

# **MANAGEMENT OPTIONS FOR BLACK BREAM IN THE LAKES AND COORONG**

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## Introduction

Fish stocks are constantly changing and require continual monitoring. As such, fisheries managers and fishers must regularly review management arrangements to ensure the long term sustainability of South Australian fisheries.

The *Fisheries Management Act 2007* aims to ensure the sustainable harvest of the South Australia's aquatic resources.

The purpose of this options paper is to seek informed feedback from all stakeholders on future management arrangements for the Black Bream (*Acanthopagrus butcheri*) stock in the Lakes and Coorong area.

This review is being undertaken in response to concerns about the sustainability of the Black Bream stock in the Lakes and Coorong, which in the 2016 Black Bream Stock Assessment Report has been assigned the stock status classification of 'overfished' (Earl et al., 2016).

When a fish stock is classified as 'overfished', it means the stock biomass is recruitment overfished and current management is not adequate to recover the stock. Under this status, management action is needed to reduce fishing pressure and ensure that the Black Bream stock biomass does not decline further.

In terms of fishing pressure, stock status considers whether the current level of fishing pressure is adequately controlled to ensure that the stock abundance is not reduced to a point where production of juveniles is significantly reduced (Flood *et al.* 2014).

The aim of this review is to establish management arrangements that:

- Ensure the Lakes and Coorong Black Bream stock returns to a 'sustainable' stock classification
- Maintain quality recreational fishing opportunities, both now and into the future
- Ensure the continued supply of commercially harvested, premium seafood from South Australia's clean waters
- Maintain the proportional catches of Black Bream taken by each fishing sector within the allocated shares provided by the *Management Plan for the South Australian Lakes and Coorong Fishery*.

## The Black Bream Fishery

Black Bream is harvested by the recreational fishing sector, commercial fishing sector and Aboriginal traditional fishing sector. It is an iconic and highly valued species.

The *Fisheries Management Act 2007* provides that a fishery management plan must specify the share of the fishery to be allocated to each fishing sector, based on the existing shares at the time the first management plan is requested. The *Management Plan for the South Australian Lakes and Coorong Fishery* has formally allocated the Black Bream resource between the three fishing sectors across the state as follows:

- Commercial 50.6%
- Recreational 48.4%
- Aboriginal traditional 1%.

State-wide catches of Black Bream were shared almost equally between commercial and recreational fishers at this time. A nominal share of 1% was allocated for the Aboriginal traditional fishing sector to allow for the resolution of Indigenous Land Use Agreements. There is limited information available to inform estimates of Aboriginal traditional catches of Black Bream.

Black Bream is regarded as an important species by the recreational sector in South Australia (Kailola *et al.* 1993). Recreational fishers primarily use rods and line to take this species but registered monofilament nylon nets can also be used where permitted and are known to target Black Bream in the Coorong estuary (refer to area 1 and 2 of figure 1).

The commercial sector primarily uses large mesh gill nets to target Black Bream with smaller catches of the species taken with smaller mesh nets, haul nets, and ring nets. Most catches of Black Bream in South Australia are taken in the Coorong estuary by the commercial Lakes and Coorong Fishery. Commercial fishery production for Black Bream in the Coorong estuary (refer to area 1 and 2 of figure 1) has been variable since the 1960s. Estimates of total annual commercial catch peaked at 72 t in the early 1980s and were >35 t until 1986/87. Catches declined steeply in the late 1980s and remained at historically low levels through the 1990s and 2000s (Figure 2). In 2014/15, the total catch of 2.4 t was among the lowest on record.

The most recent estimate of recreational harvest of Black Bream in South Australia was 4.97 t in 2013/14, which was approximately 60% of the State-wide combined commercial and recreational harvest (Giri and Hall 2015). This 2013/14 estimate of total recreational harvest weight was 15% lower than the estimate of 5.85 t in 2007/08 (Jones 2009). The recreational fishery for Black Bream is characterised by high release rates, with approximately 70% of the fish captured subsequently released back into the water (Giri and Hall 2015), however post-release survival is unknown.

