Black Bream (*Acanthopagrus butcheri*)

Stock Structure and Biology

Black bream populations in the Gippsland Lakes, Lake Tyers, Mallacoota Inlet, the Hopkins and Glenelg Rivers, and other minor inlets and river estuaries are discrete self-replenishing stocks, with limited mixing among adjacent estuaries.

This species lives for at least 29 years and typically grows to more than 60 cm TL. Size at 50% maturity occurs at two years of age and 20 cm TL (LML = 28 cm). Black bream are characteristically variable in their fecundity and growth rate, taking three to eight years to reach the current LML. The main spawning occurs in estuaries during October to February, often associated with a salt-wedge.

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Assessment Summary

Gippsland Lakes

The status of the black bream in the Gippsland Lakes was evaluated using:

- Available harvest information for the commercial and recreational sectors
- CPUE (standardised and nominal) for the recreational fishery estimated from annual creel surveys (1979–2022, reference period 1979-–2015)
- CPUE (nominal) for diary angler catches
- Length composition of diary angler catches
- Length composition of recreational fishery creel survey catches
- Pre-recruit (post-larval) abundance from fishery independent netting surveys (2010–2022).

Management measures have been implemented through the Gippsland Lakes Recovery Plan including the buy-out of all commercial netting licences by April 2020 and the recent introduction of a black bream slot limit of 28–38 cm. The minimum size limit of 28 cm remained unchanged and was enhanced by a new maximum size limit of 38cm to provide added protection for larger bream. Large black bream are more prolific breeders, producing more eggs and thereby contributing more stock to future generations. The modified slot limit is evidence-based and underpinned by science with modelling indicating that 12 per cent more breeding biomass will remain in the population with the slot limit in place. The removal of the commercial fishery has resulted in CPUE (standardised and nominal) for commercial mesh net no longer being suitable as a primary performance measure for black bream stock status in the Gippsland Lakes.

This assessment found:

- *Fishing pressure* – Commercial harvests have dropped considerably since the 1980s (Figure 35), and more recently have declined substantially in response to declining netting effort due to commercial licence reductions since 2010 up until the fishery ceased in March 2020 (Appendix 2). The estimated fishing mortality rate experienced by the stock from 2015–2019 was in the order of 0.2 (95% CLs = 0.1–0.3) which is not overly high within the bounds of a species with the life history characteristics of Black Bream (Kailola et al. 1993). There is no recent information on recreational harvest or effort.
- *Biomass* – Standardised CPUE from the creel surveys has remained low (compared to historical levels) since the early 2000s and was below the reference period average and above the reference period lowest point from 2016–2018 (Figure 36). Standardised CPUE from mesh nets has declined continuously from 2011 to below the reference period lowest point in 2017/18 through until 2019/20 when fishing ceased in the Gippsland Lakes

(Figure 37). Since 2018, recreational CPUE has increased, but remains well below historic levels. In 2022 was just below the reference period average. Diary angler targeted CPUE, which includes catches of fish above and below the LML, shows peaks in 2006 and 2012–2013, similar to the timing of peaks in the mesh net and creel survey CPUE (Figure 38). Diary angler CPUE declined from 2013 to 2016, similar to mesh net and creel survey CPUE, however has increased in the most recent year to be well above the reference period average in 2022.

- *Recruitment* – Recruitment of 0+ age black bream has been relatively stronger (c.f. 2010–2016) from 2017 to 2020, lower in 2021, and the highest since the monitoring period started in 2022 (Figure 39). These cohorts will grow to legal size over the next 5-6 years. However, because of the short length of the recruitment time series it remains unclear how the recruitment index relates to replenishment of adult biomass, or how this relates to historic recruitment rates.
- *Length composition* – Length composition data from creel surveys has been stable over the last 15 years with signs of an increase in the median size of fish harvested from 2009 to 2022 (Figure 40). There has been increased proportions of smaller fish in diary angler catches in 2017–2021, suggesting recent increased recruitment rates as evidenced by the smaller sub-legal fish in recent years (Figure 40).

Stock status summary: Overall, the above evidence indicates that the biomass of this stock is unlikely to be depleted or recruitment impaired. Furthermore, the above evidence indicates that the current level of fishing mortality attributable to the fishery has reduced commensurate with cessation of the commercial fishery and introduction of further recreational size limit restrictions. Due to the creel survey CPUE increasing from the lowest point recorded in 2004 to just below the reference point average in recent years; the increase in angler diary CPUE over the last 5 years to 2022 to be well above the reference period average; in 2022 and the relatively stronger recruitment of 0+ age black bream from 2017–2022 (c.f. 2010–2016) the Gippsland Lakes Black Bream stock has been assessed as recovering.

