

Yellowtail Kingfish (2023)

Seriola lalandi



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STOCK STATUS OVERVIEW

Jurisdiction	Stock	Stock status	Indicators
Commonwealth, Queensland, New South Wales, Victoria, Tasmania, South Australia	Eastern Australia	Sustainable	Catch, Catch Rates, Depletion Estimates, Size Composition, Mortality Rates, Spawning Potential Ratio
Western Australia, Tasmania	Western Australia	Sustainable	Catch, indicator species status, risk analysis

STOCK STRUCTURE

Yellowtail Kingfish is a highly mobile pelagic species with a widespread distribution extending throughout temperate waters of the Atlantic, Pacific and Indian Oceans. Yellowtail Kingfish is a highly mobile pelagic species with a widespread distribution extending throughout temperate waters of the Atlantic, Pacific and Indian Oceans [Nugroho et al. 2001]. In Australian waters, the species occurs along the entire southern seaboard of the continent from North Reef in Queensland (23°S) to Trigg Island in Western Australia (32°S) including the east coast of Tasmania, and around Lord Howe and Norfolk Islands [Love and Langenkamp 2003] where they inhabit rocky reefs and adjacent areas in coastal waters to depths of more than 300 m [Stewart and Hughes 2008]. Yellowtail Kingfish is considered a range extending species in south-eastern Australia with its presence increasing concurrent to ocean warming off the east coast of Tasmania [Stuart-Smith et al. 2018; Champion et al. 2018]. Species distribution modelling indicates a poleward shift of 94.4 km/decade in core oceanographic habitat and 108.8 km/decade in the poleward edge of the preferred oceanographic habitat of Yellowtail Kingfish [Champion et al. 2018].

Genetic analyses have shown the population in Western Australia to be genetically distinct from

Yellowtail Kingfish found on the eastern (New South Wales) and southern (Victoria, South Australia) Australian coasts or New Zealand waters [Miller et al. 2011; Green et al. 2020]. This is consistent with the results of tagging studies which show connectivity spanning southern Queensland, NSW, Victoria, Tasmania and SA, but not WA [Hughes and Stewart 2020; NSW DPI unpublished data]. These results also confirm previous analyses that found no evidence of genetic differentiation between New Zealand and New South Wales Yellowtail Kingfish [Smith et al. 1991] and results of tagging studies which show that Yellowtail Kingfish undergo bi-directional movements between Australia and New Zealand [Gillanders et al. 2001; Holdsworth et al. 2016; NSW DPI unpublished data].

Here, assessment of stock status is presented at the genetically-determined biological stock level—Eastern Australia and Western Australia.

STOCK STATUS

Eastern Australia

Yellowtail Kingfish are caught in Queensland, New South Wales (NSW), Tasmanian, Victorian and South Australian (SA) waters, as well as in Commonwealth managed waters in the Southern and Eastern Scalefish and Shark Fishery (SESSF) and the South Pacific Regional Fisheries Management Organisation Convention Area. The stock status presented here for the entire biological stock considers evidence from these six Australian jurisdictions.

Catch in Commonwealth Trawl and Gillnet, Hook and Trap sectors of the SESSF was 4.1 tonnes (t) (combined) in the 2021–22 financial year. Vessels operating on the high seas also catch the species, with 35.0 t reported in logbooks in the 2021–22 financial year.

Reported commercial catches from the Queensland fishery are relatively minor, peaking at 13 t in 2008-09, and have averaged 4 t over the last decade to 2021-22. Recreational catch was estimated to be less than 10 t in 2013–14 [Webley et al. 2015]. Recreational catch could not be estimated in the 2019–20 survey due to low sample size but is likely to be low [Teixeira et al. 2021]. There are no current estimates for Indigenous harvest, although these are likely to be minor.

In Victoria, Yellowtail Kingfish is targeted by recreational anglers in offshore waters throughout much of the state but catch and effort data are lacking. It has occasionally been targeted by commercial fishers with handlines and by trolling, but landings have generally been low at less than 2 t per year [VFA unpublished catch data]. The greatest landings, 2–13 t, were historically caught as by-product from the shark fishery prior to the amalgamation of this component of the Victorian fleet into the Commonwealth SESSF in 1998. Since that time, landings have remained around 2 t or less per year [VFA unpublished catch data], mostly caught by seine in bays and inlet fisheries, which is presumably incidental. There is insufficient information from any of these fisheries to inform stock biomass trends. Anecdotal reports from recreational fishers suggest that during the mid-1990's both the number and size of Yellowtail Kingfish in Victoria decreased resulting in reduced targeting. The low availability of Yellowtail Kingfish continued until about 2010 when it appears their abundance in Victorian waters began to increase and targeted recreational fishing increased considerably.