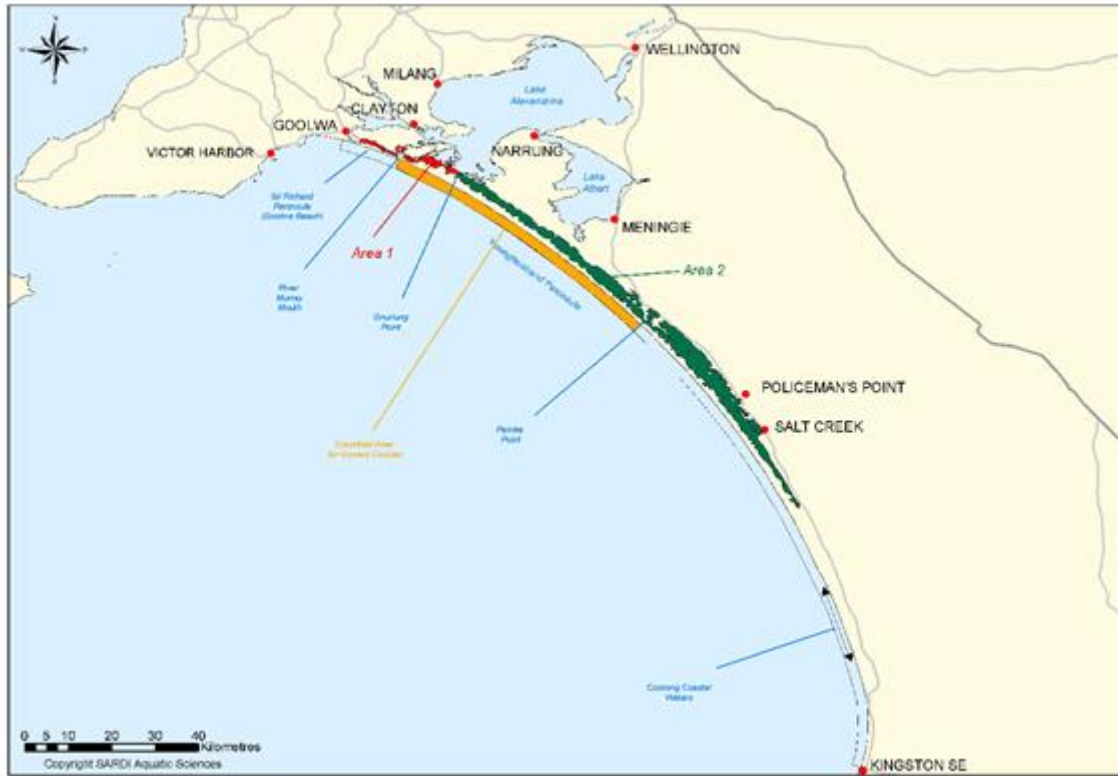


Figure 1: Map of the management areas of the Lakes and Coorong region

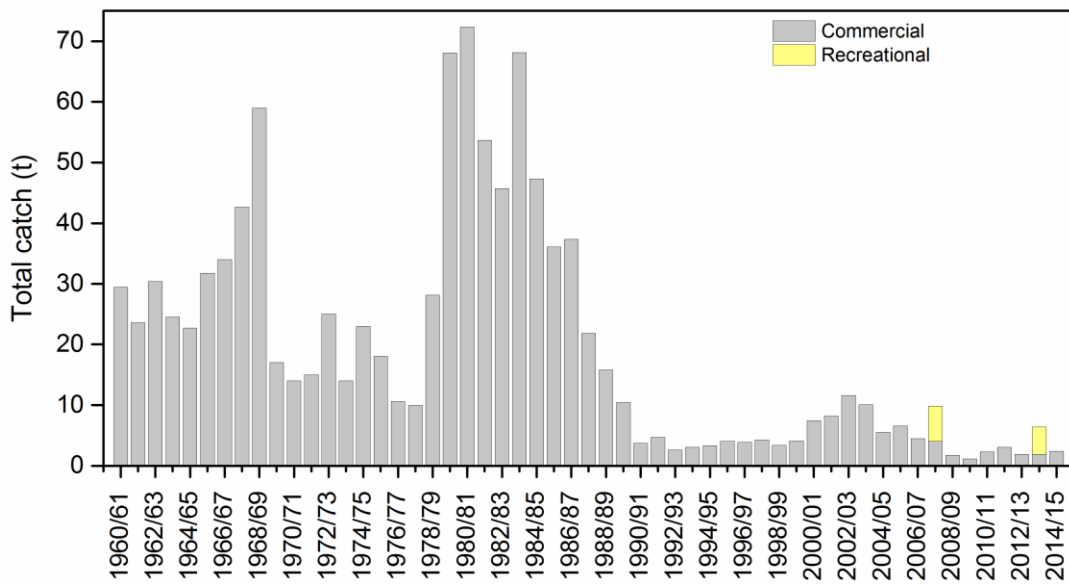


Figure 2: Total catch of Black Bream in the Lakes and Coorong Fishery 1960/61 -2014/15

