



**Australian Government**

**Australian Fisheries Management Authority**

# **Southern Squid Jig Fishery**

## **Five Year Research Plan**

**(2015 – 2019)**

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**Contents**

Acronyms ..... 4

Introduction ..... 5

Overview of the Southern Squid Jig Fishery ..... 5

Institutional Framework for Research in the SSJF ..... 8

    Research management bodies ..... 8

    Sources of Funding for Research ..... 9

    Process for Commissioning SSJF-related Research ..... 11

Southern Squid Jig Fishery Strategic Research Plan..... 15

    Overview ..... 15

    Identifying research needs ..... 15

    Research Priority Areas..... 16

    Conclusion ..... 17

## Acronyms

<b>AFMA</b>	Australian Fisheries Management Authority
<b>SSJF</b>	Southern Squid Jig Fishery
<b>CTS</b>	Commonwealth Trawl Sector
<b>GABTS</b>	Great Australian Bight Trawl Sector
<b>GHAT</b>	Gillnet, Hook and Trap
<b>RAG</b>	Resource Assessment Group
<b>MAC</b>	Management Advisory Committee
<b>GABMAC</b>	Great Australian Bight Management Advisory Committee
<b>SEMAC</b>	South East Management Advisory Committee
<b>TAE</b>	Total allowable effort
<b>SFR</b>	Statutory Fishing Right
<b>ITQ</b>	Individual transferable quotas
<b>GVP</b>	Gross Value of Production
<b>R&amp;D</b>	Research and Development
<b>HSF</b>	Harvest Strategy Framework
<b>FIS</b>	Fishery Independent Survey
<b>ERA</b>	Ecological risk assessment
<b>ERM</b>	Ecological risk management
<b>TEP</b>	Threatened, endangered and protected
<b>EPBC Act</b>	Environmental Protection and Biodiversity Conservation Act 1999
<b>FRDC</b>	Fisheries Research Development Corporation
<b>FRRF</b>	Fisheries Resources Research Fund
<b>ARC</b>	AFMA Board's Research Committee
<b>CSIRO</b>	Commonwealth Scientific and Industrial Research Organisation
<b>COMFRAB</b>	Commonwealth Fisheries Research Advisory Board

## Introduction

The Southern Squid Jig Fishery (SSJF) is a Commonwealth fishery managed under the *Southern Squid Jig Fishery Management Plan 2005* (the Management Plan). The South East Management Advisory Committees (SEMAC) is the principle advisory body to the Australian Fisheries Management Authority (AFMA) on issues affecting the SSJF.

Achieving an adequate understanding of both the biological and economic issues within the SSJF, by the identification of appropriate targeted research, is vital if the management objectives for the fishery are to be met. Particularly providing the best opportunity to maximise the economic returns to the Australian community as well as providing the fishing industry with a stable and reliable operating environment. This document provides a strategic framework for the SSJF that identifies the key research needs in the fishery for the five-year period 2015-2019.

The purpose of this document is to assist SEMAC in identifying and supporting research that will help achieve the management goals for the SSJF, and ensure that endorsed research projects fit within a comprehensive and strategic research plan for the fishery.

The research plan also provides a framework to assist industry, managers, scientists and other interested parties to work together in a co-operative and open way to address the management issues and research needs which are in the best interests of the fishery, its participants and the wider community.

Research providers wishing to make use of the various funding opportunities which are available for undertaking research on issues of relevance to the SSJF should consult this document to ensure that their research proposals address the management needs for this fishery. Interest groups wishing to investigate how research funds are spent in the SSJF should also refer to this research plan.

