Stock Status Summary – 2021/22

NSW Stock Status Summary – Bigeye Ocean Perch
(*Helicolenus barathri*)

NSW GOVERNMENT

Assessment Authors and Year

Smoothey, AF and Johnson, DD. 2021. NSW Stock Status Summary 2021/22 – Bigeye Ocean Perch (*Helicolenus barathri*). NSW, Department of Primary Industries, Fisheries. 17 pp.

Stock Status

Current stock status	On the basis of the evidence contained within this assessment, Bigeye Ocean Perch are currently assessed as **sustainable**.

Stock structure & distribution

Within the Commonwealth, Ocean Perch is managed as a single stock that includes two species: Inshore Ocean Perch (*Helicolenus percoides*) and Offshore Ocean Perch (*H. barathri*; hereinafter referred to as Bigeye Ocean Perch). Ocean Perch stock structure is uncertain, but there is probably an east–west structuring of stocks (Morrison et al. 2013). Bigeye Ocean Perch are caught at depths between 235-1100 m along the south east coast of Australia with a separate population along the south west coast of Western Australia. Inshore Ocean Perch are found on coastal rocky reef from the Queensland/New South Wales border to the south west coast of Western Australia and are caught in depths between 10-425 m (AFMA, 2021). Inshore Ocean Perch and Bigeye Ocean Perch have been assessed separately in the Commonwealth since 2009, but a single all-areas Commonwealth TAC is set for the two species. Based on the depth of capture and logbook records, most of the landed Ocean Perch are considered to be Bigeye Ocean Perch (Patterson et al. 2021).

Biology

Ocean Perch are a benthopelagic species that inhabit flat seabeds on the continental shelf and upper slope areas; more commonly found in 250–800 m. They grow up to 40 cm for Offshore Ocean Perch or 30 cm for Inshore Ocean Perch in length and can weigh up to 1.4 kg. The estimated lifespan of Ocean Perch is up to 60 years. Females reach sexual maturity at about 5 years of age, whilst males mature later around 5-7 years of age. Ocean Perch are lecithotrophic and viviparous, meaning that egg fertilization and larval development occur inside the female fish. The larvae are released when they reach about 1 mm in length. The breeding season of Ocean Perch extends from June to November and a single female can produce between 150,000-200,000 larvae per season. Ocean Perch are ambush predators, rising quickly from the ocean floor to capture prey. Main food sources for Ocean Perch are Royal Red Prawns, squid and smaller fish (AFMA, 2021).

Scope of this assessment

The fishery scientific assessment summarised in this report is considered adequate to meet the legislative requirements for supporting a total allowable catch (TAC) determination for the NSW Bigeye Ocean Perch that is done by the CSIRO, commissioned by the Australian Fisheries Management Authority (AFMA) and published as 'Bigeye Ocean Perch' in the 'Ocean Perch (*Helicolenus barathri*, *H. percoides*)' section of the Fishery Status Reports by the Australian Bureau of Agricultural and Resource Economics and Sciences (Patterson et al. 2021; hereinafter referred to as the Commonwealth assessment).

Assessment of the status of the stock of Bigeye Ocean Perch that is fished by commercial and recreational fishers in New South Wales (NSW) is principally based on the modelling and assessment done for this species by the Commonwealth. The primary mechanism for controlling the harvest of Bigeye Ocean Perch in SESSF is through the allocation of an Annual Total Allowable Catch (TAC). Determination of annual TACs for the Commonwealth SESSF is based on the SESSF Harvest Strategy Framework (HSF) (AFMA, 2017) that derives from the Commonwealth Fisheries Harvest Strategy Policy (HSP) (DAFF, 2007).

The Commonwealth assessment for Bigeye Ocean Perch is a Tier 4 assessment, i.e. standardised catch per unit effort (CPUE), including discards. The Tier 4 analysis determines an Recommended Biological Catch (RBC) by selecting CPUE reference points that are taken as proxies for the estimated BLIM and BTARG. This is done by assuming that the CPUE is proportional to stock abundance. If the stock was at unexploited equilibrium at the start of fishing, then the initial CPUE level at the start of the time series would correspond to the unexploited biomass or B0, and the other reference points are the appropriate fractions of this (e.g. 20% for B20).

This assessment of the status of Bigeye Ocean Perch, in waters under NSW jurisdiction, comprises:

(1) a summary of the most recent Commonwealth stock assessment for Bigeye Ocean Perch and current determinations of status based on criteria specified by the Commonwealth and also those used for the Status of Australian Fish Stocks;

(2) the rationale by which the Commonwealth assessment for Bigeye Ocean Perch is considered to be relevant and valid for determining the status of the Bigeye Ocean Perch stock fished within NSW jurisdiction (Appendix 1);

(3) information that may inform the determination of the 2022-23 NSW TAC for Bigeye Ocean Perch in the Ocean Trap and Line – Line East Fishery (Appendix 2). This is done in the absence of: (i) a formal NSW harvest strategy for this species/fishery; and (ii) a formal resource sharing agreement between NSW and the Commonwealth.

FISHERY STATISTICS

Catch information

Commercial

Fishery statistics presented in this report are restricted to those used to inform the Commonwealth assessment and are summarised here from Patterson et al. (2021) and references therein. The Commonwealth assessment of Bigeye Ocean Perch uses data from the Commonwealth Ocean Trawl Fishery within Commonwealth fishing zones 10 and 20 (south-eastern Australia) and catch records from depths from 200-700 m depth.

Descriptions of NSW fishery statistics are provided in Appendix 2 of this report and the changes in NSW commercial fishery reporting requirements and sources of NSW commercial fishery data are discussed.

Commonwealth catch information below is summarised from Patterson et al. (2021).

> Bigeye Ocean Perch has been a significant part of trawl catches since the fishery developed in the late 1960s (Morison et al. 2013). Total landed catch of Ocean Perch (both species) since the 1970s has generally been between 200 and 400 t, increasing from 200 t in the

1980s to around 400 t from 1995 to 2004, before decreasing again to around 200 t from 2007 to 2016 (Figure 1).

