, type and mode of gear used, fishing intensity, and vulnerability and resilience of the benthic habitats in the area of the fishery and the distribution of the habitat type both within and outside of the areas fished.

Assessors are responsible for classifying benthic habitats as commonly encountered or vulnerable based on the information available, supporting rationale and any associated references must be provided

If there is insufficient information to assess the potential impact, qualitative or quantitate risk assessment can be used.

Where risk assessment methods are used, the rationales, and any associated references, for scores must be provided in the text.

Fishing gear with greater potential to come into contact with the benthos has a higher inherent risk and therefore requires higher quality and more detailed information on distribution and abundance of benthic habitats and more robust assessment, management and monitoring.

Note: Tables 4-6 are provided as guidance and do not have to be explicitly used in the assessment.

However, the underlying concepts should form an important component of the supporting rationale provided.

To ensure fisheries with limited impacts on benthic habitats are not penalised, fisheries should first be assessed based on their gear type and mode of use which classifies gear types by their potential impacts on benthic habitats as very low, low, medium and very high (see Table 6).

Table 6 Potential impact of different gear types on benthic habitats (Adapted from (Chuenpagdee et al., 2003)

Gear Type	Potential impact of gear type and usage on habitat
Trawl- midwater	Very low
Hand collection	Very low
Gillnet – midwater	Very low
Hook and line	Very low
Purse seine	Very low
Longline – pelagic	Very low
Longline- bottom	Low

Gillnet – bottom	Medium
Pots and traps	Medium
Trawl – midwater	Medium
Dredge	Very high
Trawl bottom	Very high

Potential impact of gear type/use, fishing intensity are then combined to assess the risk of potential impact on benthic habitats (Table 7). Assessors determine fishing intensity based on the information provided relative to the size and scale of the fishery.

Rationale and reference for determination of fishing intensity must be provided.

Table 7: Risk of potential impact of fishery on benthic habitats based on gear type/usage and fishing intensity. Green=Low, Orange=Medium and Red=High.

Potential impact of gear type and usage*	Fishing Intensity		
	Low	Medium	High
Very Low			
Low			
Medium			
Very High			

*Potential impact of gear type is from Table 6.

Once the fishery is allocated a risk level based on Table 5, consideration then needs to be given to the type of benthic habitats (vulnerability and resilience) the fishery interacts with to determine the level of information required.

When a benthic habitat is being assessed, the assessor should consider the following habitat characteristics to allocate the habitats in the area of the fishery a level of risk based on their inherent vulnerability and resilience:

- Substratum – sediment type (e.g., hard substrate, unconsolidated sediment)
- Geomorphology – seafloor topography (e.g., flat rocky terrace, slope)
- Biota – characteristic floral and/or faunal group(s) (e.g. seagrass, large erect sponges, coral)

Note: habitats that are highly vulnerable with low resilience are classified as High Risk, and habitats that have low vulnerability with high resilience are classified as Low Risk.

Assessors must provide rationales, including supporting references, to support the classification of resilience and vulnerability of benthic habitats in the area of the fishery.

Subsequently Table 8 is used to provide an overall inherent risk of the fishery to benthic habitats.

Table 8 Overall inherent risk of fishery to benthic habitats.

Risk of potential adverse impact	Habitat Risk

(from Table 5)	(vulnerability x resilience)		
	Low	Medium	High
Low			
Medium			
High			

Assessing habitats in this manner ensures that gear types (and how they are used) with lower potential impacts are recognised as not requiring the same level of habitat knowledge, management or mitigation, as high-risk gear types and therefore not unfairly penalised.

Fisheries with a higher overall inherent risk (e.g. high or medium) require higher quality and more detailed information on distribution and abundance of benthic habitats and more robust management, mitigation and monitoring to justify lowering their inherent risk.

For example, a demersal trawl fishery with high inherent risk would require detailed information on commonly encountered and vulnerable benthic habitats within and outside the area of the fishery, including quality benthic habitat maps. In addition, the fishery would require effective habitat specific management and mitigation measures (e.g. effort control, spatial closures) and monitoring to be implemented and regularly reviewed to lower the inherent risk (for example see MRAG, 2019).

While, fisheries with a low overall inherent risk are recognised as not requiring the same level of habitat knowledge, management or mitigation.

