



**Australian Government**

**Australian Fisheries Management Authority**

# **Gillnet, Hook and Trap Data Collection Advisory Working Group**

**Meeting outcomes**

**Date: 17 March 2017**

**Venue: Australian Fisheries Management  
Authority, Canberra**

## Attendees

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| Name                              | Member  |
|-----------------------------------|---|
| <b>Working Group Chair</b>        |   |
| Sandy Morison                     | SERAG and SharkRAG Chair (scientific)               |
| <b>Working Group Participants</b> |   |
| Simon Boag                        | Southern Shark Industry Alliance (industry)         |
| Chris Burns                       | AFMA  |
| Sarah Dart                        | AFMA  |
| George Day                        | AFMA  |
| Mike Gerner                       | AFMA  |
| Malcom Haddon                     | CSIRO (scientific)                                  |
| Ryan Keightley                    | AFMA  |
| Ian Knuckey                       | Fishwell Consulting (industry)                      |
| Giverny Rodgers                   | AFMA  |
| Les Scott                         | Industry member, Finfish (industry)                 |
| David Stone                       | EO Sustainable Shark Fishing Association (industry) |
| Robin Thomson                     | CSIRO (scientific)                                  |
| Geoff Tuck                        | CSIRO (scientific)                                  |
| <b>Observers</b>                  |   |
| Cathy Dichmont                    | SESSFRAG Chair                                      |
| Brodie Macdonald                  | AFMA  |

## 1. Introduction and apologies

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The Chair opened the meeting at approximately 12:00 pm and welcomed participants.

Participants were advised the meeting was being recorded to assist with the preparation of meeting outcomes; there were no objections.

## 2. Declaration of interests

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The working group reviewed the table of participants' declarations as outlined in the revised Fisheries Management Paper 1 (FMP 1). The Chair asked participants to declare any specific conflicts of interest with items to be discussed at the meeting or to declare conflicts of interest that were not recorded in the provided table.

The working group noted a specific conflict of interest in relation to the items for discussion from:

- Industry participants in relation to costs of data collection;
- Dr Ian Knuckey who has been shortlisted as part of a limited tender process for the AFMA Scientific Observer Program.

The working group noted the knowledge and valuable contribution of these participants and decided that all working group participants should participate in the discussion and recommendations.

An updated table of declared conflicts of interest is at Attachment A.

### 3. Data needs

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The draft GHAT Data and Assessment Plan 2017-20 (the Plan) was circulated to the working group (Attachment B).

The working group discussed the document and suggested the following edits:

- Page 9: An industry participant suggested that predator mortality should be included as a source of fishing mortality. It was suggested the presence/absence of orcas could be noted in logbooks.
- Page 12: An industry participant suggested that “Improvement in the data collected will allow fisheries management to *accurately* predict the impact of commercial fishing operations on the environment” be changed to “Improvement in the data collected will allow fisheries management to *better* predict the impact of commercial fishing operations on the environment”
- A scientific participant noted the importance of distinguishing between data and analysis results in the document.

Mr Keightley provided an additional summary of the information and data needs for the GHAT fishery.

The following points arose from the discussion:

- A scientific participant questioned the ability to customise threatened, endangered and protected species (TEP) monitoring requirements and whether the current 10% review of electronic monitoring (EM) footage was sufficient to capture interactions. The AFMA participant clarified that EM review for TEPs is intended as a logbook verification tool only and not intended to capture all interactions.
- The working group questioned whether the spatial and temporal zoning specified in the data collection plan is appropriate for stock assessment purposes. The scientific participants noted that whilst a finer scale spatial zoning would be desirable, the current plan is sufficient for stock assessment purposes for many species. Scientific participants also noted that as the data is analysed annually, increasing inter-trip variability captured within the plan is less important. The plan is to sample one trip per quarter, so at least there are four trips being sampled for each zone per year, not just one.
- The working group noted that a new report on the stock structure of blue-eye trevalla has recently been released. Once a RAG decision is made regarding how to deal with the information in an assessment sense, changes to spatial sampling recommendations within the GHAT data plan may be required. The working group agreed that the discussion around blue-eye stock structure would need to be put on hold until the results of the report had been fully considered. An industry participant

noted that the percentage of blue-eye trevalla catch taken around sea mounts should also be considered at the same time.

- The working group noted that length frequency and otolith data is currently not technically required for ribaldo as it is not subject to a tier 1 assessment. An industry participant noted that ribaldo has the potential to become a targeted species if market prices were to improve, in which case a move to a tier 1 assessment could be desirable. Based on this the working group recommended the continuation of biological data collection for this species.
- Scientific participants noted that discard length/frequency data was important in the GHAT, particularly for pink ling and school shark.
- Scientific participants noted that there are currently no issues with the data obtained within the GHAT fishery in terms of use for environmental risk assessment (ERA).
- The working group agreed that the biological sample targets outlined in the Plan were appropriate targets for moving forward. Scientific members noted that higher replicates would be preferable, however given that no data is currently being collected the proposed targets were deemed acceptable for now.
- It was noted that in the past there has been some difficulty in meeting collection targets for some species, particularly finfish.

## 6. Methods of data collection

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Mr Keightley provided a summary of the methods of data collection that could be used to meet the data needs of GHAT fisheries.

The following points arose from the discussion:

- Port sampling has been used in the past to successfully collect data from some ports where catch is regularly landed.
- AFMA stated that port sampling was intended to replace observer sampling when EM was introduced. For this purpose port sampling is currently not collecting representative data.
- Scientific participants noted a number of issues with the current port sampling program as a method for collecting biological data (e.g. length/frequency and otoliths). These included;
  - depth and gear type (where multiple gear types were used within a single trip) are not specified for each sample;
  - the manner in which the sampled fish were collected is also unknown i.e. shot specific length/frequency data is not collected via port sampling but is required for stock assessments due to spatial variation in the data. Otolith/vertebrae data is not required to be shot specific.
- The AFMA observer coordinator noted a number of issues with the current port sampling program from an operational perspective. These included;
  - logistical issues in collecting data from remote ports;
  - lack of industry cooperation in both reporting landings and facilitating data collection in port (currently almost all samples are taken in just one port: Lakes Entrance);

- low economic efficiency of the port sampling program (high time and transport costs to distribute staff to remote locations for the collection of only a relatively small amount of data if port samplers are not locally based);
- low staff availability for short periods of work in remote locations;
- access to a limited selection of catch (which may also have been graded), typically only one grade can be sampled and the relative weights of the catch across grades is not known;
- inability to determine the sex of processed fish.
- Industry clarified that observers as a method of data collection may not pick up all TEP interactions due to their positioning on vessels when carrying out their duties.
- Industry participants expressed support for an industry based data collection program. AFMA noted that such programs have been trialled in the past but have been unsuccessful despite significant industry consultation and program development.
- The working group noted that crew based sampling as a method of data collection has been conducted successfully within the Great Australian Bight (GAB) trawl sector. The administration, time and training costs needed to establish such a program and the ongoing requirements to support it were discussed and were considered to be considerable, and ongoing. The working group noted that the time taken to trial such a program would not meet the immediate need for biological data in the GHAT.
- Unlike length/weight/sex data, it is possible to collect otoliths/vertebrae at a processing facility as sampling does not need to be random with respect to length. A range of size classes is still required and spatial and temporal variation should still be pursued.

**Action item 1: David Stone/Les Scott**

David Stone/Les Scott to develop and trial proposals for industry based data collection programs in the gillnet and longline fisheries. Any proposal for an alternative data collection program should provide evidence of an ability to collect the requisite biological (length/frequency, sex and/or otolith/vertebrae) data.

- AFMA participants raised the option of using AFMA observers to collect biological data every second year, rather than on an annual basis. Scientific participants responded that the impact of biennial data collection on stock assessments could not be immediately quantified. Biennial data rather than annual is likely to increase the uncertainty (variability) in the outputs from analyses, which in turn may increase the risk changes occurring and managers not becoming aware of them.
- Scientific participants suggested that it may be possible to model the impact of biennial data collection on stock assessments using historical data with the view to potentially reduce data collection to every second year should the impacts be found to be low.

**Action item 2: Robin Thomson**

Robin Thomson to investigate the statistical implications of conducting biennial collection of biological data for the GHAT (subject to funding).

- Scientific participants raised the possibility of collecting length/frequency data via EM in the future. Dr Ian Knuckey left the room while the working group discussed his current funding expression of interest (EOI) in relation to estimating discard weights from piece counts verified by EM. The working group expressed support for expanding the proposed project to include a proof of concept investigation into length/frequency measurement of catch using EM cameras.

#### **Action item 3: Ian Knuckey**

Ian Knuckey to consider expanding his current funding EOI to include a preliminary investigation into the use of EM cameras as a method for collecting length/frequency data.

## **7. Costing**

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Mr Keightley provided a summary of costs for proposed data collection methods.

The following points arose from the discussion:

- Industry suggested that a proportion of the base costs of EM should be allocated to compliance due to their reliance on the footage.
- AFMA participants noted that the current and proposed costs of data collection within the GHAT are still under those proposed in the business case. Differences in costings have arisen due to new management arrangements that specify greater data needs (e.g. Australian sea lion strategy, dolphin strategy).

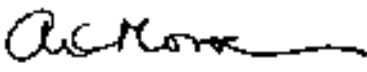
## **8. Working group recommendations**

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The working group provided the following recommendations;

- The chair summarised that based on working group discussion, AFMA observers are the most suitable method for moving forward with collection of biological data (length/frequency, sex, otoliths/vertebrae) in the GHAT in the short term.
- An observer program should be reinstated in the GHAT in conjunction with logbook data, CDRs and EM (in its current format with the view to moving towards 5% catch review and fee for service EM review for poor reporters), to meet the data needs of the GHAT.
- The recommended number of observer days (gillnet - 72 days, demersal longline - 48 days and automatic longline - 96 days) reflects the minimum number of days required to achieve the spatial and temporal data needs outlined within the GHAT data plan, assuming an average observer trip length of 6 days.
- Mr David Stone recorded a dissenting view to the working group with regards to the implementation of AFMA observers as a recommended method of data collection.
- It was recommended that AFMA observers be implemented in the GHAT as soon as possible, preferably by the commencement of the 2017/18 fishing season on 1 May.
- Alternative data collection options to reduce monitoring costs should be investigated including industry consideration of a crew member data collection program. To assist this, the ability of EM to fulfil a greater data collection role (length

measurements) should be investigated (ideally through Dr Knuckey's research proposal).

