Australian Government
Australian Fisheries Management Authority

Eastern Gemfish (*Rexea solandri*) Stock Rebuilding Strategy

Revised 2015

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Executive Summary

This *Eastern Gemfish Stock Rebuilding Strategy 2015* (the Strategy) is a revision of the *Eastern Gemfish Stock Rebuilding Strategy 2008* (the 2008 Strategy). The 2008 Strategy was implemented as required by the *Commonwealth Fisheries Harvest Strategy Policy 2007* to support the recovery of eastern gemfish to above 20 per cent of their unfished spawning biomass, the biomass limit reference point that has been adopted for the stock.

Eastern gemfish underwent significant decline as a result of commercial fishing in the 1970s and 1980s. In response to the decline, AFMA implemented management measures from the early 1990s including no targeted fishing, and more recently the 2008 Strategy, with the objective to rebuild the stock to its limit reference point within one mean generation time or nine years. Eastern gemfish is still recovering and was assessed in 2010 to be at 15.6 per cent of unexploited female spawning stock biomass, below its limit reference point of 20 per cent of unfished spawning stock biomass levels.

Management actions in this Strategy focus on maintaining the overall low fishing mortality of eastern gemfish while continuing to monitor and assess the stock status to ensure recovery. This will be done through:

- fishing effort restrictions through limited entry to existing fisheries. This means that an existing licence must be leased or purchased in order to fish
- catch restrictions preventing targeted fishing of eastern gemfish. Incidental catches are managed under a low Total Allowable Catch (TAC) limit designed to cover the minimum unavoidable catch while targeting other species
- research and monitoring to support stock assessments and to measure the Strategy in meeting its objectives.

An annual review of eastern gemfish catch rates and biological information is conducted by the Shelf Resource Assessment Group (ShelfRAG). AFMA reports annually to the Department of the Environment on progress made under the Strategy. The management arrangements contained within the Strategy may be amended as required in response to changes in stock status or the ongoing monitoring by ShelfRAG. This Strategy will be formally reviewed after five years.

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Introduction

Eastern gemfish (*Rexea solandri*) is estimated to be at 15.6 per cent of its unfished biomass (Little and Rowling, 2010), which is below its limit reference point of 20 per cent of the unfished spawning biomass. As such, this stock is considered as overfished in the Southern and Eastern Scalefish and Shark Fishery (SESSF) (Georgeson *et al.* 2014). The *Commonwealth Fisheries Harvest Strategy Policy 2007* (HSP) requires formal rebuilding strategies to be developed for all species below their biomass limit reference point. This *Eastern Gemfish Stock Rebuilding Strategy 2015* (the Strategy) has been developed to meet that requirement.

This Strategy replaces the 2008 *Eastern Gemfish Stock Rebuilding Strategy* (the 2008 Strategy). The objective of this Strategy is to promote the recovery of eastern gemfish to ecologically sustainable levels and ultimately maximise the economic returns to the Australian community from the resource.

Rebuilding timeframes

When the 2008 Strategy was developed, it adopted a timeframe for rebuilding eastern gemfish to the limit reference point of one mean generation time (being approximately nine years). However, this timeframe is unlikely to be met given recent recruitment levels have been below average and, when last assessed in 2010, the stock was at 15.6 per cent of its unfished biomass.

The HSP provides further guidance that the rebuilding timeframe to the limit reference point should be biologically reasonable. Examples given are:

- a period equal to a mean generation time plus 10 years; or
- three times the mean generation time.

Accordingly, in this Strategy, AFMA has adopted the biologically reasonable rebuilding timeframe to the limit reference point of one mean generation time plus 10 years (being approximately 19 years from 2008), in line with the example given in the HSP. This means eastern gemfish should be rebuilt to or above the limit reference point by 2027.

