

Dusky Flathead (2020)

Platycephalus fuscus



Anthony Roelofs: Department of Agriculture and Fisheries, Queensland, **Matt Broadhurst:** New South Wales Department of Primary Industries, **Victorian Fisheries Authority:** Victorian Fisheries Authority, **Jason McGilvray:** Department of Agriculture and Fisheries, Queensland

STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Queensland	Queensland	Sustainable	Stock assessment, commercial catch and CPUE, length and age
New South Wales	New South Wales	Sustainable	Commercial catch and CPUE, and length frequency
Victoria	Victoria	Undefined	Commercial catch and CPUE, angler diary catch rates and length frequency

STOCK STRUCTURE

The biological stock structure of Dusky Flathead populations is unknown.

In the absence of information on biological stock boundaries, here assessment of stock status is presented at the jurisdictional level—Queensland, New South Wales and Victoria.

STOCK STATUS

New South Wales Dusky Flathead occur throughout estuaries and inshore areas of New South Wales, where they form a single stock, with at least some movements between estuaries; both during early life stages and via mature fish during their reproduction [Gray and Barnes 2015; Taylor et al 2020]. The species is an important commercial and recreational target throughout its entire New South Wales distribution.

During the past decade, commercial catches of Dusky Flathead in New South Wales have fluctuated at between 116 and 172 t per year, and with more than 95 per cent of the total caught using mesh nets. During the past five years, catches were initially consistent at 125 t, but peaked at 165 t in 2016, and

declined to 118 t in each of 2018 and 2019. The latter reduction was associated with substantially reduced effort, and the nominal catch rate by mesh netters has increased during the past five years [Department of Primary Industries 2020]. Further, the sizes of Dusky Flathead measured from commercial catches in 2017 were similar to annual estimates during the preceding decade, suggesting broad temporal consistency in the size composition of the stock [Department of Primary Industries 2020].

The most recent recreational harvest estimate was ~304 000 fish or 190 t during 2017–18 [Murphy et al. 2020]. This estimate was based on a survey of recreational fishing licence (RFL) households, which comprised at least one person with a long-term (one or three year) fishing licence, but also included other fishers within the household. A similar survey of RFL households was done in 2013–14 during which a comparable number (481 164) of individual Dusky Flathead were recreationally harvested. In addition to these retained catches, large numbers (up to 55 per cent of the total catches) of Dusky Flathead were released at each period (minimum legal size is 360 mm TL, and fishers are allowed only one individual >700 mm TL within a total daily bag limit of 10 fish). The weight of evidence indicates that the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

There are no current estimates of fishing or natural mortality for Dusky Flathead in New South Wales, but it is well established that the species has very high short-term survival after being released by anglers [91 per cent; Butcher et al. 2008]. While their survival after discarding by mesh netters is much less [23 per cent; Broadhurst et al. 2009], in the last decade, mandated changes to mesh-net configurations, including increases in mesh size [Broadhurst et al. 2003, 2009; Gray et al. 2005] have improved selectivity, and therefore reduced discard mortality. Escape mortalities remain unknown, but these are presumed to be minimal [Uhlmann and Broadhurst 2015]. Consequently, fishing mortality on undersized Dusky Flathead (360 mm TL) in New South Wales is likely to be quite low. The above evidence indicates that the currently level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, Dusky Flathead in New South Wales is classified as a **sustainable stock**.