**Signed (Chairperson):** 

Alexander Morison

**Date: 10/4/2017**

## Attachments

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- A. Declared conflicts of Interest
- B. Draft GHAT Data and Assessment Plan 2017-20



## Attachment A

|                   | Declared Interest - Last updated: 17 March 2017   |
|-------------------|---|
| Mr Simon Boag     | Executive Officer South East Trawl Fishing Industry Association (SETFIA)<br>Non-beneficiary Director of two fishing companies in the SESSF.<br>Member Victorian Fisheries Advisory Council.<br>Industry member on both ShelfRAG and SlopeRAG.<br>SETFIA receives funding from various bodies to complete projects.<br>Involved in the delivery of industry training courses through East Gippsland TAFE. Undertakes contracts as an independent consultant. On the Commonwealth Fisheries Association Board.                        |
| Mr Chris Burns    | AFMA, Observer Coordinator, No interest, pecuniary or otherwise.  |
| Mr George Day     | Employed by AFMA; Senior Manager of Demersal and Midwater Fisheries.<br>No interest, pecuniary or otherwise.  |
| Mr Mike Gerner    | AFMA, manager Observers and E-monitoring, No interest, pecuniary or otherwise.  |
| Dr Malcolm Haddon | CSIRO stock assessment scientist.<br>Member of GAB RAG, Northern Prawn RAG and sub-Antarctic RAG.<br>Scientific member on the sub-Antarctic MAC. A participant in the 'SESSF Monitoring and Assessment Review Project' (SMARP).   |
| Mr Ryan Keightley | AFMA, a/g Gillnet, Hook and Trap, High Seas and Norfolk Is Manager. No interest, pecuniary or otherwise.  |
| Dr Ian Knuckey    | Director Fishwell Consulting Pty Ltd<br>Involved in –Fishery Independent Survey (FIS) SESSF and GAB<br>Range of research interests in relation to South East fisheries including the GABTF, SESSF and auto-longline sector. Agent for Olfish Electronic Logbooks<br>NPF RAG Chair, Scientific member on NORMAC Member on Scallop MAC and SquidMAC<br>Provides research advice to various industry associations: SETFIA, GABIA and SSIA<br>Shortlisted as part of a limited tender process for the AFMA Scientific Observer Program. |
| Mr Sandy Morison  | Director of Morison Aquatic Sciences.<br>Chair of SharkRAG, SERAG and the Tropical Rock Lobster Working Group.<br>Scientific member on SEMAC.<br>Contracted by government departments, non-government agencies and companies for a range of fishery related matters including research and (by SCS Global Services) for MSC assessments of AFMA managed and other Australian and international fisheries.<br>No pecuniary or other interest in the SESSF.   |
| Dr Robin Thomson  | CSIRO, Assessment scientist. Acquiring funding for research purposes  |

|                    |   |
|--------------------|---|
|                    | PI on data services contract and close kin project for school shark.  |
| Dr Geoff Tuck      | Employed by CSIRO.<br>Involved in Stock assessments. Interest in obtaining funding for future research. Principle investigator on the SESSF stock assessment project and marine closures project.   |
| Dr Giverny Rodgers | AFMA, Fisheries management officer, Gillnet, Hook and Trap. No interest, pecuniary or otherwise.  |
| Mr Les Scott       | Managing Director: Petuna Sealord Deepwater Fishing P/L an Australian resident company which holds various fishing rights in, and operates vessels in the SESSF, GHAT, East Coast Deepwater Fishery, Coral Sea and International fisheries operating a vessel under an Australian Flag;<br>Consultant to: Australian Longline P/L an Australian resident company which holds various fishing rights in, and operates vessels in the Australian Sub-Antarctic fisheries (Heard Island and McDonald Islands, Macquarie Island Fisheries) and waters under the jurisdiction of CCAMLR; and<br>Advisor to PG&UM Rockliff – Petuna Fisheries who hold various fishing rights in the SESSF, GHAT, Commonwealth and State (Tasmania) Scallop Fishery, East Coast Tuna Fishery, Off Shore Fisheries and Tasmanian State Fisheries.<br>Pecuniary interest is limited to the extent of: an employee of the company's and partnership disclosed. |
| Mr David Stone     | Executive officer of Sustainable Shark Fishing Association.   |

# Data and Assessment Plan 2017-20

Gillnet, Hook and Trap Fishery

March 2017



Australian Government

Australian Fisheries Management Authority

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## Acronyms

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|          |  |
|----------|--|
| AFMA     | Australian Fisheries Management Authority                                  |
| CDR      | Catch Disposal Record  |
| CPUE     | Catch per unit effort  |
| ERA      | Ecological Risk Assessment   |
| ERM      | Ecological Risk Management   |
| FIS      | Fishery Independent Survey   |
| GABRAG   | Great Australian Bight Resource Assessment Group                           |
| GABMAC   | Great Australian Bight Trawl Sector Management Advisory Committee          |
| GHAT     | Gillnet Hook and Trap sector   |
| HSF      | Harvest Strategy Framework   |
| MAC      | Management Advisory Committee  |
| MYTAC    | Multi-year total allowable catch   |
| RAG      | Resource Assessment Group  |
| RBC      | Recommended biological catch   |
| SEMAC    | South East Management Advisory Committee                                   |
| SERAG    | South East Resource Assessment Group                                       |
| SESSF    | Southern and Eastern Scalefish and Shark Fishery                           |
| SESSFRAG | Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group |
| SharkRAG | Shark Resource Assessment Group  |
| TAC      | Total allowable catch  |
| TEP      | Threatened, Endangered and Protected                                       |
| VMS      | Vessel Monitoring System   |

# 1 Introduction

---

The purpose of this document is to provide a clear plan for collecting data needed to support fishery management decisions and assessments in the gillnet, hook and trap (GHAT) sector of the Southern and Eastern Scalefish and Shark Fishery (SESSF).

The *Fisheries Management Act 1991* sets out the broad objectives for AFMA to manage fisheries and ensure that fisheries are ecologically sustainable and economically efficient. Each year the AFMA Commission makes decisions on sustainable catch limits for the key commercial species and AFMA implements management arrangements to keep catch of commercial species within these limits and minimise impacts on protected species, other bycatch and habitats.

In order to make management decisions in pursuit of its objectives, AFMA needs an accurate measure of what is being caught (total fishing mortality and impacts) and an assessment of what is an acceptable catch and impact. These two questions provide the basis for AFMA's data collection and scientific assessment processes.

The core data collected includes a measure of what is caught (catch) and how it has been caught (effort). This data is primarily collected and reported by fishers directly through daily fishing logbooks and catch disposal records (CDRs). Independent verification of catch reports is extremely important to ensure accurate data collection and AFMA is increasingly investing in cost effective data verifications tools. This includes the use of vessel monitoring systems (VMS) that verify boat location as well as electronic monitoring (e-monitoring) systems that include cameras and sensors to enable independent verification of catch and effort.

Catch and effort data is used to support ecological risk assessments (ERAs) for all species and habitats that interact with fishing gear as well as scientific stock assessments for commercial species. At a minimum AFMA needs catch and effort data to be collected in a fishery to provide a measure of what is caught and support assessments of what is ecologically sustainable.

The AFMA Ecosystem Based Fisheries Management Framework (Figure 1) provides high level guidance on what data and information is needed and what assessments are conducted. Commercial species are assessed and managed in accordance with the Commonwealth Harvest Strategy Policy and broader impacts on the marine environment are assessed through ERAs and managed in accordance with AFMA environmental objectives.

The SESSF Harvest Strategy includes a tiered framework for assessing commercial species with assessments ranked according to the amount of data that is required and how the assessments measure abundance. Data needs for specific species depend on what stock assessment tier is used (Table 2) and there are trade-offs between what data is available (cost of collection), the amount that is caught (catch) and the risk of not keeping the catch sustainable.



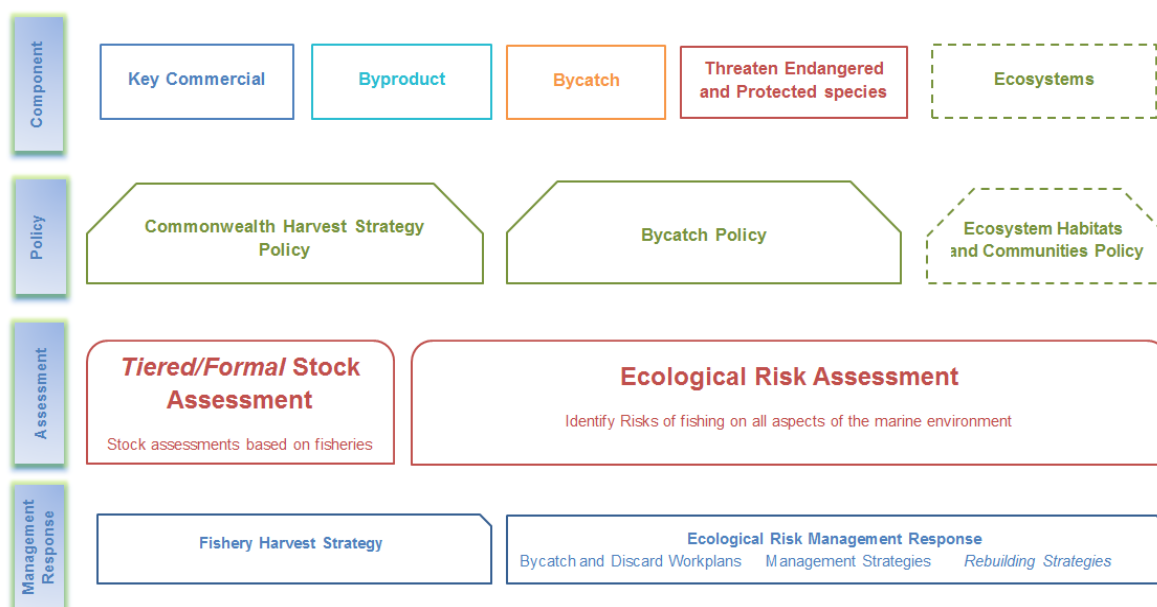


Figure 1. AFMA's Ecosystem Based Fisheries Management Framework

## 1.1 Objectives of the data and assessment plan

- Define information needed to set catch limits for commercial species in the GHaT to levels that support the objectives of the harvest strategy.
- Define data and monitoring needs to support the management of threatened, endangered and protected (TEP) species interactions.
- Define data needs to support ecological risk management for non-commercial species, protected species and habitat.
- Develop and maintain an up to date plan on how fishery data is collected and managed, considering frequency, quantity, representativeness, reliability, auditing, risk, collection method and value for money.

