

# Baldchin Groper (2023)

*Choerodon rubescens*



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## STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Western Australia	Western Australia	Recovering	Catch, effort, mean lengths, fishing mortality, relative spawning biomass

## STOCK STRUCTURE

Analyses of microsatellite DNA indicates that Baldchin Groper comprises a single biological stock in Western Australia, occurring primarily in the West Coast Bioregion (WCB) south of 27°S latitude and west of 115°30'E longitude [Fairclough et al. 2011; Gardner et al. 2015].

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

## STOCK STATUS

### Western Australia

Baldchin Groper is primarily caught by recreational (including charter) fishers, with this sector landing around 85% of the annual retained catches in Western Australia over the past decade. While early catch information for this species is uncertain due to limited recreational fishing surveys and charter reporting prior to the mid-2000s, available data suggest that the total annual catches of Baldchin Groper by the commercial and recreational sectors fluctuated around 100 tonnes (t) from the early 1980s to the late 2000s, before reducing to around 60 t. The reduction in catch corresponds to the introduction between 2007 and 2010 of significant management measures for both the commercial and recreational sectors to reduce fishing effort and catch of demersal scalefish in the West Coast Bioregion (WCB), where the majority of Baldchin Groper are landed. A 20-year recovery plan is in place to monitor the recovery of the West Coast Demersal Scalefish Resource (WCDSR). In addition to periodic

assessments of indicator species [Newman et al. 2018], annual reviews of retained catches and estimates of post-release mortality (PRM) for key species are also undertaken against recovery benchmarks for each sector to inform management of the resource [DPIRD 2021].

In the WCB, retained catches of Baldchin Groper by the commercial and recreational fishing sectors in 2020–21 were 11 t and 53 t, respectively, with the latter comprising 38 t landed by private boat-based fishers and 14 t landed by charter fishers [Ryan et al. 2022; Fisher et al. 2023]. The proportions of Baldchin Groper that were caught and released by private recreational and charter fishers in 2020–21 were 35% and 38%, respectively (note that data on commercial release rates are limited), with this species susceptible to very high levels of PRM (i.e., assumed to be 90% of released fish) [DPIRD 2021]. The combined retained catch and estimated PRM (referred to here as total fishing mortality) of Baldchin Groper by the commercial sector in the WCB has been below the original recovery benchmark of 22 t since 2009 (12 t in 2021–22). Total fishing mortality by the recreational (including charter) sector in the WCB has exceeded the original recovery benchmark of 40 t for this species in 2011–12 (48 t), 2015–16 (63 t), 2017–18 (56 t) and 2020–21 (67 t) [Fisher et al. 2023].

A 2021 assessment of the WCDSR, for which Baldchin Groper is an indicator species only for the Mid-West area, showed that declines in the spawning biomass of key indicator species (West Australian Dhufish and Snapper) at the bioregion level have been halted but remain below the threshold reference level corresponding to BMSY [Fairclough et al. 2021]. In the case of Snapper, the estimated relative spawning biomass in the WCB in 2020 was still below the limit reference level of 0.2, with model projections indicating that fishing pressure has remained too high to allow stocks to recover above the threshold level by 2030. In response, new management measures for the WCDSR were implemented in early 2023, designed to further reduce retained catches and PRM of key demersal scalefish species in the WCB (including Baldchin Groper) to below 50% of the original recovery benchmarks specified in the WCDSR Harvest Strategy [DPIRD 2021]. The indicator species approach used is based on management being focused on the species at highest risk of further depletion, to ensure the overall WCDSR is sustainably fished [Newman et al. 2018].

A data-limited Catch-MSY analysis of the Western Australian stock of Baldchin Groper, based on available catch data from 1975 to 2022, predicts a Maximum Sustainable Yield (MSY) of 85 t (95% CI: 68–99 t). Although annual catches have fluctuated within and above this range from the early 1980s to the late 2000s, recent management measures to reduce fishing effort on demersal scalefish has resulted in catches of Baldchin Groper below the predicted MSY since 2009. While uncertain and based on assumptions about the initial and final levels of depletion of the stock (0.4–0.8 and 0.15–0.7, respectively), the analysis indicates that the recent low catches have reduced the fishing mortality (F) experienced by the stock below the predicted level of FMSY (0.12 year<sup>-1</sup>). The predicted relative stock biomass in 2022 was 0.53 of the estimated unfished level (95% CI: 0.23–0.69), just above the threshold reference level corresponding to BMSY (0.5).