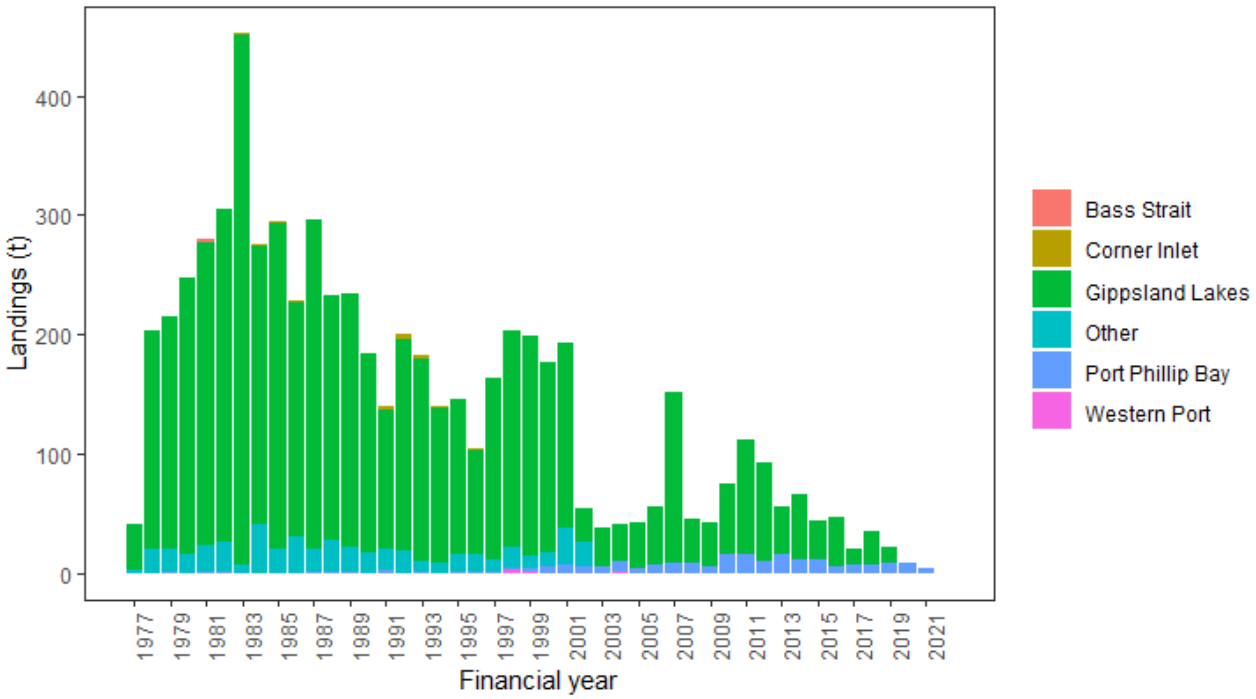

Figure 35 Commercial harvests of black bream from Victorian waters by area during fiscal years 1978—2021.

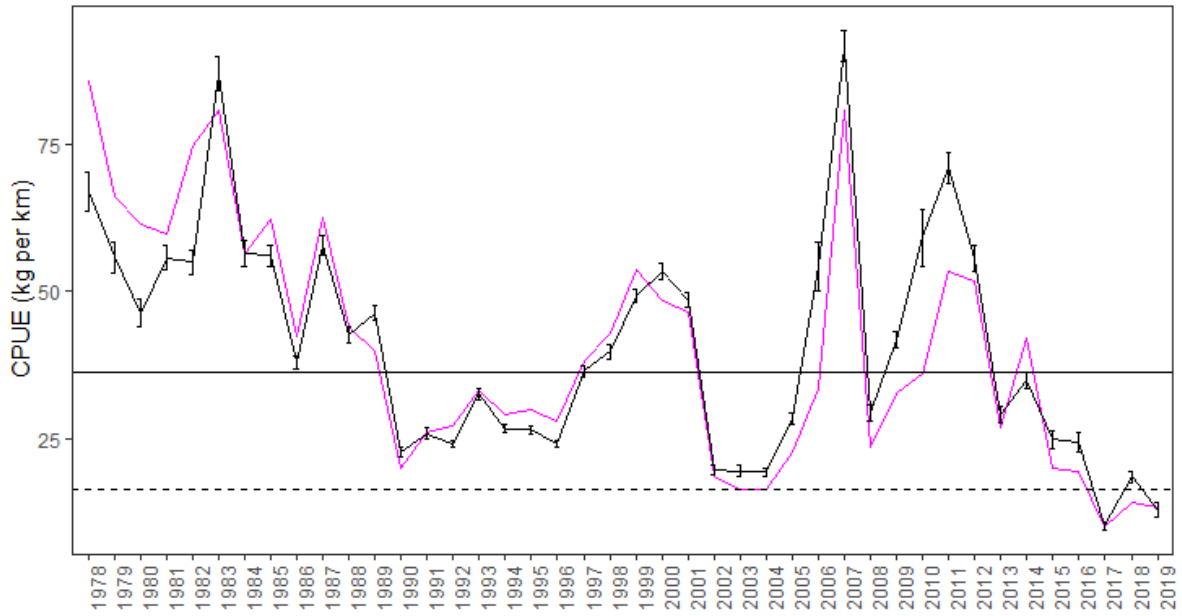

Figure 36 Catch-per-unit-effort (CPUE) of black bream by commercial mesh net fishers in the Gippsland Lakes during 1978 – 2019 financial years. Black line is nominal CPUE (±SE), magenta line is standardised CPUE, blue line is a generalised additive model (GAM) of the standardised CPUE trend with the shaded grey area representing the 95% confidence interval of the GAM. Horizontal black line is the mean standardised CPUE during the reference period (1985–2015) and the dashed black line is the minimum standardised CPUE within the reference period. Note: CPUE is calculated as Kg/km as no soak time data were available prior to 1998 and mesh net fishers in the Gippsland Lakes tend to soak their gear overnight meaning soak time is relatively uniform through time.

