

Gemfish (2018)

Rexea solandri



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STOCK STATUS OVERVIEW

| Jurisdiction | Stock | Fisheries | Stock status | Indicators |
|---------------------------------|---------|---|--------------|----------------------------|
| Commonwealth, New South Wales | Eastern | N/A, OTF, OTLF, SESSF (CTS), SESSF (GHTS) | Depleted | Biomass, fishing mortality |
| Commonwealth, Western Australia | Western | SESSF (CTS), SESSF (GABTS), SESSF (GHTS), WCDSIMF | Sustainable | Biomass, fishing mortality |

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector) (CTH), SESSF (GHTS) Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), OTLF Ocean Trap and Line Fishery (NSW), WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery (WA)

STOCK STRUCTURE

There is genetic evidence for two biologically distinct stocks of Gemfish in Australia—an Eastern and a Western biological stock—separated by a boundary at the western end of Bass Strait [Colgan and Paxton 1997, Moore et al. 2016]. Studies suggest that there are no genetic differences between Gemfish in eastern Australia and New Zealand [Colgan and Paxton 1997]. For the purposes of management and assessment, the Eastern Australia population is treated as a single biological stock, independent of the New Zealand population.

Given the evidence of two genetically distinct stocks in Australian waters, stock status is reported accordingly.

Here, assessment of stock status is presented at the biological stock level—Eastern and Western.

STOCK STATUS

Eastern Historically high catches of Gemfish from the Eastern biological stock through the 1970s and 1980s substantially reduced the biomass of Eastern Gemfish by

the 1990s [Kailola et al. 1993]. The biological stock has remained at a depressed level, with limited recruitment over this period [Little and Rowling 2011]. The most recent assessment [Little and Rowling 2011] estimated the biomass as 15.6 per cent of the unfished (1968) level. Based on this evidence, the stock is considered to be recruitment impaired [Helidoniotis et al. 2018].

A recent study suggests that the spawning biomass in the Eastern stock has fewer effective genetically successful contributors between generations than expected [Moore et al. 2016]. Smaller effective population size was not detected in the Western Gemfish stock. Hybridisation between east and west populations was detected, but there was no evidence of introgression of genetic material between either population, suggesting all hybrids are sterile. The decreased effective population size in Eastern Gemfish may be related to wasted reproductive effort in producing sterile hybrids, in combination with an overfished stock.

A spawning potential ratio analysis [Little 2011] indicated high fishing mortality rates on Eastern Gemfish until the late-1990s, but much lower rates since 2002. Because fishing mortality rates have substantially decreased, assessment model projections indicate that the stock should reach 20 per cent of unfished biomass by 2025 [Little and Rowling 2011], which is less than the one generation time plus 10 years provided for the 2007 Commonwealth Fisheries Harvest Strategy Policy [AGDAFF 2007].

This rebuilding projection, however, is based on future recruitments determined from the stock-recruitment relationship and total removals being limited to the 100 tonnes (t) incidental catch allowance (no targeting is allowed) [AFMA 2015]. If these assumptions are not met, the time required to rebuild the stock may be underestimated.

Discards were estimated at 131 t in 2013, which was around double the catch in that year. The combined mortality of 183 t is in excess of the 100 t incidental bycatch level that would allow rebuilding. Discarding decreased to 33 t in 2014, with a combined total catch of 70 t [Upston and Thomson 2015]. Discarding remains low in 2017 at 27 t [Burch et al. 2018], with 30 t of Eastern Gemfish landed in 2017. Fishing induced mortality on the stock has clearly reduced, however it is unclear whether the stock is recovering from its recruitment overfished state as there has been no recent assessment.

Anecdotal evidence indicates that some recreational anglers target Gemfish, however, a survey of recreational catch in New South Wales during 2013–14 detected no Gemfish captures [West et al. 2015].

The current level of fishing mortality is expected to allow the stock to recover from its recruitment impaired state, however, measurable improvements in biomass are yet to be detected.

On the basis of the evidence provided above, the Eastern biological stock is classified as a **depleted stock**.

Western

Western Gemfish are mostly caught by the Commonwealth Trawl Sector (CTS) and the Great Australian Bight Trawl Sector (GABTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF). Western Gemfish catch in the SESSF CTS is currently restricted by a three year total allowable catch (TAC). The SESSF GABTS has not moved to implement quota for Western Gemfish, instead relying on a catch trigger, which would manage the stock as a tier 1 stock under the SESSF harvest strategy framework [AFMA 2009] if catch exceeds 1 000 t over three years [AFMA 2014]. Catches of the Western biological stock of Gemfish by Western Australian state fisheries remain very small (≤ 0.1 t in each year between 2008 and 2017). This species is caught as bycatch by fisheries that primarily target demersal species.