Estimates of fishing mortality (F) for Baldchin Groper have been periodically derived by fitting a catch-curve model that accounts for variable recruitment [Fisher 2013] to age composition data collected from recreational and commercial catches in the mid-west area of the WCB since the mid-2000s [Fairclough et al. 2014]. While these equilibrium analyses indicate that the long-term average F of fully-selected fish in the population has remained well above the estimated value of natural mortality for this species, recent analyses of

available biological data indicate that the size at full selectivity of Baldchin Groper to line fishing gear (approximately 570 mm total length) is well above the minimum legal length for this species in place prior to 2023 (400 mm), the length at 50% female maturity (279 mm) and the length at 50% sex change from female to males (479 mm) [Crisafulli et al. in review]. Consequently, the average level of F experienced by the spawning stock is likely lower than indicated by the catch-curve analysis for fully selected fish. The mean lengths of Baldchin Groper in charter catches from the southern parts of the Mid-west area have remained steady since 2002, being well above the mean length at 50% female maturity [Crisafulli et al. in review], thus providing further protection to the stock from fishing pressure.

Estimates of relative spawning biomass for male and female Baldchin Groper have been derived from an age-based per-recruit model that incorporates a stock-recruitment relationship, accounts for age-based selectivity, female-to-male sex change and high levels of post-release mortality of this species. While recent estimates for males were below the limit reference level of 0.2, the equivalent estimates for females were above the threshold level of 0.3 considered as a proxy for BMSY. The use of this measure for the males of protogynous species is considered more precautionary [Fairclough et al. 2014, 2023]. The results from the age-based per-recruit analyses of samples from the Mid-West area are broadly consistent with outputs derived from length-based catch curve and per-recruit analyses using charter data for Baldchin Groper from the southern part of the Mid-west [Crisafulli et al. in review].

While current estimates of relative biomass levels for male Baldchin Groper remain below the reference level corresponding to MSY, the Catch-MSY analyses indicate that the recent lower catch levels have resulted in reductions in the fishing pressure and overall stock depletion, and consequently reduced the risk of recruitment impairment. Thus, recovery of Baldchin Groper is expected to continue under the new management arrangements for the WCDSR, which will further reduce fishing effort and catch of key demersal scalefish species in the WCB.

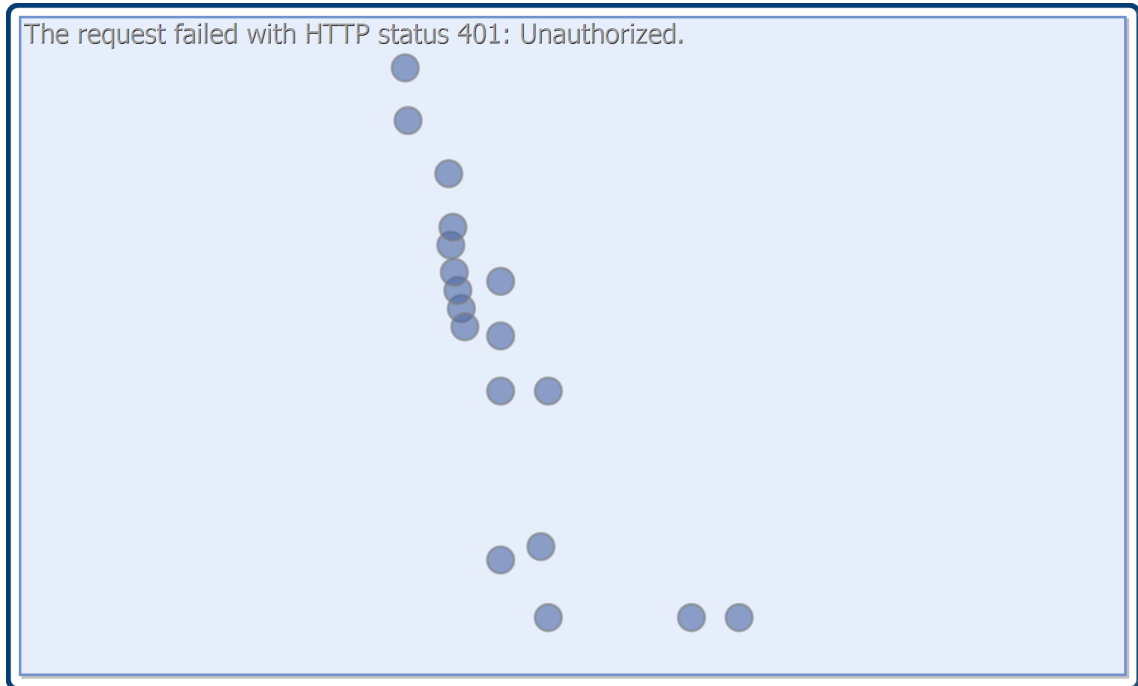
The above evidence indicates that the biomass of this stock is likely to be depleted and that recruitment has been impaired. However, the evidence also indicates that the current level of fishing mortality should allow the stock to recover from its impaired state. The Western Australia biological stock of Baldchin Groper is classified as **recovering**.