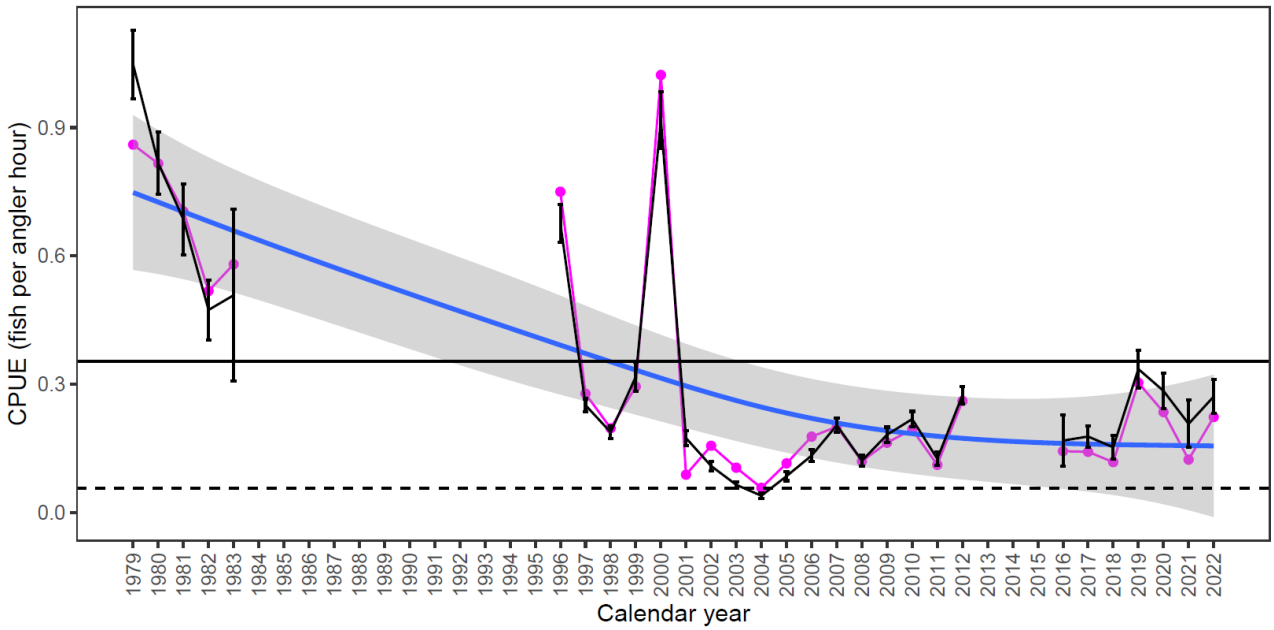

Figure 37 Catch-per-unit-effort (CPUE) of black bream by recreational anglers interviewed in creel surveys undertaken in the Gippsland Lakes during 1979–2022. Black line is nominal CPUE (±SE), magenta line is standardised CPUE, blue line is a generalised additive model (GAM) of the standardised CPUE trend with the shaded grey area representing the 95% confidence interval of the GAM. Horizontal black line is the mean standardised CPUE during the reference period (i.e. all years up and including 2015) and the dashed black line is the minimum standardised CPUE within the reference period.

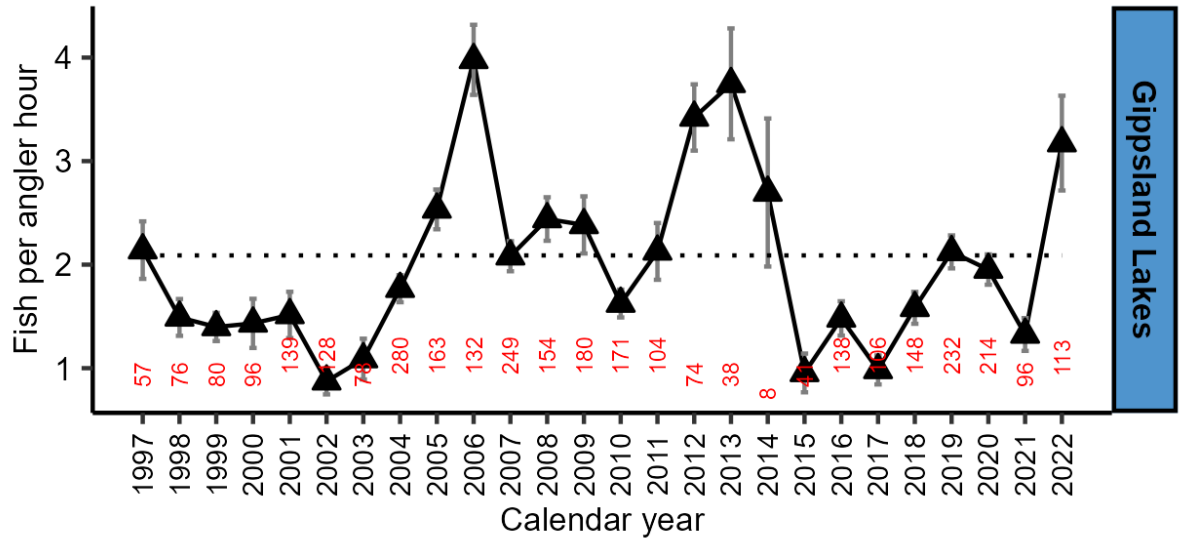

Figure 38 Diary angler mean nominal (±SE) catch-per-unit-effort (CPUE) of black bream from the Gippsland Lakes, 1997-2022 calendar years. Horizontal black line is the mean CPUE during the reference period (1997 - 2015) and the dashed black line is the minimum CPUE within the reference period. Red numbers along x-axis are numbers of diary angler trips.