Objectives

Consistent with the *Fisheries Management Act 1991* (the Act) and the HSP, the broad objective of the Strategy is to return eastern gemfish stocks to ecologically sustainable levels and ultimately maximise the economic returns to the Australian community from the resource. There are three rebuilding objectives:

1. to rebuild eastern gemfish in the area of the SESSF to the default limit reference point of 20 per cent of unfished spawning stock biomass (B_{LIM}) within a biologically reasonable timeframe, being approximately 19 years (one mean generation time plus 10 years);

2. having reached B_{LIM}, rebuild eastern gemfish to the maximum sustainable yield level of 40 per cent of unfished spawning stock biomass (B_{MSY}); and

3. once B_{MSY} is reached, pursue the biomass level which aims to maximise net economic returns, currently 48 per cent of unfished spawning stock biomass (B_{MEY}).

Background

Stock structure and distribution

Gemfish are found throughout southern Australian temperate waters (Pogonoski *et al.* 2002), and are divided into two stocks:

- eastern gemfish, which are distributed from Cape Moreton, southern Queensland, along the east coast to Bass Strait and the waters off Tasmania
- western gemfish, which are distributed from Ningaloo Reef and Geraldton through the Great Australian Bight (Colgan & Paxton 1997).

The two Australian stocks do not differ in appearance but analysis suggests that they are genetically different (Colgan & Paxton 1997).

Eastern gemfish are mesopelagic and inhabit deeper continental shelf habitats and upper slope waters from 100 m to 700 m (recorded down to 1254 m), but are generally found in waters about 250 m – 500 m deep. This species is generally caught close to the sea floor but the fish are likely to move into mid-water at times (Kailola *et al.* 1993; Pogonoski *et al.* 2002). Larvae occur in shallow to very shallow waters (Pogonoski *et al.* 2002).

Mature eastern gemfish undergo an annual spawning migration. This begins with the aggregation of fish north of Bass Strait in autumn, and concludes with fish reaching the spawning grounds off Crowdy Head, NSW, in August. The eggs and pelagic larvae are then carried back down the NSW coast by the Eastern Australian Current (DotE 2014).

For AFMA management purposes, eastern gemfish are defined by those gemfish caught east of 146° 22’ east longitude. The area south of 42° south latitude and west of 146° 22’ east longitude off western Tasmania, is also considered part of the eastern gemfish stock for management purposes. The boundary between the eastern and western stocks is currently being investigated and the results will be used to assess the appropriateness of the above management boundary.

Life history

Male and female eastern gemfish exhibit different life histories. Females mature at four to six years of age, grow to a maximum length of 116 cm and may live to 17 years. Males mature earlier, at three to five years, grow to a maximum length of 106 cm and may live to 13 years (Morison *et al.* 2007). While gemfish can grow to 116 cm, most commercially caught fish are smaller than 90 cm.

Juvenile gemfish exhibit rapid growth and reach 25 – 30 cm fork length after one year and 65 – 75 cm after five years. Estimates of age at first maturity in NSW waters are three to five years for males and four to six years for females. The mean generation time for the species has been estimated to be nine years.

Key threats

Eastern gemfish comprised a very significant proportion of Commonwealth and NSW trawl landings off south-eastern Australia during the 1970s and 1980s, based on targeted fishing of mature fish in winter pre-spawning aggregations. In the late 1980s, the impact of fishing on

the eastern gemfish stock became apparent, with declining mean length of fish in the spawning population and reduced catch rates in the winter fishery. In 1988 eastern gemfish became the first species in the South East Fishery to be subject to a Total Allowable Catch (TAC) which was set at 3 000 t. In the early 1990s the spawning stock was also significantly reduced by a series of very poor recruitment cohorts and the TAC was progressively reduced to zero by 1993 (Knuckey *et al.* 2009).