For example, a fishery using pelagic longlines that does not make contact with the benthos (as verified by supporting information) would require limited knowledge of the habitats within and outside the fishery and no habitat specific management and mitigation.

C2.3a. The types and spatial distribution of commonly encountered and vulnerable benthic habitats are identified both within and outside the fishery.

The quantity and quality of information required on benthic habitats should be determined for each fishery (and gear type/use, including for multiple gear types where appropriate) based on gear type, usage and fishing intensity (Table 5) in combination with consideration of the vulnerability and resilience of the benthic habitat being fished (Table 6).

The types of information on benthic habitats required for a fishery based on the risk outcome of Table 6 (risk of potential adverse impact x habitat risk) are illustrated in Table 9.

Table 9: Examples of the types of information on benthic habitat. Fisheries with higher overall inherent risks (Table 6) require higher levels of information to determine actual risk.

Risk level	Level of information required on benthic habitats
Low Inadequate or low quality data from which to evaluate habitat risk	Limited information on the spatial distribution of habitat types within and outside the area of the fishery is available. Some data may be available in general publication such as: For Australia: Evans K, Bax NJ, Smith DC. 2017. Marine environment. In: Australia State of the Environment 2016. Australian Government, Department of the Environment and Energy, Canberra. https://soe.environment.gov.au/sites/default/files/soe2016-

	marine-launch_v36march17.pdf?v=1517454961 For New Zealand: Fisheries New Zealand (2020). Aquatic Environment and Biodiversity Annual Review 2019– 20. Compiled by the Aquatic Environment Team, Fisheries Science and Information, Fisheries New Zealand, Wellington New Zealand. 765p https://www.mpi.govt.nz/dmsdocument/40980-aquatic-environment-and-biodiversity-annual-review-201920
Medium Sufficient data of sufficient quality to have a moderate understanding of habitat risk.	General information on the spatial distribution of commonly encountered habitats within and outside the area of the fishery is available. This does not require benthic habitat maps. Some information on the spatial distribution of vulnerable habitats in the area of the fishery. Some information on spatial closures within the fishery is available (location, age, compliance, enforcement). Qualitative information on the resilience and recovery rates of habitats within the fishery are available.
High Good quality or sufficient data to evaluate habitat risk with low uncertainty.	Specific information on the spatial distribution of commonly encountered and vulnerable habitats within and outside the area of the fishery, including high quality benthic habitat maps e.g. habitat maps based on field surveys and/or interpreted and validated satellite imagery. Detailed information on spatial closures, and the habitats they encompass, within and outside the fishery is available. Quantitative information on the resilience and recovery rates of habitats within the fishery are available.

Box 13: Example for scoring C2.3a, including rationale

Score Category 2 – Detailed Knowledge (Medium Risk)
Exmouth Gulf Prawn Managed Fishery (EGPMF) Extract from MRAG, 2019 Historical data on benthic habitats within the EGPMF have been collated (Evans, 2017), with a paucity of detailed mapping occurring within this fishery. Lyne, et al., (2006) developed a marine habitat biota hierarchical classification Level 4 habitat map for Exmouth Gulf. Lyne, et al., (2006) describe six biophysical habitats; coral reef communities, mudflats, sand, mixed assemblage, filter feeder communities and low relief subtidal reef. Based on Lyne et al (2006), the biophysical habitats with the EGPMF are primarily sand (~50%) and mixed assemblage (~30%) with the remaining categories cumulatively accounting for ~20% associations for the EGPMF (MRAG, 2019). More recently a collaborative project lead by the Department of Primary Industries and Regional Development (DPIRD), has conducted a series of field surveys to validate the map produced by Lyne et al., (2006). The DPIRD map identified four major habitat types; mixed assemblage (macro algae, seagrass, anemones, ascidians, bryozoans, soft coral) (~48%), sand (~44%), filter feeder communities (7.5%) and coral reef communities (0.5%). The definition of the habitat types is comparable with the Lyne et al., (2006) habitat types however, given the increased number of sampling sites used to produce the DPIRD 2018 map it provides a more accurate estimate of the spatial distribution of benthic habitats within the EGPMF (see (MRAG, 2019).

Therefore, detailed habitat information, in the form of benthic habitat maps, are available for the area of the fishery, including areas closed to fishing.