Commonwealth landed catch in the 2020/21 fishing season was 189.2 t, based on CRDs (Figure 2) with 88% of landings offshore Bigeye Ocean Perch and the remaining 12% inshore Reef Ocean Perch. Data on discards and state catches are not currently available for 2020/21. However, the weighted average discards between 2015/16 and 2018/19 were calculated and used to estimate discards and state catch of 121.5 t and 4 t, respectively for Inshore Reef Ocean Perch, and 40.3 t and 13.9 t, respectively for offshore Bigeye Ocean Perch (Althaus et al. 2020). Most Inshore Ocean Perch are discarded because of their smaller size. For the 2020/21 fishing season, total catch and discards combined were estimated to be 368.9 t. Annual landings by NSW state fishers have been between 8–21 t since 2009.

Figure 1. Total Ocean Perch (Reef and Bigeye) annual catches (Commonwealth Trawl Sector, Scalefish Hook Sector and state combined) and discards, 1986 to 2019 (Source: Sporcic 2020 cited in Patterson et al. 2021).
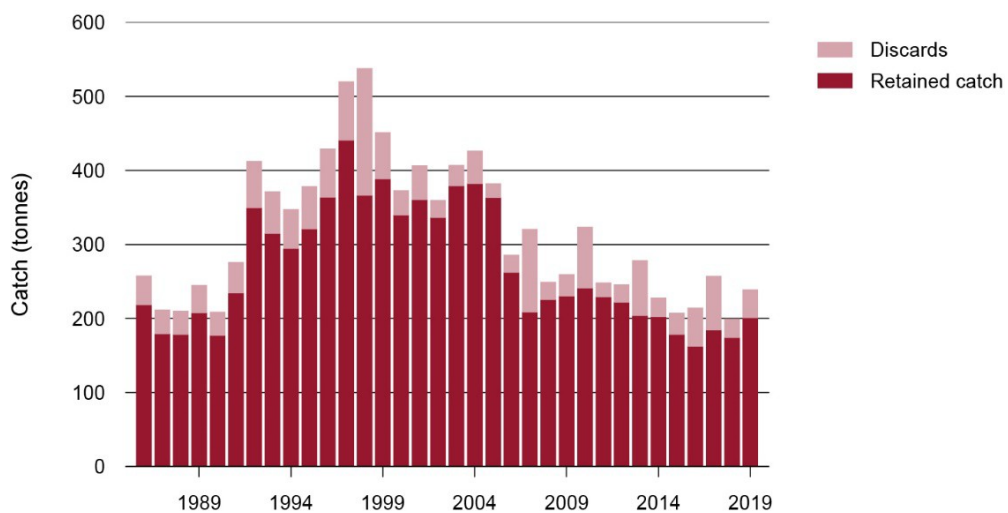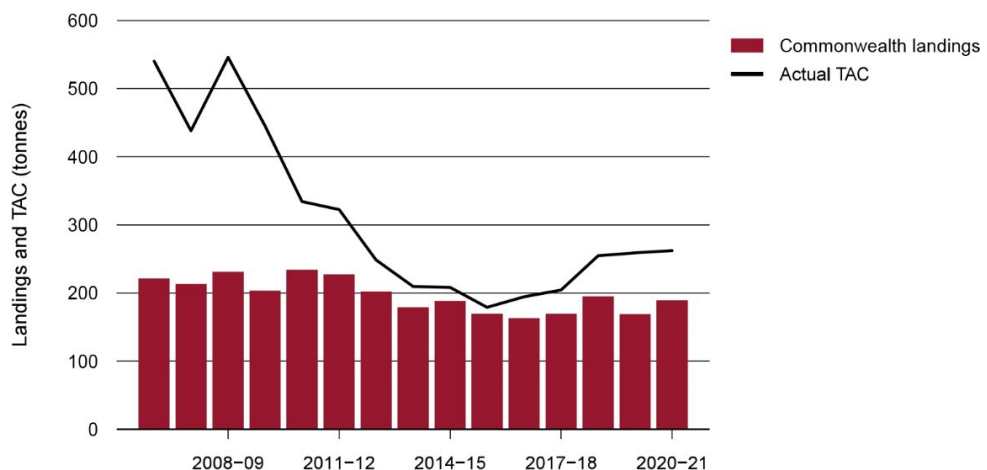

Figure 2. Total Ocean Perch (Reef and Bigeye) seasonal landings (SESSF) and total allowable catches (TACs), 2006-07 to 2020-21 (Source: AFMA catch disposal records cited in Patterson et al. 2021).

Recreational & Charter boat

Recreational catches have not been accounted for in the Commonwealth assessment of Bigeye Ocean Perch. The model is conditioned on commercial catch data alone. Accounting for recreational catch has been raised as an issue for consideration in Commonwealth assessments (SESSF RAG 2017). The National Recreational and Indigenous Fishing Survey completed in 2000/01 (Henry and Lyle 2003) describes recreational and Indigenous catches restricted to the general category of 'Scorpionfish/Gurnard' and reported the national harvest of 146,112 individuals (total 540,788 individuals caught with 73% released). Further, more recent state-wide recreational fishing survey completed in 2013/14 (West et al. 2015) and 2017/18 (Murphy et al. 2020) but did not report on Bigeye Ocean Perch. State-wide operators within the nearshore charter fishery landed two Bigeye Ocean Perch during the 2017/18 survey period, in contrast, 401 Reef Ocean Perch were caught (Hughes et al. 2021). The interpretation of the survey results is that catches of Bigeye Ocean Perch by recreational fishers in NSW are negligible, relative to the magnitude of commercial catches.

Indigenous

Neither the Commonwealth assessment or the process for determining the Commonwealth TAC from RBC includes estimates of Bigeye Ocean Perch catches by the Aboriginal sector. As for the recreational catch, any catches by the Aboriginal fishers in recent history are negligible, relative to the magnitude of commercial catches. Thus, the omission of Aboriginal catch from the model and Commonwealth assessment has little effect on the assessment outcome of the Bigeye Ocean Perch stock.

Illegal, Unregulated and Unreported

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

Fishing effort information

N/A

Catch Rate information

The recent average standardised CPUE had increased since the 2017 Tier 4 analysis and was above the TRP, with a substantial increase in the 2019 estimate (Figure 3). It was believed this was mostly likely due to the inclusion of revised estimates of NSW state catches (for the period 1998 to 2019) in the Tier 4 analysis, increased catches and higher estimated proportional discards (Sporcic 2020).