In Tasmania, Yellowtail Kingfish are a popular species targeted by the recreational sector, however, catches are still estimated to be small with approximately 1,000 fish retained and 500 released according to the last state-wide recreational fishing survey [Lyle et al. 2019]. Minor catches of Yellowtail

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Kingfish are reported by commercial fishers but given the low numbers and recent emergence of the fishery the species is not currently reported in the annual Scalefish assessment report for Tasmania. Reported annual commercial landings in Tasmania averaged 3.2 t for the last decade, with those reported for 2021–22 being 1.0 t. With continued warming of the waters off Tasmania, availability of Yellowtail Kingfish in Tasmania is likely to increase [Champion et al. 2019].

In South Australia, Yellowtail Kingfish makes a minor contribution to the total production and value of the state's commercial multispecies, multi-gear and multi-sectoral Marine Scalefish Fishery (MSF). Historically, the commercial catch has rarely exceeded 5 t per year, with most of the catch taken incidentally and retained as by-product. The most recent estimate of the recreational harvest (retained) of Yellowtail Kingfish in SA was 2,004 (\pm 947 SE) individuals in 2021–22 [Beckmann et al. 2023]. No formal stock assessments have been conducted for Yellowtail Kingfish in SA state waters.

Despite catches of Yellowtail Kingfish reported from the above jurisdictions, the Eastern Australia biological stock is assessed here using evidence primarily from the NSW fishery. Commercial landings of Yellowtail Kingfish in NSW have declined from an average of approximately 550 t per year in the period 1983–84 to 1989–90, to an average of approximately 150 t per year since the mid-1990s. More recently, a decline in landings has been recorded from 264 t in 2009–10 to 67 t in 2021–22. Standardised catch per unit effort (CPUE; in days) for handlining (the main commercial method landing Yellowtail Kingfish in NSW) showed an increase from around 10 kg.day^[-1] in 1997–98 to approximately 60 kg.day^[-1] in 2010–11 followed by a decline to approximately 30 kg.day^[-1] between 2017–18 and 2021–22 [Hughes 2023]. However, when this series was scaled for reporting changes and adjusted for increases in fishing power (efficiency), the resulting time series showed an approximately 85% increase from 1997–98 to 2008–09, followed by an approximately 30% decline to 2013–14, with a period of relative stability to 2021–22. Overall catch rates have therefore increased by approximately 13% between 1997–98 and 2021–22 [Hughes 2023].

The most recent estimate of the recreational harvest of Yellowtail Kingfish in NSW was 31,184 (\pm 11,140 SE) individuals weighing an estimated 114 t in 2019–20 [Murphy et al. 2022]. In 2017–18, an estimated 41,241 (\pm 16,450 SE) individuals, weighing approximately 129 t, were harvested [Murphy et al. 2020]. These estimates only encompassed harvests by NSW households within which a long-term NSW Recreational Fishing Licence holder resided (RFL household). Re-analysis of the previous survey [West et al. 2015] estimated that 45,578 (\pm 19,419 SE) individuals weighing approximately 120 t were harvested by RFL households during 2013–14 [Murphy et al. 2020]. In 2000–01, the estimated recreational harvest by all fishers in NSW state waters was 59,029 (\pm 25,232 SE) individuals weighing between 144 and 219 t [Henry and Lyle 2003]. While these survey results are not directly comparable due to different sampling approaches, they likely represent a slight decline in recreational harvest through time and consistently indicate that the recreational harvest in recent years is likely larger than the commercial harvest.

A surplus production model [CMSY++; Froese et al. 2021] was used to model biomass depletion over time using reconstructed catch histories (including both commercial and recreational components) and standardised commercial CPUE time series data [Hughes 2023]. Modelling indicated that the stock underwent a dramatic decline in biomass from the early 1980s through to the mid-1990s when it approached the 20% limit reference point (B20). Biomass

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slowly increased with the substantial decrease in catch through the late 1990s and early 2000s. Biomass steadily declined through the early 2010s but has been stable since with the current biomass (B/K) estimated at 26% (range 16–46%) [Hughes 2023]. Length-based spawning potential ratio (SPR) modelling estimates median SPR for the period 2013–14 to 2021–22 to be 22%, with a range of 12–33% of unfished levels [Hughes 2023], which spans the limit reference level of 20% [Goodyear 1993; Mace and Sissenwine 1993].