The new data plan should also compliment the Southern and Eastern Scalefish and Shark Fishery five year strategic research plan 2016-20, to ensure future priority research can be supported with data.

Section 2 of this plan outlines the general data needs for commercial species managed by quota in the SESSF. Section 3 outlines the data needs for bycatch and threatened, endangered and protected species (TEPs). For further details for each quota species including data collection targets and timeframes, refer to Appendices 1 to 7.

## 2 Information and data needs for commercial species

The GHAT is managed in accordance with the *SESSF Harvest Strategy Framework* (HSF; AFMA 2015b) under which stock assessments are conducted for all quota species. Stock assessment models are mathematical descriptions of fish populations and their interaction with the fisheries that target them. AFMA's ability to meet the objectives of the HSF relies on obtaining the required data in time for stock assessments to be carried out. For stock

assessment models to produce reliable estimates, the data must be accurate, representative and of sufficient quantity. If the data does not meet the above criteria, poor model estimates may result in poor management decisions.

The HSF uses a tiered approach designed to apply different types of assessments and cater for different amounts of data available for different stocks. The HSF adopts increased levels of precaution that correspond to increasing levels of uncertainty about stock status, in order to reduce the level of risk associated with uncertainty. Each commercial stock is assessed depending on the amount and type of information available to assess stock status and also what level of assessment is needed. Each stock assessment tier has its own harvest control rule that is used to determine the recommended biological catch (RBC) of species. The RBCs provide the best scientific advice on what the total fishing mortality (landings from all sectors plus discards) should be for each species. A recommended total allowable catch (TAC) is then calculated using rules outlined in the HSF.

Historically all quota species have been assessed at a tier one, three or four level, but tier five assessments are now being considered for some quota species.

Commercial species include any species that are landed and sold. There is increasing focus on the by-product species that currently do not have formal stock assessments and are managed through catch limits or other triggers. All of these species are captured in the ERAs for a fishery but specific assessment measures and triggers have not been clearly documented.

This plan summarises the data needs for all quota species and assessments that are conducted. Information needs for quota species management are summarised as follows:

- What is the stock structure (one stock or more than one)?
- What is the abundance of the stock?
  - Measure through stock assessment; fishery independent survey (FIS); alternative index of abundance.
- How much can be sustainably harvested?
  - Stock assessment in accordance with Harvest Strategy.

## **2.1 Information requirements for stock assessments**

Figure 2 illustrates the information that should be considered to estimate biomass for stock assessments. This includes information on factors that add biomass to the population including recruitment and growth, and factors that remove biomass including natural and fishing mortality.

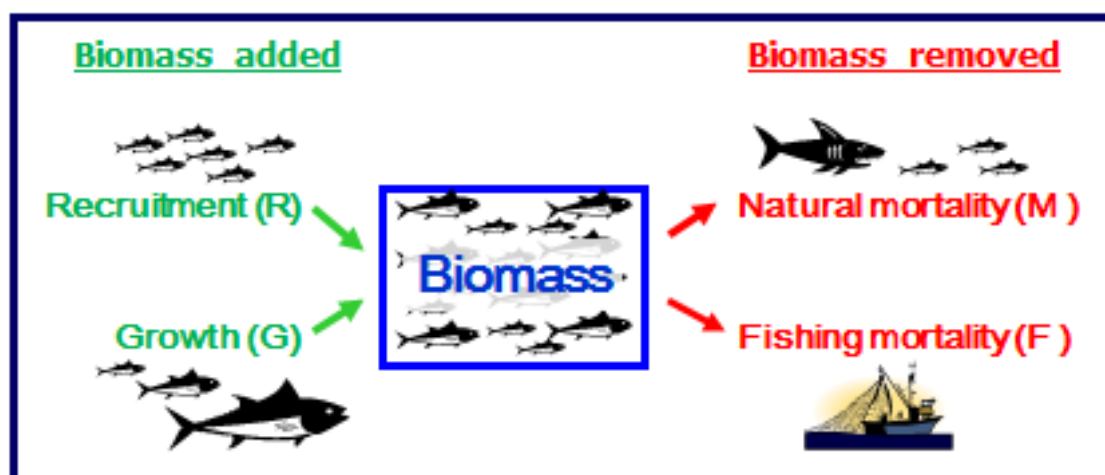


Figure 2. Factors affecting fish stock biomass.

Table 1 outlines data that can be collected to meet stock assessment information requirements. 'Catch composition', 'vessel activity', 'shot details', 'biological data' and 'gear details' refers to logbook data collection categories, further details of what each category consists of is at [Attachment 1](#).

Table 1. Information requirements for stock assessments and data that can be used to meet the requirements.

| Information requirement | Data collected  |
|-------------------------|---|
| Recruitment             | Length-frequency  |
| Growth                  | Otoliths (fish) or vertebrae (sharks)<br>Length-frequency<br>Tagging (e.g. mark-recapture)  |
| CPUE                    | Catch composition<br>Vessel activity<br>Shot details  |
| Fishing mortality       | Catch composition<br>Vessel activity<br>Shot details<br>Biological data<br>Discards<br>Catch from other fisheries<br>Predator mortality |
| Stock Structure         | Otoliths (fish) or vertebrae (sharks)<br>Length-frequency<br>Tagging (e.g. mark-recapture)  |
| Selectivity             | Length-frequency  |
| Catchability            | Area<br>Season<br>Vessel<br>Oceanography<br>CPUE standardisation  |

| Information requirement | Data collected  |
|-------------------------|---|
|                         | Gear details<br>Vessel activity<br>Shot details<br>Catch composition<br>Biological data   |
| Natural mortality       | Tagging (e.g. mark-recapture)<br>Sex ratio<br>Estimates from other regions<br>Otoliths (fish) or vertebrae (sharks)<br>Length-frequency |
| Movement                | Tagging (mark recapture, satellite tags etc.)   |
| Age at maturity         | Otoliths (fish) or vertebrae (sharks)<br>Biological samples (gonads)  |

## 2.2 Stock assessment tiers

The SESSF HSF uses a tiered approach designed to apply different types of assessments and cater for different amounts of data available for different stocks. Data requirements for commercial species are determined by the type of stock assessment (tier level) which is used.

A Tier 1 stock assessment uses an integrated biological and statistical approach that combines a wide variety of data inputs, generally including catch per unit effort (CPUE), other indices of abundance and size and age composition. Tier 3 and Tier 4 assessments use other indicators (relating to fishing mortality and catch rates respectively) and reference points which are taken as proxies for the biomass reference points for Tier 1.

Table 2 summarises the data requirements and collection methods for each stock assessment tier, and which tier the SESSF commercial species are assessed under.

**Table 2. Stock assessment tier descriptions, data requirements, collection methods and quota species.**

| Tier | Tier description   | Data requirements  | Current data collection method   | Commercial species (SESSF)   |
|------|--|--|--|--|
| 1    | Robust assessment of fishing mortality and biomass based on fishery dependent data ONLY  | <ul style="list-style-type: none"> <li>- Length-frequency</li> <li>- Catch composition</li> <li>- Vessel activity</li> <li>- Shot details</li> <li>- Otoliths or vertebrae</li> <li>- Sex ratio</li> <li>- CPUE</li> <li>- Pup production</li> </ul> | <ul style="list-style-type: none"> <li>- Logbook</li> <li>- Catch disposal records</li> <li>- E-monitoring</li> <li>- Port Sampling</li> </ul> | <ul style="list-style-type: none"> <li>- Flathead</li> <li>- Jackass morwong</li> <li>- Pink ling</li> <li>- Gemfish (east and west)</li> <li>- Gummy shark</li> <li>- Silver warehou</li> <li>- Bight redfish</li> <li>- Blue grenadier</li> <li>- Deepwater flathead</li> <li>- Orange roughy (east)</li> <li>- Redfish</li> <li>- School shark</li> </ul> |
| 3    | Empirical estimates of fishing mortality based on size and/or age data   | <ul style="list-style-type: none"> <li>- Length-frequency</li> <li>- Catch composition</li> <li>- Vessel activity</li> <li>- Shot details</li> <li>- Otoliths or vertebrae</li> </ul>  | <ul style="list-style-type: none"> <li>- Logbook</li> <li>- Catch disposal records</li> <li>- E-monitoring</li> <li>- Port Sampling</li> </ul> | <ul style="list-style-type: none"> <li>- Alfonsino</li> <li>- John dory</li> </ul>   |
| 4    | Empirical estimates of relative biomass based on <ul style="list-style-type: none"> <li>• fishery dependent data</li> <li>• fishery independent surveys</li> </ul> | <ul style="list-style-type: none"> <li>- Catch composition</li> <li>- Vessel activity</li> <li>- Shot details</li> </ul>   | <ul style="list-style-type: none"> <li>- Logbook</li> <li>- Catch disposal records</li> <li>- AFMA Observer Program</li> </ul>                 | <ul style="list-style-type: none"> <li>- Blue-eye trevalla*</li> <li>- Deepwater shark (east and west)</li> <li>- Elephant fish</li> <li>- Mirror dory</li> <li>- Ocean perch</li> <li>- Oreo basket</li> <li>- Ribaldo</li> <li>- Royal red prawn</li> <li>- Sawshark</li> <li>- Silver trevally</li> </ul>   |
| 5    | Tier method used for data poor fisheries.  | Weight of evidence approach, may estimate the central tendency of sustainable catches (such as the median catch, average catch, or 3rd highest catch) when catch data is not available.  |  | Non quota commercial species   |

\*Proposed move to tier 1.