## LAKES AND COORONG BLACK BREAM FISHERY PROFILE

**Recreational harvest:**

5.85 tonnes in 2007/08

4.97 tonnes in 2013/14

**Aboriginal traditional harvest:**

No estimates of catch available

**Commercial harvest:**

5.5 tonnes in 2007/08

2 tonnes in 2013/14

**Commercial gross value of production (GVP):**

Black Bream GVP of \$29,000 in 2013/14

Overall Lakes and Coorong Fishery GVP of \$8.1 million in 2013/14

**Number of commercial licences:**

36 licences with non-exclusive access within the Lakes and Coorong Fishery

**Gear:**

Rod and line, hauling nets, gill nets, ring nets, traditional apparatus

**Area of fishery:**

Lakes, Coorong and adjacent marine waters.

**Allocated shares:**

Commercial 50.6%

Recreational 48.4%

Aboriginal traditional 1%

## Traditional fishery

The lower Murray Lakes and Coorong region has been important to Aboriginal people throughout the entire period of their habitation of Australia. The Aboriginal (Ngarrindjeri) history associated with the Lakes and Coorong region extends over at least 45,000 years. Archaeological evidence to support this is provided by middens containing cockle shells and the remains of fish and terrestrial animals, traditional camp sites, meeting places, rock formations and burial sites (Leubbers, 1981). These sites are found throughout the Lakes and Coorong region in a greater frequency than other locations throughout Australia (Leubbers, 1981).

The high abundance and diversity of natural aquatic and terrestrial resources in the Lakes and Coorong region provided a rich sustenance for the Ngarrindjeri people and formed the basis of large semi-permanent settlements in the region. The Ngarrindjeri population density is likely to have been the largest of any aboriginal group in Australia, with an estimated 3,000 inhabiting the region in the early 1800s, prior to European settlement. The Ngarrindjeri people continue to target Black Bream in the LCF using a range of traditional apparatus, including nets, spears as well as rod and line (Jenkin 1979; Olsen 1991).

## Recreational fishery

The recreational fishery is regulated through size, bag and boat limits and restrictions on fishing gear. Legal minimum lengths in South Australia are generally set so that most fish will have the chance to spawn at least once. Size limits for Black Bream are designed to provide a level of protection to allow for an adequate proportion of fish to spawn. This allows the replenishment of stocks for the species. Recreational daily bag limits are also a management measure for protecting and maintaining fish stocks, as this restricts the number of fish taken by fishers. Bag limits also serve to provide equitable fishing opportunities between recreational fishers. Restrictions apply to the specification and number of hand lines, rods and line and mesh nets that may be used by recreational fishers.

## Commercial fishery

The Lakes and Coorong Fishery is a small-scale, multi-species, multi-gear fishery that operates in, and adjacent to, the estuary of the Murray River and Coorong lagoons (Coorong estuary), the lower lakes of the Murray River (Lake Alexandrina and Albert) and the nearshore marine environment adjacent the Coorong estuary along Younghusband and Sir Richard Peninsulas (see Figure 1 above). Fishers in the Lakes and Coorong Fishery primarily use large mesh gill nets (115 – 150mm mesh) to target Black Bream, along with several other finfish species (Earl *et al.* 2016)

A wide and complex range of restrictions are in place to control the use of all commercial fishing methods in the Lakes and Coorong Fishery, which reflects the multi-species nature of the fishery. These restrictions are aimed at limiting commercial fishing effort, to restrict gear conflict between sectors, as well as to minimise impacts on fish stocks and the broader aquatic ecosystem and to ensure overall stock sustainability.

A new *Management Plan for the South Australian Commercial Lakes and Coorong Fishery* has recently been adopted. As part of this process, a new management framework and finfish harvest strategy were developed to facilitate economic efficiency and flexibility whilst maintaining sustainability for net fishing. The new finfish harvest strategy was developed by PIRSA in collaboration with SARDI and industry and is based upon habitat condition, which links to the availability of the fished resources. Effort controls using net units (number of 50 m large and small mesh nets) have been implemented to control the level of net fishing effort in key areas of the fishery. Decision rules state that various levels of environmental condition will trigger a specific response in terms of a total allowable commercial effort adjustment, to ensure that finfish resources are harvested within ecologically sustainable limits. This new framework was implemented for the 2016/17 fishing season.