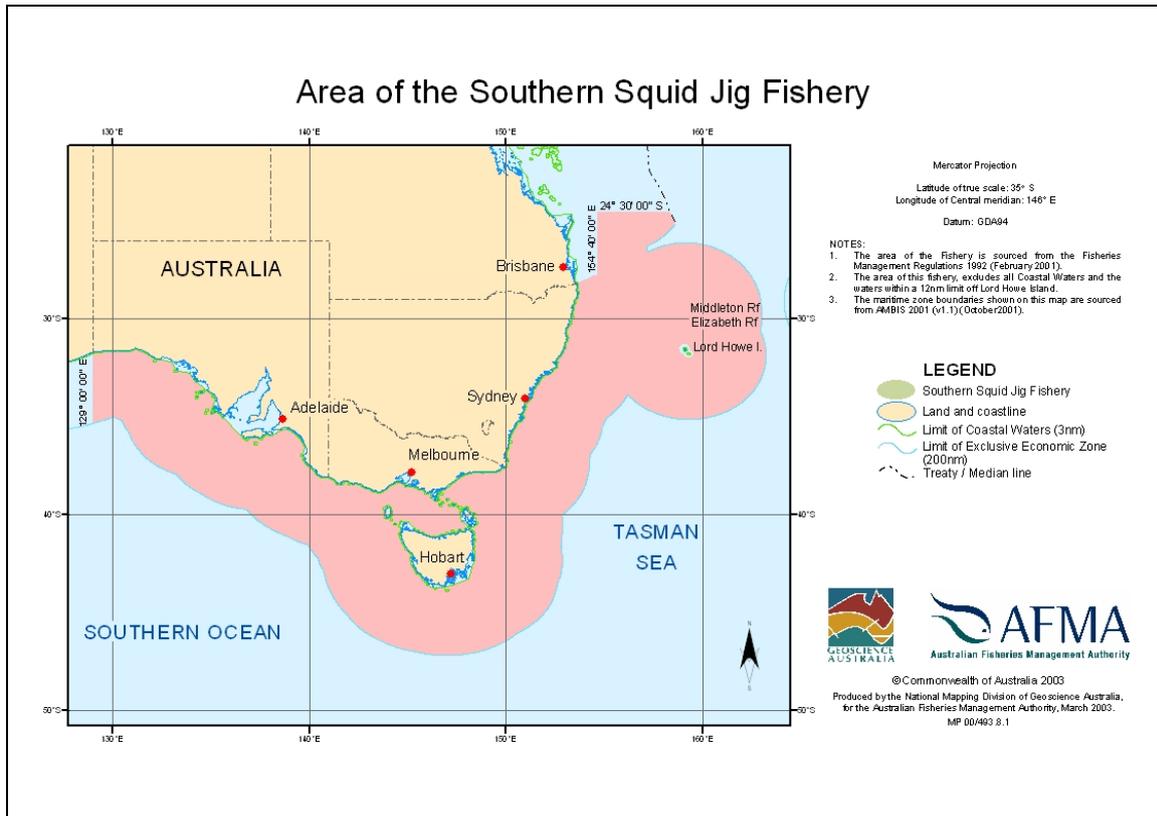
## Overview of the Southern Squid Jig Fishery

The SSJF is a low impact, single-method (jigging), single-species fishery targeting Gould's Squid (*Nototodarus gouldi*). The fishery is located off New South Wales, Victoria, Tasmania and South Australia and in a small area of oceanic waters off southern Queensland, with most fishing taking place off Portland, Victoria (**Figure 1**).

