Stock status summary: Blue-eye Trevalla- 2020

The fishery scientific assessment summarised in this document is considered adequate to meet the legislative requirements for supporting a Total Allowable Catch (TAC) determination for NSW Blue-eye Trevalla is that done by the CSIRO, commissioned by the Australian Fisheries Management Authority (AFMA) and published as 'Blue-eye Trevalla (*Hyperoglyphe antarctica*)' 'slope' population by the Australian Bureau of Agricultural and Resource Economics and Sciences (Patterson et al. 2019; hereinafter referred to as the Commonwealth assessment).

The structure of this stock status summary is consistent with a format to inform a species status determination against criteria for the Status of Australian Fish Stocks (SAFS; www.fish.gov.au). It does not attempt to replicate the detail of the Commonwealth assessment but sources and cites key information from that assessment. Where data are unavailable or considered insufficient to reliably inform the SAFS criteria the summary has been populated with 'NA', rather than removing the criteria. This format has been maintained to transparently represent the data available and highlight areas where supplementary information, alternate data sources or analyses may be required to improve the assessment and determination of species status into the future.

Assessment authors and Year

Chick, R.C. and M.B. Lowry. 2020. Stock status summary – Blue-eye Trevalla - 2020. NSW Department of Primary Industries. Fisheries NSW, Port Stephens Fisheries Institute. 10 pp.

Biology and stock structure

Blue-eye Trevalla (*Hyperoglyphe antarctica*) are distributed in continental slope waters off South America, South Africa, New Zealand and Australia. Their Australian distribution stretches along the southern continental margin in waters from Moreton Island in Queensland to 30°S in Western Australia. Blue-eye Trevalla also occur on the seamounts off eastern Australia and south of Tasmania, Lord Howe Island and Norfolk Island.

Adults and sub-adults occur in mid-water at depths of around 500 m and are associated with rocky ground on the continental slope where the majority of fish are found between 200 and 600 m, but a small number have been reported to occur at depths of up to 900 m.

Analysis of Blue-eye Trevalla samples from Tasmania found that 72 cm fork length (FL) is the average size at maturity for females (corresponding to about 11–12 years of age) and for males the average is 62 cm FL (8–9 years of age).

Williams et al. (2016) provided a strong evidence base for the stock structure of Blue-eye Trevalla within Australian waters.

For the 2019/20 fishing season, Blue-eye Trevalla were assessed as two separate stocks, seamount and slope subpopulations (AFMA 2018, in Patterson et al.2019).

Stock status and assessment method

The Commonwealth assessment classifies the Blue-eye Trevalla – slope stock as not overfished and not subject to overfishing (Patterson et al. 2019).

The Commonwealth assessment for Blue-eye Trevalla – slope stock is a Tier 4 assessment (AFMA 2017).

The status of the eastern Australian stock of Blue-eye Trevalla was assessed against the SAFS criteria in 2016 and 2018 and scheduled for SAFS assessment again in 2020. Status determination in 2016 and 2018 was **sustainable** and **sustainable** respectively. Status determination for 2020 has yet to be finalised at the time of publication of this report.

Fishery statistics summary

Fishery statistics presented in this report are restricted to those used to inform the Commonwealth assessment and are summarised here from Patterson et al. (2019) and references therein. The Commonwealth Tier 4 assessment of Blue-eye Trevalla slope stock is based on that done by Haddon (2017) that standardised the catch per unit effort (CPUE) series from auto-longline (2002-2016) and dropline (1997-2006) from zones 20-50 and the eastern seamounts (Patetrson et al. 2019). An update of this assessment was also done in 2018 to inform the assessment of the slope stock (Sporcic 2018, cited in Patterson et al. 2019, Figure 2).

Catch information

The description of catch information below is summarised from Paterson et al. (2017).

Blue-eye trevalla catch peaked at more than 800 t in 1997 (Figure 1). Commonwealth-landed catch in the 2018–19 fishing season was 373.6 t. State catch was 17.5 t, and weighted average discards between 2014 and 2017 were 0.1 t (Castillo-Jordán et al. 2018). For the 2018–19 fishing season, catch and discards combined were 373.7 t.