Figure 3. Standardised CPUE, including discards, for Bigeye Ocean Perch, 1986 to 2019 (Source: Sporcic 2020 cited in Patterson et al. 2021).
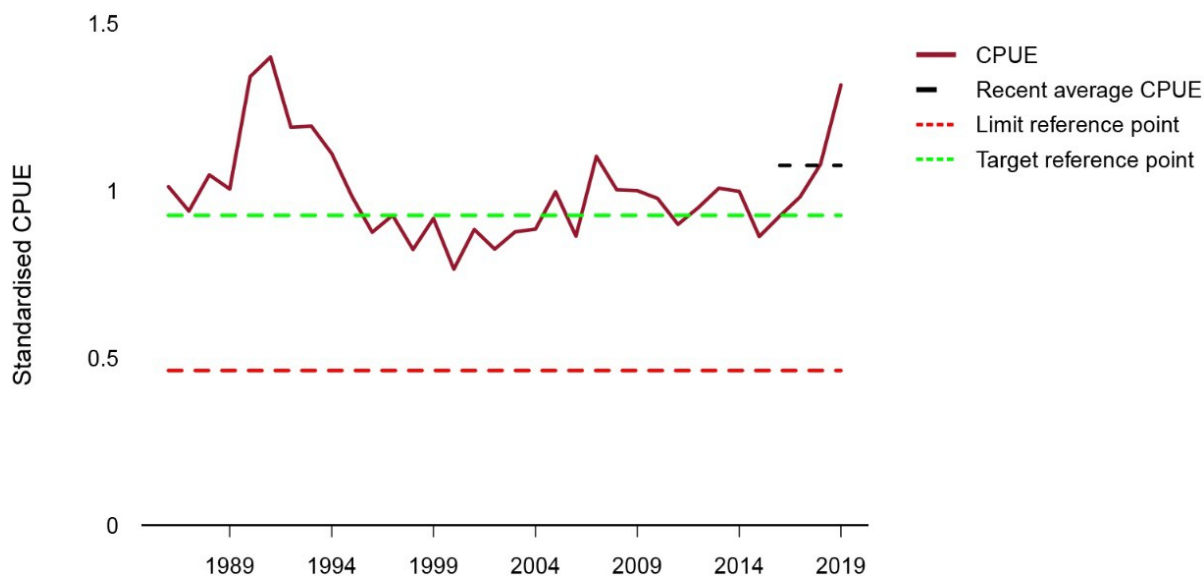
STOCK ASSESSMENT

The Commonwealth assessments for Bigeye Ocean Perch is a Tier 4 assessment using standardised catch rates, derived from the Commonwealth Trawl Fishery fleet in Commonwealth fishing zones 10 and 20 (south-eastern Australia). The Commonwealth assessment framework, including reference points (target and limit) is described in the Commonwealth Harvest Strategy Policy (Commonwealth of Australia 2003, 2017) and Harvest Strategy Framework for the Southern and Eastern Scalefish and Shark Fishery (SESSF; AFMA 2017). This framework defines stock status with regards to reference levels (target and limit) of standardised catch per unit effort (CPUE) as a proxy for biomass, as defined by Commonwealth criteria, and informs the determination of a recommended biological catch (RBC), for the Commonwealth fishery.

The most recent application of the Commonwealth Bigeye Ocean Perch Tier 4 assessment was done in 2017 for Inshore Ocean Perch (Haddon and Sporcic 2017) and 2020 for Offshore Ocean Perch. Both Sporcic and Haddon (2016) and Haddon and Sporcic (2017) highlight uncertainty associated with the Tier 4 assessment, including the standard assumptions associated with the Tier 4 assessment method, as well as comment on the effects of discards – for Bigeye Ocean Perch sometimes as high as 25–35% of total catch, whilst not substantially effecting the CPUE series through the reference period (1986–1995) has increased average CPUE over the last five years of the assessment and is above the target reference level.

Stock Assessment Methodology

Year of most recent assessment:

2017 for Inshore Ocean Perch (Haddon and Sporcic 2017 in Patterson et al. 2021) and 2020 for Offshore Ocean Perch (Sporcic 2020).

Assessment method:

Commonwealth Tier 4 analysis, Standardised CPUE (including discards).

Main data inputs:

 CPUE – Commonwealth Trawl Fishery; zones 10–20; depth 200–700 m

Discard rates (Thomson and Upston 2016).

Key model structure & assumptions:

Tier 4 – Standardised CPUE (Commonwealth Harvest Strategy Policy; Commonwealth of Australia 2003, 2017)
Assumptions: (see Haddon 2016): catch rate provides a relative index of abundance (not subject to hyper-stability or hyper-depletion and not unduly influenced by other factors not accounted for through standardisation); the reference period provides a good estimate of the stock when at a depletion level of $0.48B_0$; estimates of catch during the target period are accurate.

Sources of uncertainty evaluated:

Uncertainty associated with Tier 4 assessment (see Haddon 2013; Haddon and Sporcic 2017; Sporcic 2020c). SERAG noted that the high discard rate for Inshore Reef Ocean Perch had made the standardisation and associated Tier 4 analyses uncertain and the number of discards to be deducted would have resulted in a TAC of zero. SERAG recommended that Inshore Reef Ocean Perch be removed from the Ocean Perch quota basket and that a catch trigger be set for the species (Patterson et al. 2021).

Status Indicators - Limit & Target Reference Levels

Biomass indicator or proxy	Standardised CPUE (AFMA 2017)
Biomass Limit Reference Point	Standardised CPUE at $0.20B_0$ = Limit Reference Point
Biomass Target Reference Point	Standardised CPUE at $0.48B_0$ = Target Reference Point
Fishing mortality indicator or proxy	Catch (including discards) as a proportion of RBC. Note, the RBC calculation does not account for predicted discards of predicted State catches.
Fishing mortality Limit Reference Point	N/A
Fishing Mortality Target Reference Point	$CPUE_{48}$ at or above target, F_{48} (Fishing mortality rate that achieved B_{48})

Stock Assessment Results

Bigeye Ocean Perch standardised CPUE analyses summarised from Patterson et al. (2021).

A new Tier 4 analysis for Offshore Ocean Perch was done in 2020, despite separate tier 4 analyses for Inshore and Offshore Ocean Perch done by Haddon and Sporcic (2017) to inform the management of the stock for the 2019-20 fishing season. This was done because of the increased uncertainty caused by high discards and it was recommended that a basket TAC be applied using

only the Offshore Ocean Perch Tier 4 analysis (AFMA 2020b) and apply a catch trigger for the Inshore Ocean Perch. Although Inshore Ocean Perch remains part of the quota basket, the TAC was determined based on the RBC for Offshore Ocean Perch only and was set at 239 t for 2020-21, the third year of a 3-year MYTAC (AFMA 2020c).

