Stock Status Summary 2021

NSW Stock Status Summary – Bass Groper
(Polyprion americanus)

Assessment Authors and Year

Fowler, A. M. & Chick, R.C. 2021. NSW Stock Status Summary 2020/21 – Ocean Trap and Line Fishery (Line Fishing – Eastern Zone) - Bass Groper (*Polyprion americanus*). NSW Department of Primary Industries. Fisheries. 9 pp

This stock status summary report updates the stock status summary report – Bass Groper provided in March 2020 (Fowler and Chick 2020).

Stock Status

Current stock status	On the basis of the evidence contained within this assessment, Common Name are currently assessed as Undefined for the NSW component of the stock.

Biology and Stock Structure

Bass Groper (*Polyprion americanus*) is a large demersal perciform with a global anti-tropical distribution (Ball et al. 2000; Wakefield et al. 2013). The species occurs throughout NSW, with adults found on the continental slope at depths typically exceeding 300 m. The species also associates with seamounts (Sedberry et al. 1999).

The stock structure of Bass Groper in NSW is unknown, with no genetic analyses or comparative demographic investigations conducted to date. Genetic panmixia is expected, given the extended pelagic phase (see below) and exposure to strong surface currents through association with floating objects during this period that likely result in broad-scale dispersal (Roberts 1989; Machias et al. 2003).

No demographic information is available for Bass Groper in NSW. Investigations in other regions, including Western Australia, indicate that the species attains a large size (up to 200 cm total length, TL; Roberts 1989) and weight (up to 100 kg; Roberts 1989), is long-lived (up to 78 years; Wakefield et al. 2013), and late maturing (11–14 years; Wakefield et al. 2013). Growth differs between sexes, with females growing faster and achieving a larger size than males (Wakefield et al. 2013).

Length samples (n = 354) obtained from the commercial fishing sector in NSW during the 1990s indicated a high proportion of large (>100 cm TL) individuals.
The assessment is made at the jurisdictional level (state-wide).

Stock Status

The current classification is consistent with that described in the 2020 Bass Groper stock status summary report (Fowler and Chick 2020) and the 2018 Bass Groper stock assessment report (Fowler and Chick 2018) which was supported by independent review. A weight-of-evidence approach was used as insufficient data are available to support a more quantitative stock assessment. Uncertainty regarding Bass Groper stock structure, biology and recreational catch, decreasing and low levels of commercial catch and effort (days), and low and variable catches and effort between different commercial fishing methods that exacerbate uncertainty surrounding

estimates of standardised and nominal catch rates, provide insufficient information with which to reliably determine a stock status.

Fishery statistics summary

Changes in NSW commercial fishery reporting requirements, sources of commercial fishery data and the continuity or otherwise of data sources through time are outlined in Appendix 1 of Fowler and Chick (2021). Notably, between 1997/98 and 2008/09 (inclusive), fishers reported monthly catch and effort (in days) for each fishing method (gear type). From 2009/10, monthly reports of daily catch and effort (hours) and fishing method have been required. To construct a longer time series of commercial fishery data (i.e. from 1997/98 to present), daily records from 2009/10 have been re-aggregated into monthly catches (kg) by fisher and gear type, with effort in days per month estimated from the number of distinct fishing dates in each month when the method was used and there was a reported landing of the species of interest in that month, irrespective of whether the species was reported on each day, to be consistent with earlier reporting.

Changes in reporting requirements from 1997/98 included separate reporting of Bass Groper from congener Hapuku (*P. oxygeneios*). Hence, fishery data for this species alone is only available from 1997/98. Further, management arrangements including input controls and modified OTL Fishery endorsements to restrict fishing east and west of the 100 fathom depth contour (OTL–Line East and OTL–Line West, respectively) are described in the NSW Fisheries Management (Ocean Trap and Line Share Management Plan) Regulation 2006 (NSW DPI Fisheries 2017). Changes to the endorsement limited the number of fishers endorsed to access deep waters, and hence Bass Groper, and prohibited OTL–Line West-endorsed fishers from landing Bass Groper (as well as other species). Changes to the endorsement limited the number of fishers endorsed to access deep waters, and hence Bass Groper, and prohibited OTL–Line West-endorsed fishers from landing Bass Groper (as well as other species). Given the historical catch considerations in the allocation of the endorsements and the deep-water distribution of Bass Groper, the change to this fishing endorsement is not considered to have substantially impacted on the catch of Bass Groper through time. This report includes data available from logbook returns from commercial fishers for the period July 1997 to June 2020 (inclusive). All reported catches of Bass Groper are presented unless otherwise stated in the text and captions.