C2.3b. Assessment of the impact of fishing activity on benthic habitats.

Issues to consider;

Where do fishing activities take place in relation to the different habitat types?

What information is available on the impacts of gear use on habitat types?

Is there any indication of any serious negative impacts from fishing on the habitat including:

- Habitat loss
- Extinction of habitat types
- Depletion of key habitat forming species or associated species to the extent they are at a high risk of depletion or extinction and / or
- Significant alteration of habitat cover/mosaic that causes major changes to the structure or diversity of the associated species assemblages?
- What information is available on the spatial extent of interactions and the location and timing of the use of fishing gear?
- How often is this information collected / monitored?
- Is there any other habitat monitoring in place?

Box 14: Example of C 2.3b, assessment of very high impact gear type (demersal trawl), assessed as low risk of causing severe adverse impacts on benthic habitats due to high quality information and mitigation, including rationale

Score Category 1 – Highly Likely (Low Risk)

Heard Island and McDonald Islands (HIMI) Toothfish Fishery
Extract from SCS Global Services, 2017a

All vessels in the fishery carry a VMS that reports all fishing locations in addition to comprehensive 100% observer coverage. The fishery operates in a region that has an extensive Marine Reserve system that was designed based on a bioregionalization with the explicit goal of protecting a comprehensive, adequate and representative collection of the existing Australian marine biota. A study that combined data on the fishing footprint with estimates of taxa-specific vulnerability concluded that the great majority of vulnerable organisms live on the seafloor in depths less than 1200 m. This range overlaps with the depths targeted by the trawl fishery, however due to the fact that the majority of trawling has focused on a few relatively small fishing grounds, less than 1.5% of all the biomass in waters less than 1200 m were estimated to have been damaged or destroyed. The fishery is excluded from these Marine Reserves, and thus while the demersal gear may affect the habitat on a bioregional basis there are significant areas (39% of the area that is less than 1000 meters depth) that are protected from any potential harm. Effort in the fishery is concentrated in a relatively small portion of the region around Heard Island and McDonald Islands. An estimated 0.7% of the seafloor area within the Exclusive Economic Zone (EEZ) at HIMI has had some level of interaction with demersal fishing gear between 1997 and 2013 and thus at present impacts are expected to be limited in spatial extent even within the fished area (SCS Global Services, 2017a).

C2.3c. Where measures are needed, these measures avoid, minimise or mitigate any slowly reversible or irreversible impacts

Slowly reversible or irreversible impacts are defined as changes caused by the fishery that alter the capacity of the habitat to maintain its structure and function.

Changes may include a reduction in habitat distribution, structure, biodiversity or function such that the habitat would be unable to recover to at least 80% of its unimpacted structure, biological diversity or function within 5-20 years (MSC, 2014)

Issues to consider;

Is there is an implemented framework or process to;

- Adequately monitor (frequency, quality, etc.) the areas where fishing occurs and outline any changes over time,
- Estimate the extent of overlap with commonly encountered and vulnerable habitats
- Assesses the risks to the different habitats from the fishery.

Is there a mechanism to evaluate the effectiveness of the strategy and of individual measures?

Table 8: Examples of types of management/mitigation required based on risk categories in Table 8.

	Level of management /mitigation
Low	Some measures are in place to limit or minimise the impact of the fishery on habitat structure and function such as: • spatial and/or temporal closures and restrictions • compulsory validated reporting of fishing location / effort • effective and validated observer programmes • gear specific modifications • limited entry/effort limits • restricted gear types
Medium	Coordination of measures, into a partial strategy based on an: Understanding of how the different measures work together to avoid, minimise or mitigate impacts on benthic habitats An awareness of the need to change measures if found to be ineffective
High	A habitat-specific strategy or a strategy that includes a habitat specific component including (but not limited to): Appropriate (quality, frequency) monitoring of habitat interactions (extent, intensity, frequency); Effective, fully-implemented measures to avoid, minimise or mitigation habitat impacts. Mechanisms are in place to identify if unacceptable impacts due to, for example, changes in fishery operation occur, and take effective corrective action.