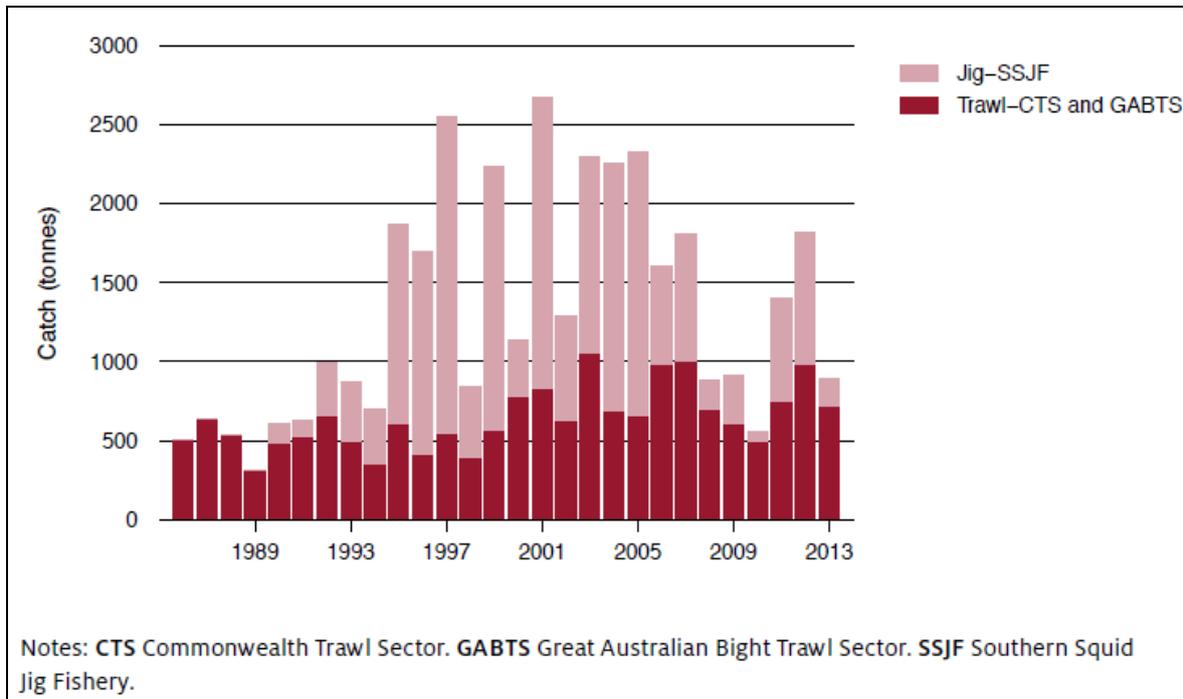
The Commonwealth SSJF is managed by the Australian Government (AFMA), whereas jigging operations within coastal waters (within the 3nm limit) are managed by the relevant state governments.

In recent years low prices have resulted in a significant reduction in targeted fishing effort. This has result in low catches (**Figure 2, page 6**), and low gross value of production (GVP).he GVP trends over the past two decades are shown in **Figure 3, page 7**.

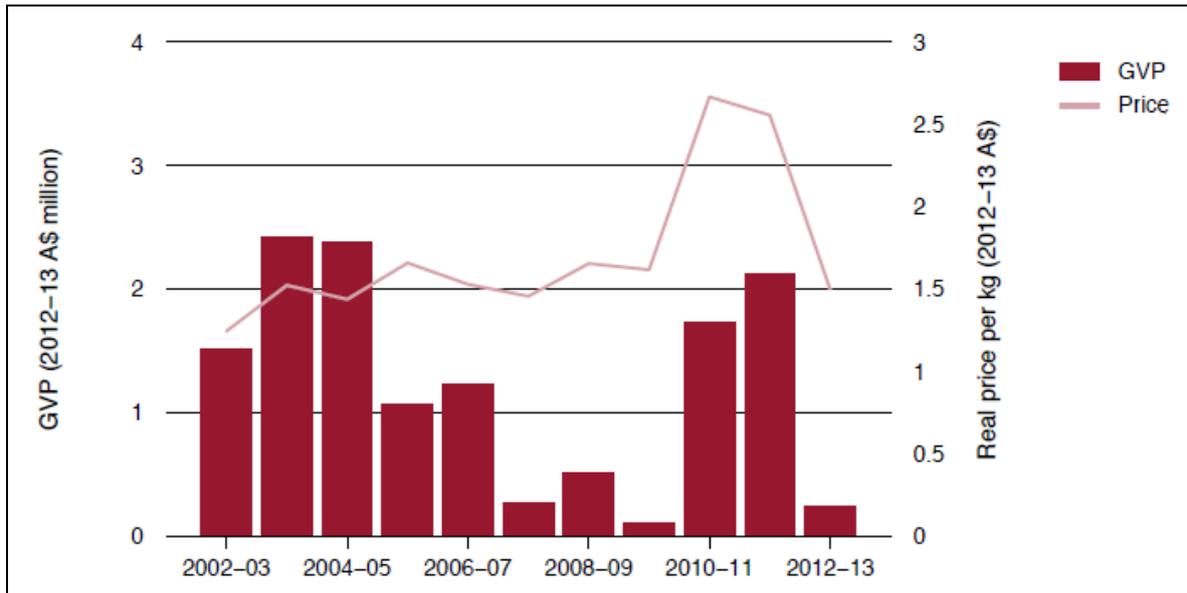
The SSJF is managed under the *Southern Squid Jig Fishery Management Plan 2005* (the Management Plan) and governed by the *Fisheries Management Act 1991*. Under the Management Plan, AFMA manages the catch by limiting effort, restricting how many boats can fish in the area of the fishery and regulating what gear they can use.