## Background on the issue

Management action is needed to ensure that the Black Bream stock in the Lakes and Coorong region returns to a sustainable status, and support the objectives of the *Management Plan for the South Australian Commercial Lakes and Coorong Fishery*.

The Black Bream stock assessment report produced by SARDI Aquatic Sciences in 2016 (Earl *et al.*, 2016) used a 'weight-of-evidence' approach to assess the status of the Black Bream stock in the Coorong estuary against an agreed national reporting framework (Flood *et al.* 2014). The assessment considered a synopsis of biological information available for



the species, trends in commercial fishery catch and effort data and fishery size and age structures. The Black Bream stock in the Coorong estuary was classified as 'overfished' based on the following key points:

- Annual catches by the LCF peaked at 72 t in 1980/81 and remained >35 t.yr<sup>-1</sup> until 1986/87. Catches then declined and averaged 4.4 t.yr<sup>-1</sup> from 1990/91 to 2013/14. In 2014/15, the total catch of 2.4 t was among the lowest on record.
- Mean annual catch per unit effort for large mesh gill nets (CPUE<sub>LMGN</sub>) peaked at 30 kg.fisher day<sup>-1</sup> in 2007/08. In 2013/14, CPUE<sub>LMGN</sub> declined to 3.2 kg.fisher day<sup>-1</sup>, which was the lowest on record.
- The performance indicator for total catch in 2014/15 was 20% below the lower limit reference point.
- The age structure for Black Bream for 2014/15 comprised mostly fish from two age classes of 5 and 8 year old fish. These age classes appeared to be linked to freshwater releases to the Coorong, suggesting that environmental conditions associated with freshwater inflow are important for successful reproduction in the Coorong.
- Despite the recruitment of several year classes since 1997/98, recruitment levels have not been strong enough to support recovery of the stock, as measurable improvements in adult biomass have not been detected. This finding suggests that the spawning biomass of Black Bream in the Coorong has been reduced to a level where recruitment is severely impaired.
- The current level of fishing mortality is unlikely to allow the Black Bream stock in the Coorong estuary to recover from its current weakened state. On the basis of the information above and using the definitions from the national stock status framework, the Black Bream stock in the Coorong estuary is classified as overfished.

The stock assessment report also noted that the recent low levels of recruitment in the Coorong estuary may be exacerbated by the prior to December 2016 legal minimum size for Black Bream in South Australia of 280 mm total length, which is 9 mm and 50 mm lower than the estimated size at maturity for females and males, respectively (Cheshire et al. 2013). Although, the Lakes and Coorong Fishery mainly harvests individuals above the size at maturity (size at which 50 per cent of population is mature), the size of Black Bream harvested by the recreational sector is poorly understood. This may be significant because annual recreational harvest is slightly higher than the commercial catch (Jones 2009). Following the bag, boat and size limit review in 2016, the minimum size limit for all Bream is now 300mm.

There were uncertainties in the recent classification of Black Bream stock status in the Lakes and Coorong, including:

- The reliability of estimates of commercial CPUE as an indicator of relative abundance for Black Bream in the Coorong estuary
- The levels of recreational catches of Black Bream in the Coorong estuary

## Desired outcomes

Key objectives in selecting appropriate management measures for returning Black Bream stocks to a 'sustainable' classification are outlined below. These conceptual objectives are consistent with the goals of the harvest strategy in the *Management Plan for the South Australian Lakes and Coorong Fishery*. They include, to:

- Ensure the long term sustainable harvest of Black Bream
- Maintain catches of Black Bream within agreed allocations for each sector.
- Minimise impacts on the structure, productivity, function and biological diversity of the ecosystem
- Ensure cost-effective and participative governance of the fishery

PIRSA considers that an effective management strategy to return the Black Bream stock to a sustainable level would include translating the above conceptual objectives into the following operational objectives for the stock to:

- Increase Black Bream spawning biomass and recruitment
- Increase Black Bream abundance
- Maintain recreational and commercial catches within their allocated shares.