The (targeted) TAC remained at zero until a trawl survey conducted during the winter of 1996 confirmed that a relatively strong cohort (spawned in 1990) was recruiting to the mature population. A 1 000 t TAC was set for the 1997 winter season however landings only amounted to about 300 t. Analysis of the fishery and biological data at this time suggested that the spawning biomass remained well below the target level. In subsequent years a 'non-target' incidental bycatch TAC was applied for eastern gemfish and allocated to fishers in proportion to their eastern gemfish quota holdings. When first applied in 1998 the incidental bycatch TAC was 300 t but was sequentially reduced to 100 t by 2002, and has remained at this level until now. The management arrangements outlined in this Strategy are intended to reduce the threat to eastern gemfish posed by Commonwealth commercial fishing mortality.

The impacts on eastern gemfish from recreational fishers are not well known, however, more fishers now have better access to equipment needed to locate eastern gemfish fishing grounds and deploy hooks at the depths at which the species lives. Improved estimates of mortality from the recreational sector will assist in improving the estimate of total fishing mortality.

While fishing is considered to have had a significant impact on eastern gemfish, environmental variability, including climate change or a productivity shift, can also affect fish population dynamics and could potentially limit the recovery of eastern gemfish. The potential impacts of environmental variability on fish stocks, including eastern gemfish, are not well understood and further work in this area would provide a greater understanding of the species and threats to its recovery.

Status of resource

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) Fishery Status Reports has classified eastern gemfish as overfished since 1992. The ABARES Fishery Status Reports 2013-14 classified eastern gemfish as overfished, but uncertain as to whether overfishing is occurring. This was because of increasing uncertainty about whether the current levels of recruitment and removals will allow the stock to rebuild in the timeframe specified in the 2008 Strategy (Georgeson *et al.* 2014).

The HSP states that if the stock is below the biomass limit reference point, any fishing is classified as overfishing unless the stock will recover by the shorter of:

a) a period equal to a mean generation time plus 10 years; or

b) three times the mean generation time.

A generation for eastern gemfish is estimated to be nine years. Management measures implemented under the Strategy aim to recover eastern gemfish to its limit reference point within a generation time plus 10 years – that is 19 years from the date of the 2008 Strategy being 2027. Based on the most recent biomass projections in 2010, the stock is predicted to recover to a biomass larger than its limit reference point by about 2025 under an incidental catch of 100 t (Morison *et al.* 2013). However, this conclusion depends strongly on average

recruitment for the stock occurring in the future, and whether catches remain within the 100 t incidental catch TAC. Recruitment over the last 25 years has been weaker compared to the period from the 1970s to 1980s (Little and Rowling 2010) and if recruitment remains below average, rebuilding within the target timeframe is unlikely. Recreational and NSW commercial catch also have the potential to impact on recovery times, however estimates of catch from both of these sectors are unreliable and need improvement.

More information on stock assessments of eastern gemfish can be seen below under 'Monitoring and evaluation'.

Catch, targeting and discards

Catch of eastern gemfish peaked in 1978 at more than 6000 t, then decreased rapidly after about 1987 (Figure 1). In 2013 the retained catch of eastern gemfish was approximately 79 t and the estimated discards were at 141 t[1]. ShelfRAG noted the estimate of discards for 2013 was an increase from 28 t discarded in 2012 but below the levels seen in 2008 (164 t), 2009 (171 t) and 2010 (191 t).