In 2020, a new Tier 4 analysis for Offshore Ocean Perch was done (Sporcic 2020c). The recent average standardised CPUE had increased since the 2019 Tier 4 analysis and was above the TRP, with a substantial increase in the 2019 estimate (Figure 3). It was believed this was mostly likely due to the inclusion of revised estimates of NSW state catches (for the period 1998 to 2019) in the Tier 4 analysis, increased catches and higher estimated proportional discards (Sporcic 2020). Applying the Tier 4 harvest control rule to the standardised CPUE series with discards resulted in an RBC of 422 t for the 2021-22 fishing season.

Both the 2017 (Inshore Ocean Perch) and 2020 (Offshore Ocean Perch) Tier 4 analyses (Haddon and Sporcic 2017; Sporcic 2020c) estimated the recent average standardised CPUE to be above the target reference points. The stock is therefore classified as **not overfished** (Patterson et al. 2021).

For the 2020-21 fishing season, total catch and discards for Ocean Perch were estimated to be 391.4 t, which is below the combined recommended biological catch of 593 t calculated from the 2017 Tier 4 analyses. Therefore, fishing mortality in 2020-21 would be unlikely to deplete the stock of Ocean Perch to a level below its biomass limit reference point and is therefore classified as **not subject to overfishing** (Patterson et al. 2021).

Bigeye Ocean Perch was first assessed against the criteria for SAFS in 2018 and stock status was classified as sustainable. The stock status for 2020 was sustainable (Emery et al. 2020).

Stock Assessment Result Summary

Biomass status in relation to Limit	Recent average standardised CPUE (Biomass proxy) is between the Target and Limit Reference Point (Patterson et al. 2021)
Biomass status in relation to Target	Biomass proxy (Standardised CPUE) is above Target Reference Point (Patterson et al. 2021).
Fishing mortality in relation to Limit	N/A
Fishing mortality in relation to Target	N/A
Current SAFS stock status	Sustainable
Current Commonwealth stock status	Sustainable

Fishery interactions

Interactions between the Commonwealth Trawl and Auto Long Lining Fisheries are described by Sporcic and Haddon (2016); declines in the Trawl sector since the mid-2000s are associated with increased catches in the Auto Long Lining sector. Concurrent with general declines in Trawl catches are increased and sustained relatively high geometric mean CPUE for the Trawl fishery (Sporcic and Haddon 2016)

The Commonwealth Trawl Fishery interacts with other commercial and non-commercial bycatch and discard marine species, a range of endangered threatened and/or protected species and marine habitats (AFMA 2014; Wayte et al. 2007).

Qualifying Comments

Supplementary information relevant for to the interpretation of the assessment is provided in Appendix 1 and 2.

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Appendix 1

Reliability and Relevance of the Commonwealth Assessment to assessment of stock status in NSW

The current Commonwealth assessment of Bigeye Ocean Perch could adequately inform the decision process for an NSW TAC determination, accepting and understanding the limitations and restrictions of the Commonwealth assessment framework and understanding that data collected and analysed at a finer resolution and considered within the NSW jurisdiction could deliver some outcomes inconsistent with the Commonwealth assessment. In particular, it is important to note that the Commonwealth assessment uses data from the Commercial Trawl Fishery, whereas the majority of the NSW Bigeye Ocean Perch catch is reported from the Set/Trotline fishing method in the NSW OTL Fishery (Line Fishing Eastern Zone). However, the benefits of adopting Commonwealth assessments include the application of processes exposed to broad review, including by management, science and industry representatives within the Commonwealth fishing sector, as well as observers from other stakeholder groups (e.g. NSW DPI Fisheries). The Commonwealth assessments have not, however, been developed to provide specific outputs for jurisdictions other than the Commonwealth and do not necessarily include or apply data at resolutions more applicable to alternate jurisdictions. Therefore, applying these assessments to inform NSW total allowable catch (TAC) determinations is done understanding that there are limitations in the data used and the application of the data to a scale other than that to which the assessment was applied.

In addition, applying the assessment of Bigeye Ocean Perch from the Commonwealth to inform the status of NSW Bigeye Ocean Perch and reliably inform management decisions for this species assumes (among other issues) that the assessment represents the same population(s) being harvested by these fisheries. Support for this assumption is provided by the 2020 determination of the stock structure of Bigeye Ocean Perch for the 2020 SAFS reports as a biological stock at the scale of south-eastern Australia, including Commonwealth waters to which the Commonwealth assessment applies and NSW waters.

Appendix 2

NSW catch statistics and additional information relevant to TAC setting in NSW

The stock status summary for Bigeye Ocean Perch summarises information from the Commonwealth assessment for 'Bigeye Ocean Perch' in the 'Ocean Perch (*Helicolenus barathri*, *H. percoides*)' section of Patterson et al. (2021).

Information presented here is intended to supplement that assessment, and includes: i) comment on the Commonwealth assessment to inform NSW TAC determinations and more specifically the Commonwealth Tier 4 analyses of Bigeye Ocean Perch; ii) NSW commercial catch of Bigeye Ocean Perch and catch as a proportion of the total across all fisheries for the period 2009/10 to 2020/21; iii) NSW commercial fishery data for Bigeye Ocean Perch for key fishing methods in the NSW Ocean Trap and Line Fishery – Line East (OTLLE) from 2009/10 to 2020/21; iv) NSW commercial fishery length-frequency data for Bigeye Ocean Perch from 2005/06 to 2011/12; and iv) NSW recreational fishing estimates from the National Recreational and Indigenous Fishing Survey (2000/01; Henry and Lyle 2003) and state-wide surveys (2013/14; West et al. 2015; 2017/18; Murphy et al. 2020).

Ocean Perch (family Sebastidae) are found offshore along the NSW coast but Bigeye Ocean Perch comprise the majority of landings. Bigeye Ocean Perch is an upper-slope species found in 250–800 m depth. Other species including Reef Ocean Perch is distributed across the continental shelf and onto the upper slope in depths of about 80–350 m, and the Deepsea Ocean Perch (*Trachyscorpia capensis*) occurs mostly in mid-slope depths greater than 800 m and, because there is little fishing at such depths off NSW, few Deepsea Ocean Perch are caught.