## Proposed management options

There are number of management options available to manage the Lakes and Coorong Black Bream stock. Each option may have positives and negatives which have been outlined in the section below. It should be noted that while each option has impacts due to the additional constraints that would be imposed, without suitable management action/s the result will likely be further decline in the stocks that support the fishery and/or a stock biomass that is maintained at the current historically low level. This would have much greater biological, social and economic impacts on Lakes and Coorong communities. Therefore, management action is necessary but should strike a balance between providing adequate protection for the Black Bream stock and equitably sharing the resource between fishing sectors, while minimising impacts on fishers, seafood consumers and associated regional communities. It should also be noted that the current *Review of size, bag and boat limits in South Australia's recreational fishing sector, marine and freshwater* has proposed to increase the minimum size limit to 30 cm.

A combination of the following management options may be suitable to achieve the operational objectives outlined above.

## 1. Implement a 300 m spatial closure around the Lakes and Coorong barrages to prohibit fishing for both recreational and commercial fishing

The main aim of prohibiting fishing for Black Bream in this area is to support passage of Black Bream utilizing the fishways installed in the barrages, as well as providing additional protection for Black Bream aggregating at the barrage during the spawning season.

**Proposed management option:** Prohibit recreational and commercial fishing within 300 m of the Lakes and Coorong barrages.

### What are the likely outcomes and benefits?

- Spatial closures may reduce overall fishing pressure/exploitation rate or catch
- Equally applies to both the recreational and commercial sectors
- Closure is simple, easy for everyone to comply with and for compliance to enforce.
- Protects spawning aggregations at the barrages during the critical time.
- May enhance recruitment opportunities. Enhanced recruitment would also mean increased production in the fishery

### What are the potential impacts and other considerations?

- Loss of access for recreational and commercial fishers.

## 2. Implement a Seasonal Closure

The spawning period for the Lakes and Coorong stock of Black Bream generally occurs from August to November (Cheshire et al. 2013). Currently, around 75% of annual catches of Black Bream are taken from August to December. A seasonal closure that prohibits the take of Black Bream during this period would provide additional protection to the spawning biomass during this critical reproductive phase. Seasonal closures would likely reduce the capture of mature Black Bream, minimise disturbance to spawning fish caused by fishing activities, as well as reduce fishing pressure/exploitation rate on the stock.

**Proposed management option:** Introduce a seasonal closure from August to December (all of spawning period) to apply to all recreational and commercial sectors. The rules for the seasonal closure would include a prohibition to the take of Black Bream in the Lakes and Coorong only.

### What are the likely outcomes and benefits?

- Protects spawning aggregations during the critical time.
- Reducing the level of disturbance to Black Bream during spawning may enhance spawning success and therefore future recruitment into the fishery
- May enhance recruitment opportunities. Enhanced recruitment would also mean increased production in the fishery

- Seasonal closures may also reduce overall fishing pressure/exploitation rate or catch. Currently, around 75% of annual catches of Black Bream are taken from August to December.
- Equally applies to both the recreational and commercial sectors
- Closure is simple, easy for everyone to comply with and for compliance to enforce.

#### What are the potential impacts and other considerations?

- Commercial fishers may increase effort on the other target species during the closure period. However, the impacts of such a shift in effort is likely to be low as targeted fishing effort for Black Bream has been negligible since 2008/09 (Earl et al., 2016)

### 3. Closure of the Lakes and Coorong Black Bream Fishery until recovery of the population to a sustainable status

The closure of the Lakes and Coorong Black Bream Fishery would be a vital management tool to protect the species stock and eliminate any fishing pressure that could impact on the long-term sustainability of the Black Bream stocks.

**Proposed management option:** Closure of the Lakes and Coorong Black Bream Fishery to all commercial and recreational fishers.

#### What are the likely outcomes and benefits?

- Fishing mortality would be zero. Prohibiting the take of Black Bream, would allow more Black Bream to live longer and grow to a larger size. This would allow for increased egg production and promote recovery of spawning stock biomass.
- Equally applies to both the recreational and commercial sectors
- A closure is easy for everyone to understand and comply with and simple for enforcement.
- Provides for maximum recruitment. Enhanced recruitment would also mean increased production in the fishery

#### What are the potential impacts and other considerations?

- Will have a financial impact for the local recreational and commercial fisheries, and the local communities that rely heavily on these fishing industries.

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