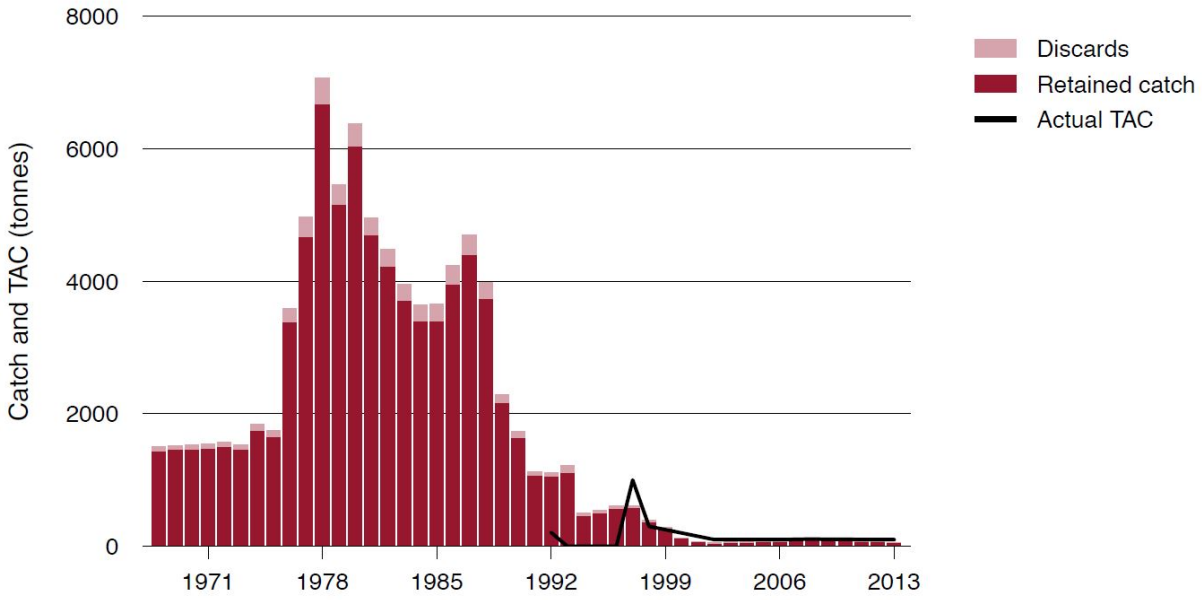

Figure 1: Eastern Gemfish annual catches (tonnes) from the Commonwealth SESSF (trawl and, Scalefish Hook Sectors) and state combined, and fishing season TACs, 1968 to 2013. Note: Data after 2008 excludes discards and state catch (Georgeson et al 2014).

Despite 2013 catches plus discards exceeding the incidental catch TAC, ShelfRAG recommended maintaining the existing TAC of 100 t on the basis that individual boats should be targeted to reduce catches, and, because of the high level of discards, reducing the incidental catch TAC would not significantly reduce fishing mortality.

Recent analysis of targeting presented to ShelfRAG in 2012 estimated that approximately 10 t of eastern gemfish in 2012 may have been targeted catch. However, ShelfRAG noted that as

[1] Estimate of discards from the Integrated Scientific Monitoring Program using a comprehensive sampling strategy to account for major changes in fishery dynamics across the SESSF (Bergh et al 2009).

catches reduce, the analysis becomes less reliable and highly sensitive to small catches by a small number of boats. AFMA and ShelfRAG will however continue to monitor potential targeting and, if there is increase in targeting behavior, AFMA, in consultation with ShelfRAG and SEMAC, may implement further management measures, including move on provisions or spatial closures.

AFMA will continue to monitor discarding through the AFMA observer program and will work with industry to further reduce discarding. AFMA is assessing ways to improve the precision of discard information recorded by operators in catch and effort logbooks.

Monthly catch and TAC information for all SESSF quota species, including eastern gemfish, can be accessed through AFMA's 'catchwatch' reports at http://www.afma.gov.au/fisheries-services/catchwatch-reports/.

Management actions to achieve the objectives

The primary mechanism available to AFMA to promote recovery is restricting commercial catches. Accordingly, management measures focus on preventing targeting and limiting bycatch of eastern gemfish. AFMA and ShelfRAG will annually review and report on eastern gemfish data (see Appendix A) and recommend additional management measures where appropriate to achieve the objectives.