Bigeye Ocean Perch are being assessed as part of the national Status of Australian Fish Stock reports (SAFS). The scale of the stock structure accepted to be assessed, despite some uncertainty, is that of a biological stock throughout south-eastern Australia, including NSW waters. In 2018 and 2020 SAFS status determination for Bigeye Ocean Perch was sustainable.

Information presented in figures and tables below is summarised by fiscal year (July–June). Reference to 'year' refers to the first year within a fiscal year unless otherwise stated. For example, 2009 refers to the fiscal year 2009/10.

NSW commercial fishery records have not been consistently reported throughout the history of the fishery (see Appendix 1). Between 1999/00 and 2000/01, management arrangements in the OTL Fishery changed such that endorsements were allocated inside (OTL – Line West (OTLLW)) and outside (OTL – Line East (OTLLE)) the 100 fathom depth contour. Prior to 2009/10 Bigeye Ocean Perch were reported to the multi-species group 'Ocean Perch'. As a result, species specific fishery data are unavailable prior to 2009/10. The commercial fishery data presented in this section is limited to data from key fisheries, primarily the OTL Fishery (Eastern Zone) from 2009/10, as contemporary supplementary information to the assessment and to help inform NSW TAC determinations.

From 2009/10 to present, effort (days) is derived from the number of distinct fishing dates entered on daily catch returns for each fisher in each month when the method was used and the species catch for that month was > 0, irrespective of whether the species was caught on those specific days that month.

State-wide fisheries catch

Bigeye Ocean Perch are caught predominantly in two fisheries within NSW; the OTL Fishery (Eastern Zone, OTLLE) and the Ocean Fish Trawl – Northern (OTFN) Fishery (Figure 4 & 5). Since 2009/10, the annual catch of Bigeye Ocean Perch across all fisheries has ranged from 8.1-21.4 t.

Since 2009/10, the OTLLE Fishery has accounted for an average of 93% (range 69-99%) of the total annual catch of Bigeye Ocean Perch, which has ranged between 7.8 and 20.8 t (Figure 4 & 5). In 2020/21, 7.83 t of Bigeye Ocean Perch were reportedly landed in the OTLLE Fishery and this is likely to be incomplete data at this stage due to delays in logbook reporting (Figure 4). An average of 0.7 t.yr^{-1} (range 0 to 2.8 t p.a.) of Bigeye Ocean Perch has been reported from the Ocean Trawl Fish (Northern Zone; Figure 4). The remaining 'other' catch has averaged 0.38 t.yr^{-1} (range 0.1 to 1.8 t; Figure 4).

Ocean Trap and Line Fishery (Line East) catch and catch rate

Within the OTLLE endorsement, two methods-setline (STD) and dropline (DPL)-account for approximately, 91 and 8.9% of reported landings of Bigeye Ocean Perch, respectively (Figure 6 & 7). Since 2019/10, the average annual catch of Bigeye Ocean Perch from OTLLE-STD gear was 12.1 t.yr^{-1} (range 7.6 to 20.0 t) and in 2020/21, 7.6 t (98%) of Bigeye Ocean Perch were reported against it. Since 2009/10, the average annual catch of Bigeye Ocean Perch from OTLLE-DPL gear was 1.2 t yr^{-1}(range 0.19 to 2.3 t; Figure 6 & 7). Since 2009/10, the average annual days fished were 185 days, with effort declining over the past 3 years to the lowest days fished in the 2020/21 fishing season (Figure 8).

Setline standardised catch rates were predicted from generalised linear models (GLM). The GLM statistical modelling provided an estimate of mean catch rates that were corrected for a variety of variables that bias raw data. The GLM models were fitted using the statistical software packages Cede (Haddon et al. 2018) and R (R Development Core Team 2017). Explanatory model terms considered different catch rates between fishing years, months, zones, individual fisher operations (Authorised fisher ID) and, their transformed fishing effort.

Trends in standardised catch rates (CPUE) for Bigeye Ocean Perch taken by Setline in the Ocean Trap and Line, Line East fishery operating within NSW jurisdiction (Figure 7) are generally consistent with indices of abundance based on spawning stock biomass trends in Commonwealth Trawl Sector and Scalefish Hook Sector (Figure 2). For recent NSW CPUE data analysed as mean daily catch rates (available from 2009/10 to 2020/21, Figure 9), catch rates have remained relatively stable and fluctuated around the mean from 2014/15 to 2018/19 (Figure 9). The reasons for the decline in standardised CPUE following the transition to quota management in 2019/20 and 2020/21 require further investigation as this trend contrasts those currently experienced in the Commonwealth with increasing trends in abundance between 2016 and 2019.

Measures of catch and CPUE are heavily influenced by the reporting behaviour of a small number of fishers (< 5 individuals). For example, since 2013/14, fewer than five fishing businesses have been responsible for all of the reported catch of Bigeye Ocean Perch from the OTLLE-STD, and in more recent years the number has reduced to two. The reliance on a small number of operators for fishery dependent data to inform the assessment of this fishery provides additional levels of uncertainty. Small changes to reporting behaviour or errors and misreporting of species catch could have substantial effects on the assessment. There is some anecdotal evidence of potential misreporting of recent historical catches that perhaps would have correctly been reported as Bigeye Ocean Perch. The consequence of which is an underreporting of total Bigeye Ocean Perch catch in the early years after individual species were required to be reported. Finally, although discarding has been highlighted as contributing factor to changes in CPUE in the Commonwealth assessment (see above), the findings of Macbeth and Gray (2005) suggest it is not an issue in the NSW OTLLE Fishery, with 98% of Bigeye Ocean Perch caught being retained.

Commercial catch length-frequency data for Bigeye Ocean Perch have been collected between 2005/06 and 2011/12 as part of the NSW DPI Fisheries resource assessment and monitoring program (Figure 10). Between one and four samples were taken within each year and the number

of fish sampled each year ranged between 83 and 389. Average length has not varied substantially through time. No detailed analyses of these data have been attempted.

In addition, there are unpublished analyses of historic (1970s and 1990s) length and age structures of Bigeye Ocean Perch, from samples collected in NSW from multiple sources and locations. The unpublished data has not been assessed for accuracy but is mentioned to flag the existence of historic data that could inform future considerations and assessments. The value of investing further in assessing, and where necessary, reanalysing these data needs to be balanced with consideration of the value of the fishery, the contribution these data may play in any future assessment and competing priorities for fishery assessments.