Box 15: Example of C2.3c, measures to avoid, minimise or mitigate potential impact of very high impact gear type (demersal trawl), including rationale

Score Category 1 – Demonstrably effective (Low Risk)
Northern Prawn Fishery (NPF) Extract from MRAG Americas, 2018b Habitat impacts are managed mainly by footprint control. About 19.6% of the NPF area (0-150 m) is permanently closed in Commonwealth Marine Reserves (CMRs), ~0.2% in Marine Protected Areas (MPAs) and ~0.7% under fishery regulations, the total area closed is 20.5%. Also, the entire fishery is closed for 5.5 months each year. Reduced fishing effort, permanent

and seasonal closures, ongoing footprint monitoring using VMS and repeated risk assessments for habitat types within the NPF managed area ensures that any increase in risk is identified. Vessel Monitoring System (VMS) data that covers the whole fleet throughout the season to monitor position of vessels especially with respect to spatial and temporal closures. Studies found that the state of the habitats impacted by trawling in the NPF is a highly dynamic one in which the seabed biota is changing in response to factors other than trawling. Simulation of the food web processes demonstrated that the reduction of fishing (from 286 vessels in 1981 to 52 vessels in 2009) has resulted in clear reductions in the overall impacts on biomass (bycatch) and trophic levels. Therefore, the significant reduction in fishing effort in the NPF has led to a decrease in risk of depletion for benthic macrofauna, and the current levels of trawling did not overall affect biodiversity (MRAG Americas, 2018b).

C.3 Fisheries Governance and Management

C3.1 Fisheries Governance

C3.1 Fisheries Governance	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
An effective legal and administrative framework for fisheries resource management is in place.	Highly likely	Likely	Unlikely
C3.1. Scoring Criteria	**1**	**2**	**3**
a. Fisheries management frameworks are consistent with international agreements and national/state regulatory requirements.	Consistent, well administered and legally established	Mostly consistent but deficient in one of the following: defined powers or functions specified or objectives clearly stated in law	Not consistent and/or poorly administered and/or not legally established
b. There are laws and policies in the definition, allocation and administration of access for all resource users	Clear evidence each of these exist and have been implemented and are complied with	Mostly exist but track record of implementation or compliance is inconsistent or intermittent	Not available or cannot be identified and/or no evidence of implementation or compliance
c. Governance and administrative processes are participatory and transparent. Responsibilities are clearly defined.	Clear evidence these elements exist and have been effectively implemented	Mostly exist but track record of implementation is inconsistent or intermittent	No or insufficient evidence of implementation, opportunity to participate, transparency or defined responsibilities

C3.1.1 General Guidance

The scale and intensity of the fishery shall be considered in determining the appropriateness of the governance and management system.
Reference must be made to appropriate local, national and international legislation and accepted customary/indigenous practices.
C3.1 Effective legal and administrative framework for fisheries resource conservation and management are in place.

To score this component need to determine which jurisdictional category or combination of jurisdictional categories apply to the management system of the fishery, including consideration of formal, informal and/or traditional management systems.

Jurisdictional arrangements may include;

- Single jurisdiction;
- Single jurisdiction with indigenous component;
- Shared stocks, bilateral, multinational (including one or more RFMO);
- Straddling stocks, bilateral, multinational (including one or more RFMO);

A range of documents and sources should be consulted to score this component including;

- Fishery and relevant environmental legislation (Acts, Regulations) at all relevant jurisdictional levels – regional, national, international.
- Relevant international instruments and evidence of domestic implementation.
- Regional Fishery Management Organisations (RFMO) conservation and management measures.
- Fisheries policy documentation.
- Documents on fishery management arrangements, such as legal and policy research papers.
- Accepted norms, values and agreed rules held across the fishery.

C3.1a. Fisheries management frameworks are consistent with international agreements and national/state regulatory requirements.

Issue to consider:

There is a formally established fisheries management framework defined in legislation with explicit objectives, functions and powers.

There are no substantive inconsistencies or conflicts within the framework.

For fisheries that are not subject to international cooperation for management, this means:

- The existence of appropriate jurisdictional local, state or national laws, agreements, regulations and policies governing the actions of all the authorities and actors involved in managing the fishery and
- A level of cooperation between entities (e.g. regional and national management, state and federal management, indigenous and other groups) on local, state or national management issues (as appropriate for the context, size, scale or intensity of the fishery and the fishers).