**Figure 1:** Area of the Southern Squid Jig Fishery.



**Figure 2:** Squid Catch in the SSJF, CRS and GABTS, 1986 to 2013. *Source: ABARES Fishery status reports 2013-14.*



**Figure 3:** Real Gross Value of Production and average unit prices in the SSJF, 2002/03 – 2012/13, source: ABARES Fishery Status Reports 2013-14.

AFMA sets the total allowable effort for the fishery in advance of the upcoming fishing season (a calendar year). The total allowable effort determines the total number of standard squid jigging machines that can be used in the fishery for the fishing year. Setting an effort limit is one of the main methods AFMA uses to ensure that squid catches remain sustainable. Methods to restrict catch such as an annual Total Allowable Catch do not apply for squid because it is extremely difficult to predict catch (due to highly variably nature of squid fisheries because their availability and abundance are strongly linked to the environment). To determine what the effort should be, a number of sources of information are used. AFMA and scientists have developed the [Southern Squid Jig Fishery Harvest Strategy](#) (Arrow Squid Harvest Strategy), which looks at the catch and effort data in the fishery, environmental aspects and other available scientific information.

The effort set is based on the sustainability of the species, the amount that can be taken out of the ocean each year without causing a decline in the species over time. Consideration is also given to the economic yield to maximise economic returns from the fishery whilst ensuring the sustainability of the species.

All operators in the Southern Squid Jig Fishery have been granted Statutory Fishing Rights that allow them to fish in the fishery and catch squid. These rights are transferable between fishers. Under these arrangements, each fisher is limited to only fish using the amount of effort they hold and the whole fishery is limited to the total allowable effort that is set each season.

Further information about the fishery and management arrangements can be found in the SSJF Management Arrangements Booklet, which is available on the AFMA website <http://www.afma.gov.au/fisheries/southern-squid-jig-fishery/>.

# Institutional Framework for Research in the SSJF

## Research management bodies

### *Squid Resource Assessment Group*

Resource assessment groups (RAGs) are the bodies responsible for providing scientific advice to the management advisory committees (MACs) and the AFMA Commission on the status of fish stocks, sub-stocks, species (target and non-target), and the impact of fishing on the marine environment. They coordinate, evaluate and regularly undertake fishery assessments, and provide recommendations on issues such as the setting of total allowable catches, stock rebuilding targets, and biological reference points.

Membership of the RAGs comprises representatives from the areas of fisheries management, research, industry, fisheries economics and conservation. The broad membership ensures that, in addition to scientific information on each fish stock, industry knowledge and developments in management strategies, market prices and the costs of harvesting are also taken into account.

The Squid Resource Assessment Group is the RAG which provides advice for the Southern Squid Jig Fishery and meets at least annually.

### *South East Management Advisory Committee*

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.

The MACs provide a link between AFMA and those with an interest in the fishery, with membership generally comprising members from commercial industry, fisheries management, the scientific community, the recreational sector, the environment/conservation sector and, in some instances, the State governments. They 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 considers 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. The South East MAC (SEMAC) provides advice on management issues affecting the SSJF.