Commercial fishery statistics are sourced from a small number of commercial operators. Variation in the composition of fishers through time can influence differences in measures of fishery-dependent data and their use for inferring fishery performance and stock status such that changes in these measures may not relate to biological performance of the stock.

- Reported landings and measures of CPUE are heavily influenced by the reporting behaviour of a small number of fishers (< 5 individuals).
- Comparisons between observer-based survey of the OTL Fishery (Macbeth and Gray 2015) and reported catch and effort logbooks indicate recent historical misreporting to species other than Bigeye Ocean Perch could substantially influence recent historical catches.
- If using number of hooks as measure of effort, there is a need to understand the accuracy of reporting. There are some instances of consistent reporting of large numbers of hooks that are likely misreporting.

Additional information relevant to TAC setting in NSW

1. The Bigeye Ocean Perch TAC for the May 2020-April 2021 fishing season was set at the 8-year maximum catch of 21.0 tonnes.

2. The Independent Allocation Panel (IAP) recommended that the initial allocation of quota shares for Bigeye Ocean Perch be calculated based on 20% on the proportion of access shares held + 80% on recorded landings for an individual fishing business in the Ocean Trap & Line – Line East Share Class over the selected criteria period 2009/2010 to 2016/2017 (inclusive), but with the "worst catch year" for each business removed (https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0009/832464/Ocean-Trap-and-Line-IAP-Final-Report.pdf). Quota holdings may restrict catches of individual fishers and could result in increased discarding when continuing to target other co-occurring species.

3. Landings (quota usage) of 8.17 t were reported against a TAC of 21.0 t in 2020/21 which suggests that the current TAC was not constraining total catches.

4. In 2020/21 approximately 6.3 t of quota was held by fishing business that reported nil landings of Bigeye Ocean Perch.

5. 5.53 t (26.2%) of the 2021/22 Bigeye Ocean Perch TAC (21.1 t) was taken at 1st November 2021 (51% of season complete).

6. SESSF TAC recommendation for 2021/22 was 304 t, which was a 65 t increase on the 2020/21 TAC (239 t,

https://www.afma.gov.au/sites/default/files/sessf_tac_recommendations_2021-22_-_for_concession_holders.pdf).