For fisheries that are subject to international cooperation for management (e.g. fisheries on shared stocks, straddling stocks, highly migratory species or discrete high-seas stocks), this means:

- National and international laws, arrangements, agreements and policies governing the actions of the authorities and actors involved in managing the fishery; and
- A level of international cooperation with other territories, sub-regional or regional fisheries management organisations under the obligations of United Nations Convention on the Law of the Sea (UNCLOS).

Box 16: Example of scoring C3.1.1a, including rationale

Score Category 1 – Consistent, well administered and legally established (Low Risk)
New Zealand Hoki, Hake & Ling Trawl Fishery Extract from Acoura Marine, 2018 Ministry for Primary Industries (MPI)* is responsible for the use of New Zealand's fisheries resources while ensuring sustainability in accordance with its governing legislation - the Fisheries Act 1996. The Fisheries Act binds the Crown. Decisions made under power given by the Act are judicially reviewable by the Courts in the event of disputes. Procedures and processes that apply to disputes about the effects of fishing on the fishing activities of any person that has a current fishing interest provided for under the Act, are set out under Part 7

of the Fisheries Act. MPI's fisheries management responsibilities extend to the 200 nautical mile limit of the New Zealand EEZ. MPI provides management, licensing (where applicable) research and compliance and education services for commercial, recreational and customary fishing. MPI assists the Minister for Primary Industries in the administration of the relevant Acts. The New Zealand Department of Conservation (DoC) Conservation Services Programme (CSP) monitors the impact of commercial fishing on protected species, studies species populations and looks at ways to limit bycatch. MPI and DeepWater Group coordinate with DoC in management of the fisheries (Acoura Marine, 2018).

*Now Ministry of Fisheries

C.3.1b. There are laws and policies in the definition, allocation and administration of access for all resource users

Issues to consider;

- Are there readily identifiable rules and policies e.g. regulations and/or legislation?
- Are processes to grant or allocate defined and protected in legislation?
- Are there clear polices and processes/mechanisms to allocate fishing rights between sectors (commercial, recreational, indigenous)?

Box 17: Example of scoring C3.1b, including rationale

Score Category 1- Clear evidence (Low Risk)

South Australian Lakes and Coorong Pipi Fishery
Extract from SCS Global Services, 2016c

Commercial fishing rights for Pipis in the form of licences and quota are issued under the Fisheries Management Act (FMA) 2007 and have a strong legal foundation. The FMA 2007 also provides a mechanism that respects, observes and formally commits to the legal rights of indigenous people dependent on fishing for food or livelihood. The national Native Title Act 1993 provides an alternative mechanism for formal assessment of and for the making of formal binding decisions about native title rights to areas of land and water. The local Indigenous people in the area of the Lakes and Coorong Fishery (LCF) are the Ngarrindjeri people, in 1998 they lodged a native title claim with the National Native Title Tribunal which includes waters of the LCF. The National Native Tribunal helps people to resolve native title issues and to make agreements about the use of land. The Native Title Act 1993 encourages negotiation and agreement. Determinations about native title by the Federal court of Australia are binding. The LCF Management Plan determines access to Pipis by commercial LCF fishers, other commercial fisheries, the recreational fishing sector and the Aboriginal traditional sector. Under the Plan commercial fishers have access to 73% of the catch, the recreational sector to 26% and Aboriginal traditional fishers to 1%. The Plan has been developed so that it can integrate with any Aboriginal traditional fishing management plans that are made in the future that apply to the waters of the LCF. The management system has a mechanism to generally respect, observe and formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood (SCS Global Services, 2016c).

3.1c. Governance and administrative processes are participatory and transparent. Responsibilities are clearly defined.

Issues to consider;

- The role and responsibilities of organisations, groups and individuals involved in the management process should be clearly defined and transparent
- Processes to deliver the management advice should be consultative with and representative of interest groups. The processes for recruitment/appointment to advisory bodies and groups should be documented and transparent.
- The effectiveness and transparency of processes to obtain and consider information from a wide range of sources, including local knowledge, for input into a broad range of decisions, policies and practices within the management system.
- Consultation processes should be appropriate to the scale, intensity and cultural context of the fishery and should be described at both the management system and the fishery-specific level
- Processes are formally documented, established and easily available to all stakeholders.