Queensland The most recent stock assessment (based on 2017 data) of Dusky Flathead in Queensland estimated biomass levels in two regions, Moreton Bay and Fraser Island [Leigh et al. 2019]. The assessment produced precautionary estimates using some fixed model parameters due to a lack of contrast in the data inputs. The spawning biomass of Dusky Flathead in the Moreton Bay region in 2017 was 36 to 39 per cent of unfished levels, approximately equal to or slightly below 'biomass maximum sustainable yield' (BMSY). The estimated MSY was 104 t per year to 112 t per year, approximately equal to current harvests (commercial and recreational combined). In the Fraser region, estimated fishing pressure on Dusky Flathead was lower than in the Moreton region, and 2017 estimated spawning biomass was 70 per cent of unfished levels. Fishery-dependent monitoring from 2007–19 indicates that both the commercial and recreational fishery sectors are harvesting Dusky Flathead across various lengths. The size-frequency distributions are very similar among years. Fishery-dependent monitoring indicates very little change in age frequency since 2007 (modal age group of three, with only 2009 and 2011 showing differences with a modal age group of four) [McGilvray et al. 2018]. The above evidence indicates the biomass of this stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Nominal effort in the commercial net fishery has been steadily decreasing and was at an historic low for the 2019 calendar year (2 460 boat days) [QFISH 2020]. This represents a 55 per cent decrease in days fished compared to 2007 (5 490 days fished); largely a result of Queensland Government buy backs and structural adjustment packages [McGilvray et al. 2018]. Recreational effort in

areas where Dusky Flathead are common decreased between 2001 and 2014 (176 800 days fished in 2001, 151 000 days fished in 2011, 111 800 days fished in 2014) [Webley et al. 2015]. There is no estimate of Indigenous harvest or fishing effort for fishers using traditional fishing methods. Commercial and recreational fishers predominantly harvest female fish because of the minimum and maximum size limits that are in place. The minimum size protects most male fish, and the maximum size protects large fish [McGilvray et al. 2018]. A recent study in Queensland estimated between 10 and 20 per cent of the yearly egg production is likely to come from fish protected by the maximum size limit [Pollock 2015]. Possession limits are in place for the recreational sector. Commercial fishers using tunnel nets operate under an industry developed code of best practice guidelines, and released fish have high survival [Moreton Bay Industry Association 2012]. The above evidence indicates that the current level of fishing pressure is unlikely to cause this stock to become recruitment impaired.

On the basis of the evidence provided above, Dusky Flathead in Queensland is classified as a **sustainable stock**.

Victoria

Until its recent closure, the Gippsland Lakes Fishery was the only remaining Victorian fishery to commercially harvest Dusky Flathead. Recreational anglers continue to catch the species in the Gippsland Lakes, and in various eastern Victorian estuaries. Catch information is only available for the Gippsland Lakes, and, Mallacoota Inlet, and Lake Tyers. This assessment therefore focuses on those locations.

The impact of fishing pressure on stock biomass was evaluated using recreational CPUE and size composition data from fishers participating in an angler diary program [Conron and Oliveiro 2016]. The CPUE obtained from angler diarists showed a declining trend in Gippsland Lakes over almost two decades noting the low sample sizes and associated high uncertainty in the data [Conron et al. 2020]. Angler diarist CPUE declined in Mallacoota Inlet from 1999–2011, before stabilising at around one fish per angler hour through until 2018–19 [Hamer et al 2019, Conron et al. 2020]. The CPUE of angler diarists in Lake Tyers increased from 1999–2004 and was highly variable throughout the 2000s. From 2010, there was a consistent decline in CPUE from around 2.5 fish per hour to less than 1.0 fish per hour [Conron et al. 2020]. Elevated CPUE during 2004–2009 from angler diarists in Mallacoota Inlet was likely reflective of a strong recruitment event. Nevertheless, the time series is too brief to determine if this is part of the boom-bust cycle of recruitment that characterises this species [Hamer et al 2019; Hicks et al. 2015] or represents an ongoing depleted state in which recruitment has become impaired. A reduction in participation in the angler diary program has increased the uncertainty of angler diarist CPUE in recent years [Conron et al. 2020].

There is no direct measure of recreational fishing pressure for the Gippsland Lakes, Mallacoota Inlet and Lake Tyers estuarine systems. From 2003, slot limit regulations and reduced bag limits were introduced in Victoria specifically for Dusky Flathead to ameliorate the risks of overfishing. The regulations have been refined over time as more information became available, with the current regulations (minimum legal length 30 cm, maximum legal length 55cm, daily bag limit of 5) being established in 2012 [Hamer et al. 2019].