### 3 Data needs for bycatch and TEPs

AFMA needs a reliable measure of catch and discards of bycatch and TEPs. AFMA monitors TEP interactions to ensure that management triggers set for TEP species are not exceeded. AFMA needs to be able to monitor boat level performance in some fisheries (e.g. the longline sector for the *Threat Abatement Plan 2014 for the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations*, and the gillnet sector for the AFMA Dolphin Strategy and Australian Sea Lion Management Strategy).

The Department of Agriculture and Water Resources is currently reviewing the Commonwealth Policy on Fisheries Bycatch. This policy deals with those aspects of bycatch that are not currently subject to commercial fishery management provisions, outlined in the Commonwealth Harvest Strategy Policy and Guidelines 2007. In addition to the policy on fisheries bycatch, AFMA is currently finalising the Ecological Risk Management (ERM) Guide. AFMA has been working to progress the ERA/ERM Revitalisation Project with the aim of finalising it in time for the AFMA Commission to endorse it at its April 2017 meeting. There are a range of supporting documents to sit alongside the ERM Guide, including a policy paper.

The new ERM and bycatch policy papers will outline the need to avoid and minimise bycatch, and encourage industry led solutions to minimise bycatch of protected species. The policies will require greater accuracy in bycatch reporting within Australian fisheries in order to progress the ecologically sustainable development of fisheries and ensure the sustainability of the species, populations and ecosystems with which fisheries interact. Improvement in the data collected will allow fisheries management to better predict the impact of commercial fishing operations on the environment and account for the cumulative impact of Commonwealth fisheries on protected species. Accurate reporting in fisheries logbooks will greatly aid in achieving the data needs set out in these policies.

### 4 Data collection

Table 3 outlines fishery dependent and fishery independent data collection methods for target and non-target species.

Table 3. Fishery dependent and independent data collection methods

| Data type   | Data collection methods       |
|---|-------------------------------|
| Fishery dependent data (self-reported)            | Logbooks                      |
|   | Catch Disposal Records        |
| Fishery dependent data (independent verification) | Observers                     |
|   | Port sampling                 |
|   | E-monitoring                  |
|   | Vessel Monitoring System      |
| Fishery independent data                          | Fishery Independent Survey    |
|   | Independent research projects |

## 4.1 Data collection methods

Current methods of data collection in the SESSF are fishery logbooks, CDRs, the observer program, e-monitoring, transit forms, fish receiver permits, VMS, vessel inspections, licensing and quota management information and research projects and surveys.

### 4.1.1 Logbooks and CDRs

AFMA requires fishers to record catch and effort information in logbooks at sea, and in CDRs which record the landed catch at port. CDRs are more accurate than logbook records as fish are weighed in port whereas logbook weights are often estimates.

The following data is recorded for each fishing operation: the port and date of departure and return; gear type and fishing method; weight of fish kept and discarded; and resultant catch including what is included in the weight (e.g. trunked, gutted, filleted, whole).

Catch and effort data from commercial logbooks is the main data source used for an index of abundance in stock assessments for most SESSF commercial species. Logbook data is also used to monitor catch and effort trends, to standardise effort for CPUE analyses, for quota management, reference points for bycatch and by-product species, input into gross value of production estimates and monitoring and reporting of TEP interactions to the Department of the Environment.

CDR data is used to monitor quota species, verify logbook weight data for stock assessments, verify logbook recorded catch and input into gross value of production.

Data collected in logbooks is further detailed at [Attachment 1](#).

### 4.1.2 E-monitoring

E-monitoring integrates video, sensors and programmable loggers to record data that can be used to independently verify logbook catch. A typical e-monitoring system uses sensors to detect and record fishing activity. An on-board computer takes this information from the sensors and GPS to record video and other information about fishing activities. Information is stored on the system for detailed analysis and some information is transmitted to AFMA for real-time monitoring.

E-monitoring is currently implemented in the GHAT to validate logbook catch and effort data, verify catch composition, and reporting of TEP species interactions. E-monitoring is not capable of collecting important biological data such as length, sex and age data for fish.

### 4.1.3 Vessel Monitoring Systems

VMS are employed by AFMA for the delivery of near real time vessel information in order to effectively monitor the movements of all Commonwealth endorsed fishing vessels. Each VMS unit routinely produce positional reports which contain information such as the vessel's current location, course and speed for the purpose of domestic compliance, fisheries management and research.

The VMS system is a vital tool in assisting fisheries managers to achieve compliance with fishery management arrangements, particularly where fishing activity needs to be



restricted to certain areas or zones. VMS data can also be used for fine-scale position data for stock assessments.

#### **4.1.4 Observer program and port sampling**

The Integrated Scientific Monitoring Program (ISMP; observer program) provides fisheries managers, research organisations, environmental agencies, the fishing industry and the wider community with independent, reliable, verified and accurate information on the fishing catch, effort and practice of Commonwealth vessels.

Each year the requirements and priorities for the observer program are determined by AFMA after consultation with the relevant management advisory committees (MACs) and RAGs, so that timing and area of observer coverage is proportional to fishing effort within and across fisheries. RAGs review individual species targets annually. Data collected as part of the observer program is done by on-board observers or port sampling. Refer to Bergh et al. (2009) for further details on the ISMP sampling regime in the SESSF.

The observer program is used to:

- verify logbook information and assist compliance;
- determine levels of interaction with TEP species;
- quantify levels of bycatch and status of discards (mortality rates);
- collect biological data for stock assessments and research projects on-board or at port (e.g. collection of otoliths – fish ear bones – to age fish, and collect sex and length data of fish);
- record environmental observations;
- collect anecdotal information (qualitative data) for research;
- quantify level of depredation (if high coverage);
- educate fishers (e.g. data collection, species identification, handling TEP species, tag recovery, compliance regulations).

#### **4.1.5 Fishery independent surveys**

A FIS provides a time-series of relative abundance indices for key target species. Most of the SESSF stock assessments use some form of CPUE time series data from logbooks as the main index of stock abundance. The FIS provides a time series of abundance indices that can be used in addition to, or instead of, commercial CPUE data.

Various biological and environmental data are collected by scientific observers on-board including: target species; catch rate (kg/shot); fishing method; and fishing depth. Information which provides a relative abundance index of other main by-product and bycatch species is also obtained.

#### **4.1.6 Research projects relevant to data collection**

Research projects are used to collect and assess additional data required for scientific or management purposes where significant data gaps are identified. In the past this has included the following.

- Tagging programs for migration and stock structure studies.



- Oceanographic data for the study of environmental determinants of fishery production.
- Genetic data for studies of stock structure.
- Otolith ring counts for growth studies and stock assessments.
- Stomach contents data for food-web and predation studies.
- Ecosystem information for modelling food web structures.
- Environmental and oceanographic data for use in stock dynamics, migrations and production models.
- Survivorship of discard species.
- Economic data in conjunction with scientific assessments to assess economic performance of fisheries.
- Sustainability of biodiversity (abundance, distribution, composition).
- Identify and quantify bycatch and by-product.
- Biological characteristics of target and non-target species.
- Additional data required for management purposes.
- Fishery responses to alternative management measures.
- Marketing data used to inform assessments of the sources of variation not accounted for in stock assessments.

#### **4.2 Cost effective data collection**

One of the objectives of this plan is to support managers and scientists to define what data is needed and then identify cost effective data collection methods. The basic premise is that the data required for stock assessments and to support management can be collected or verified in different ways.

## **5 Data management**

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AFMA oversees the collection of large amounts of fishery data that are collected through multiple methods outlined in section 4. This section outlines the stages in the data lifecycle and specifies roles, responsibilities and performance measures for each stage to ensure that data is collected to the required standards. Figure 3 outlines the data lifecycle and AFMA's business requirements.

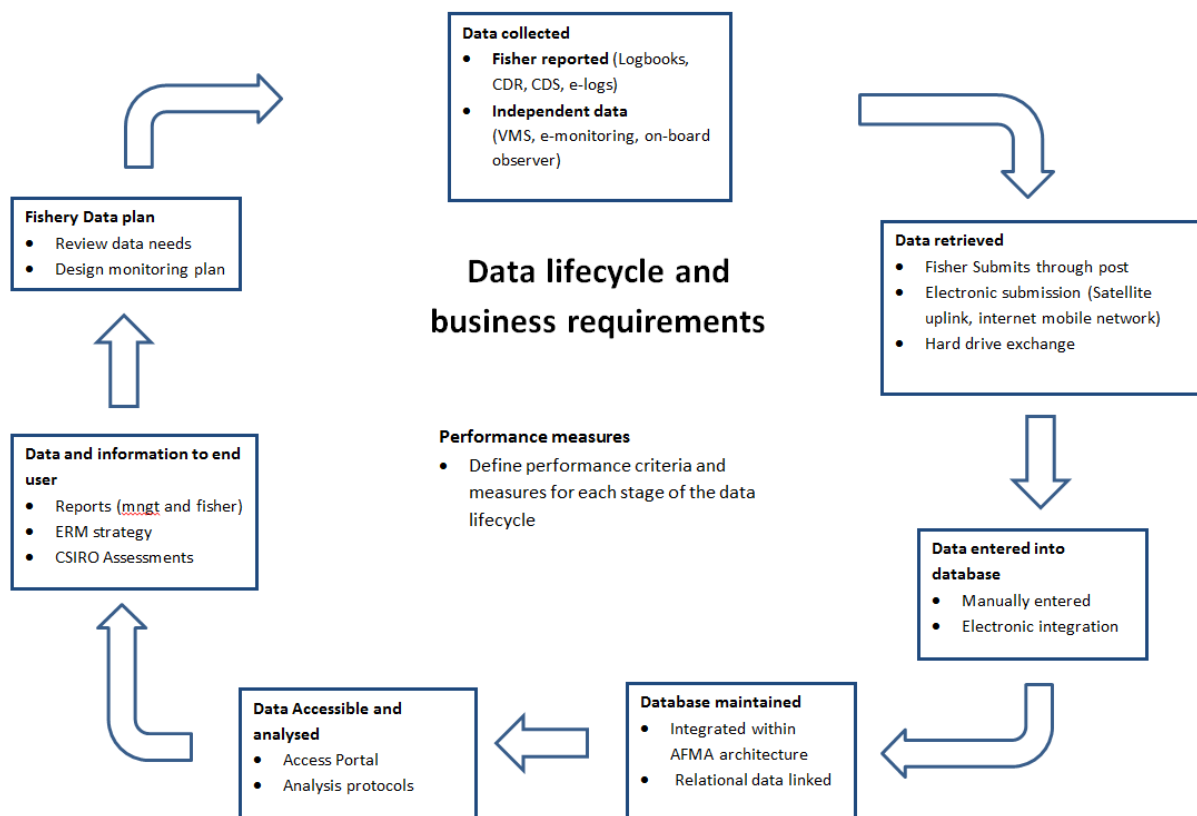


Figure 3. Summary diagram depicting the stages in the fisheries data lifecycle.