Box 18: Example for scoring C3.1c, including rationale

Score Category 2 – Highly Likely (Low Risk)
Northern Territory Coastal Line Fishery The fishery is managed by the Northern Territory Department of Primary Industry and Resources (NTDPIR) under the Northern Territory of Australia Fisheries Act 1988 and the Northern Territory of Australia Fisheries Regulations 1993 (Department of Environment and Energy, 2019). The main roles and responsibilities of individuals and organisations in Northern Territory fisheries management processes are well-understood, with relationships and key powers explicitly defined in legislation. Management arrangements are primarily developed through a Management Advisory Group (MAC), which includes stakeholders from commercial, recreational and charter fishing, members from the Aboriginal traditional sector, conservationists, research, seafood marketing and other government sectors (Department of Environment and Energy, 2019) . The MAC provides a forum for relevant issues to be discussed by key stakeholder groups and is responsible for providing advice to the Executive Director of Fisheries. The MAC provides advice on operational aspects of the fishery and assists with the development of management options. Minutes of meetings and issues discussed are publicly available and all substantial proposed management changes have a public consultation period. The fishery also undergoes EPBC Act accreditation which involves a public consultation period with all associated documentation publicly available.

- ## C3.2 Fisheries Management System

C3.2 Fisheries Management System	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
Effective, appropriately resourced and operational fisheries management system is in place.	Highly likely	Likely	Unlikely
C3.2 Scoring Criteria	**1**	**2**	**3**
a. Mechanisms for effectively resourcing fishery management functions	Available and/or identifiable with consistent track record of implementation	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified
b. Institutional arrangements, legislation, regulations and other instruments, are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.	Periodic reviews occur and implementation of outcomes is comprehensive	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified
c. Science and information to inform management are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.	Periodic reviews occur and implementation of outcomes is comprehensive	Structured and identified but track record of implementation is inconsistent or intermittent	Not available or cannot be identified

C3.2a. Mechanisms for effectively resourcing fishery management functions

Evidence demonstrates mechanisms are adequate to carry out management agency functions e.g. financial, infrastructural and human resources are demonstrably sufficient to effectively carry out all necessary functions.

Box 19: Example for scoring C3.2a, including rationale

Score Category 2 - Likely (Medium Risk)
West Coast Demersal Scalefish Fishery The West Coast Demersal Scalefish (Interim) Managed Fishery (WCDSIMF) is a handline and drop line fishery that targets demersal species in the WA West Coast. The fishery is managed by the Department of Primary Industries and Regional Development (DPIRD) under the Fisheries Resource Management Act (FRMA). DPIRD's Strategic Intent document provides a high-level outline of the Department's purpose, role, strategic priorities and key initiatives towards achieving their goals over the next three years. DPIRD's annual report to Parliament outlines the Department's operations (including finances), performance and achievements against a set of predetermined key performance indicators for each financial year. The Aquatic Science and Assessments Section reports the status of stocks under an Ecosystem Based Fisheries Management Framework in the annual Status reports of the fisheries and aquatic resources of Western Australia (Gaughan, Molony, & Santoro, 2019). The information from these reports is incorporated into the National Status of Australian Fish Stocks reports which are released every two years (www.fish.gov.au).

C3.2. b. Institutional arrangements, legislation, regulations and other instruments, are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.

Issues to consider;

- What mechanisms are in place to evaluate institutional arrangements?
- How frequently are reviews conducted and are they publicly available?
- Do reviews include a range of stakeholders?
- Are report recommendations implemented, or where not implemented the reasons are clear?

Box 20: Example of scoring C3.2b, including rationale

Score Category 1- Periodic reviews occur (Low Risk)
South East Australia Small Pelagic Fishery Extract from MRAG Americas, 2019 The Australia Government commissioned two independent reviews of the core Acts (Environment Protection and Biodiversity (EPBC) Act and Fisheries Management Act (FMA)) governing the environment and fisheries (Hawke, 2009, and Borthwick, 2012). The Borthwick review also included reviews of policy settings, recasting AFMA's objectives, fisheries management plans, the Minister's powers to vary fisheries management plans, integrating fisheries and environmental assessments, Research, fisheries management and industry levies, Offshore Constitutional Settlements (OCS), Recreational Fishing, Aquaculture, Compliance and enforcement and Co-management. The Government response to the Borthwick Review was announced in March 2013. DAWR thereafter initiated a public consultation process DAFF (2012/2013), followed by specific Reports on Harvest Strategy and Bycatch management strategy (DAFF 2013a, DAFF 2013b). Thereafter, this prompted the formulation revisions to the national harvest strategy (GoA, 2018a) and bycatch management policy (GoA, 2018c) The Government also commissioned an expert panel review of the Small Pelagic fishery (Lack et al,2014), providing support to the Australia Government is responding to the Senate (2016), Environment and Communications References Committee. AFMA regularly undertake reviews into their management system. These include Productivity Commission review (AFMA,2016a) of commercial fisheries regulation in Australia; and an independent review of AFMA's fisheries management, organisation and governance. The fishery has in place mechanisms to evaluate all parts of the management system. (MRAG Americas, 2019)