On balance, insufficient information exists to confidently determine stock status. Recreational catch rates (CPUE) have stabilised since 2014, however, future trends are uncertain as there is a lack of reliable information of recent recruitment.

On the basis of the evidence provided above, Dusky Flathead in Victoria is classified as an **undefined stock**.

BIOLOGY

Dusky Flathead biology [Gray and Barnes 2015, Hicks et al. 2015, Kailola et al. 1993]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Dusky Flathead	Females ≥ 16 years, 1 200 mm TL Males ≥ 11 years, 620 mm TL	Females 570 mm TL Males 320 mm TL

DISTRIBUTION



Distribution of reported commercial catch of Dusky Flathead

TABLES

Fishing methods	New South Wales	Queensland	Victoria
Charter			
Hook and Line	✓	✓	✓
Spearfishing		✓	
Commercial			
Line		✓	
Mesh Net	✓		
Net		✓	✓
Various	✓		
Recreational			
Hook and Line	✓	✓	✓
Spearfishing	✓	✓	

Management Methods			
	New South Wales	Queensland	Victoria
Charter			
Fishing gear and method restrictions	✓		
Gear restrictions		✓	
In possession limits	✓		
Licence	✓		
Possession limit		✓	
Size limit	✓	✓	
Spatial closures	✓	✓	
Commercial			
Gear restrictions	✓	✓	✓
Limited entry	✓	✓	✓
Size limit	✓	✓	✓
Spatial closures	✓	✓	✓
Temporal closures	✓	✓	
Recreational			
Bag and possession limits	✓		
Bag limits	✓		✓
Fishing gear and method restrictions	✓		
Gear restrictions		✓	✓
Licence	✓		✓
Possession limit		✓	
Size limit	✓	✓	✓
Spatial closures	✓	✓	

Catch			
	New South Wales	Queensland	Victoria
Commercial	117.622 t	32.4219 t	4.7049 t

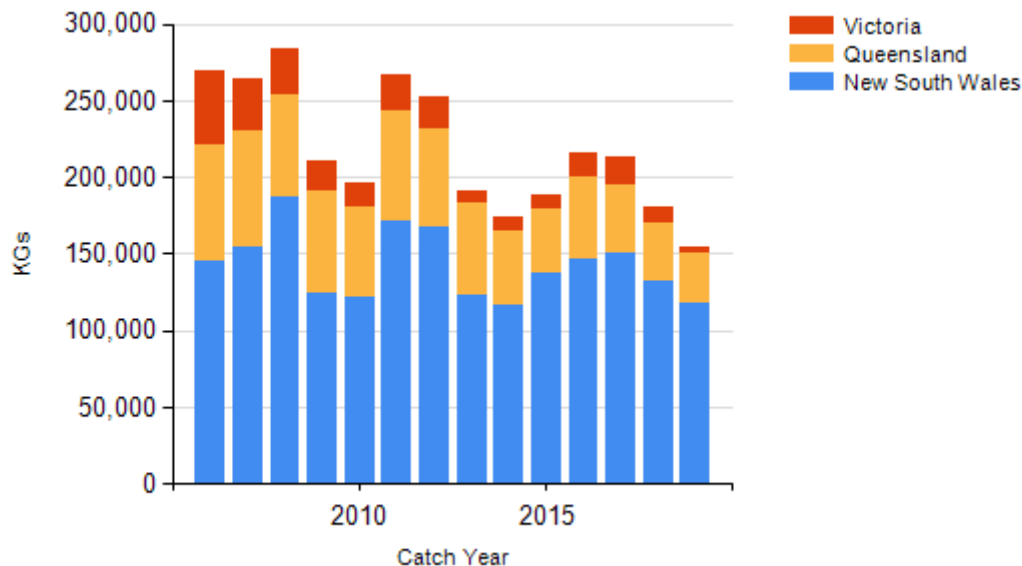
Indigenous	Unknown	Unknown	Unknown (No catch under permit)
Recreational	190 t (2017–18)	89 t (2019–20)	Unknown

Queensland – Indigenous (Management Methods) please refer to <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

New South Wales – Indigenous (Management Methods) <https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>

Victoria – Indigenous (Management Methods) A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, size limits and restricted areas. Traditional (non-commercial) fishing activities that are carried out by members of a traditional owner group entity under an agreement pursuant to Victoria’s *Traditional Owner Settlement Act 2010* are also exempt from the need to hold a recreational fishing licence, subject to any conditions outlined in the agreement. Native title holders are also exempt from the need to obtain a recreational fishing licence under the provisions of the Commonwealth’s *Native Title Act 1993*.