Gemfish was managed as a tier 4 stock in 2017 under the SESSF harvest strategy. This harvest strategy uses standardised catch per unit effort [CPUE]) as an index of abundance. The recent four year average CPUE (2013–16) was above the target, and a recommended biological catch (RBC) of 436 t was generated from the application of the tier 4 harvest control rule [Haddon and Sporic 2017]. This is corroborated by the assessment, which suggests that current standardised catch rates are above the target catch rate and well above the limit. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired. The above evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

There are uncertainties about the discard data—the amount of discarding varies between years, and the reporting of discards is uncertain [Helidoniotis and Moore 2016]. High levels of discards have been estimated, and the inclusion of discards in the tier 4 analysis increases the CPUE. This in turn increases the RBC, although the increase is somewhat offset by removing the discards before setting a TAC.

The standardisation of the CPUE series for Western Gemfish accounts for vessel participation and gear variability. However, the varying discard rates in fishing grounds and the potential for hyperstability in aggregating species (that is, the CPUE remains stable while stock biomass decreases) are not explicitly accounted for in the standardisation. If CPUE estimates are not indexing stock biomass, CPUE estimates may mislead the assessment [Haddon 2016].

The landed catch in 2017 was 77 t, and the weighted average discards were 47.79 t [Castillo-Jordan et al 2018], giving a total of 129 t, which is below the estimated RBC of 200 t. This indicates that the fishing mortality rate in 2017, if maintained, would be unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Western biological stock is classified as a **sustainable stock**.

BIOLOGY

Gemfish biology [AGDE 2009, Hutchins and Swainston 1986, Rowling 1999]

| Species | Longevity / Maximum Size | Maturity (50 per cent) |
|---------|---|--|
| Gemfish | Males 13 years, up to 1 060 mm TL , 15 kg Females 17 years, up to 1 160 mm TL, > 15 kg | Males 4–5 years, 600 – 660 mm TL, Females 5–6 years, 710 – 740 mm TL |

DISTRIBUTION



Distribution of reported commercial catch of Gemfish

TABLES

| Commercial Catch Methods | Commonwealth | New South Wales | Western Australia |
|---------------------------------------|---------------------|------------------------|--------------------------|
| Danish Seine | ✓ | | |
| Demersal Gillnet | ✓ | | |
| Demersal Longline | ✓ | | |
| Demersal Pair Trawl | ✓ | | |
| Dropline | ✓ | ✓ | ✓ |
| Hand Line, Hand Reel or Powered Reels | | | ✓ |
| Hook and Line | | ✓ | ✓ |
| Midwater Trawl | ✓ | | |
| Otter Trawl | ✓ | ✓ | |
| Rod and reel | ✓ | | |
| Trawl | ✓ | | |
| Unspecified | | ✓ | ✓ |

| Fishing methods | Commonwealth | New South Wales | Western Australia |
|------------------------|---------------------|------------------------|--------------------------|
| Charter | | | |
| Hook and Line | | ✓ | ✓ |
| Rod and reel | | ✓ | |
| Commercial | | | |
| Danish Seine | ✓ | | |
| Demersal Longline | ✓ | | |

| | | | |
|--|---------------------|----------------------------|------------------------------|
| Dropline | ✓ | ✓ | |
| Hand Line, Hand Reel or Powered Reels | | | ✓ |
| Hook and Line | | ✓ | |
| Otter Trawl | ✓ | ✓ | |
| Unspecified | | ✓ | |
| Indigenous | | | |
| Hook and Line | | ✓ | |
| Rod and reel | | ✓ | |
| Recreational | | | |
| Hook and Line | | ✓ | |
| Rod and reel | | ✓ | |
| Management Methods | | | |
| | Commonwealth | New South Wales | Western Australia |
| Charter | | | |
| Bag and possession limits | | ✓ | ✓ |
| Bag limits | | ✓ | ✓ |
| Gear restrictions | | ✓ | ✓ |
| Licence | | ✓ | ✓ |
| Limited entry | | | ✓ |
| Marine park closures | | ✓ | ✓ |
| Commercial | | | |
| Catch limits | | ✓ | |
| Effort limits | | | ✓ |
| Gear restrictions | ✓ | ✓ | ✓ |
| Limited entry | ✓ | ✓ | ✓ |
| Marine park closures | | ✓ | |
| Mesh size regulations | | ✓ | |
| Spatial closures | ✓ | ✓ | ✓ |
| Total allowable catch (incidental) | ✓ | | |
| Trip limits | ✓ | | |
| Vessel restrictions | | ✓ | |

| Indigenous | | | |
|---|--|---|--|
| Bag limits | | ✓ | |
| Native Title | | ✓ | |
| Section 37 (1d)(3)(9), Aboriginal cultural fishing authority | | ✓ | |
| Recreational | | | |
| Bag and possession limits | | ✓ | |
| Bag limits | | ✓ | |
| Gear restrictions | | ✓ | |
| Licence | | ✓ | |
| Marine park closures | | ✓ | |

| Active Vessels | | |
|-----------------------|--|---------------------------------|
| | New South Wales | Western Australia |
| | 15 Fishing Business in OTF, 18 Fishing Business in OTLF, | <3 in WCDSIMF, 3 in Charter, |

OTF Ocean Trawl Fishery(NSW)

OTLF Ocean Trap and Line Fishery(NSW)

WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery(WA)