## 5.1 Data storage

Logbook, CDR, VMS and observer program data is currently stored on the AFMA database for internal use, and is also provided to research organisations for data analysis services.

E-monitoring footage is analysed by an AFMA contractor and annotated catch data is stored in AFMA databases. Annotated e-monitoring data is compared to logbook data for the same shots and comparison reports are sent to fishers and stored by AFMA.

There is currently no process for incorporating and storing FIS data on the AFMA database.

## 5.2 Data access

AFMA accesses data through the Oracle Business Intelligence Enterprise Edition (OBIEE). The data is from logbooks, CDRs and observer trips.

# 6 Review

SharkRAG will annually review this plan and prioritise data needs and gaps for the species they assess. RAGs and SEMAC should consider these data needs and priorities when assessing research proposals and other information relative to the GHAT. Fishery managers must consider the balance between the risk of accepting the current state of data collection against cost of further investment required to improve data and fill the data gaps.

SESSFRAG currently holds an annual data meeting to review data summaries and strategic data issues. Outcomes of this review will then be addressed through each RAG's work plan for that year. Annual reviews will focus on ensuring that data is collected and managed within defined quality standards throughout the full data lifecycle. This includes data collection and recording, data submissions, data entry, data storage, data access, data analysis, reporting, review and planning.

## **7 Stock assessment process**

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AFMA provides the data needed for stock assessments to scientists for analysis and reporting. The analyses are then discussed by RAGs (SESSFRAG, SharkRAG, SERAG and GABRAG), which produce final stock assessment reports for quota species in the SESSF during October and November each year. AFMA produces a report in mid-December with recommended TACs and this is distributed for public comment. In February SEMAC and GABMAC have a TAC meeting and recommend TAC settings. The outcomes of the RAGs, SEMAC and GABMAC meetings as well as AFMA's report are provided to the AFMA Commission to determine TACs for the upcoming fishing season which starts 1 May each year.

### **7.1 Stock assessment timeline**

Table 4 outlines the schedule of stock assessments for each GHAT commercial species and the tier level of that stock assessment.

**Table 4. Stock assessment schedule for the 34 commercial species in the Southern and Eastern Scalefish and Shark Fishery for 2016-20\*.**

| Species                         | MYTAC in 2016-17 season                    | Last Assessed | 2016 | 2017 | 2018 | 2019 | 2020 | AFMA management comment  |
|---------------------------------|--|---------------|------|------|------|------|------|--|
| Alfonsino                       | 3rd year of a three year MYTAC             | 2013          |      |      | 3    |      |      | Push back because of low catches   |
| Bight Redfish                   | 1st year of 5 year MYTAC                   | 2015          |      |      |      |      | 1    | 5-year MYTAC, due 2020   |
| Blue-Eye Trevalla               | Single year TAC                            | 2015          | 4    |      |      |      |      |  |
| Blue Grenadier                  | 3rd year of a three year MYTAC             | 2013          |      |      | 1    |      |      | Undercaught and above target   |
| Blue Warehou                    | N/A  | 2014          |      |      |      |      |      |  |
| Deepwater Flathead              | 3rd year of a three year MYTAC             | 2013          | 1    |      |      |      |      |  |
| Deepwater shark east            | 3rd year of a three year MYTAC             | 2013          |      | 4    |      |      |      |  |
| Deepwater shark west            | 3rd year of a three year MYTAC             | 2013          |      | 4    |      |      |      |  |
| Elephant Fish                   | 1 <sup>st</sup> year of a three year MYTAC | 2013          |      | 4    |      |      |      | Run Tier 4 assessments in 2017   |
| Flathead                        | 3 <sup>rd</sup> year of a three year MYTAC | 2016          | 1    |      |      |      |      |  |
| Gemfish - East                  | N/A  | 2010          |      | 1    |      |      |      | SESSFRAG recommended postponing the eastern gemfish assessment until 2017                  |
| Gemfish - west                  | 3rd year of a three year MYTAC             | 2011          | 1/4  |      |      |      |      | Reliant on stock structure report from ABARES and ability of data to inform the assessment |
| Gummy Shark                     | 3rd year of a three year MYTAC             | 2013          | 1    |      |      |      |      |  |
| Jackass Morwong                 | 1st year of a three year MYTAC             | 2015          |      |      | 1    |      |      |  |
| John Dory                       | 2nd year of a three year MYTAC             | 2013          |      | 3    |      |      |      |  |
| Mirror Dory                     | Single year TAC                            | 2015          | 4    |      |      |      |      |  |
| Ocean Perch                     | 3rd year of a three year MYTAC             | 2013          |      | 4    |      |      |      | SESSRAG recommended moving 'batch' Tier 4 in 2017.   |
| Orange Roughy - south           | N/A  | 2000          |      |      |      |      |      |  |
| Orange Roughy - east            | N/A  | 2006          |      | 1    |      |      |      |  |
| Orange Roughy - west            | N/A  | 2002          |      |      |      |      |      | Limited effort, bycatch TAC  |
| Orange Roughy - Cascade Plateau | N/A  | 2009          |      |      |      |      |      | Limited data   |

|                              |  |      |      |      |      |      |  |   |
|------------------------------|--|------|------|------|------|------|--|---|
| Orange Roughy - Albany & Esp | N/A  | N/A  |      |      |      |      |  | Limited effort, bycatch TAC   |
| Oreo Smooth - Cascade        | Long term TAC (catch dependent)            | 2010 |      |      |      |      |  | Limited data  |
| Oreo Smooth - other          | Long term TAC (catch dependent)            | 2010 |      |      |      |      |  | Limited data  |
| Oreo Basket                  | 2nd year of a three year MYTAC             | 2013 |      | 4    |      |      |  | Push back to 2017   |
| Pink Ling                    | 2nd year of a three year MYTAC             | 2015 |      |      | 1    |      |  |   |
| Redfish                      | N/A, bycatch TAC                           | 2013 |      | 1    |      |      |  |   |
| Ribaldo                      | 3 <sup>rd</sup> year of a three year MYTAC | 2013 |      | 4    |      |      |  | Push back to 'batch Tier 4'   |
| Royal Red Prawn              | 3rd year of a three year MYTAC             | 2013 |      | 4    |      |      |  | Move back to 'batch' Tier 4   |
| Saw Shark                    | Seek advice from SEMAC/stakeholders        | 2013 |      | 4    |      |      |  | Run Tier 4 assessments in 2017  |
| School Shark                 | N/A (Index of Abundance start 14/15)       | 2012 |      |      | 1    |      |  | Potential for 2018 depending on close kin   |
| School Whiting               | Long term TAC                              | 2009 |      | 1    |      |      |  | Data work in 2016 including ageing issues and NSW data catch rate standardisation and ageing data |
| Silver Trevally              | 3 <sup>rd</sup> year of a three year MYTAC | 2013 |      | 4    |      |      |  |   |
| Silver Warehou               | 1st year of three year MYTAC               | 2015 |      |      | 1    |      |  |   |
|                              |  |      | 2016 | 2017 | 2018 | 2019 |  |   |

\*Multi-year total allowable catch (MYTAC); Tier 1 stock assessment; Tier 3 stock assessment; Tier 4 stock assessment. Key GHAT species included are gummy shark, school shark, saw shark, elephant fish, blue-eye trevalla, pink ling and ribaldo.

## References

AFMA, 2015. *Harvest Strategy Framework for the Southern and Eastern Scalefish and Shark Fishery, 2009 Amended (February 2015)*. Available at: [www.afma.gov.au/sustainability-environment/harvest-strategies/](http://www.afma.gov.au/sustainability-environment/harvest-strategies/).

Bergh, M., Knuckey, I., Gaylard, J., Martens, K. and Koopman, M., 2009. A revised sampling regime for the Southern and Eastern Scalefish and Shark Fishery – Final Report. AFMA Project F2008/0627. OLRAC and Fishwell Consulting. Available at: [www.afma.gov.au/wp-content/uploads/2010/07/ismp\\_sessf.pdf](http://www.afma.gov.au/wp-content/uploads/2010/07/ismp_sessf.pdf).

## Attachment 1 – Logbook data collection and methods of verification

Table 5. Gillnet Fishing Daily Fishing Log NT01B

| Logbook data collected                   | Data verified or collected independently |           |     |               |                             |
|--|--|-----------|-----|---------------|-----------------------------|
| Logbook NT01B                            | E-monitoring                             | Observers | VMS | Port Sampling | Fishery Independent Surveys |
| <b>Fishing vessel &amp; crew details</b> |  |           |     |               |                             |
| Vessel name                              | ✓  | ✓         | ✓   | ✓             | ✓                           |
| Voyage start date                        | ✓  | ✓         | ✓   | ✓             | ✓                           |
| <b>Gear details</b>                      |  |           |     |               |                             |
| Gear type/method                         | ✓  | ✓         |     | ✓*            | ✓                           |
| Mesh size                                |  | ✓         |     |               | ✓                           |
| No. meshes in net drop                   |  | ✓         |     |               | ✓                           |
| Net length                               |  | ✓         |     |               | ✓                           |
| Net height                               |  | ✓         |     |               | ✓                           |
| <b>Vessel activity</b>                   |  |           |     |               |                             |
| Inshore/Offshore                         |  | ✓         | ✓   |               | ✓                           |
| Shot date                                | ✓  | ✓         | ✓   |               | ✓                           |
| Start fishing time                       | ✓  | ✓         |     |               | ✓                           |