### *AFMA Research Committee*

Research managed by AFMA is overseen by the AFMA Research Committee (ARC), a six-member committee drawn from AFMA Commissioners and executive management. The Committee is responsible for:

- advising the AFMA Commission and other Commonwealth agencies on research priorities; and
- advising the AFMA Commission on research policy and issues.

The ARC serves a double function as COMFRAB.

## *Commonwealth Fisheries Research Advisory Board*

The Commonwealth Fisheries Research Advisory Board (COMFRAB) is the body which determines the research projects to fund for Commonwealth managed fisheries and the sources of funding for these projects. COMFRAB advises the Fisheries Research and Development Corporation (FRDC) on research priorities and makes recommendations on applications for funding.

### *Division of responsibilities*

The role of each research management body is as follows:

- RAGs – identifies research priorities for fishery sectors and potential research investigators and funding sources, with a focus on stock assessments
- MACs – endorses research priorities/projects and assess the ability of them to meet the management objectives of the fishery
- ARC – advises the AFMA Commission on research priorities and policy issues
- COMFRAB – advises the FRDC on research projects to be funded and the sources of funding
- FRDC – determines the research projects to be funded and the sources of funding

## **Sources of Funding for Research**

Fisheries research projects in the SSJF may be funded through a range of sources, which are described below.

### *a) Fisheries Research and Development Corporation (FRDC)*

The FRDC is a statutory authority jointly funded by the Australian Government and the fishing industry. It funds research and development (R&D) projects and facilitates the adoption of R&D results which provide economic and social benefits for the fishing industry and the Australian community. There are four key programs to which funding is allocated: Natural fish resources, Aquaculture, Harvesting and Marketing.

The FRDC is guided in its funding of research by AFMA's recommendations on Commonwealth fisheries research, as specified in a Memorandum of Understanding between AFMA and the FRDC. All research funded by AFMA or the FRDC requires MAC endorsement in the first instance.

The FRDC receives a total funding of up to 1% of the annual Gross Value of Production (GVP) for any given fishery averaged over the preceding three years, which is made up of the following contributions:

- the Commonwealth Government provides unmatched funds at 0.5% of the average GVP;
- State, Territory and Commonwealth fishers and aquaculture operators provide voluntary contributions; and
- the Commonwealth Government matches the contributions by State, Territory and Commonwealth fishers and aquaculture operators up to a maximum of 0.25% of the average GVP.

Industry funds raised from a particular fishery or region will generally be spent over a five-year period on projects of direct relevance to that fishery or region.

*b) AFMA Research Fund*

The AFMA Research Fund was established in 1995, and primarily provides government funding for management-related fisheries research.

Industry pays a research levy which goes towards research projects and the administration of AFMA's research program. Under AFMA's cost recovery impact statement (CRIS), which was reviewed in 2010, the following government/industry funding allocations apply:

- fisheries management research and collection of verified data – 20% funded by government and 80% by industry;
- broader marine research – 75% funded by government and 25% by industry;
- fishery independent surveys – government contribution of up to 20% where the ARC agrees there is a public benefit;
- resource assessment groups – 20% funded by government and 80% by industry.

AFMA has guidelines for categorising research costs in accordance with 'AFMA's Research Policy 2010'.

*c) Fisheries Resources Research Fund (FRRF)*

The Australian Government established the Fisheries Resources Research Fund (FRRF) in 1991 as a component of the 1989 "New Directions for Commonwealth Fisheries Management in the 1990s" policy statement. The fund was established to provide the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) with the capacity to undertake policy-related research and to provide expert, objective and independent commentary on the status of Commonwealth managed fisheries to the Minister (and the Australian community in general).

Whilst this role has gradually evolved, the major role of the FRRF continues to be the provision of funding for:

- a rolling program of assessments of the management of all Commonwealth fisheries (which is considered necessary for the ongoing stewardship of those fisheries); and
- economic, social and biological research to underpin the Australian Government's effective response to current and emerging fishery policy and management issues (on both a domestic and international basis).