Catch Information

Commercial catch

Since 2012/13, Bass Groper have been exclusively caught in the OTL Fishery (100% of total reported catch). Prior to 2012/13, minor catches (0-13% of total annual catch) were reported in the Ocean Fish Trawl and Ocean Prawn Trawl Fisheries. Most of the catch prior to 2011/12 was taken using dropline (mean: 87%), while the majority of catch after 2011/12 has been taken using handline (mean 66%).

Total annual reported commercial catch of Bass Groper is low (< 10 t since 2004/05; Figure 1). Catch increased from 2.3 t during 1998/99 to 10.5 t during 2004/05, after which catch decreased to 3.0 t during 2008/09. Catch has remained relatively stable since 2008/09, with the lowest catch of 1.8 t taken during the most recent complete reporting year (2019/20). Larger catches (up to 136 t)

have been reported historically; however, these records include unknown components of *P. oxygeneios* and catches taken from seamounts outside of NSW jurisdiction.

The trend in dropline catch was similar to total catch, with a peak during 2004/05, followed by a decline to 2008/09 (Figure 2). However, unlike total catch, dropline catch continued to decline gradually after 2008/09 to lowest level in the current reporting year (0.3 t, 2019/20; Figure 2). Trends in handline catch differed to trends in both total catch and dropline catch, with very low (<1 t) catches showing no clear trend between 1997/98 and 2009/10, followed by an increase in catch to 3.9 t during 2014/15 and a subsequent decrease to 1.4 t during the most recent reporting year.

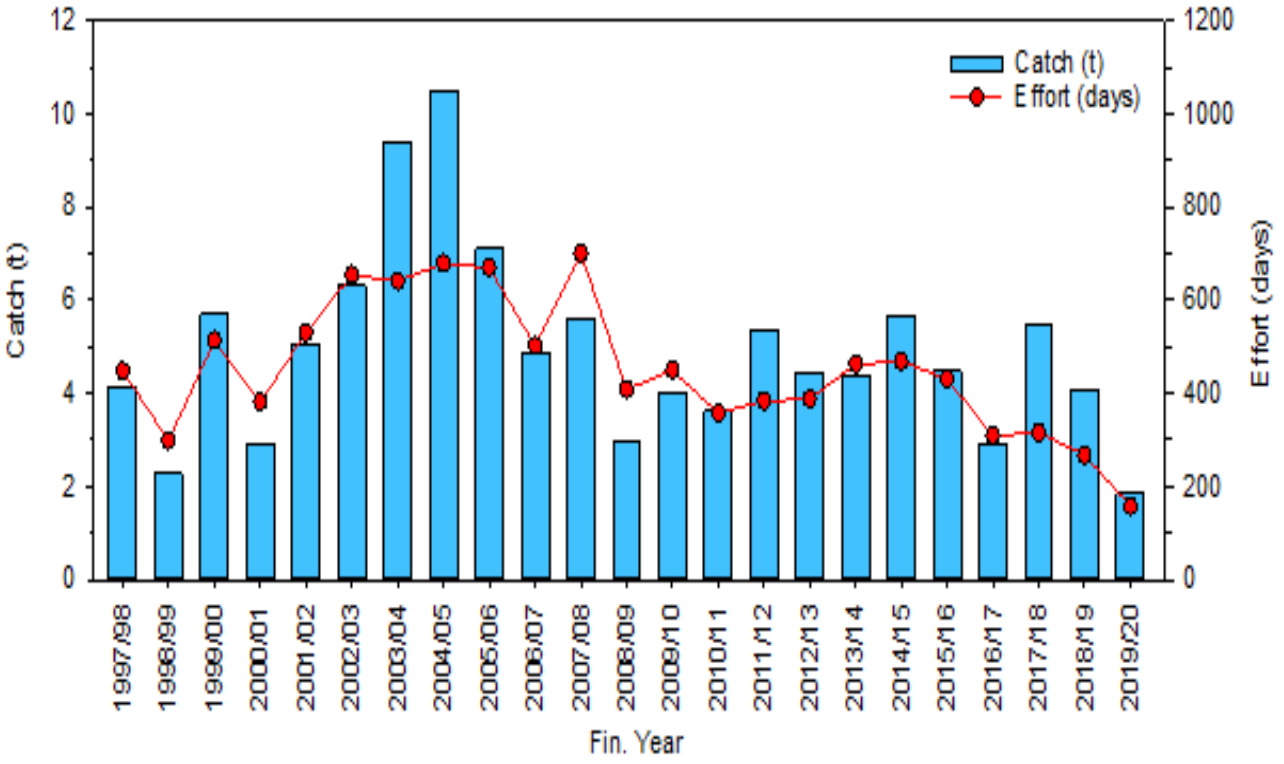

Figure 1. All fishing methods and fisheries combined – Total catch (t) of Bass Groper and total effort (days) from 1997/98 to 2019/20. Note: effort (days) from 2009/10 are days fished per month irrespective of species reported to be consistent with effort reported from 1997/98 to 2008/09