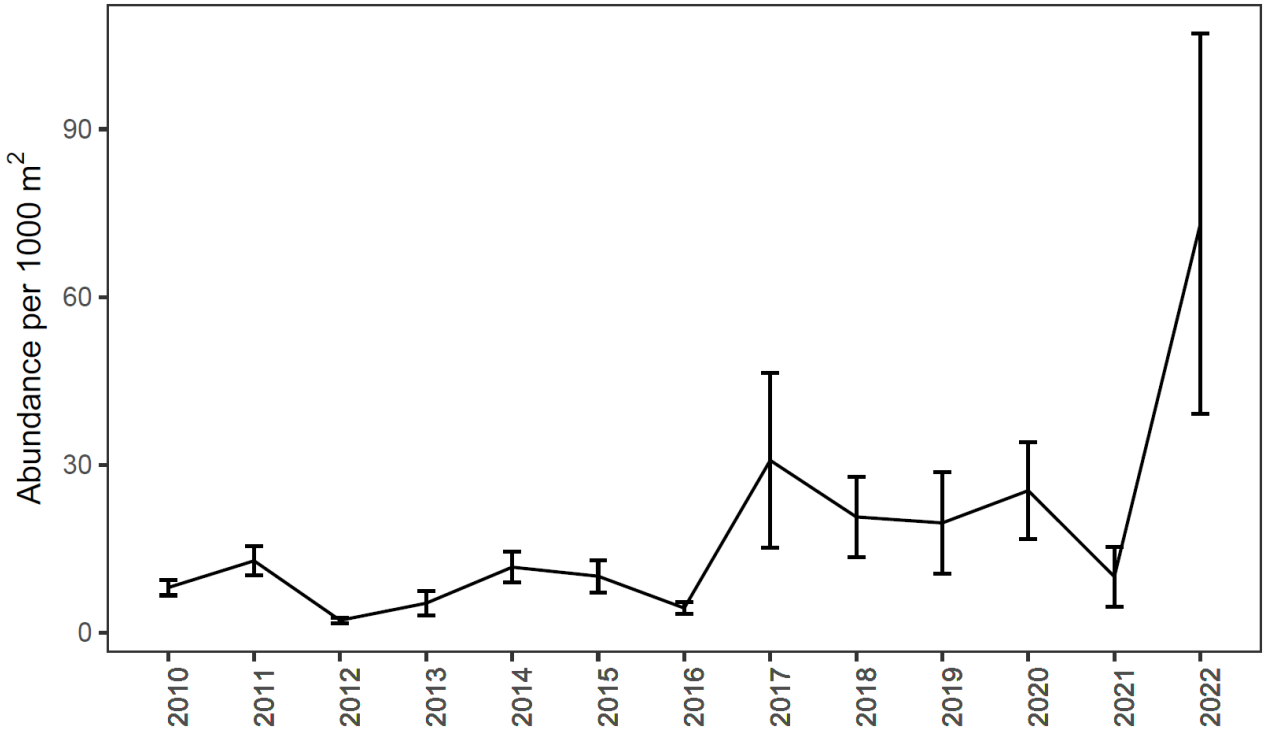

Figure 39 Pre-recruit survey abundance of 0+ black bream in the Gippsland Lakes (mean ±SE) during 2010–2022. Pre-recruit surveys comprise ~50 demersal trawl shots throughout the rivers and lakes of the system.

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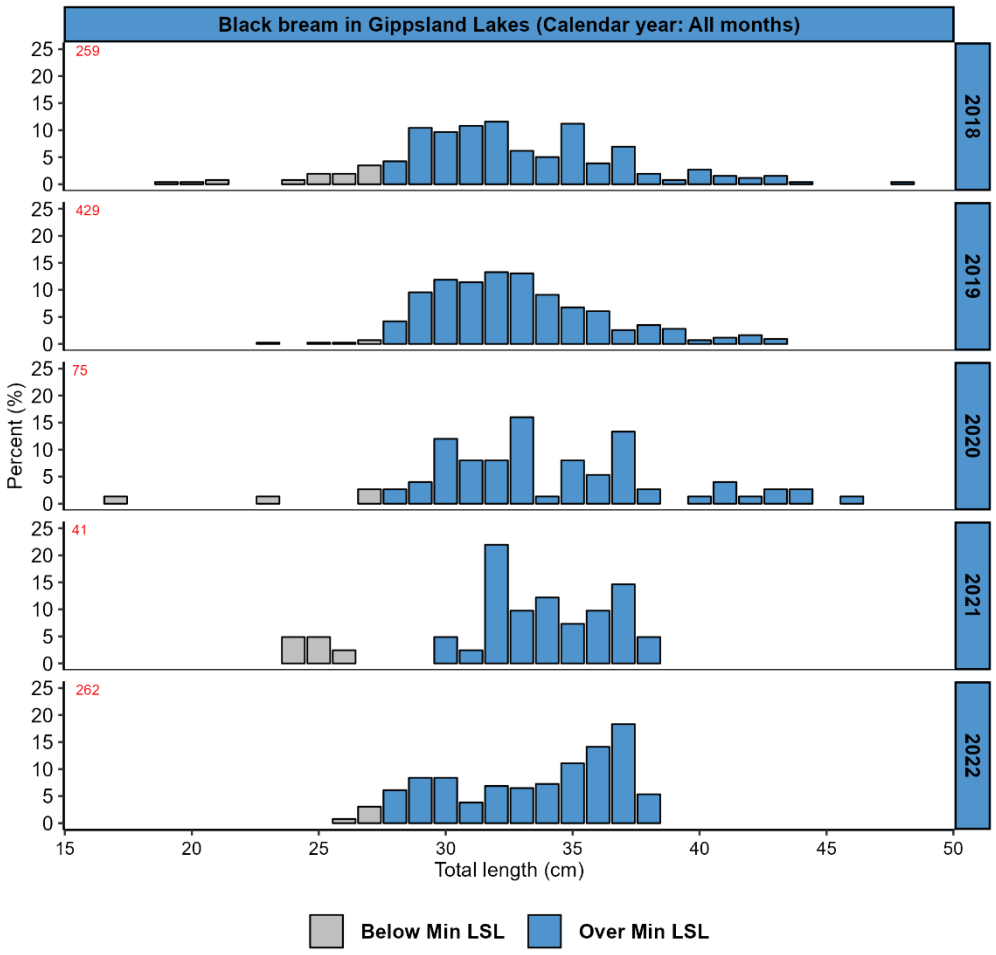

(b)