Although the FRRF is managed by DAFF, AFMA is consulted on expenditure by the FRRF through participating in an advisory committee that evaluates applications for funding. Further information on the FRRF can be obtained from DAFF.

d) *Research funded through other sources*

Many other organisations also invest in Commonwealth fisheries research, including Australian Government agencies such as the Department of Environment, (DoE), the National Oceans Office, and the Commonwealth Environment Research Facilities (CERF). CSIRO and several State research organisations also provide funding for research that assists in an increased understanding of the SESSF. These organisations are responsible for developing their own research plans and research priorities.

Where the research interests of AFMA and the FRDC or other research investors overlap there may be opportunities for co-investment to obtain better leverage for research outcomes.

### **Process for Commissioning SSJF-related Research**

The process of commissioning SESSF-related research projects is as follows:

a) *Call for Research Proposals*

Between February and May each year a call for research applications is made. Research bodies are publicly notified of the SESSF research priorities and are invited to submit research proposals to address these priorities. The research proposals may be directed at AFMA or the FRDC.

The notification includes details of the tendering process for research projects that will be funded. The timetable for the MAC tendering process is shown in Table 3. Final research proposals are generally sought from the researchers by August each year.

b) *Endorsement of Research Proposals*

Once received, research applications are evaluated by the relevant MAC and, based on the nature of the research proposals and available research funds, recommendations are made to endorse and rank selected projects. The MAC may request changes to the proposals to better meet the needs of the fishery.

The MAC submits its endorsed proposals to COMFRAB and the ARC for consideration by 1 September. COMFRAB and the ARC review the recommendations, determine the appropriate funding source for each project, and recommend the proposals to the appropriate funding agency by early October.

The research proposals are evaluated according to the guidelines set out in the fishery research plans and the AFMA Strategic Research Plan at both the MAC and AFMA corporate levels.

Full research applications for FRDC funded projects are due on 1 November, although the FRDC may consider applications out-of-session.

c) *Research Contracts*

All AFMA and FRDC funded research is commissioned through the issue of research contracts between the funding body and the researcher. Apart from terms and conditions, these contracts specify the objectives of the research project, the outputs of the project, milestone reports, communication and extension activities and final publication requirements. Payments for research projects are contingent on milestones being met in a timely manner.

The MACs annually review the status and progress of SESSF-related research.

**Table 3: MAC tendering process and ComFRAB timetable**

Date	Timing	SSJF Activity	ComFRAB Activity
Sep of previous year		<p>SquidRAG:</p> <ul style="list-style-type: none"> <li>- planning meeting to review 5 year strategic research plan and research priorities for the SESSF</li> <li>- review MAC funded research as presented in milestone reports</li> <li>- recommend research topics</li> </ul> <p>MACs:</p> <ul style="list-style-type: none"> <li>- determine research priorities and develop project scopes</li> </ul>	
Feb - March	MACs set timeframes	Commencement of SSJF project tender process for AFMA-ComFRAB tactical research and SESSF-prioritised projects.	
March		<p>MACs:</p> <ul style="list-style-type: none"> <li>- advise research providers of priority research areas</li> <li>- call for research proposals (tenders) according to MAC priorities, for the following financial year</li> </ul>	<p>ComFRAB:</p> <ul style="list-style-type: none"> <li>- call for research applications and pre-proposals</li> <li>- cross-fishery research priority setting</li> </ul>
April	FRDC set timeframes	Close call for SSJF project tenders	<p>FRDC FRAB biennial workshop.</p> <p>ComFRAB:</p> <ul style="list-style-type: none"> <li>- Call for cross-fishery research proposals (tactical research for current year, and pre-proposals for following year)</li> </ul>
May	MACs set timeframes	<p>MACs/RAGs:</p> <ul style="list-style-type: none"> <li>- assess and prioritise research proposals submitted by research providers, for submission to ComFRAB</li> </ul>	