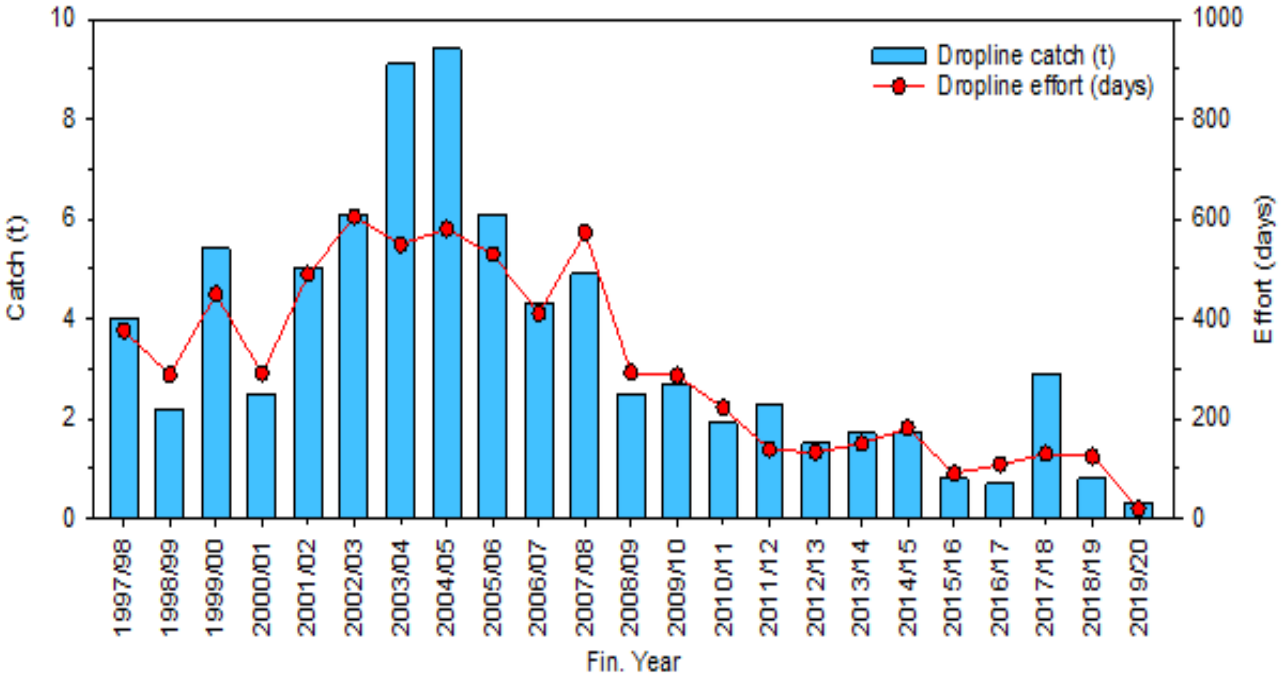

Figure 2. Droplining – Catch (t) of Bass Groper and effort (days) from 1997/98 to 2019/20. Note: effort (days) from 2009/10 are days fished per month irrespective of species reported to be consistent with effort reported from 1997/98 to 2008/09.

Recreational and Indigenous cultural catch

Recreational catches of Bass Groper are uncertain. Bass Groper, like congener Hapuku, are highly valued by recreational anglers in Australia (Wakefield et al. 2013), and recreational catch may comprise a substantial proportion of the total catch in NSW. Henry and Lyle (2003) estimated the NSW annual recreational harvest of Rock Cod/Gropers (including Hapuku and nine other 'offshore/deep' species) during 2000/01 to be 4,770 (± 1,532) individuals. However, a survey of NSW recreational fishers during 2013/14 reported no recreational catch of Bass Groper (West et al. 2015). A catch of 350 individuals was estimated from a similar survey of recreational fishers during 2017/18 (Murphy et al. 2020); however, relative standard error was 100% and fewer than 30 respondents reported catches of the species. Anecdotal evidence, including social media reports of catches of Bass Groper and Hapuku, suggests the NSW recreational catch of these species in some years may equate to a substantial proportion of the commercial catch.