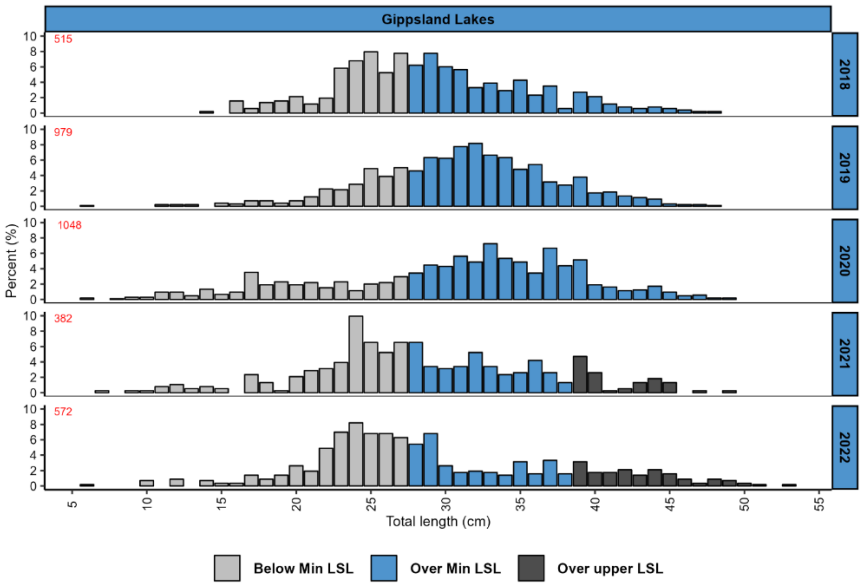

Figure 40 (a) Frequency histograms of Gippsland Lakes black bream length composition for recreational creel survey for calendar years 1997–2021, red numbers on x-axis indicate numbers of fish measured, blue line median length, red line is the legal minimum length (LML). (b) Frequency histograms of Gippsland Lakes black bream length composition from diary anglers for calendar years 2018–2022. Red numbers indicate numbers of fish measured.

Western Victorian Estuaries

Glenelg River
This review found:

- *Biomass* – Diary angler targeted CPUE was well below the reference period average in 2022 (Figure 47). For the last five years CPUE has had a stable trend at about or just below the reference period average with the exception 2022.
- *Fishing pressure* – There is no direct information on the amount of fishing pressure on the black bream population in the Glenelg River. Size composition data shows that larger fish (>35 cm) are consistently recorded in the catches in recent years suggesting fishing mortality is likely to be relatively low. A lower number of sampling trips has been recorded in recent years due to less diary anglers and CPUE and length frequency data is become unreliable.

Hopkins River
This review found:

- A lower number of sampling trips has been recorded in recent years due to less diary anglers and CPUE (and length) frequency data has become unreliable.

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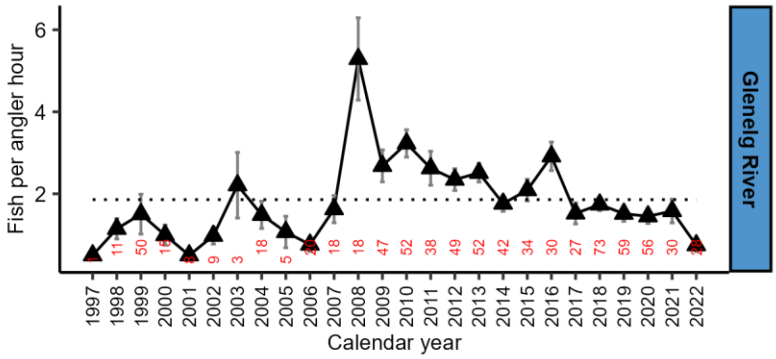

Figure 41 Diary angler mean nominal (±SE) catch-per-unit-effort (CPUE) of black bream from the Glenelg River, 1997-2022 calendar years. Horizontal black line is the mean CPUE during the reference period (1997 - 2015) and the dashed black line is the minimum CPUE within the reference period. Red numbers along x-axis are numbers of diary angler trips.

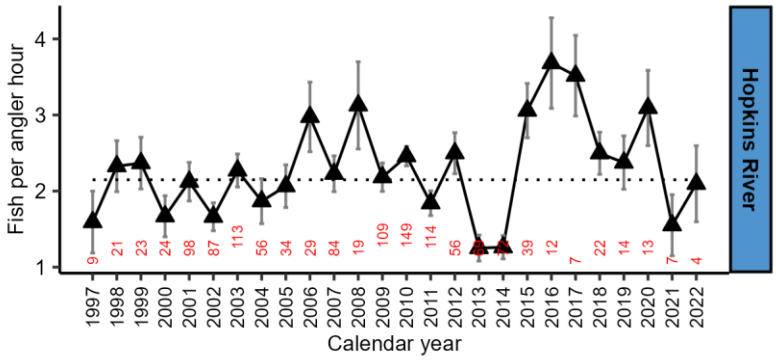

Figure 42 Diary angle mean nominal (±SE) catch-per-unit-effort (CPUE) of black bream from the Hopkins River, 1997-2022 calendar years. Horizontal black line is the mean CPUE during the reference period (1997 - 2015) and the dashed black line is the minimum CPUE within the reference period. Red numbers along x-axis are numbers of diary angler trips.