Figure 4. Annual catch (t) of Bigeye Ocean Perch from the NSW Ocean Trap and Line – Line East (grey, OTLLE), Ocean Trawl Fish – Northern (black, OTFN) and Other Fisheries (white) from 2009/10 to 2020/21.
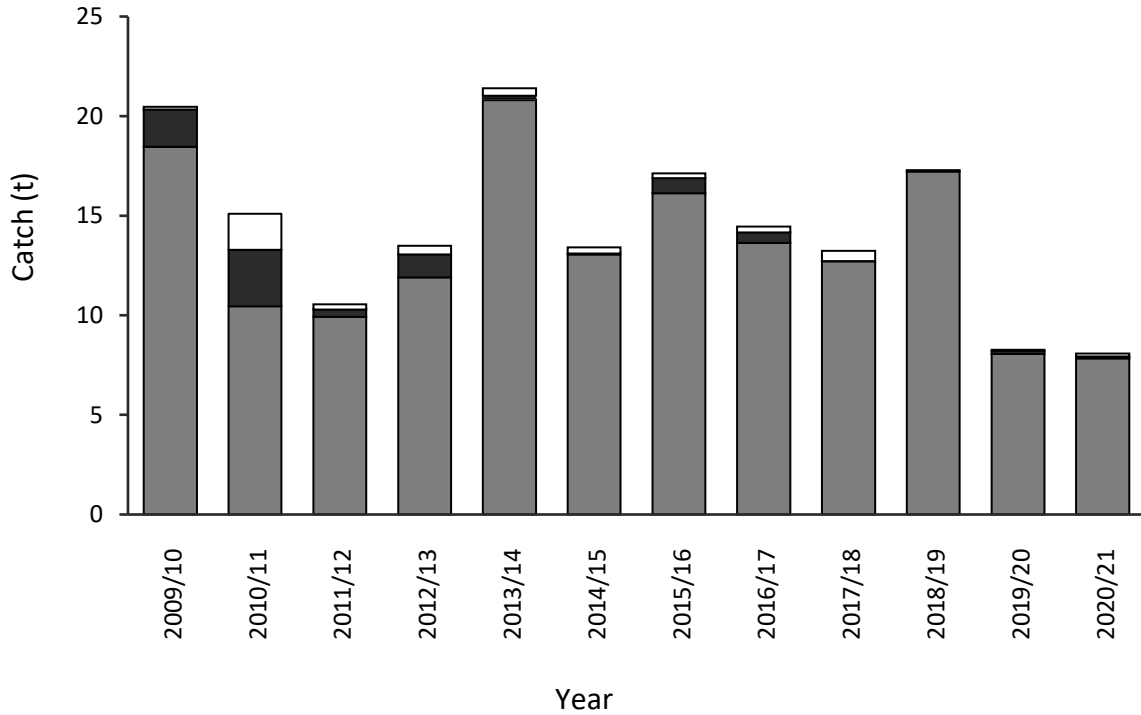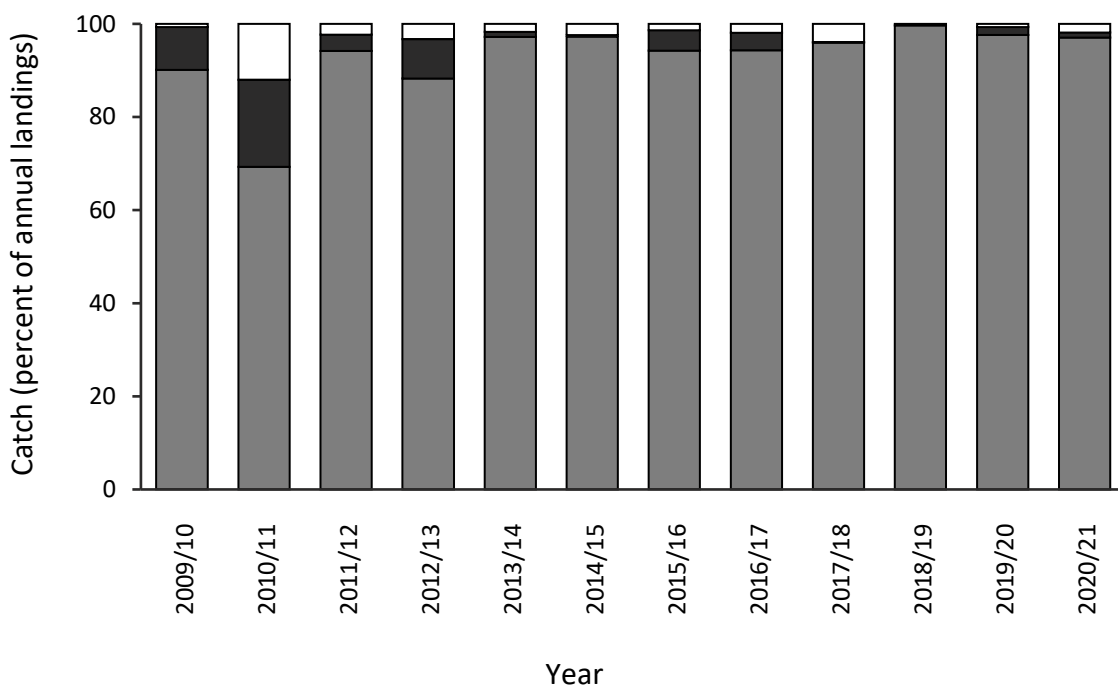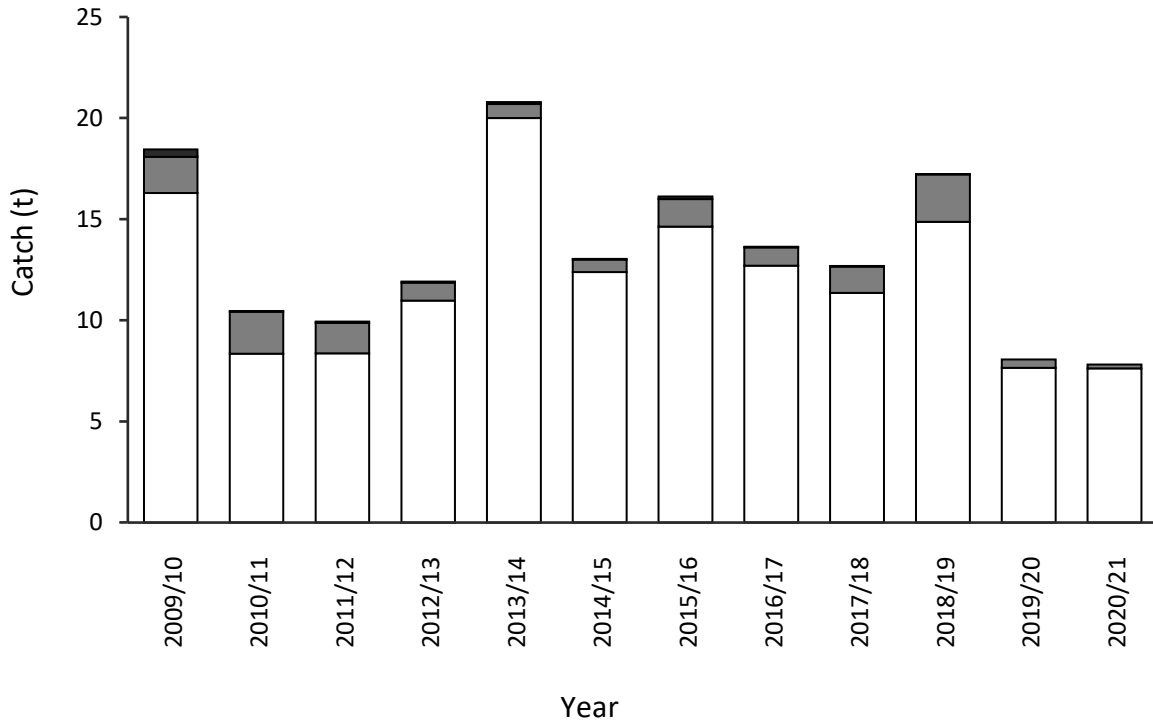

Figure 5. Annual catch of Bigeye Ocean Perch as a percentage of total catch from the NSW Ocean Trap and Line – Line East (grey, OTLLE), Ocean Trawl Fish – Northern (black, OTFN) and Other Fisheries (white) from 2009/10 to 2020/21.

Figure 6. Annual catch (t) of Bigeye Ocean Perch from the NSW Ocean Trap and Line – Line East (OTLLE) Setline demersal (white, STD), Dropline (grey, DPL) and Other methods (black) from 2009/10 to 2020/21.
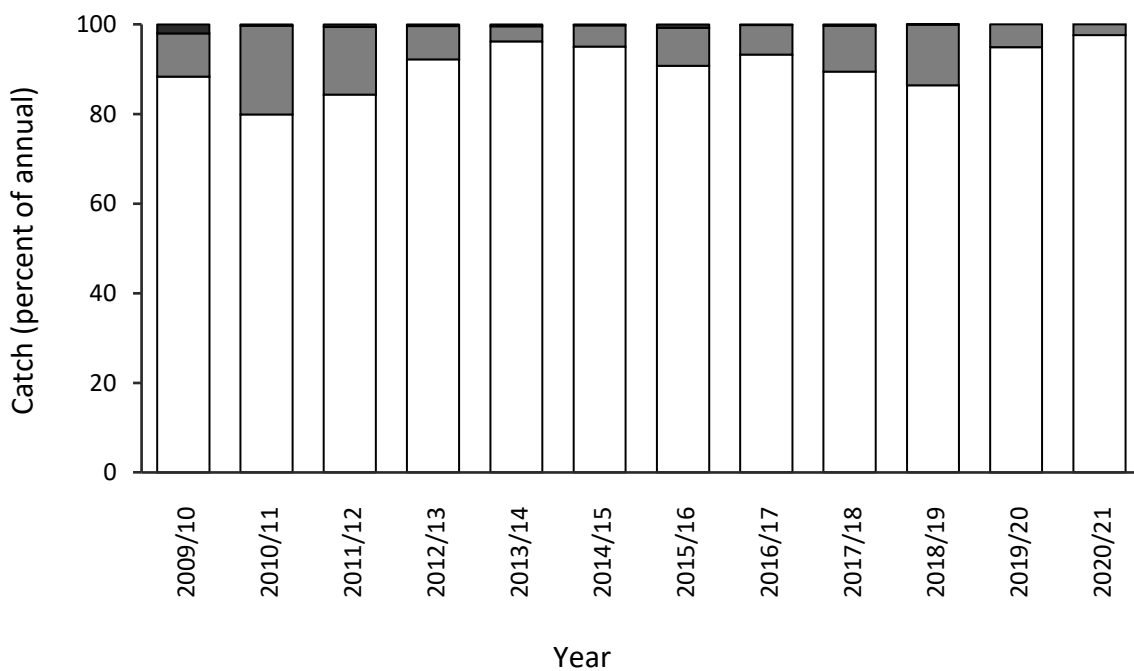