Indigenous catches are unknown but likely to be very low.

Illegal, Unregulated, Unreported (IUU) catch

The level of Illegal Unregulated and Unreported (IUU) fishing has not been quantified.

NSW Fisheries Compliance provide annual summaries of seizures of fish and invertebrates due to non-compliance to the public (dpi.nsw.gov.au/fishing/compliance/fisheries-compliance-

enforcement). These public reports have not highlighted IUU activity specific to Bass Groper within financial years between 2014/15 and 2019/20.

Fishing effort information

Commercial effort

The trend in total annual commercial effort was similar to that for total catch, with an increase from 299 days during 1998/99 to 701 days during 2007/08, followed by a decrease to 358 days by 2010/11 (Figure 1). Effort then remained relatively steady until 2015/16, after which it declined to the most recent complete reporting year (158 days, 2019/20). The trend in dropline effort was similar to dropline catch, with a low of 19 days in the most recent reporting year (2019/20; Figure 2). The pattern of handline effort was also similar to handline catch throughout the available reporting period (1997/98–2019/20).

Recreational and Indigenous cultural effort

Recreational and Indigenous effort for Bass Groper are unknown.

Catch rate information - Commercial

Standardised catch per unit effort ($CPUE_{dy}$, $kg.day^{-1}$) for droplining was estimated using a general linear model (LM) constructed using the 'cede' package in the R statistical software. CPUE was standardised for fishing business and ocean zone. Fishing business was used as a proxy for vessel, because fishers are no longer required to report fishing vessel numbers on catch returns. The resulting standardised $CPUE_{dy}$ for droplining showed no clear trend over the available reporting period (1997/98–2019/20; Figure 3), with substantial variance in the most recent reporting year. Greater variance was apparent for estimates of $CPUE_{dy}$ following 2011/12, likely related to reduced effort (Figure 3).

Median handline $CPUE_{dy}$ showed no clear trend over the available reporting period (1997/98–2019/20). Peaks in $CPUE_{dy}$ were observed during 2000/01 and 2010/11, with the 95% confidence interval surrounding the latter value not overlapping with those from some preceding years. The latter peak in CPUE followed a major change in reporting of fishing effort that occurred during 2009/10.

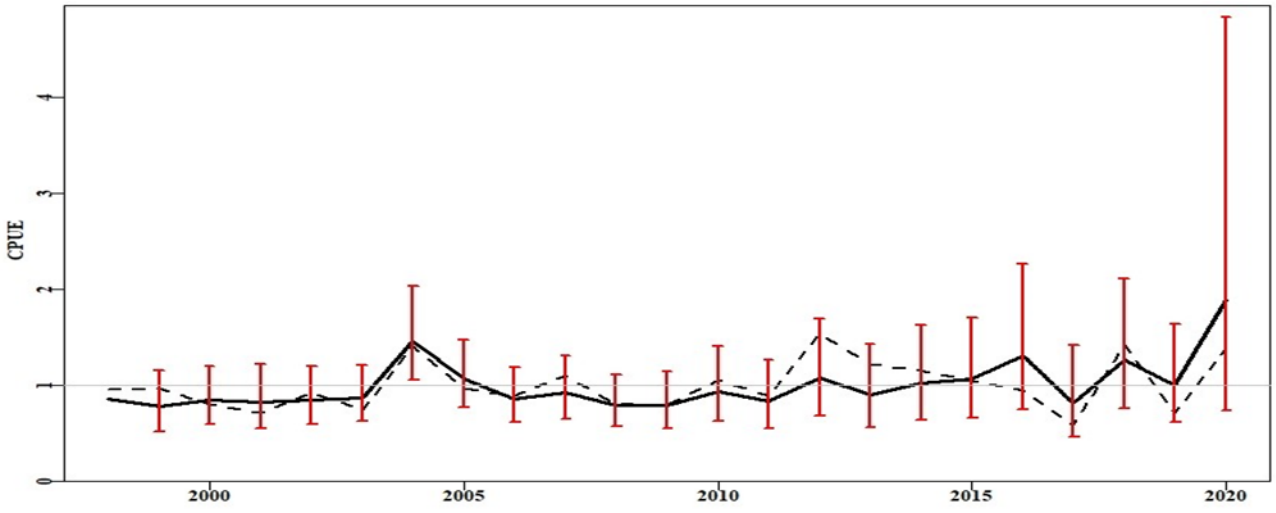

Figure 3 Droplining – Standardised CPUEdy (black line, kg.day-1) for Bass Groper from 1998/99 to 2019/20. Error bars represent 95% confidence intervals. Dashed line indicates the geometric mean CPUE (kg.day-1).