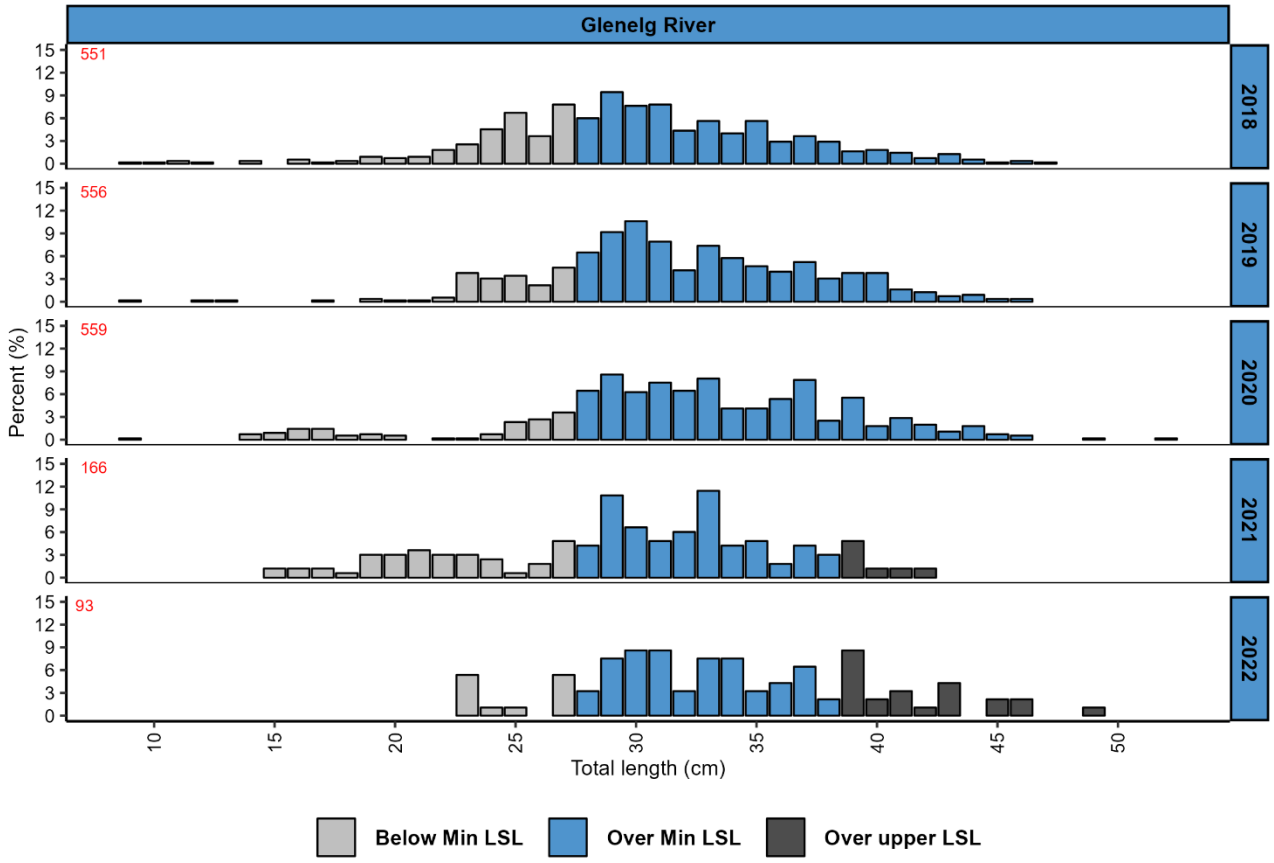

Figure 43 Frequency histograms of Glenelg River black bream length composition from diary anglers for calendar years 2018–2022. Red numbers indicate numbers of fish measured.