The four-year average CPUE (2013–2016) from the analysis undertaken by Haddon (2017) is between the limit and the target reference points defined by the SESSF HSF. The blue-eye trevalla stock is therefore classified as not overfished. In the 2018–19 fishing season, catch and discards combined were 373.6 t, which is below the RBC (481.6 t). This indicates that, if the fishing mortality in 2018–19 is maintained, the stock

is unlikely to be depleted to a level below the biomass limit reference point. The stock is therefore classified as not subject to overfishing.
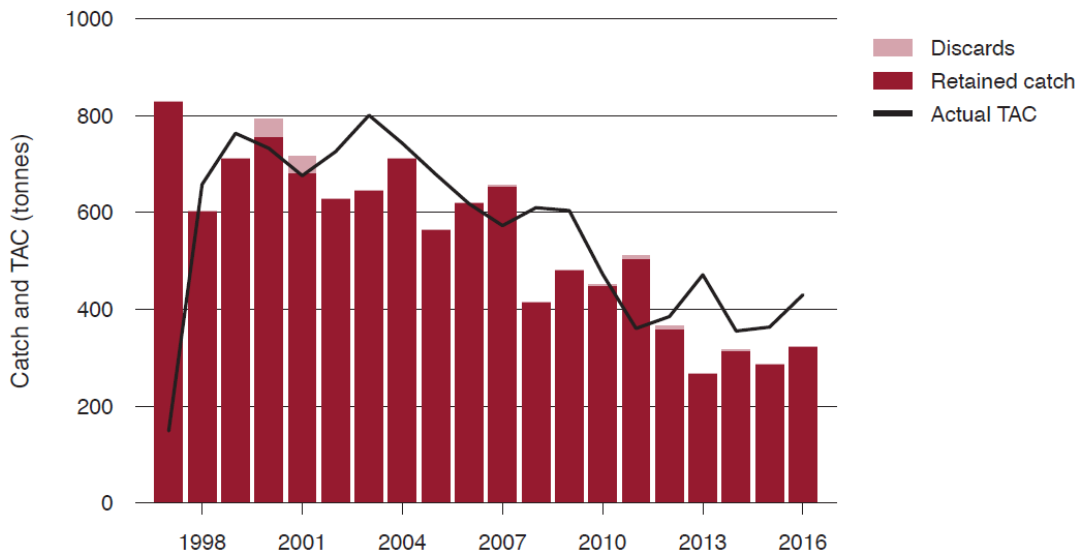
Note: **TAC** Total allowable catch. Data for 2016 do not include discards and state catch.
Source: Haddon 2016a; Australian Fisheries Management Authority catch disposal records (2016 data)

Figure 1   **Blue-eye Trevalla annual catches (CTS, SHS and states) and fishing season TACs, 1997 to 2016 (from Patterson et al. 2017).**

Note: **CPUE** Catch-per-unit-effort.
Source: Sporcic 2018

Figure 2   **Standardised auto-longline and dropline CPUE index for Blue-eye Trevalla to the east and west of Tasmania, 1997-2017 (from Patterson et al. 2019).**

Catch information

Recreational and Indigenous

Recreational catches have not been accounted for in the Commonwealth assessment of Blue-eye Trevalla. Accounting for recreational catch has been raised as an issue for consideration in Commonwealth assessments (SESSF RAG 2017).

Illegal Unregulated and Unreported

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

Stock assessment method

Year of most recent assessment	2016 (Haddon 2016)
Assessment method	Commonwealth Tier 4, Standardised CPUE (including discards)
Main data inputs	CPUE (Commonwealth Dropline (1997–2006) and Autoline (2002–2015); Zones 20–50; Depth 200–600) Catch (total Blue-eye catch from the SESSF); Discard rates (Thomson and Upston 2016)
Main data inputs (rank)[†]	CPUE: 2 (medium quality) (Haddon 2016) Catch and discard rates: 2 (medium quality) (Haddon 2016; Thomson and Upston 2016)
Key model structure and assumptions	Tier 4 – Standardised CPUE (Commonwealth harvest strategy policy); Commonwealth of Australia 2007, 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 2016); factors considered in the CPUE standardisation: Year, Vessel, Month, Zone, Depth category and Month: Zone;

Stock assessment method

investigation of additional zones (84 and 85); alternate CPUE i.e. catch per day; effect of Commonwealth fishery closures