June	ComFRAB deadline	Submit project proposals to ComFRAB	<p>Deadline for electronic submission to ComFRAB of:</p> <ul style="list-style-type: none"> <li>tactical research applications for current year and pre-proposals for following year</li> <li>MAC assessment advice on the tactical research proposals and pre-proposals</li> </ul>
July	MACs set timeframes	MACs assess and rank full research applications and RAG workplans for following financial year	<p>ARC - policy issues, tactical research applications, pre-proposals</p> <p>ComFRAB - tactical research applications and pre-proposals</p>
August	ComFRAB deadline	Submit final MAC endorsed and ranked project proposals to ComFRAB	<p>Deadline for electronic submission to ComFRAB of:</p> <ul style="list-style-type: none"> <li>Full project proposals for following financial year</li> <li>MAC assessment advice of endorsed and ranked full proposals for following financial year</li> </ul>
September			ComFRAB - Research applications assessed and funding recommendations made to funding partners
November	FRDC deadline		<p>Deadline for applications seeking FRDC funding to be lodged with FRDC</p> <p>Deadline for submission to ARC of RAG applications for following financial year</p>
December			ARC – policy matters, deferred research proposals

**Note:**

<sup>1</sup> These are nominally projects of a single year's duration

<sup>2</sup> The dates specified above are subject to change, but they are generally a good indicator of research target dates. For confirmation of times and venues contact AFMA's Research and Data Section.

## AFMA's Research Program

AFMA has four research programs which are directed to meeting AFMA's legislative objectives and achieve the outcome of ecologically sustainable and economically efficient Commonwealth fisheries. These are:

For further information on AFMA's research programs, refer to the 'AFMA Strategic Research Plan' which is available on the AFMA website.

### Program 1 – Fishery stocks and biology

- *Stock monitoring*  
To collect appropriate information to support stock assessments, using a total stock management approach.
- *Understanding stocks*  
To underpin stock assessments with a knowledge of the stock biology and the total stock accessed by all sectors.

### Program 2 – Ecosystem-based fisheries management

- *Impact monitoring*  
To base management decisions on a knowledge of impacts on fisheries ecosystems.
- *Impact reduction*  
To minimise impacts on fisheries ecosystems.

### Program 3 – Evaluation

- *Management indicators*  
To monitor and evaluate the effectiveness of existing management strategies.
- *Management strategies*  
To development management and harvest strategies to ensure best-practice management and the greatest return to the community.

### Program 4 – Development

- *Management development*  
To develop policies and technology to support the management of Commonwealth fisheries.
- *Industry development*  
To develop skills and knowledge of stakeholders involved in the fishing industry.

For further information on AFMA's research programs, refer to the 'AFMA Strategic Research Plan' which is available on the AFMA website.

# Southern Squid Jig Fishery Strategic Research Plan

## Overview

Broadly speaking, all research activities in AFMA focus on ensuring the attainment of AFMA's two primary management objectives, which are:

- i) to ensure the ecological sustainability of the fishery; and
- ii) to maximise the economic efficiency of the fishery.

Management towards each of these objectives requires an understanding of both the impacts of fishing on target stocks and the broader ecosystem, and the fishing strategies and performance of fishing vessels.

The SESSF research plan identifies the research needs and priorities for the fishery over the next five years. Addressing these needs will provide the necessary scientific and economic information to:

- assist with the achievement of the management objectives for the SSJF, which are consistent with the AFMA objectives;
- enable the effective implementation and appraisal of management plans, including amendments to the plan and the introduction of new quota species.

There are a range of legislative, management and assessment requirements which influence research activities in the SSJF. Research priorities must be consistent with AFMA's research programs and the 'AFMA Strategic Research Plan'. They are also influenced by other assessments undertaken for Commonwealth fisheries, and any obligations under the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Under the EPBC Act all Commonwealth fisheries are required to be strategically assessed (similar to an Environmental Impact Assessment) against a set of sustainability guidelines.