C3.2.c. Science and information to inform management are subject to periodic review through identifiable, transparent and publicly reported procedures and mechanisms.

Issues to consider;

- What mechanisms are in place to review science and information that informs management?
- How frequently are reviews conducted and are they publicly available?
- Are recommendations implemented, or where not implemented the reasons are clear?

Box 22: Example for scoring C3.2c, including rationale

Score Category 1 - Highly Likely (Low Risk)
Southern and Eastern Scalefish and Shark Fishery (SESSF) Information from www.afma.gov.au/fisheries/southern-eastern-scalefish-shark-fishery The SESSF five year strategic research plan 2016-2020 (AFMA, 2016) is the overarching document that identifies the research priorities for the fishery over the next five years to assist with the management objectives for fishery and enable the effective implementation and evaluation of management arrangements. The Research Plan is evaluated every 5 years and is publicly available. In addition, there are a number of groups responsible for providing science and management advice for the SESSF. The overarching resource assessment group (RAG) is the SESSF Resource Assessment Group (SESSFRAG), there are four fishery specific RAGs that provide advice on the sub-fisheries. The main function of RAGs is to peer review scientific data and information and provide advice to Australian Fisheries Management Authority (AFMA) on the status of fish stocks, sub stocks, species (target and non-target species) and the impact of fishing on the marine environment. Management Advisory Committees (MACs) are the main advisory bodies to AFMA. They provide advice on a variety of issues including fisheries management arrangements, research, compliance and management costs. MACs provide a broad perspective on management options and are a forum where issues relating to a fishery are discussed, problems identified and possible solutions developed. The MACs consider the advice of RAGs and provide recommendations to the AFMA Commission based on how the options will contribute to meeting the overall objectives for a particular fishery and the pursuit of AFMA's legislative objectives (www.afma.gov.au). Minutes of RAG and MAC meetings are publicly available at www. afma.gov.au.

- ### C.3.3 Fishery specific management objectives

C 3.3 Fishery Specific Management	LOW RISK: 3	MEDIUM RISK: 4-6	HIGH RISK: 7-9
The fishery is effectively managed.	Highly likely	Likely	Unlikely
C.3.3. Scoring Criteria	**1**	**2**	**3**
a. There is a management plan (or equivalent) to achieve Component 1 and 2 outcomes	Management plan is documented, objectives are appropriate, actions are specified and responsive.	Management objectives and actions only partially specified and/or partially responsive.	No or insufficient evidence of objectives or actions
b. Actions specified in the management plan (or equivalent) are implemented, including appropriate monitoring and enforcement	Sufficient evidence	Inconsistent or intermittent	No or unconvincing evidence
c. Relevant, comprehensive reviews are undertaken and changes made where appropriate	Reviews completed, findings considered, stakeholders consulted and changes are implemented in a timely manner	Occasional or partial reviews undertaken, limited stakeholder consultation and late/inadequate change implementation	No evidence of regular review or any recommendations being implemented

Outcomes for Component 1 (C1) and 2 (C2) are defined as;

C1- sustainably managed stocks

C2- healthy ecosystems

Issues to consider;

- Is there an agreed, public, management plan (or equivalent e.g. strategic plan or harvest strategy) for the fishery, which clearly states the short- and long-term management objectives?
- Do the objectives reflect the outcomes of C1 and C2, i.e. sustainably managed stocks and healthy ecosystems?
- Are there other relevant documents, legislation or plans which clearly state the objectives that direct decision-making?