Figure 7. Annual catch of Bigeye Ocean Perch as a percentage of total catch from the NSW Ocean Trap and Line – Line East (OTLLE) Setline demersal (white, STD), Dropline (grey, DPL) and Other methods (black) from 2009/10 to 2020/21.

Figure 8. Days fished for Bigeye Ocean Perch from OTLLE using setline demersal estimated from the number of distinct fishing dates entered only daily catch returns in a month where the method was used irrespective of whether the Bigeye Ocean Perch was reported on those days (NSW DPI Fisheries unpublished data).
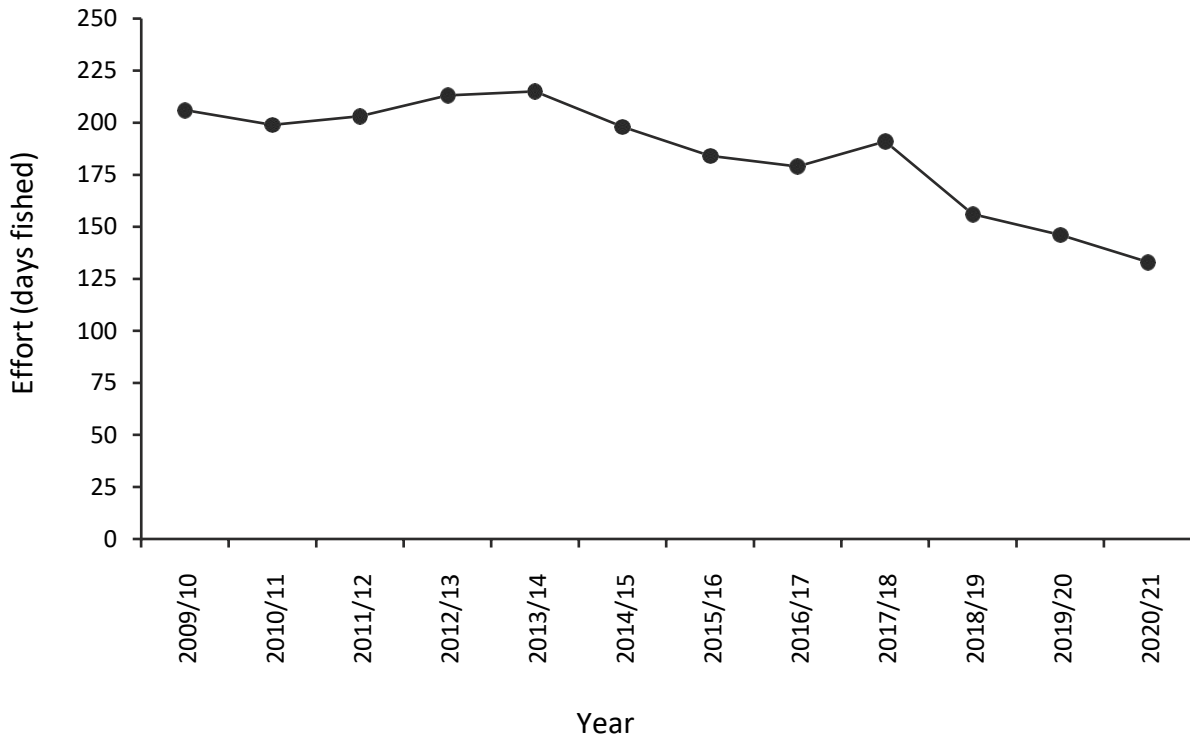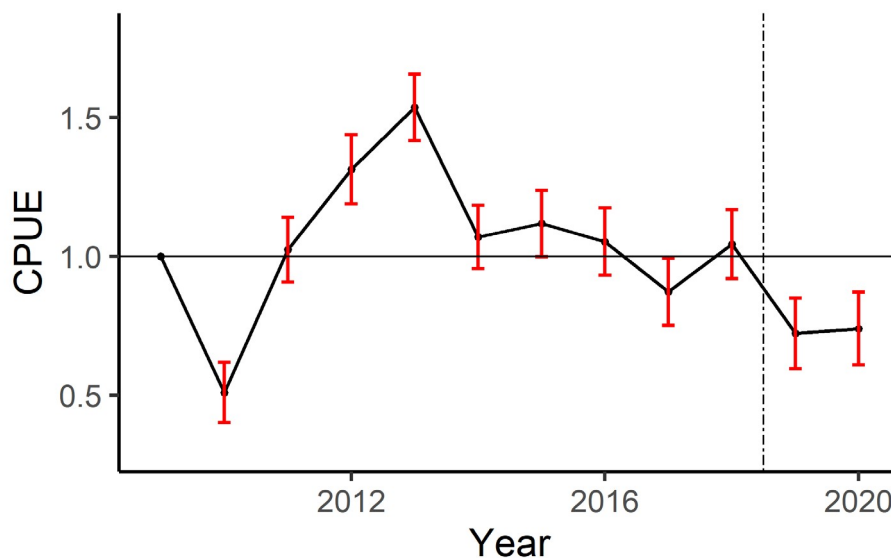

Figure 9. Standardised commercial catch rates (CPUE$_{dy}$ kg.day^{-1} from daily records) of Bigeye Ocean Perch for the method of setline. The horizontal line represents the average catch rate (2009/10 to 2020/21). Vertical line = TAC introduction.

Figure 10. Bigeye Ocean Perch- Length frequency analysis for Bigeye Ocean Perch 20–50 cm fork length (FL) 2005/06–2012/13 (NSW DPI Fisheries unpublished data).