Charter Tour Operator(WA)

| Catch | | | |
|---------------------|---|--------------------------------|--------------------------|
| | Commonwealth | New South Wales | Western Australia |
| Charter | | | <0.1 t Charter |
| Commercial | 103.977t in SESSF (CTS), 3.377t in SESSF (GABTS), 3.70328t in SESSF (GHTS), | 0.309t in N/A, 3.267t in OTLF, | |
| Indigenous | Unknown | Negligible (2013–14) | Unknown |
| Recreational | Unknown | Negligible (2013–14) | Unknown |

SESSF (CTS) Southern and Eastern Scalefish and Shark Fishery (Commonwealth Trawl Sector) (CTH), SESSF (GABTS) Southern and Eastern Scalefish and Shark Fishery (Great Australian Bight Trawl Sector) (CTH), SESSF (GHTS) Southern and Eastern Scalefish and Shark Fishery (Gillnet Hook and Trap Sector) (CTH), N/A Not Applicable (NSW), OTF Ocean Trawl Fishery (NSW), OTLF Ocean Trap and Line Fishery (NSW), WCDSIMF West Coast Demersal Scalefish (Interim) Managed Fishery (WA),

Commonwealth and New South Wales Data for the Commonwealth align with the Commonwealth Southern and Eastern Scalefish and Shark Fishery 2016–17 fishing season (1 May 2015–30 April 2016). Data for New South Wales is the 2016–17 financial year.

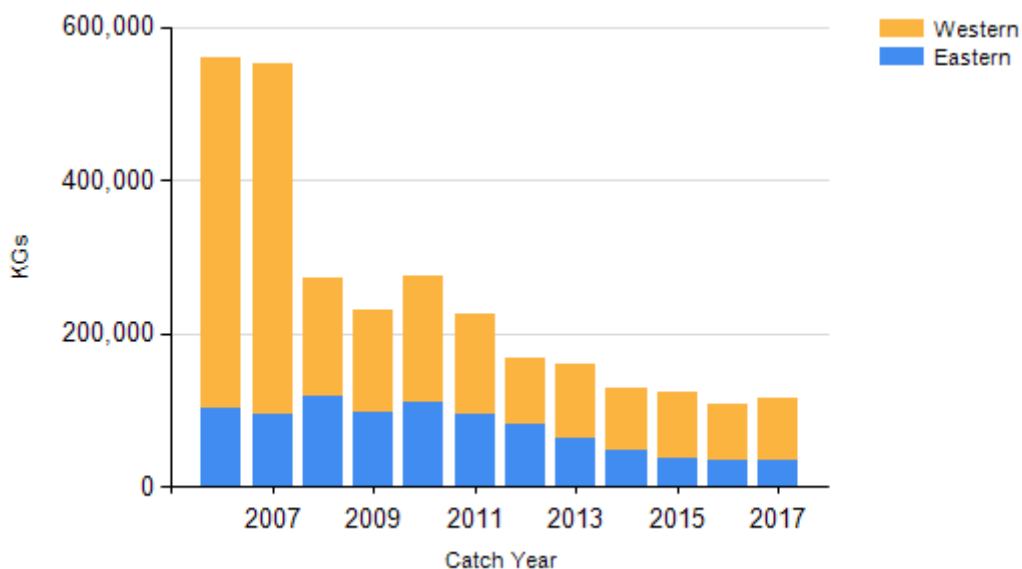
Commonwealth – Recreational The Australian Government does not manage recreational fishing in Commonwealth waters. Recreational fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters, under its management regulations.

Commonwealth – Indigenous The Australian Government does not manage non-commercial Indigenous fishing in Commonwealth waters, with the exception of the Torres Strait. In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the state or territory immediately adjacent to those waters.

New South Wales – Indigenous (Management Methods) (a) The Aboriginal Cultural Fishing Interim Access Arrangement allows an Aboriginal fisher in New South Wales to take in excess of a recreational bag limit in certain circumstances, for example, if they are doing so to provide fish to other community members who cannot harvest themselves, (b) The Aboriginal cultural fishing authority is the authority that Indigenous persons can apply to take catches outside the recreational limits under the *Fisheries Management Act 1994* (NSW), Section 37 (1d)(3)(9), Aboriginal cultural fishing authority, and (c) In cases where the *Native Title Act 1993* (Cth) applies fishing activity can be undertaken by the person holding native title in line with S.211 of that Act, which provides for fishing activities for the purpose of satisfying their personal, domestic or non-commercial communal needs. In managing the resource where native title has been formally recognised, the native title holders are engaged with to ensure their native title rights are respected and inform management of the State's fisheries resources.

New South Wales Indigenous and Recreational catch estimates of “Negligible” are based zero catches of Gemfish recorded during the “Survey of Recreational Fishing in NSW and the ACT, 2013/14” (West et al. 2015)

CATCH CHART



Commercial catch of Gemfish - note confidential catch not shown

EFFECTS OF FISHING ON THE MARINE ENVIRONMENT

ENVIRONMENTAL EFFECTS on Gemfish

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