Box 23: Example of scoring C3.3a, including rationale

Score Category 1 – Management plan is documented (Low Risk)
Abalone Managed Fishery (AMF) Extract from SCS Global Services, 2017b The AMF short and long-term ecological, social and economic objectives, consistent with the overarching objective of the Fisheries Resource Management Act (FRMA), are defined in the AMF harvest strategy. The social and economic objectives are applied within the context of ESD and fisheries management arrangements can be amended to help meet the social and economic objectives, but not at the expense of sustainability of the resource. The harvest

strategy for the AMF translates these objectives into short-term operational objectives. The harvest strategy contains measurable performance indicators to enable monitoring of the fishery's performance against the objectives; reference levels for each performance indicator; and associated control rules, which articulate pre-defined management responses designed to maintain each resource at target levels and achieve the management objectives for the fishery. There are established decision-making processes in the AMF that result in measures and strategies to achieve the objectives of the fishery. These processes and the decision-making framework, roles and responsibilities are explicit in legislation (e.g. FRMA, Abalone Management Plan 1992) and policy documents (e.g. Fisheries Policy Statement) and are publicly available (SCS Global Services, 2017b).

C3.3b. Actions specified in the management plan (or equivalent) are implemented, including appropriate monitoring and enforcement

- Are the objectives operationally-defined such that their performance can be measured?
- Are there public, key performance indicators (KPIs) in place, are these KPIs appropriate, and is progress against the KPIs publicly reported?
- Is there a demonstrated ability to enforce relevant management measures / rules?

Box 24: Example of scoring for C3.3b, including rationale

Score Category 1 – Sufficient evidence (Low Risk)

Spencer Gulf Prawn Fishery (SGPF)
Extract from MRAG Americas, 2016

The SGPF evolved from a long history of industry involvement in management of the fishery supported by ongoing fishery-independent surveys and scientific support. The Harvest Strategy (HS) is the combination of the various rules and actions and information that enable implementation of those rules and actions It includes 'break out' provisions in the form of performance indicators and specified actions. The strategy operates at three temporal scales: a) annual assessment of stock status; b) seasonal fishing strategies, and; c) daily management at sea. The HS is responsive to the state of the stock with start-of-season and in-season rules and actions triggered by a range of indicators. These indicators rely on a wide range of information. The current strategy has introduced explicit target and limit reference points against which to monitor the stock. Management measures in place to ensure the actions are implemented include a limited entry, effort restrictions, gear controls, including bycatch reduction devices, closed seasons and fishing day caps, spatial and temporal closures and reporting systems. The PIRSA's Fisheries Services Group (FSG) delivers the Division's compliance services for commercial fisheries. All licensed fishing vessels are required to submit complete catch returns as well as ETP logbooks. Other regulations applied comprise gear restrictions, bycatch limits, fishing outside closed areas and fishing inside temporal restrictions. Monitoring of the effectiveness of the compliance system demonstrates a high degree of effectiveness of the system applied. An educational programme conducted by FSG further supports the compliance system. FSG also operate a Fishwatch system. (MRAG Americas, 2016).

C3.3c. Relevant, comprehensive reviews are undertaken and changes made where appropriate

Issues to consider;

- What mechanisms are in place to evaluate all or part of the management system?
- How often is the management system subject to comprehensive internal and / or external review?
- Are such reviews made publicly available?
- Are there opportunities for all stakeholders to provide feedback to decision makers on the management system?
- How regularly are such opportunities available?

Box 25: Example of scoring 3.3c, including rationale

Score Category 1 – Timely reviews completed (Low Risk)
Heard Island and McDonald Islands (HIMI) Toothfish Fishery Extract from SCS Global Services, 2017a The HIMITF Management plan includes performance criteria against which the HIMITF is assessed annually. AFMA and SouthMAC (which includes external members) assess the effectiveness of the Plan including the measures taken to achieve the objectives every 5 years. AFMA's performance in managing fisheries, including the HIMITF, is also reviewed in ABARES' annual reports on the biological, ecological and economic status of AFMA-managed fisheries and five-yearly assessments of ecological sustainability by the Department of the Environment and Energy (DoEE). Periodic audits by the Australian National Audit Office such as that done for the Domestic compliance programme further confirm that there are a wide range of review and monitoring mechanisms in place for this fishery that cover all parts of the management system (SCS Global Services, 2017a).

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