- Incidental catch TAC - The HSP and this Strategy provide for zero targeted catch of eastern gemfish. As such, the eastern gemfish TAC has been set at the minimum amount required to cover the incidental catch of eastern gemfish. An incidental catch TAC of 100 t has been implemented since 2002. This incidental catch TAC level is reviewed by ShelfRAG annually (see Appendix A) and may be increased or decreased depending on information about targeting behaviour or changes to fishing mortality and biomass. The 2010 assessment indicated that there was little difference in the rebuilding trajectory to the limit reference point under 0 t or 100 t catch scenarios (Little and Rowling 2010).

- Trawl gear selectivity – increased codend mesh size (minimum of 90 mm mesh size) and bycatch reduction devices were implemented through a Direction under the Act in 2006. This bycatch reduction measure has since been implemented as a condition on each operator's fishing permit. This decreases the number of juvenile eastern gemfish caught in trawl nets.

  A recent survey showed that, in addition to an enforced minimum mesh size of 90 mm, almost half the trawl operators in the SESSF are using a codend mesh size greater than 100 mm which will further help reduce catches of juvenile fish including gemfish.

- Limited entry – Access to the SESSF is limited. New operators can generally only access the fishery by purchasing an existing concession. This restricts any future expansion of incidental catch of eastern gemfish within the TAC limit.

  A structural adjustment package in 2006 resulted in the removal of 59 boat Statutory Fishing Rights (approximately a 50 per cent reduction) and 32 vessels from the Commonwealth trawl sector (CTS) of the SESSF. This structural adjustment led to an immediate and significant reduction in effort in the CTS, and resulted in a 24 per cent decline in total catch from 2005-06 to 2007-08 (Viera *et al* 2010).

- Existing fishery closures – A closure to protect upper-slope dogfish in depths between 200 – 500 m and approximately 40 nm in length off Sydney was implemented in 2007 and applies to all methods in the SESSF. The closure was subsequently extended in 2013 to a depth of 1000 m, and is now approximately 65 nm long. This closure also provides some protection to eastern gemfish during the pre-spawning winter run.

- Monitoring discards by onboard AFMA observers to estimate discard rates across the fishery – Approximately three per cent of fishing effort is observed by AFMA observers in the Commonwealth Trawl Sector, and there is a focus on achieving coverage in areas and times of high abundance of eastern gemfish to obtain biological samples and estimates of discards.

- Regular fishery independent surveys (FIS) are undertaken to help provide an independent index of abundance of as many SESSF quota species as possible, including eastern gemfish.

- Trip limits – Commercial NSW state fishers are restricted to a 50 kg trip limit for eastern gemfish. This is designed to prevent targeting of eastern gemfish.

- Compulsory pre-reporting – AFMA introduced compulsory pre-reporting arrangements in 2015-16 for fishers landing eastern gemfish during the species annual spawning migration (north of latitude 36° 45' South, between 1 June and 30 September). The intent of this is to support data collection from spawning fish, a key source of data for the stock assessment.

- State and Recreational engagement – AFMA is engaging with Recreational and State Government stakeholders to discuss complementary management measures and actions to protect eastern gemfish outside of AFMAs jurisdiction.

Management arrangements for the current fishing season can be accessed in the 'SESSF Management Arrangements Booklet', which is sent out to all concession holders before the start of each fishing season. A copy of the booklet is available at http://www.afma.gov.au/fisheries-services/fisheries-management-plans/.

Future management

Improved data collection to provide a better understanding of the status of the stock and its recovery projection is a key focus of this Strategy. This will in turn inform future management measures to ensure the objectives of this Strategy are achieved. With increased data becoming available, adaptive management measures may be adopted. These may include:

- targeted monitoring (onboard observer or electronic monitoring) when fishing in areas of high historical eastern gemfish catch

- implementation of trigger and move-on provisions for vessels reporting large catches if annual analysis by ShelfRAG indicates that boats are targeting eastern gemfish

- spatial and temporal closures if appropriate areas are identified (as discussed under 'Closures' below).