|  |   |   |   |   |   |
|--|---|---|---|---|---|
| Start fishing position                     | ✓ | ✓ | ✓ |   | ✓ |
| End fishing position                       | ✓ | ✓ | ✓ |   | ✓ |
| Start haul time                            | ✓ | ✓ |   |   | ✓ |
| End haul time                              | ✓ | ✓ |   |   | ✓ |
| Offal discharge                            |   | ✓ |   |   | ✓ |
| Minimum depth                              | ✓ | ✓ |   |   | ✓ |
| Maximum depth                              | ✓ | ✓ |   |   | ✓ |
| <b>Shot details</b>                        |   |   |   |   |   |
| Shot date / number                         | ✓ | ✓ |   |   | ✓ |
| Total gear lost (mainline length, # hooks) |   | ✓ |   |   | ✓ |
| <b>Catch Composition</b>                   |   |   |   |   |   |
| Vessel name                                | ✓ | ✓ | ✓ |   | ✓ |
| Shot number                                | ✓ | ✓ |   |   | ✓ |
| Voyage ID                                  | ✓ | ✓ |   |   | ✓ |
| Retained species weight                    |   | ✓ |   | ✓ | ✓ |
| Retained species piece count               | ✓ | ✓ |   | ✓ | ✓ |
| Discard species weight                     |   | ✓ |   |   | ✓ |
| Discard species piece count                | ✓ | ✓ |   |   | ✓ |
| Life status of discards                    |   | ✓ |   |   | ✓ |
| <b>Biological Data</b>                     |   |   |   |   |   |
| Date                                       | ✓ | ✓ |   |   | ✓ |
| Time                                       | ✓ | ✓ |   |   | ✓ |
| Species identification                     | ✓ | ✓ |   |   | ✓ |
| Catch location                             | ✓ | ✓ | ✓ |   | ✓ |
| Life status                                | ✓ | ✓ |   |   | ✓ |
| Fate                                       | ✓ | ✓ |   |   | ✓ |
| Retained species length/weight             |   | ✓ |   | ✓ | ✓ |
| Discard species length/weight              |   | ✓ |   |   | ✓ |
| Otolith/vertebrae                          |   | ✓ |   | ✓ | ✓ |

| Wildlife interactions             |   |   |  |  |   |
|-----------------------------------|---|---|--|--|---|
| Species name                      | ✓ | ✓ |  |  |   |
| Number of species interacted with | ✓ | ✓ |  |  |   |
| Date                              | ✓ | ✓ |  |  |   |
| Time                              | ✓ | ✓ |  |  | ✓ |
| Shot number                       | ✓ | ✓ |  |  | ✓ |
| Latitude/Longitude                | ✓ | ✓ |  |  | ✓ |
| Caught during set/haul/other      | ✓ | ✓ |  |  | ✓ |
| Band or tag number                |   | ✓ |  |  | ✓ |
| Life status                       | ✓ | ✓ |  |  | ✓ |

\*Where only a single gear type is used in a trip.

Table 6. Line Fishing Daily Fishing Log LN01B

| Logbook data collected                   | Data verified or collected independently |           |     |               |                             |
|--|--|-----------|-----|---------------|-----------------------------|
| Logbook LN01B                            | E-monitoring                             | Observers | VMS | Port Sampling | Fishery Independent Surveys |
| <b>Fishing vessel &amp; crew details</b> |  |           |     |               |                             |
| Vessel name                              | ✓  | ✓         | ✓   | ✓             | ✓                           |
| Voyage start date                        | ✓  | ✓         | ✓   | ✓             | ✓                           |
| <b>Gear details</b>                      |  |           |     |               |                             |
| Gear type/method                         | ✓  | ✓         |     | ✓*            | ✓                           |
| Mainline length on drum                  |  | ✓         |     |               | ✓                           |
| IWL (grams/metre)                        |  | ✓         |     |               | ✓                           |
| Mainline diameter                        |  | ✓         |     |               | ✓                           |
| Mainline type of connector               |  | ✓         |     |               | ✓                           |
| Branchline length                        |  | ✓         |     |               | ✓                           |



| Logbook data collected           | Data verified or collected independently |   |   |  |   |
|----------------------------------|--|---|---|--|---|
| Branchline type of connector     |  | ✓ |   |  | ✓ |
| Snood length                     |  | ✓ |   |  | ✓ |
| Snood diameter                   |  | ✓ |   |  | ✓ |
| Snood type of connector          |  | ✓ |   |  | ✓ |
| Hook type                        |  | ✓ |   |  | ✓ |
| Hook size                        |  | ✓ |   |  | ✓ |
| Tori pole height above sea level |  | ✓ |   |  | ✓ |
| Tori line length                 |  | ✓ |   |  | ✓ |
| Diameter of tori line            |  | ✓ |   |  | ✓ |
| No. of streamer pairs            |  | ✓ |   |  | ✓ |
| Tori pole alternatives           |  | ✓ |   |  | ✓ |
| <b>Vessel activity</b>           |  |   |   |  |   |
| Inshore/Offshore                 |  | ✓ | ✓ |  | ✓ |
| Shot date                        | ✓  | ✓ | ✓ |  | ✓ |
| Start fishing time               | ✓  | ✓ |   |  | ✓ |
| End fishing time                 | ✓  | ✓ |   |  | ✓ |
| Start fishing position           | ✓  | ✓ | ✓ |  | ✓ |
| End fishing position             | ✓  | ✓ | ✓ |  | ✓ |
| Start haul time                  | ✓  | ✓ |   |  | ✓ |
| End haul time                    | ✓  | ✓ |   |  | ✓ |
| Offal discharge                  |  | ✓ |   |  | ✓ |
| Minimum depth                    | ✓  | ✓ |   |  | ✓ |
| Maximum depth                    | ✓  | ✓ |   |  | ✓ |
| <b>Shot details</b>              |  |   |   |  |   |
| Shot date / number               | ✓  | ✓ |   |  | ✓ |
| Mainline length used             |  | ✓ |   |  | ✓ |
| Total hooks per shot             |  | ✓ |   |  | ✓ |

| Logbook data collected                     | Data verified or collected independently |   |   |   |   |
|--|--|---|---|---|---|
| Number of bubbles set                      |  | ✓ |   |   | ✓ |
| Number of beacons set                      |  | ✓ |   |   | ✓ |
| Seabird mitigation devices used            | ✓  | ✓ |   |   | ✓ |
| Tori line deployment                       | ✓  | ✓ |   |   | ✓ |
| Bait type                                  |  | ✓ |   |   | ✓ |
| Bait amount                                |  | ✓ |   |   | ✓ |
| Number of line lifts (dropline only)       |  | ✓ |   |   | ✓ |
| Average hooks per line (dropline only)     |  | ✓ |   |   | ✓ |
| Total gear lost (mainline length, # hooks) |  | ✓ |   |   | ✓ |
| <b>Catch Composition</b>                   |  |   |   |   |   |
| Vessel name                                | ✓  | ✓ | ✓ | ✓ | ✓ |
| Shot number                                | ✓  | ✓ |   |   | ✓ |
| Voyage ID                                  | ✓  | ✓ |   |   | ✓ |
| Retained species weight                    |  | ✓ |   | ✓ | ✓ |
| Retained species piece count               | ✓  | ✓ |   | ✓ | ✓ |
| Discard species weight                     |  | ✓ |   |   | ✓ |
| Discard species piece count                | ✓  | ✓ |   |   | ✓ |
| Life status of discards                    |  | ✓ |   |   | ✓ |
| <b>Biological Data</b>                     |  |   |   |   |   |
| Date                                       | ✓  | ✓ |   |   | ✓ |
| Time                                       | ✓  | ✓ |   |   | ✓ |
| Species identification                     | ✓  | ✓ |   |   | ✓ |
| Catch location                             | ✓  | ✓ | ✓ |   | ✓ |
| Life status                                | ✓  | ✓ |   |   | ✓ |
| Fate                                       | ✓  | ✓ |   |   | ✓ |
| Retained species length/weight             |  | ✓ |   | ✓ | ✓ |
| Discard species length/weight              |  | ✓ |   |   | ✓ |

| Logbook data collected            | Data verified or collected independently |   |  |   |   |
|-----------------------------------|--|---|--|---|---|
| Otolith/vertebrae                 |  | ✓ |  | ✓ | ✓ |
| <b>Wildlife interactions</b>      |  |   |  |   |   |
| Species name                      | ✓  | ✓ |  |   | ✓ |
| Number of species interacted with | ✓  | ✓ |  |   | ✓ |
| Date                              | ✓  | ✓ |  |   | ✓ |
| Time                              | ✓  | ✓ |  |   | ✓ |
| Shot number                       | ✓  | ✓ |  |   | ✓ |
| Latitude/Longitude                | ✓  | ✓ |  |   | ✓ |
| Caught during set/haul/other      | ✓  | ✓ |  |   | ✓ |
| Band or tag number                |  | ✓ |  |   | ✓ |
| Life status                       | ✓  | ✓ |  |   | ✓ |

## Appendix 1 – Blue-eye trevalla data summary

Table 7. Blue eye trevalla data summary

|  |   |                                  |
|--|---|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 1, last assessed 2015, <u>previously tier 4</u><br>The stock assessment requires catch and effort data, and length and age data (from otoliths) for both male and female fish.<br>Estimates of the size and numbers of discards are required to calculate a discard rate |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data input</b>   | <b>Current collection method</b> |
|  | Length-frequency  | Port sampling                    |
|  | Otoliths  | Port sampling                    |
|  | Sex ratio   | Port sampling                    |
|  | Catch composition   | Logbooks/E-monitoring            |
|  | Vessel activity   | Logbooks                         |
|  | Shot details  | Logbooks                         |
|  | Gear details  | Logbooks                         |

Table 8. Blue eye trevalla data requirements for stock assessments. ✓ = all data for that year is monitored and collected.

| Data required                    | 2015   | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------------------|--------|------|------|------|------|------|
| <b>Catch</b>                     | ✓      | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Effort</b>                    | ✓      | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Length &amp; sex</b>          |        |      | 1200 | 1200 | 1200 | 1200 |
| <b>Otolith</b>                   |        |      | 750  | 750  | 750  | 750  |
| <b>Stock assessment schedule</b> | Tier 4 | TBC  | TBC  | TBC  | TBC  | TBC  |