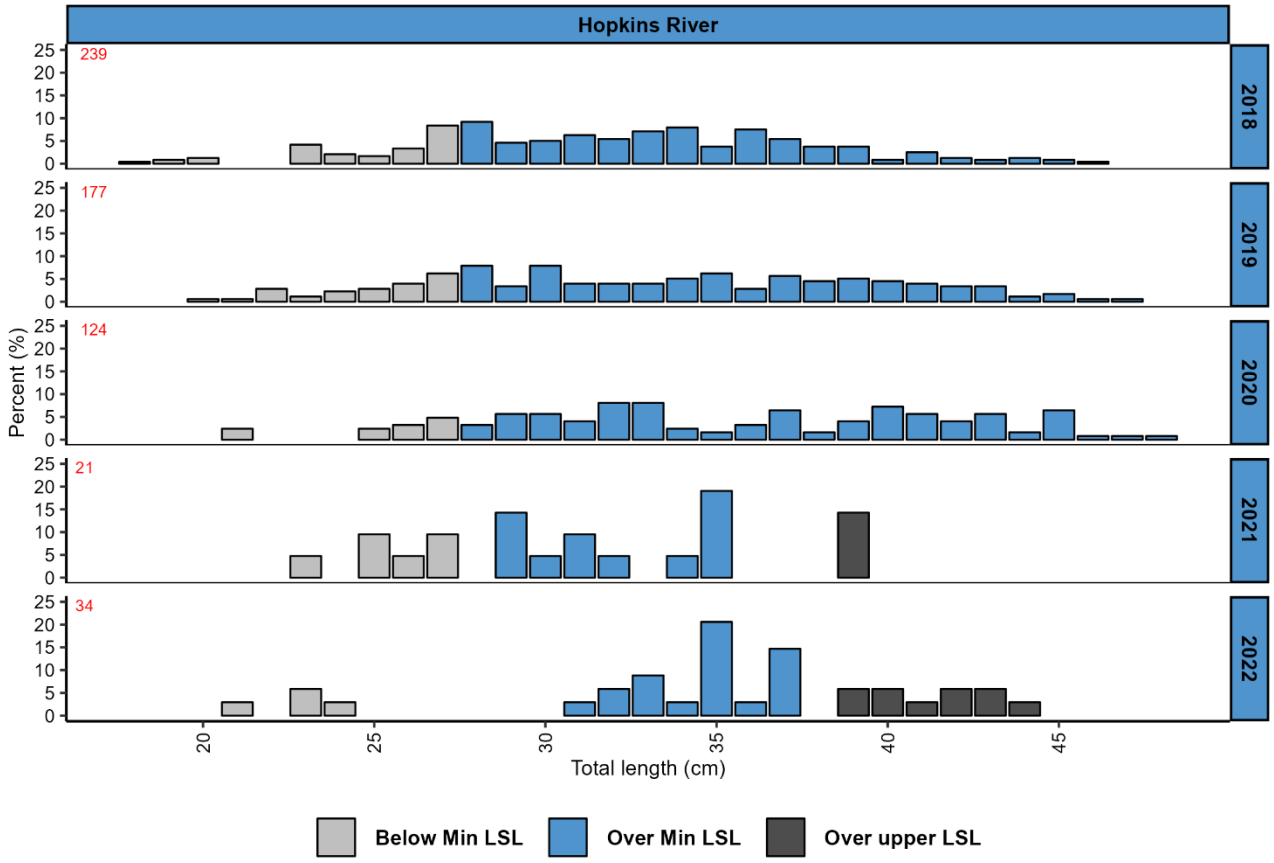

Figure 44 Frequency histograms of Hopkins River black bream length composition from diary anglers for calendar years 2018–2022. Red numbers indicate numbers of fish measured.

Eastern Victorian Estuaries

Lake Tyers
This review found:

- *Biomass* – Diary angler targeted CPUE was well below the reference period average in 2022. For the last five years CPUE has been below the reference period average.
- *Fishing pressure* – There is no direct information on the amount of fishing pressure on the black bream population in Lake Tyers. Size composition data shows that larger fish (>35 cm) are consistently recorded in the catches in recent years suggesting fishing mortality is likely to be relatively low. A lower number of sampling trips has been recorded in recent years due to less diary anglers and CPUE and length frequency data is become unreliable.

Mallacoota Inlet
This review found:

- *Biomass* – Diary angler targeted CPUE was well below the reference period average in 2022 (Figure 46). For the last five years CPUE has been below the reference period average.
- *Fishing pressure* – There is no direct information on the amount of fishing pressure on the black bream population in the Lake Tyers. Size composition data shows that larger fish (>35 cm) are consistently recorded in the catches in recent years suggesting fishing mortality is likely to be relatively low.

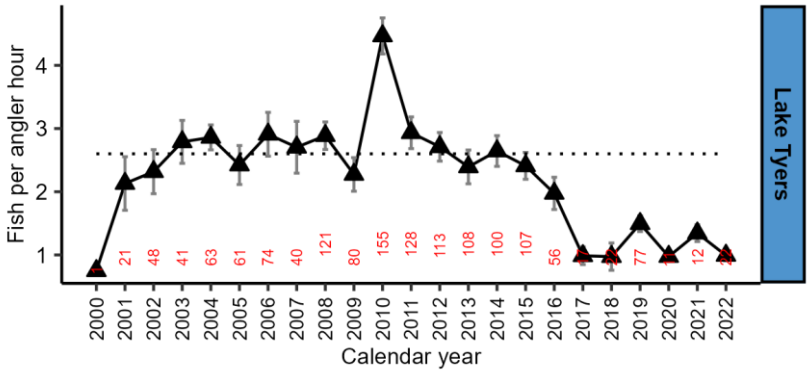

Figure 45. Diary angler mean nominal (±SE) catch-per-unit-effort (CPUE) of black bream from the Lake Tyers, 1997-2022 calendar years. Horizontal black line is the mean CPUE during the reference period (1997 - 2015) and the dashed black line is the minimum CPUE within the reference period. Red numbers along x-axis are numbers of diary angler trips.

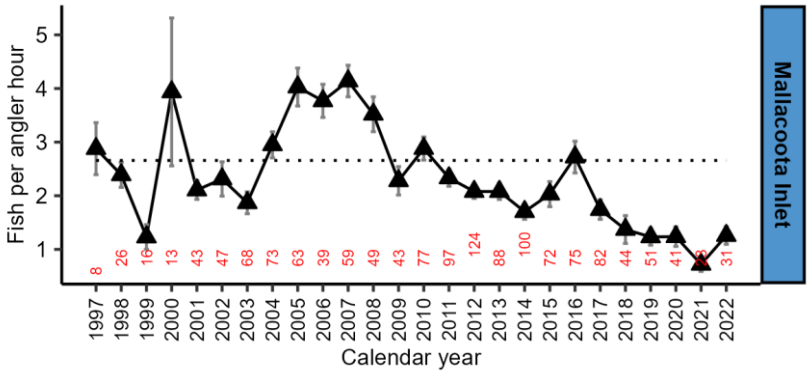

Figure 46. Diary angler mean nominal (±SE) catch-per-unit-effort (CPUE) of black bream from the Mallacoota Inlet, 1997-2022 calendar years. Horizontal black line is the mean CPUE during the reference period (1997 - 2015) and the dashed black line is the minimum CPUE within the reference period. Red numbers along x-axis are numbers of diary angler trips.