Industry code of practice

In 2011 the South East Trawl Fishing Industry Association (SETFIA), with support from AFMA, developed a code of practice (the Code) and an education program to encourage fishers to actively avoid catching eastern gemfish and highlight the importance of accurately recording data.

The Code captures the requirements set down by the Strategy and involves an additional measure in which fishermen are asked to communicate the location of large shots of eastern gemfish to others in an effort to increase avoidance and reduce incidental catches. The development of the Code saw a reduction in the total fishing mortality (catch and discards) by approximately a third between 2010 to 2011.

As a further initiative, SETFIA and AFMA are developing online learning modules to educate fishers about the fisheries management, including arrangements for eastern gemfish.

Closures

The 2008 Strategy included a stage that triggered the implementation of a spatial closure to reduce the incidental capture of pre-spawning and spawning fish. When the 2008 Strategy was implemented it was believed that moving, real time closures could protect the spawning run of fish. ShelfRAG examined this option on 5-6 November 2012 following presentation of effort and catch data by CSIRO and AFMA. These data showed that catches of the species are widespread over space and time. The RAG advised that specific closures were not appropriate as catches are widespread and there is little evidence of targeting. ShelfRAG further noted that spatial closures would need to be substantially large to be effective causing the broader fishery to become uneconomic.

ShelfRAG continue to monitor the location and time of eastern gemfish catches (see Appendix A). In 2014, ShelfRAG considered and identified areas of high catch during the species annual spawning migration. AFMA will reconsider introducing spatial and temporal closures to help achieve the objectives of this Strategy if there are indications of increasing targeted catches, or significant overcatch of the incidental catch TAC.

It should be noted that fishery closures in the SESSF, while not specifically implemented for the purpose of protecting eastern gemfish, overlap with the distribution the species. The area of the CTS that is closed to trawling adds up to approximately 86 per cent of the fishery, including a large closure off Sydney which provides some protection to eastern gemfish during the pre-spawning winter run.

Monitoring and evaluation

Stock assessments and data collection

The most recent eastern gemfish stock assessment (fully quantitative ‘Tier 1’) was conducted in 2008 and included results of a 2007 industry trawl survey. During 2010, the assessment was updated and re-run with the 2009 logbook and Integrated Scientific Monitoring Program (ISMP) observer data. This assessment showed that the stock declined from the beginning of the fishery in 1968, fluctuated in abundance during the 1970s, before declining further in the 1980s and 1990s to below the biomass limit reference point. Most of the recruitments during the last 25 years have been relatively weak which contrasts with the 1970s when recruitment

was variable, but generally higher. Although a relatively large recruitment (given the low stock size) was estimated to have occurred in 2002 which lead to a slight recovery in the biomass, these recruits have now largely passed through the fishery. The Tier 1 assessment updated in 2010 resulted in a spawning stock biomass estimate of 15.6 per cent (Figure 2) (Little and Rowling 2010).