**Table 9. Proposed port sampling regime for blue-eye trevalla caught by auto-longline in the Gillnet, Hook and Trap sector.**

| Time                    | Collection zone                                 | Length sample size |
|-------------------------|---|--------------------|
| Jul-Sep                 | 20  | 75                 |
|                         | 30  | 75                 |
|                         | 40  | 75                 |
|                         | 50  | 75                 |
| Oct-Dec                 | 20  | 75                 |
|                         | 30  | 75                 |
|                         | 40  | 75                 |
|                         | 50  | 75                 |
| Jan-Mar                 | 20  | 75                 |
|                         | 30  | 75                 |
|                         | 40  | 75                 |
|                         | 50  | 75                 |
| Apr-Jun                 | 20  | 75                 |
|                         | 30  | 75                 |
|                         | 40  | 75                 |
|                         | 50  | 75                 |
| <b>TOTAL (per year)</b> | <b>4 collection zones (20, 30, 40 &amp; 50)</b> | <b>1200</b>        |

**Table 10. Blue eye trevalla research needs and projects; multi-year TAC, MAC, RAG and logbook information.**

|                          |  |
|--------------------------|--|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>   |
| <b>Research projects</b> | <u>Blue eye trevalla catch per unit effort standardisation</u><br>The project will improve understanding of the CPUE variation for blue eye trevalla in the SESSF, and this information will be used to inform stock assessments.<br>(Project number: RR2015/0820; principle investigator: Dr Malcom Haddon, CSIRO; completion date: 15/09/15) |
| <b>Multi-year TAC</b>    | No   |
| <b>SESSF sector</b>      | Gillnet, Hook and Trap Sector (primary sector)<br>Commonwealth Trawl Sector  |
| <b>RAG</b>               | SERAG  |
| <b>MAC</b>               | SEMAC  |
| <b>Logbook</b>           | Line Fishing Daily Fishing Log LN01B<br>Gillnet Fishing Daily Fishing Log NT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01C  |

## Appendix 2 – Elephant fish data summary

Table 11. Elephant fish data summary

|  |  |                                  |
|--|--|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 4, last assessed 2015<br>The stock assessment uses CPUE as an indicator of stock status relevant to a reference period. |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data needed</b>   | <b>Current collection method</b> |
|  | Catch composition  | Logbooks/E-monitoring            |
|  | Vessel activity  | Logbooks                         |
|  | Shot details   | Logbooks                         |
|  | Biological data  | Logbooks                         |
|  | Gear details   | Logbooks                         |

Table 12. Elephant fish data requirements for stock assessments. ✓ = all data in that year is monitored and collected for the Tier 4 stock assessment.

| Data required                    | 2015   | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------------------|--------|------|------|------|------|------|
| <b>Catch</b>                     | ✓      | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Effort</b>                    | ✓      | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Stock assessment schedule</b> | Tier 4 | TBC  | TBC  | TBC  | TBC  | TBC  |

Table 13. Elephant fish research needs and projects; multi-year TAC and MAC, RAG and logbook information.

|                          |  |
|--------------------------|--|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i> |
| <b>Research projects</b> | N/A  |
| <b>Multi-year TAC</b>    | Yes, 3 years   |
| <b>SESSF sector</b>      | Gillnet, Hook and Trap sector  |
| <b>RAG</b>               | SharkRAG   |
| <b>MAC</b>               | SEMAC  |
| <b>Logbook</b>           | Gillnet Fishing Daily Fishing Log NT01B<br>Line Fishing Daily Fishing Log LN01B      |

## Appendix 3 – Gummy shark data summary

Table 14. Gummy shark data summary

|  |   |                                  |
|--|---|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 1, last assessed 2013  |                                  |
|  | The stock assessment requires length and age data (from vertebrate samples) that needs to have temporal and spatial variability and samples need to be collected from both gillnet and longline methods.<br>The indicator of abundance is pup production. |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data needed</b>  | <b>Current collection method</b> |
|  | Length-frequency  | Port sampling                    |
|  | Vertebrae   | Port sampling                    |
|  | Catch composition   | Logbooks/E-monitoring            |
|  | Vessel activity   | Logbooks                         |
|  | Shot details  | Logbooks                         |
|  | Biological data   | Logbooks                         |
|  | Gear details  | Logbooks                         |
|  | Sex ratio   | Port sampling                    |

Table 15. Gummy shark stock assessment data requirements and data collection schedule and the target sample for the observer program. ✓ = all data in that year is monitored and collected for the Tier 1 stock assessment; F = female; M = male.

| Data required             | 2015 | 2016   | 2017 | 2018 | 2019 | 2020 |
|---------------------------|------|--------|------|------|------|------|
| Catch                     | ✓    | ✓      | ✓    | ✓    | ✓    | ✓    |
| Effort                    | ✓    | ✓      | ✓    | ✓    | ✓    | ✓    |
| Location                  | ✓    | ✓      | ✓    | ✓    | ✓    | ✓    |
| Length & sex              |      |        | 2700 | 2700 | 2700 | 2700 |
| Vertebrate sample size    |      |        | 700  | 700  | 700  | 700  |
| Stock assessment schedule | x    | Tier 1 | x    | x    | TBC  | TBC  |

**Table 16. Proposed gummy shark yearly port sampling schedule for length and vertebrae data collection. (SA = South Australia; EBS = Eastern Bass Strait; WBS = Western Bass Strait; TAS = Tasmania; BS = Bass Strait).**

| Time of year (Quarter) | Zone (stocks)                             | Port             | Length samples                                 | Vertebrae samples | # trips to target                                    |
|------------------------|---|------------------|--|-------------------|--|
| Jul - Sep              | SA  | Adelaide/Robe    | 150 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
|                        | Bass Strait                               | Lakes/San Remo   | 200 gillnet<br>0 longline                      | 75                | 1 gillnet trip                                       |
|                        | TAS                                       | Triabunna/Hobart | 125 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
| Oct - Dec              | SA  | Adelaide/Robe    | 150 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
|                        | Bass Strait                               | Lakes/San Remo   | 200 gillnet<br>0 longline                      | 75                | 1 gillnet trip                                       |
|                        | TAS                                       | Triabunna/Hobart | 125 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
| Jan - Mar              | SA  | Adelaide/Robe    | 150 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
|                        | Bass Strait                               | Lakes/San Remo   | 200 gillnet<br>0 longline                      | 75                | 1 gillnet trip                                       |
|                        | TAS                                       | Triabunna/Hobart | 125 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
| Apr - Jun              | SA  | Adelaide/Robe    | 150 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
|                        | Bass Strait                               | Lakes/San Remo   | 200 gillnet<br>0 longline                      | 75                | 1 gillnet trip                                       |
|                        | TAS                                       | Triabunna/Hobart | 125 gillnet<br>100 longline                    | 50                | 1 gillnet trip<br>1 longline trip                    |
| <b>Total per year</b>  | 3 collection zones (SA, Bass Strait, TAS) |                  | 2700 total<br>- 1900 gillnet<br>- 800 longline | 700               | 24 trips<br>- 16 gillnet trips<br>- 8 longline trips |

Note this port sampling regime is linked to the sampling regime for School shark.

**Table 17. Gummy shark research needs and projects; multi-year TAC and MAC, RAG and logbook information.**

|                          |  |
|--------------------------|--|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>                               |
| <b>Research projects</b> | N/A  |
| <b>Multi-year TAC</b>    | Yes, 3 years   |
| <b>SESSF sector</b>      | Gillnet, Hook and Trap Sector (primary sector)<br>Commonwealth Trawl Sector<br>Great Australian Bight Trawl Sector |
| <b>RAG</b>               | SharkRAG   |
| <b>MAC</b>               | SEMAC  |
| <b>Logbook</b>           | Gillnet Fishing Daily Fishing Log NT01B<br>Line Fishing Daily Fishing Log LN01B                                    |



## Appendix 4 – Pink ling data summary

Table 18. Pink ling data summary

|  |  |                                  |
|--|--|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 1, last assessed 2013   |                                  |
|  | The stock assessment requires catch and effort data, and length and age data (from otoliths) for both male and female fish. The current assessment for pink ling assumes that fish caught west of Bass Strait are a separate stock to those caught east of Bass Strait.<br>Estimates of the size and numbers of discards are required to calculate a discard rate. |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data needed</b>   | <b>Current collection method</b> |
|  | Length-frequency   | Port sampling                    |
|  | Otoliths   | Port sampling                    |
|  | Sex ratio  | Port sampling                    |
|  | Catch composition  | Logbooks/E-monitoring            |
|  | Vessel activity  | Logbooks                         |
|  | Shot details   | Logbooks                         |
|  | Gear details   | Logbooks                         |

Table 19. Pink ling data requirements and stock assessment schedule. ✓ = all data in that year is monitored and collected for the Tier 1 stock assessment.

| Data required             | 2015 | 2016   | 2017 | 2018 | 2019 | 2020 |
|---------------------------|------|--------|------|------|------|------|
| Catch                     | ✓    | ✓      | ✓    | ✓    | ✓    | ✓    |
| Effort                    | ✓    | ✓      | ✓    | ✓    | ✓    | ✓    |
| Length & sex              |      |        | 700  | 700  | 700  | 700  |
| Otolith                   |      |        | 400  | 400  | 400  | 400  |
| Stock assessment schedule | x    | Tier 1 | x    | x    | TBC  | TBC  |

Table 20. Proposed port sampling regime for pink ling caught by auto-longline in the Gillnet, Hook and Trap sector.

| Time                    | Collection zone                                 | Length sample size |
|-------------------------|---|--------------------|
| Jul-Sep                 | 20  | 45                 |
|                         | 30  | 45                 |
|                         | 40  | 45                 |
|                         | 50  | 45                 |
| Oct-Dec                 | 20  | 45                 |
|                         | 30  | 45                 |
|                         | 40  | 45                 |
|                         | 50  | 45                 |
| Jan-Mar                 | 20  | 45                 |
|                         | 30  | 45                 |
|                         | 40  | 45                 |
|                         | 50  | 45                 |
| Apr-Jun                 | 20  | 45                 |
|                         | 30  | 45                 |
|                         | 40  | 45                 |
|                         | 50  | 45                 |
| <b>TOTAL (per year)</b> | <b>4 collection zones (20, 30, 40 &amp; 50)</b> | <b>720</b>         |