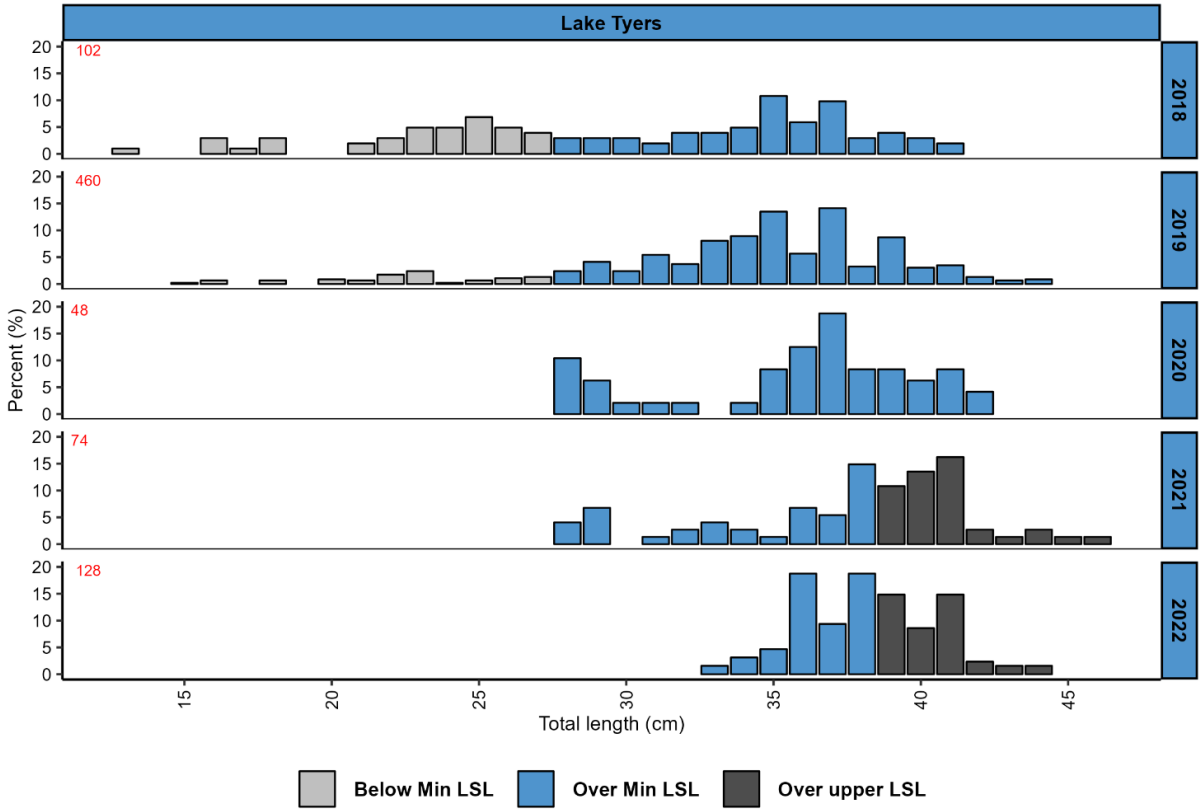

Figure 47 Frequency histograms of Lake Tyers black bream length composition from diary anglers for calendar years 2018–2022. Red numbers indicate numbers of fish measured.

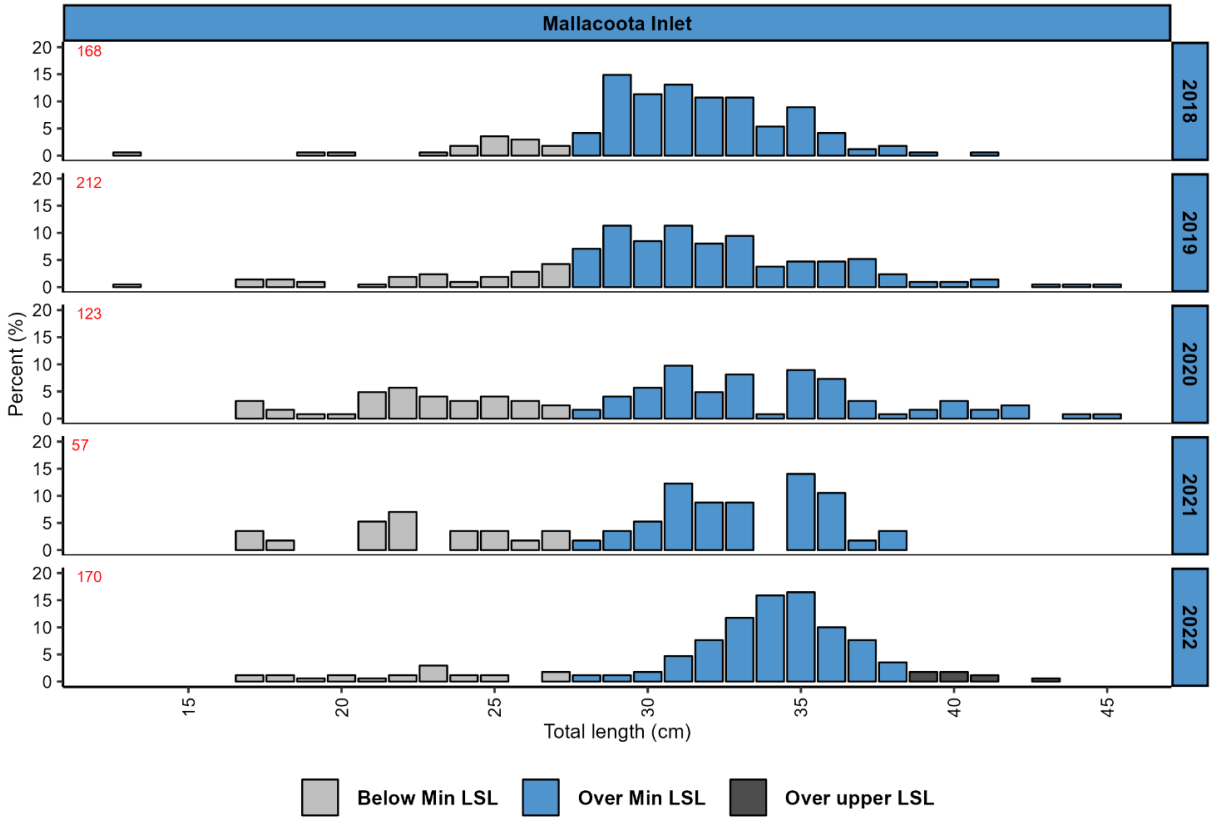

Figure 48 Frequency histograms of Mallacoota Inlet black bream length composition from diary anglers for calendar years 2018–2022. Red numbers indicate numbers of fish measured.