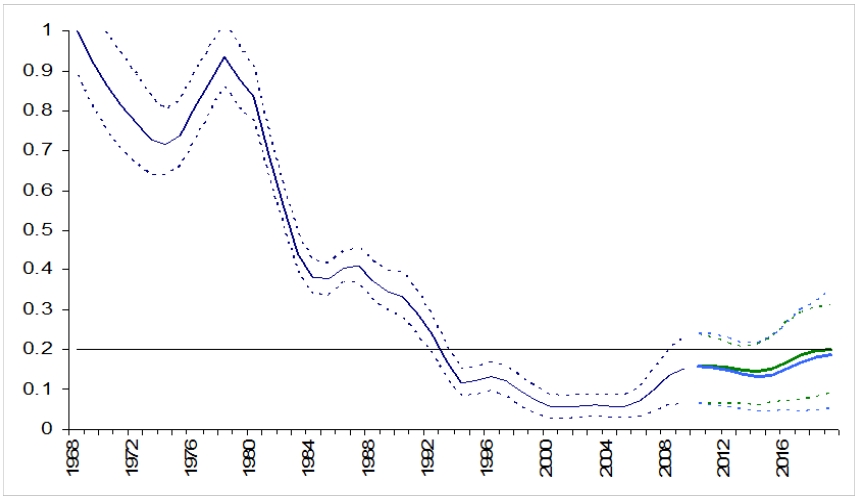

Figure 2: Eastern gemfish time-trajectories of spawning biomass depletion based on average recruitment (Little and Rowling 2010). Projections under 0 t catch are in green and 100 t catch are in blue (0.05 and 0.95 percentile).

During 2011, a Spawning Potential Ratio (SPR) assessment was conducted to determine if catch levels represented overfishing of the eastern gemfish stock (Little 2011). SPR compares the spawning ability of a stock in the fished condition to the stock's spawning ability in the unfished condition.

The time series of SPR shows some clear stages: it is relatively high until the late 1970s when there were high recruitments and spawning biomass; SPR decreased starting in the mid-late 1970s, reaching the lowest point in 1988 corresponding to high catches, and thereafter has increased to earlier levels. The indicator of fishing mortality (1-SPR) shows the opposite trend, indicating fishing mortality under the incidental catch TAC is the lowest on record (Figure 3).

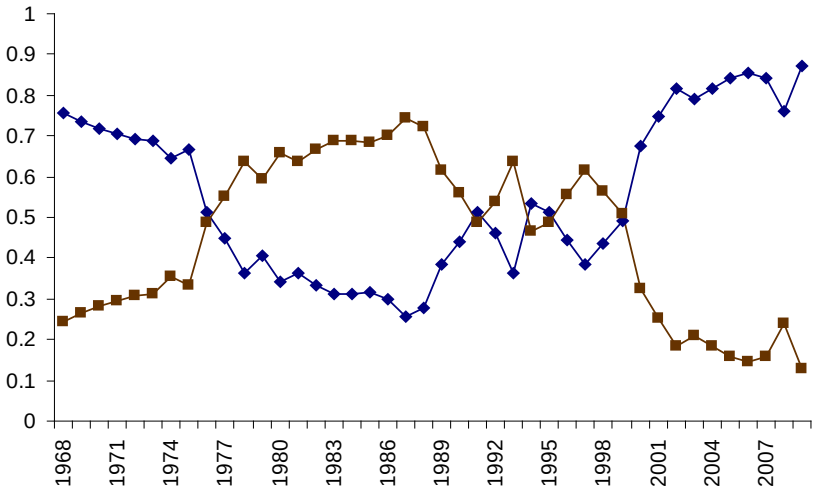

Figure 3: Time series of eastern gemfish SPR in blue and 1-SPR in brown (Little 2011).

There was no formal assessment of eastern gemfish during 2014, however AFMA is seeking to conduct a Tier 1 assessment in 2015-16. Projections from the 2010 assessment indicated that with catches at 100 t and with average recruitment the stock would recover to a biomass level above the limit reference point by 2025.

Evaluation

ShelfRAG has primary responsibility for monitoring the status of the eastern gemfish and assessing the Strategy against its objectives. A template outlining the minimum items for consideration by ShelfRAG each year is included at Appendix A.

Integrated Scientific Monitoring Program

The ISMP is a data collection program that places independent observers on commercial fishing vessels to collect independent and verifiable information on fishing operations, catch and discards in the SESSF. The program has provided information on the quantity, size and age composition of quota species caught in sectors of the SESSF since 1994.

The sampling design of the ISMP was reviewed in 2009 and updated in 2014 to ensure that data collection is representative of fishing effort and supports AFMAs ecosystem-based approach to fisheries management. The new sampling regime was implemented on 1 July 2014.

Under the regime, AFMA observers in the Commonwealth Trawl Sector cover approximately three per cent of trawl effort. This level of coverage has been statistically determined to be sufficient to provide robust estimates of discard rates.