Stock Assessment – list of indicators

Most recent assessment	2021 - undefined
Assessment method	Weight of evidence
Main data inputs	Commercial catch (t) – 1997/98 to 2019/20 Standardised CPUE dropline (kg.day^{-1}) – 1997/98 to 2019/20 Median nominal CPUE handline (kg.day^{-1}) – 1997/98 to 2019/20
Main data inputs (rank)▪	Commercial catch – 2 (medium quality): historical time series, but some reporting changes and likely misreporting, limited quality control/error validations $CPUE_{dy}$ dropline: (low quality), compromised by significant reporting changes and inaccuracies in effort data $CPUE_{dy}$ handline: (low quality), compromised by significant reporting changes and inaccuracies in effort data
Key model structure and assumptions	NA – no model-based quantitative assessment approach was used due to data limitations
Sources of uncertainty evaluated	Known or likely uncertainties in the key indicators were taken into consideration in ranking data inputs to these indicators, and in reaching a conclusion regarding stock status based on the relative weighting of these indicators

▪ Main data inputs (rank)

1 – High quality: data have been subjected to documented quality assurance and peer review processes, are considered representative and robust and provide a high level of confidence to support fisheries management decisions.

2 – Medium quality: data have been subjected to some internal quality assurance processes, have some documented limitations, but are still considered sufficiently accurate and informative to be useful to inform management decisions with some caveats.

3 – Low quality: data have been subjected to limited or no quality assurance processes, may be compromised by unknown or documented limitations that have not been fully explored, but are considered the best available information and require a high level of precaution to be exercised when interpreted to inform management decisions.

Status Indicators and Limits Reference Levels

Biomass indicator or proxy	Standardised CPUE. Used to indicate whether biomass is likely to be increasing, decreasing or stable
Biomass limit reference level	NA – no biomass limits or targets have been set
Fishing mortality indicator or proxy	NA – no agreed proxy of fishing mortality has been defined
Fishing mortality limit reference level	NA – no fishing mortality limit has been set
Target reference level	NA – no fishing mortality targets have been set

Stock Assessment Results

Biomass status in relation to limit	NA – no biomass limits or targets have been set
Fishing mortality in relation to limit	NA – no fishing mortality limit has been set
Previous SAFS stock status	NA – Bass Groper have not been SAFS-assessed
Current SAFS stock status	NA – Bass Groper have not been SAFS-assessed

Fishery interactions

Bass Groper are primarily caught as bycatch when droplining for Blue-eye Trevalla (*Hyperoglyphe antarctica*). Catches of Bass Groper and associated fishery statistics may therefore be influenced by changes in the Blue-eye fishery.

NSW OTL Fishery shareholders, fishers and/or their representatives were presented with assessment data and its interpretation through an online meeting. Feedback on the presentation and any other information that may inform the assessment was requested.

Comments from stakeholders included: 1) the reliance on favourable conditions, particularly weak ocean currents, to catch deep-water fishes, including Bass Groper; and 2) very recent low levels of catch and effort reflect the level of quota allocated to fishers and the need to accumulate quota to support fishing for this stock. There was no indication of any disagreement with the data or the assessment.

Bass Groper are landed in Australian Commonwealth fisheries, off the east coast of Australia, including waters east of NSW jurisdictional management (AFMA 2020). Reporting of Commonwealth catches for Bass Groper is combined with those for congener *P. oxygeneios*; however, catches for this group have been low and similar to those from NSW.

Qualifying Comments

NSW catch and effort logbook data vary spatially and temporally across different areas, delineated by changes in fisher reporting requirements and other management changes. Changes in dropline CPUEdy over the available reporting period did not appear to coincide with reporting changes; however, the increase in handline CPUEdy during 2010/11 immediately followed the major reporting change that occurred in 2009/10.

Recreational catch is poorly understood.

Factors other than fishing, including climate change and other environmental processes, may affect changes in the abundance and biological functioning of the NSW Bass Groper stock(s) through time. Temporal and spatial variations in oceanographic conditions, including temperature change, may influence available trophic resources, growth, population connectivity and ultimately recruitment.

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