CATCH CHART



Commercial catch of Dusky Flathead - note confidential catch not shown

References	
Broadhurst et al. 2003	Broadhurst, MK, Gray, CA, Young, DJ, and Johnson, DD 2003, Relative efficiency and size selectivity of bottom-set gill-nets for dusky flathead, <i>Platycephalus fuscus</i> and other species in New South Wales, Australia, <i>Fishery and Marine Research</i> , 50: 289–302.
Broadhurst et al. 2009	Broadhurst, MK, Millar, RB, and Brand, CP 2009, Mitigating discard mortality from dusky flathead <i>Platycephalus fuscus</i> gillnets, <i>Diseases of Aquatic Organisms</i> , 85: 157–166.
Butcher et al. 2008	Butcher, PA, Broadhurst, MK and Cairns, SC 2008, Mortality and physical damage of angled and released dusky flathead <i>Platycephalus fuscus</i> , <i>Diseases of Aquatic Organisms</i> , 81: 127–134.

STATUS OF AUSTRALIAN FISH STOCKS REPORT
Dusky Flathead (2020)

Conron et al. 2016	Conron S., Giri K, Hamer P and Hall K 2016, Gippsland Lakes Fishery Assessment 2016. Fisheries Victoria Science Report Series No. 14
Department of Primary Industries 2020	Department of Primary Industries 2020, NSW DPI Commercial catch records, New South Wales Department of Primary Industries, Sydney.
Gray et al. 2005	Gray, CA, Broadhurst, MK, Johnson, DD and Young, DJ 2005, Influences of hanging ratio, fishing height, twine diameter and material of bottom-set gillnets on catches of dusky flathead <i>Platycephalus fuscus</i> and non-target species in New South Wales, Australia, Fisheries Science, 71: 1217–1228.
Gray and Barnes 2015	Gray, CA and Barnes, LM 2015. Spawning, maturity, growth and movement of <i>Platycephalus fuscus</i> (Cuvier, 1829) (Platycephalidae): fishery management considerations. Journal of Applied Ichthyology 31(3), 442–450.
Henry and Lyle 2003	Henry, GW and Lyle JM, 2003, The National Recreational and Indigenous Fishing Survey. Tasmanian Aquaculture and Fisheries Institute, Hobart. FRDC 99/158
Hicks et al. 2015	Hicks T, Kopf RK, Humphries P 2015, Fecundity and egg quality of dusky flathead (<i>Platycephalus fuscus</i>) in East Gippsland, Victoria. Institute for Land Water and Society, Charles Sturt University. Report number 94. Prepared for the Recreational Fishing Grants Program, Fisheries Victoria. The State of Victoria Department of Economic Development, Jobs, Transport and Resources. Pp. 1–34. ISBN 978-1-86-467279-4.
Ingram et al. 2016	Ingram, BA, Hall, K, and Conron, S 2016, Recreational fishery assessment 2016 – small eastern estuaries. Recreational Fishing Grants Program Research Report, Victorian Government, Department of Economic Development, Jobs, Transport and Resources.
Kemp et al. 2013	Kemp, J, Bruce, T, Conron, S, Bridge, N, MacDonald, M and Brown, L 2013, Gippsland Lakes (non-bream) fishery assessment 2011, Fisheries Victoria assessment report series no. 67, Fisheries Victoria, Victoria.
Kailola et al. 1993	Kailola, PJ, Williams, MJ, Stewart, PC, Reichelt, RE, McNee, A and Grieve, C 1993, Australian Fisheries Resources, Bureau of Rural Resources and the Fisheries Research and Development Corporation, Canberra, Australia.
Moreton Bay Seafood Industry Association 2012	Moreton Bay Seafood Industry Association 2012, Moreton Bay tunnel net fishery code of best practice.