**Table 21. Pink ling research needs and projects; multi-year TAC and MAC, RAG and logbook information.**

|                          |   |
|--------------------------|---|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>  |
| <b>Research projects</b> | N/A   |
| <b>Multi-year TAC</b>    | Yes, 3 years  |
| <b>SESSF sector</b>      | Commonwealth Trawl Sector (primary sector)<br>Gillnet, Hook and Trap Sector   |
| <b>RAG</b>               | SERAG   |
| <b>MAC</b>               | SEMAC   |
| <b>Logbook</b>           | Line Fishing Daily Fishing Log LN01B<br>Gillnet Fishing Daily Fishing Log NT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01C |

## Appendix 5 – Sawshark data summary

Table 22. Sawshark data summary

|  |  |                                  |
|--|--|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 4, last assessed 2013<br>The stock assessment uses CPUE as an indicator of stock status relevant to a reference period. |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data needed</b>   | <b>Current collection method</b> |
|  | Catch composition  | Logbooks/E-monitoring            |
|  | Vessel activity  | Logbooks                         |
|  | Shot details   | Logbooks                         |
|  | Biological data  | Logbooks                         |
|  | Gear details   | Logbooks                         |

Table 23. Sawshark stock assessment data requirements and schedule. ✓ = all data is required.

| Data required                    | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------------------|------|------|------|------|------|------|
| <b>Catch</b>                     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Effort</b>                    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Stock assessment schedule</b> | TBC  | TBC  | TBC  | TBC  | TBC  | TBC  |

Table 24. Sawshark research needs and projects; multi-year TAC and MAC, RAG and logbook information.

|                          |   |
|--------------------------|---|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>  |
| <b>Research projects</b> | N/A   |
| <b>Multi-year TAC</b>    | Seeking advice  |
| <b>SESSF sector</b>      | Gillnet, Hook and Trap Sector (primary sector)<br>Commonwealth Trawl Sector<br>Great Australian Bight Trawl Sector  |
| <b>RAG</b>               | SharkRAG  |
| <b>MAC</b>               | SEMAC   |
| <b>Logbook</b>           | Gillnet Fishing Daily Fishing Log NT01B<br>Line Fishing Daily Fishing Log LN01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01C |

## Appendix 6 – School shark data summary

AFMA implemented a rebuilding strategy for school shark in 2008 that limits fishing mortality to levels that support rebuilding. This includes measures preventing targeted fishing, an incidental bycatch TAC and measures requiring the release of all school shark caught alive.

Table 25. School shark data summary

|  |   |                                  |
|--|---|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Tier 1, last assessed 2012  |                                  |
|  | The stock assessment requires all catch and effort data, and length and age data from vertebrate samples. The length and age data needs to have temporal and spatial variability and samples need to be collected from both gillnet and longline methods. |                                  |
| <b>Data needed for stock assessment</b>              | Currently pup production is the indicator of abundance, however, in the future close kin genetics may be used as the indicator of abundance.  |                                  |
|  | <b>Data needed</b>  | <b>Current collection method</b> |
|  | Length-frequency  | Port sampling                    |
|  | Vertebrae   | Port sampling                    |
|  | Catch composition   | Logbooks/E-monitoring            |
|  | Vessel activity   | Logbooks                         |
|  | Shot details  | Logbooks                         |
|  | Gear details  | Logbooks                         |
|  | Sex ratio   | Port sampling                    |

Table 26. School shark data requirements and stock assessment schedule

| Data required             | 2015 | 2016 | 2017 | 2018   | 2019 | 2020 |
|---------------------------|------|------|------|--------|------|------|
| Catch                     | ✓    | ✓    | ✓    | ✓      | ✓    | ✓    |
| Effort                    | ✓    | ✓    | ✓    | ✓      | ✓    | ✓    |
| Location                  | ✓    | ✓    | ✓    | ✓      | ✓    | ✓    |
| Length & sex              |      |      | 2700 | 2700   | 2700 | 2700 |
| Vertebrate sample size    |      |      | 700  | 700    | 700  | 700  |
| Stock assessment schedule | x    | x    | x    | Tier 1 | x    | x    |

**Table 27. School shark yearly port sampling schedule for length and vertebrae data collection. (SA = South Australia; EBS = Eastern Bass Strait; WBS = Western Bass Strait; TAS = Tasmania; BS = Bass Strait).**

| Time (Quarter)        | Zone                                      | Port                | Length samples                                 | Vertebrae samples | # trips to target                    |
|-----------------------|---|---------------------|--|-------------------|--------------------------------------|
| Jul - Sep             | SA  | Adelaide/Robe       | 100 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
|                       | Bass Strait                               | Lakes/San Remo      | 250 Gillnet<br>0 Longline                      | 75                | 1 gillnet trip                       |
|                       | TAS                                       | Devonport/Triabunna | 125 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
| Oct - Dec             | SA  | Adelaide/Robe       | 100 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
|                       | Bass Strait                               | Lakes/San Remo      | 250 Gillnet<br>0 Longline                      | 75                | 1 gillnet trip                       |
|                       | TAS                                       | Devonport/Triabunna | 125 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
| Jan - Mar             | SA  | Adelaide/Robe       | 100 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
|                       | Bass Strait                               | Lakes/San Remo      | 250 Gillnet<br>0 Longline                      | 75                | 1 gillnet trip                       |
|                       | TAS                                       | Devonport/Triabunna | 125 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
| Apr - Jun             | SA  | Adelaide/Robe       | 100 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
|                       | Bass Strait                               | Lakes/San Remo      | 250 Gillnet<br>0 Longline                      | 75                | 1 gillnet trip                       |
|                       | TAS                                       | Devonport/Triabunna | 125 Gillnet<br>100 Longline                    | 50                | 1 gillnet trip<br>1 longline trip    |
| <b>Total per year</b> | 3 collection zones (SA, Bass Strait, TAS) |                     | 2700 total<br>- 1900 gillnet<br>- 800 longline | 700               | 16 gillnet trips<br>8 longline trips |

Note this port sampling regime is linked to the sampling regime for Gummy shark.

**Table 28. School shark research needs and projects; multi-year TAC and MAC, RAG and logbook information.**

|                          |   |
|--------------------------|---|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>  |
| <b>Research projects</b> | <p><u>Close kin genetic project</u></p> <p>CSIRO has commenced a project to independently measure the abundance of school shark and results are due in 2017 and will support a new Tier 1 stock assessment scheduled for 2018.</p> <p>Since 1997 operators have actively avoided catching school shark. This means that the CPUE is no longer a robust index of abundance for school shark, and the stock assessment model is projecting the population into the future after 1997.</p> |
| <b>Multi-year TAC</b>    | No  |
| <b>SESSF sector</b>      | Gillnet, Hook and Trap Sector (primary sector)  |
| <b>RAG</b>               | SharkRAG  |
| <b>MAC</b>               | SEMAC   |
| <b>Logbook</b>           | Gillnet Fishing Daily Fishing Log NT01B<br>Line Fishing Daily Fishing Log LN01B   |

## Appendix 7 – Ribaldo summary

Table 29. Ribaldo data summary

|  |  |                                  |
|--|--|----------------------------------|
| <b>Stock assessment &amp; indicator of abundance</b> | Teir 4, last assessed 2013.<br>The length and age data needs to have temporal and spatial variability. |                                  |
| <b>Data needed for stock assessment</b>              | <b>Data needed</b>   | <b>Current collection method</b> |
|  | Length-frequency   | Port sampling                    |
|  | Otoliths   | Port sampling                    |
|  | Sex Ratio  | Port sampling                    |
|  | Catch composition  | Logbooks/E-monitoring            |
|  | Vessel activity  | Logbooks                         |
|  | Shot details   | Logbooks                         |
|  | Biological data  | Logbooks                         |
|  | Gear details   | Logbooks                         |

Table 30. Ribaldo stock assessment data requirements and data collection schedule and the target sample for the observer program. ✓ = all data in that year is monitored and collected for the Tier [X] stock assessment.

| Data required                    | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|----------------------------------|------|------|------|------|------|------|
| <b>Catch</b>                     | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Effort</b>                    | ✓    | ✓    | ✓    | ✓    | ✓    | ✓    |
| <b>Length &amp; sex</b>          |      |      | 1000 | 1000 | 1000 | 1000 |
| <b>Otolith</b>                   |      |      | 300  | 300  | 300  | 300  |
| <b>Stock assessment schedule</b> | TBC  | TBC  | TBC  | TBC  | TBC  | TBC  |

Table 31. Proposed port sampling regime for ribaldo caught by auto-longline in the Gillnet, Hook and Trap sector.

| Time                    | Collection zone                                 | Length sample size |
|-------------------------|---|--------------------|
| Jul-Sep                 | 20  | 63                 |
|                         | 30  | 63                 |
|                         | 40  | 63                 |
|                         | 50  | 63                 |
| Oct-Dec                 | 20  | 63                 |
|                         | 30  | 63                 |
|                         | 40  | 63                 |
|                         | 50  | 63                 |
| Jan-Mar                 | 20  | 63                 |
|                         | 30  | 63                 |
|                         | 40  | 63                 |
|                         | 50  | 63                 |
| Apr-Jun                 | 20  | 63                 |
|                         | 30  | 63                 |
|                         | 40  | 63                 |
|                         | 50  | 63                 |
| <b>TOTAL (per year)</b> | <b>4 collection zones (20, 30, 40 &amp; 50)</b> | <b>1000</b>        |

Table 32. [*Species*] research needs and projects; multi-year TAC and MAC, RAG and logbook information.

|                          |   |
|--------------------------|---|
| <b>Research needs</b>    | <i>Southern and Eastern Scalefish and Shark Fishery 2016-17 Annual Research Plan</i>  |
| <b>Research projects</b> | N/A   |
| <b>Multi-year TAC</b>    | Yes, 3 years  |
| <b>SESSF sector</b>      | Commonwealth Trawl Sector (primary sector)<br>Gillnet, Hook and Trap Sector   |
| <b>RAG</b>               | SERAG   |
| <b>MAC</b>               | SEMAC   |
| <b>Logbook</b>           | Line Fishing Daily Fishing Log LN01B<br>Gillnet Fishing Daily Fishing Log NT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01B<br>Eastern Finfish Trawl Daily Fishing Log EFT01C |