[†] 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 (AFMA 2017)
Biomass limit reference level	Standardised CPUE (AFMA 2017 – proxy $0.2B_0$) $0.2/0.48 * Cacth_{Target}$; $CPUE_{Target}$ (Haddon 2017)

Fishing mortality indicator or proxy	NA
	 Implied from Patterson et al. (2017).
	    Catch (including discards) as a proportion of RBC
	    Trend in CPUE

Fishing mortality limit reference level	Implied from Patterson et al. (2019). Catch (plus discards) as a proportion of RBC is <1
Target reference level	Standardised CPUE at $0.48B_0$ = $CPUE_{Target}$ (Haddon 2017, Sporcic 2018)

Stock assessment results

Biomass status in relation to limit	Standardised CPUE (B proxy) is between the limit and the target (Patterson et al. 2019)

Stock assessment results

Fishing mortality in relation to limit	Not subject to overfishing (Patterson et al. 2019)
Previous SAFS stock status	2016: **Sustainable** (first year of SAFS assessment) 2018: **Sustainable**
Current SAFS stock status	2020 yet to be determined

Fishery interactions

Interactions between the Commonwealth Trawl and Auto-longlining sectors are described by Sporcic and Haddon (2016), who associate declines in the trawl sector since the mid-2000s with increased catches in the auto-longlining sector. Uncertainty exists in the assessment associated with the effect of whale depredation on CPUE (Patterson et al. 2019).

Commonwealth fisheries interact 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).

NSW Fishery

Information presented in figures and tables below is summarised by financial year (July–June).

The commercial fishery data presented in this section of the report includes total Blue-eye Trevalla catch landed in NSW from 1998/99 to present and catches reported to the NSW Ocean Trap and Line Fishery- Line East (OTLLE) from 2009/10. These data are provided as supplementary information to the assessment and to help inform the NSW total allowable catch determination. NSW commercial fishery records have not been consistently reported throughout the history of the fishery (Chick 2018). Total catch from 1997/98 is restricted to that caught in waters within NSW jurisdiction. Earlier catches are complicated by catches landed from Commonwealth waters also.

State-wide fisheries catch

Annual catches of Blue-eye Trevalla have generally declined over the last two decades, from over 100 t in the late 1990s to < ~20 t in the last 4 years (Figure 3, Table 1). In 2018/19, the total catch of Blue-eye Trevalla was 14.9 t, the lowest annual catch recorded since at least 1998/99 (Figure 3, Table 1). Annual catches are dominated, almost exclusively (≥94%) by those from the NSW OTLLE endorsement (Figures 4, Table 1).

NSW Fishery

Within the OTLLE, Blue-eye Trevalla are caught predominantly using dropline, setline and handline fishing methods (Figure 5, Table 2). Dropline has generally dominated the volume and proportion of catch harvested (range 8.1–38.3 t.yr^{-1}; 43–84%), although handline catches have contributed up to 47% of annual catch (in 2013/14). Handline catches generally increased from 2009/10 (~1 t) to 2014/15 (~11 t). Since 2014/15, catch from both dropline and handline have remained relatively stable or declined moderately (Figure 5 and Table 2). Since 2009/10, setline gear has averaged about 2.8 t.yr^{-1}, equating to ~11% of the total OTLLE catch (Figures 5 and Table 2). Within the general setline gear, setline demersal (STD) is responsible for most of the catch (range 1.7–5.1 t.yr-1).
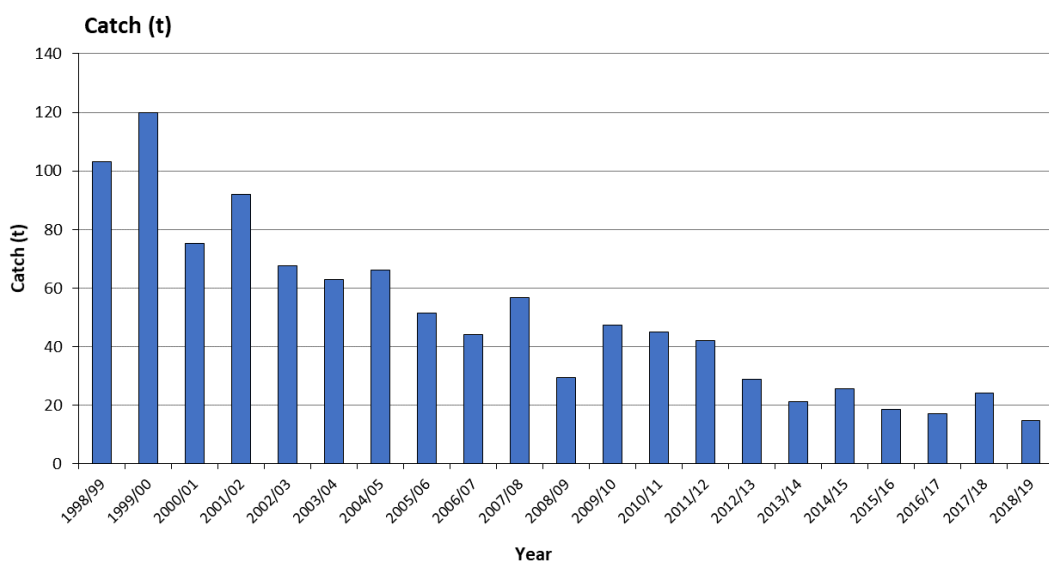
Catch (t)