## BIOLOGY

**Baldchin Groper biology** [Fairclough 2005; Nardi et al. 2006; Fairclough et al. 2014; DPIRD unpublished data]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Baldchin Groper	28 years, 750 mm TL	Female maturity: 4 years, 279 mm TL; Protogynous sex change (to male): 12 years, 479 mm TL

## DISTRIBUTION



Distribution of reported commercial catch of Baldchin Groper

**TABLES**

<b>Fishing methods</b>	<b>Western Australia</b>
<b>Charter</b>	
Hook and Line	✓
Spearfishing	✓
<b>Commercial</b>	
Dropline	✓
Gillnet	✓
Hand Line, Hand Reel or Powered Reels	✓
Line	✓
Longline (Unspecified)	✓
<b>Recreational</b>	
Hook and Line	✓
Spearfishing	✓

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<b>Management Methods</b>	
	<b>Western Australia</b>
<b>Charter</b>	
Catch limits	✓
Gear restrictions	✓
Licence	✓
Limited entry	✓
Marine park closures	✓
Passenger restrictions	✓
Spatial closures	✓
<b>Commercial</b>	
Effort limits	✓
Gear restrictions	✓
Limited entry	✓
Marine park closures	✓
Spatial closures	✓
Temporal closures	✓
Total allowable effort	✓
Vessel restrictions	✓
<b>Recreational</b>	
Bag limits	✓
Gear restrictions	✓
Licence (fishing from a boat)	✓
Marine park closures	✓
Possession limit	✓
Spatial closures	✓

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<b>Spatial zoning</b>	✓
<b>Temporal closures</b>	✓

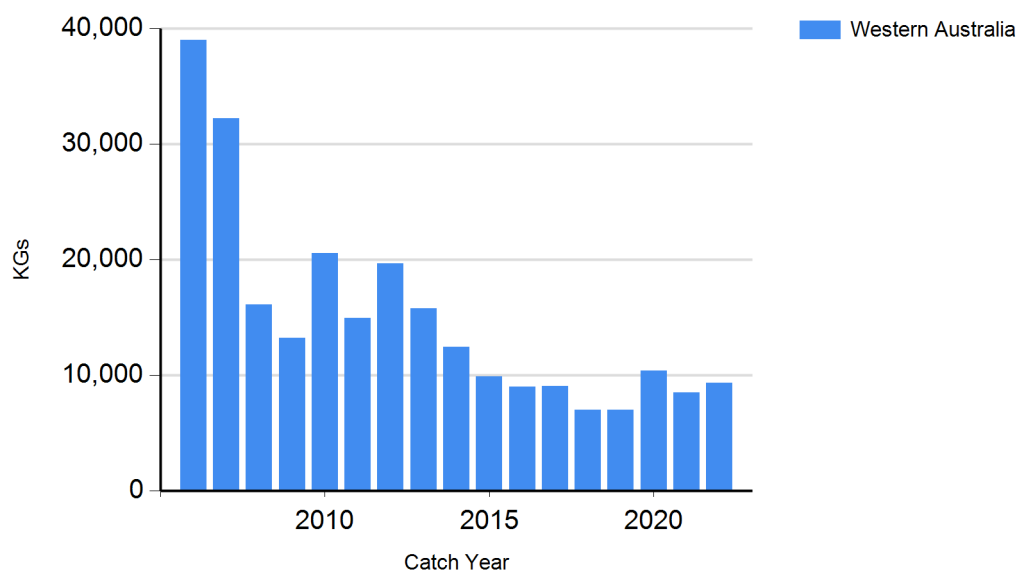
<b>Catch</b>	<b>Western Australia</b>
<b>Charter</b>	11 t (2022)
<b>Commercial</b>	9.33933 t
<b>Indigenous</b>	Unknown
<b>Recreational</b>	42 t (2020–21)

**Western Australia – Charter.** Catches reported by calendar year.

**Western Australia – Recreational.** Boat-based catch from 1 September 2020 to 31 August 2021.

**Western Australia – Indigenous** Subject to the defence that applies under Section 211 of the *Native Title Act 1993* (Cth), and the exemption from a requirement to hold a recreational fishing licence, the non-commercial take by Indigenous fishers is covered by the same arrangements as those for recreational fishing.

**CATCH CHART**



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Commercial catch of Baldchin Groper - note confidential catch not shown

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