Further changes are made as required to annual observer targets to best capture data on eastern gemfish and other SESSF species.

Electronic monitoring systems (cameras and sensors) have been in use in the SESSF gillnet sector since 2010 and have proven effective at monitoring catch and detecting threatened, endangered and protected species bycatch events. The systems automatically record fishing activity as the catch is brought on board. AFMA is investigating the capability of the systems for use in the CTS, including whether it is possible for the systems to provide estimated size and species composition of catch.

Fishery Independent Surveys

Fishery Independent Surveys provide a time series index of abundance of fish stocks. This is important because for some species, catch per unit effort (CPUE) data (fisheries dependent data) is of limited use for providing an understanding of stock status. This is the case for eastern gemfish where commercial fishers actively avoid catching the species, thereby making it difficult to determine if low CPUE is a result of fisher's behaviour or stock size

SESSF Fishery Independent Surveys were conducted in 2008, 2010, 2012 and 2014. These surveys did not provide consistent coefficients of variation (CVs) for eastern gemfish. However, even with high CVs, if Fishery Independent Surveys are continued, they have the ability to detect any large changes in abundance. Fishery Independent Surveys are expensive and are largely funded by industry, through levies.

EPBC Act listing and reporting to the Department of the Environment

Eastern gemfish were listed as Conservation Dependent under the EPBC Act in 2009. Listing in this category requires the implementation of a rebuilding strategy that provides for actions necessary to halt further decline and support the recovery of the species in order to maximise its chance of survival in nature. If the strategy does not meet its objectives, there is a risk the species may be considered for listing in a higher conservation category.

AFMA reports annually on the stock status of eastern gemfish and performance against the objectives of the Strategy to the Department of the Environment. AFMA also reports on the level of observer coverage and industry compliance with the Strategy.

Reviewing the strategy

ShelfRAG will annually review the status of eastern gemfish and performance against the objectives of the Strategy using the template at Attachment A. The Strategy itself will be reviewed by AFMA, with input from ShelfRAG and SEMAC, every five years.

Impacts of the strategy

Economic impact

Economic impacts associated with the recovery process for eastern gemfish include the costs of monitoring, research and the stock assessment process. Management costs are apportioned between industry and the Australian Government under AFMAs Cost Recovery Impact Statement.

There is an additional impact on the fishing industry because no targeted fishing is permitted and only incidental catch TACs are set. However, some of these costs may be offset in the longer term once eastern gemfish has rebuilt and commercial fishing for this species can re-commence.

Consultation

The Strategy has been developed with the assistance of:

- the Department of the Environment, the Department of Agriculture and the NSW Department of Primary Industry who have been kept informed about the development of the Strategy
- SESSFRAG, ShelfRAG and the South East Management Advisory Committee (SEMAC)
- SETFIA and individual operators, particularly those in the Commonwealth Trawl Sector
- key stakeholders including environmental non-government organisations, recreational fishers and the public through AFMA’s website.

Management arrangements may be changed in consultation with SEMAC as required in response to ongoing monitoring or stock assessment outcomes.

Environmental impacts

Environmental impacts from the implementation of the Strategy are anticipated to be positive. As previously stated the broad objective of the Strategy of returning eastern gemfish to ecologically sustainable levels is consistent with AFMA's objectives and requirements under the EPBC Act.

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Appendix A - ShelfRAG annual report template

Item	Actions
Indications of how stock status is tracking against the Strategy objectives.	
Analysis of management measures implemented.	
Data collection • Current data • Gaps and needs.	
Recommended changes to management measures or data collection.	
Any targeting analysis results and number of shots containing greater than 250kg of eastern gemfish compared to previous years.	
Catches by the top 10 boats (boat names not provided) as an indication changes to fishing operations.	
Confidential catch ‘heat’ maps over time.	