Figure 3   Annual catch (t) of Blue-eye Trevalla from all fishing methods reported to NSW from 1988/89 to 2018/19.
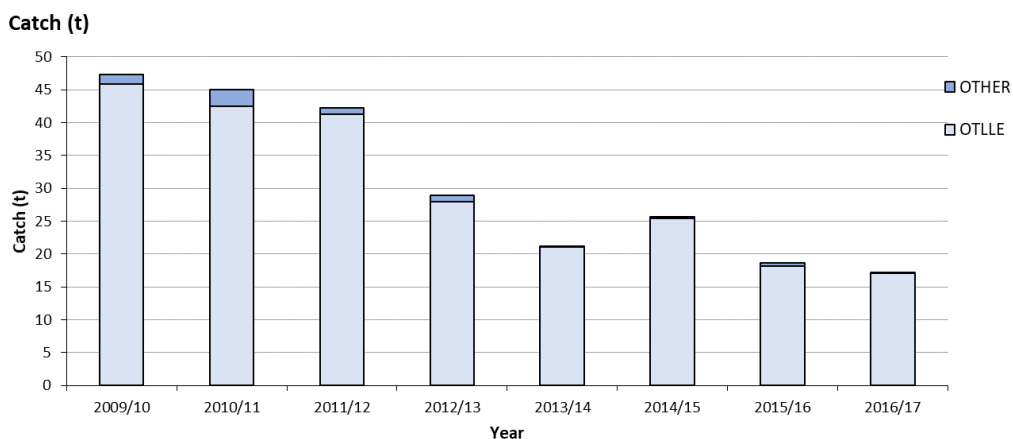

Figure 4   Annual catch (t) of Blue-eye Trevalla from NSW Ocean Trap and Line – Line East (OTLLE) and all other endorsement codes (OTHER) from 2009/10 to 2016/17
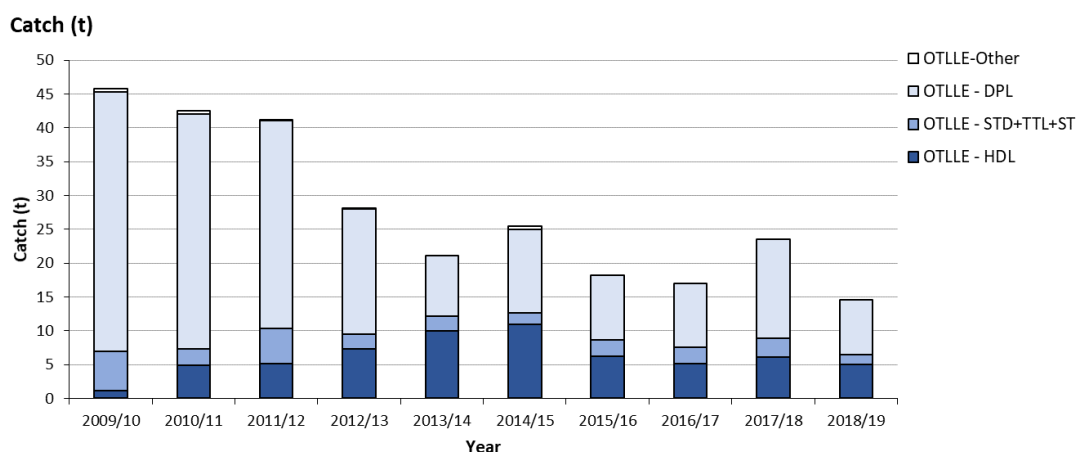
NSW Fishery

Catch (t)

Figure 5 OTLLE – fishing methods - Annual catch of Blue-eye Trevalla from NSW Ocean Trap and Line - Line East (OTLLE) – Dropline (DPL), Setline (Demersal, (STD); Trotline (TTL) and unspecified setline (ST)), Handline (HDL) and all other methods from 2009/10 to 2018/19.