Pollock 2015	Pollock, BR 2015, The annual spawning aggregation of Dusky Flathead <i>Platycephalus fuscus</i> at Jumpinpin, Queensland. Proceedings of the Royal Society of Queensland.
Then et al. 2014	Then, AY, Hoenig, NJ, Hall, NG, Hewitt, DA 2014, Evaluating the predictive performance of empirical estimators of natural mortality rate using information on over 200 fish species. ICES Journal of Marine Science.
Ullmann and Broadhurst 2015	Ullmann, SS and Broadhurst, MK 2015, Mitigating unaccounted fishing mortality in gillnets and traps. Fish and Fisheries, 16: 183–229.
Webley et al. 2015	Webley, J, McInnes, K, Tiexiera, D, Lawson, A and Quinn R 2015, Statewide Recreational Fishing Survey 2013–14, Department of Agriculture and Fisheries, Queensland.
West et al. 2015	West, LD, Stark, KE, Murphy, JJ, Lyle JM and Doyle, FA 2015, Survey of recreational fishing in New South Wales and the ACT, 2013/14. Fisheries Final Report Series.
Conron et al. 2020	Conron, SD, Bell, JD, Ingram, BA and Gorfine, HK 2020, Review of key Victorian fish stocks – 2019, Victorian Fisheries Authority Science Report Series No. 15, First Edition, November 2020. VFA: Queenscliff. 176pp.
Murphy et al. 2020	Murphy, JJ, Ochwada-Doyle, FA, West, LD, Stark, KE and Hughes, JM 2020, The NSW Recreational Fisheries Monitoring Program - survey of recreational fishing, 2017/18. NSW DPI - Fisheries Final Report Series No. 158.
Taylor et al. 2020	Taylor, MD, Becker, A, Quinn, J, Lowry, MB, Fielder, S and Knibb, W 2020. Stock structure of dusky flathead (<i>Platycephalus fuscus</i>) to inform stocking management. Marine and Freshwater Research 71, 13782–1383.
McGilvray et al. 2018	McGilvray, J, Broadhurst, M, and Hamer, P, 2018, Dusky Flathead <i>Platycephalus fuscus</i> , in Carolyn Stewardson, James Andrews, Crispian Ashby, Malcolm Haddon, Klaas Hartmann, Patrick Hone, Peter Horvat, Stephen Mayfield, Anthony Roelofs, Keith Sainsbury, Thor Saunders, John Stewart, Simon Nicol and Brent Wise (eds) 2018, Status of Australian fish stocks reports 2018, Fisheries Research and Development Corporation, Canberra.
QFISH 2020	QFish, Department of Agriculture and Fisheries, www.qfish.gov.au
Leigh et al. 2019	Leigh, GM, Yang, WH, O'Neill, MF, McGilvray, JG and Wortmann, J 2019, Stock assessments of bream, whiting and flathead (<i>Acanthopagrus australis</i> , <i>Sillago ciliata</i> and <i>Platycephalus fuscus</i>) in South East Queensland, Technical Report, State of Queensland.
Hamer et al. 2019	Hamer, P, Conron, S, and Simpson K 2019. Victorian Dusky Flathead symposium and recreational fishery online survey 2018. Recreational Fishing Grants Program Research Report.
Conron and Oliveiro 2016	Conron, SD and Oliveiro, P 2016, State-wide Angler fishing Diary Program 2011–14 Recreational Fishing Grants Program Research Report June 2016. Department of Economic Development, Jobs, Transport and Resources, Queenscliff. 45 pp.

Conron et al. 2010	Conron, SD, Gixti D and Morison AK 2010, Survival of snapper and black bream released by recreational hook-and-line fishers in sheltered coastal temperate ecosystems. Final report to Fisheries Research and Development Corporation Project No. 2003/074. Department of Primary Industries, Queenscliff, Victoria.
--------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------