## Identifying research needs

Drivers of research can be considered to fall into five categories:

- a) Biological – information for stock assessments, multi-species fisheries issues etc.
- b) Environmental – bycatch mitigation, protected species, ecosystem impacts etc.
- c) Legislative – Harvest Strategy Policy, ERAs and ERMs, EPBC listing etc.
- d) Economical – economic targets, market dynamics etc.
- e) Social – access to resource, resource allocation issues etc.

Existing gaps in our current knowledge of the SSJF influence the levels of uncertainties that need to be incorporated into stock assessment models. These gaps include a lack of understanding of the stock structure of squid, and inadequacies in the core information available on squid biology. These inadequacies relate to squid life-history parameters such as age and natural mortality rates. This lack of information hinders our ability to adequately assess the stocks and estimate the size of sustainable harvests from those stocks.

A more comprehensive discussion of this, and other identified priority areas are outlined in section 5.3 Research Priority Areas.

## Research Priority Areas

The following research areas have been identified by SquidRAG as high priority needs for the next five years. These are not listed in order of priority.

### **1. Improving the location and targeting of economically viable aggregations of squid available to the squid jigging fishery.**

Comments: SquidRAG recommends that the fishery better understand the distribution of squid and their availability to the fishery. RAG feels that the resource is presently underexploited with large aggregations of the resource in the area of the SSJF but it is difficult for fishers to locate the aggregations. Several indicators are available that may help the fishery better focus their targeting practices:

- Analysis of remote sensing data for sea surface temperature, chlorophyll A concentrations etc.
- Distribution and abundance patterns of sharks that predate on squid (e.g. mako sharks have been reported to have a large number of squid within their stomach contents).
- New Zealand data on characterizing where squid have been caught relative to environmental factors.

SquidRAG recommended that a desktop review be commissioned in the first instance to examine which indicators (such as environmental factors) have been used in other squid fisheries to improve the location and targeting of squid aggregations. This information could narrow down which factors would be most likely to predict squid catches and further investigation could be conducted.

Note – the desktop part of this project is underway and due to be completed by the end of 2017.

### **2. Improving the SSJF fishing fleets ability to catch squid.**

Comments: SquidRAG considered that economics of the fishery could be improved by bringing in foreign expertise to demonstrate to Australian squid fishers how to more effectively find fish, employ the most effective light colour to maximize shading under the boat and how to employ other squid fishing techniques. An alternative is to use industry development scholarships granted by the government to send Australian squid fishers to foreign fisheries to gather facts.

### **3. Alignment of management frameworks between Commonwealth and State arrangements.**

Comments: SquidRAG supported any future alignment of management frameworks between the Commonwealth squid fishery and state squid fisheries (NB – state fisheries are defined as those within 3nm distance off state coastlines, with the Commonwealth managed SSJF area being outside 3nm; fishers are known to purposely target squid within 3nm in Tasmanian waters to avoid the need to participate in the Commonwealth managed fishery by purchasing fishing rights).

There are likely economic benefits in sharing arrangements and an increased fleet size may assist in more effective 'scouting' for squid aggregations.

#### 4. Stock assessment

Comments: Ensuring the ecological sustainability and maximizing economic yield are two primary management objectives. To achieve these objectives, it is essential to understand basic biological and stock information. Quantitative stock assessment provide such needed information for management decisions. Until now there has been no formal stock assessment for this fishery. AFMA currently manages the fishery by limiting effort based on historical catch level. Until now there has been no formal stock assessment for this fishery. Except a formal quantitative assessment no other option can provide confidence to ensure that the risks of not achieving both objectives are within acceptable levels. More than 10 years of catch and effort data are available for SSJ fishery, as well as catch records in the trawl fishery. These data appear to be sufficient for quantitative stock assessments. Potential techniques may include depletion analysis, catch-only methods, and production models. Ideally, these approaches could be combined.

#### Conclusion

This research plan provides a framework for identifying the key research priorities in the SSJF for 2015-2019. It will assist SEMAC in identifying and supporting research that will help achieve the management goals for the SSJF, and ensure that endorsed research projects fit within the strategic research plan for the fishery.