Table 1 Annual catch (t) of Blue-eye Trevalla from all fishing methods from 1998/99 to 2018/19 and catch and catch as a percentage of total (% total) from NSW Ocean Trap and Line – Line East (OTLLE) and all other fisheries combined (OTHER) from 2009/10 to 2018/19.

Year	Total Catch (t)	OTLLE Catch (t)	OTLLE % total	OTHER Catch (t)	OTHER % total
1998/99	103.1				
1999/00	119.9				
2000/01	75.3				
2001/02	92.0				
2002/03	67.5				
2003/04	63.0				
2004/05	66.2				
2005/06	51.5				
2006/07	44.1				
2007/08	56.8				
2008/09	29.6				
2009/10	47.3	45.8	97	1.53	3
2010/11	45.0	42.5	95	2.46	5
2011/12	42.2	41.2	98	1.02	2
2012/13	28.9	28.0	97	0.88	3
2013/14	21.3	21.1	99	0.13	1
2014/15	25.6	25.4	99	0.22	1
2015/16	18.7	18.2	98	0.44	2
2016/17	17.2	17.0	99	0.11	1
2017/18	24.1	23.5	97	0.62	3
2018/19	14.9	14.6	98	0.29	2

NSW Fishery

Table 2   OTLLE – fishing methods - Annual catch (t) of Blue-eye Trevalla from NSW Ocean Trap and Line - Line East (OTLLE) – Dropline (DPL), Setline (Demersal, (STD); Trotline (TTL) and unspecified setline (ST)), Handline (HDL) and all other methods from 2009/10 to 2018/19.

Year	OTLLE-DPL		OTLLE (STD, TTL, ST)		OTLLE-HDL		OTHER		OTLLE Total (t)
	Catch (t)	% total	Catch (t)	% total	Catch (t)	% total	Catch (t)	% total	
2009/10	38.3	84	5.8	13	1.1	2	0.5	1	45.8
2010/11	34.7	82	2.4	6	4.9	12	0.5	1	42.5
2011/12	30.8	75	5.2	13	5.1	12	0.2	0	41.2
2012/13	18.5	66	2.2	8	7.3	26	0.0	0	28.0
2013/14	9.0	43	2.1	10	10.0	47	0.0	0	21.1
2014/15	12.3	48	1.7	7	10.9	43	0.4	2	25.4
2015/16	9.6	53	2.4	13	6.2	34	0.0	0	18.2
2016/17	9.5	56	2.4	14	5.2	30	0.0	0	17.0
2017/18	14.6	62	2.8	12	6.1	26	0.0	0	23.5
2018/19	8.1	56	1.5	10	5.0	34	0.0	0	14.6

References

AFMA 2018c, 'Southern and Eastern Scalefish and Shark Fishery South East Resource Assessment Group (SERAG), minutes, 19–21 September 2018, Hobart', AFMA, Canberra.

Chick, R.C. 2018. Stock status summary and supplementary information – Ocean Trap and Line Fishery (Line Fishing Eastern Zone) – Blue-eye Trevalla (*Hyperoglyphe antarctica*). NSW Department of Primary Industries, Port Stephens Fisheries Institute: 31pp.

Haddon, M. 2016. Blue-Eye (*Hyperoglyphe antarctica*) Tier 4 Analysis using Catch-per-Hook for Auto-Line and Drop-Line from 1997–2015. CSIRO Oceans and Atmosphere, Hobart. 25p.

Haddon, M. 2017, Tier 4 assessment for blue-eye trevalla (data to 2016), CSIRO Oceans and Atmosphere, Hobart.

Sporcic, M. 2018, Tier 4 assessments for selected SESSF species (data to 2017), 7 November 2018, CSIRO Oceans and Atmosphere.