The size composition of landings indicates that the NSW fishery is dominated by individuals smaller than 850 mm fork length (FL), the approximate size at maturity for female Yellowtail Kingfish in NSW [Gillanders et al. 1999]. Length frequencies have been monitored for commercially harvested Yellowtail Kingfish since the 1990s. The size distribution of the catch has been reasonably consistent since data collection commenced, except for the effect of increasing the minimum legal length in 2007 [Hughes 2023]. A stakeholder survey conducted in 2020 indicated a perception that the NSW fishery currently contains fewer large fish [Stewart et al. 2021], however the size composition of fish in recreational and tagging datasets also indicates that the recreational fishery has been based largely on juveniles since at least the mid-1970s [Gillanders et al. 2001; Steffe et al. 1996; Steffe and Murphy 2011]. This long-term stability of the narrow size distributions seen in landings suggests that the stock is not fully mixed across its range [Green et al. 2020] and mature spawning fish are therefore not fully vulnerable to the NSW fishery, thus providing recruitment which maintains the sustainability of the fishery. Numerous examples of long-distance movements of Yellowtail Kingfish have been recorded in this region, between Australia, New Zealand and Lord Howe Island as well as within Australia (spanning southern Queensland, NSW, Victoria, Tasmania and SA [Gillanders et al. 2001; Holdsworth et al. 2016; NSW DPI unpublished data]). Consistent with these recorded movements, it has also been suggested that much of the spawning stock may be distributed offshore where it is not vulnerable to the NSW coastal fishery [Smith 1987; Gillanders et al. 1999; Gillanders et al. 2001; Patterson and Swearer 2008]. Gravid female fish are routinely captured during the austral summer spawning season around Lord Howe Island [Patterson and Swearer 2008], but are relatively rare in NSW coastal waters during the same period [Gillanders et al. 1999] where the majority of the NSW fishery occurs. The temporal stability of these narrow size frequency distributions, which are used to derive estimates of mortality (from catch-curve analyses) and subsequent spawning stock biomass estimates (from length-based SPR modelling), are therefore likely to consistently indicate high mortality and low spawning biomass through time. Analyses based on these size distributions are therefore unlikely to accurately represent the status of the stock. The stability of this long-term pattern does, however, indicate ongoing recruitment into the fishery, and in particular provides no evidence of recruitment failure predicted by long term trends in SPR modelling.

The above evidence indicates that the biomass of the Eastern Australia Yellowtail Kingfish biological stock is unlikely to be depleted and that recruitment is unlikely to be impaired.

Surplus production modelling (CMSY++) estimated that fishing mortality (F) was excessive ($F > F_{20}$; F_{20} being F predicted to drive B below B_{20}) between the early 1980s and the late 1990s; however, it has declined to sustainable levels ($F < F_{20}$) since the early 2000s [Hughes 2023]. Modelling indicates that F has been declining relative to F_{20} since 2010 and is currently estimated to be 0.61. Current harvest (all sectors) is below estimated catch at maximum sustainable yield (MSY). Catch curve analyses estimate current F to be less than natural mortality [Hughes 2023].

The weight-of-evidence approach used here to assess stock status reveals considerable uncertainty due to the lack of data on size composition, total harvest and population dynamics across the range of the entire biological stock. Movement patterns and connectivity of Yellowtail Kingfish in south-eastern Australia are poorly understood, resulting in large uncertainty as to how representative the Yellowtail Kingfish population in NSW is of the entire biological stock. Further work into examining the population dynamics of the stock in the region, and particularly investigating the distribution and movements of the spawning stock, as well as the source of juveniles, is currently underway to address this uncertainty (NSW DPI 2022).

On the basis of the evidence provided above, the Eastern Australia biological stock is classified as a **sustainable stock**.

Western Australia

In Western Australia (WA), Yellowtail Kingfish makes up a very minor component of commercial and recreational catches. Total commercial catches for all fisheries have been less than 4 t annually since 1999 and the 2021 commercial catch was 1.3 t. Boat-based recreational catch estimates of Yellowtail Kingfish have averaged 7 t per year since 2011–12 (5.4 t ± 2.3 t SE in 2020–21) [Ryan et al. 2022]. Shore-based recreational catches are unknown but assumed to be low. The annual WA charter catch for this species has been less than 1.0 t since 2003. Yellowtail Kingfish is not targeted to any great extent by any sector and there is no evidence that catches have fluctuated greatly through time as a result of fishing, although there is some uncertainty in catches prior to 1999 [Lewis 2020].

In WA, all species of fish are allocated to a suite for monitoring and assessment purposes. Yellowtail Kingfish is part of the large pelagic resource in WA, which uses Spanish Mackerel, Grey Mackerel and Samsonfish as indicator species [Newman et al. 2018]. As the status of each of these indicator species is sustainable, this implies that the Yellowtail Kingfish stock is also sustainable.

In addition, WA uses a weight of evidence approach for all assessments. In the case of Yellowtail Kingfish the lines of evidence included: low catch, wide catch distribution, low effort levels, low vulnerability (Productivity Susceptibility Assessment) and stock reduction analyses (Catch-MSY) [Haddon et al. 2018]. With recent catches below MSY, biomass is inferred to be above the target and forward projections indicate an increasing trend in biomass under current catch and management arrangements. The current risk level for the Yellowtail Kingfish stock was estimated to be "Medium" [Lewis 2020]. The current status of the Yellowtail Kingfish stock in WA is "Acceptable-Sustainable", with no new management required.

The above evidence indicates that the biomass of this stock is unlikely to be depleted and the current level of fishing mortality is unlikely to cause the stock to become recruitment impaired.

On the basis of the evidence provided above, the Western Australia biological stock is classified as a **sustainable stock**.

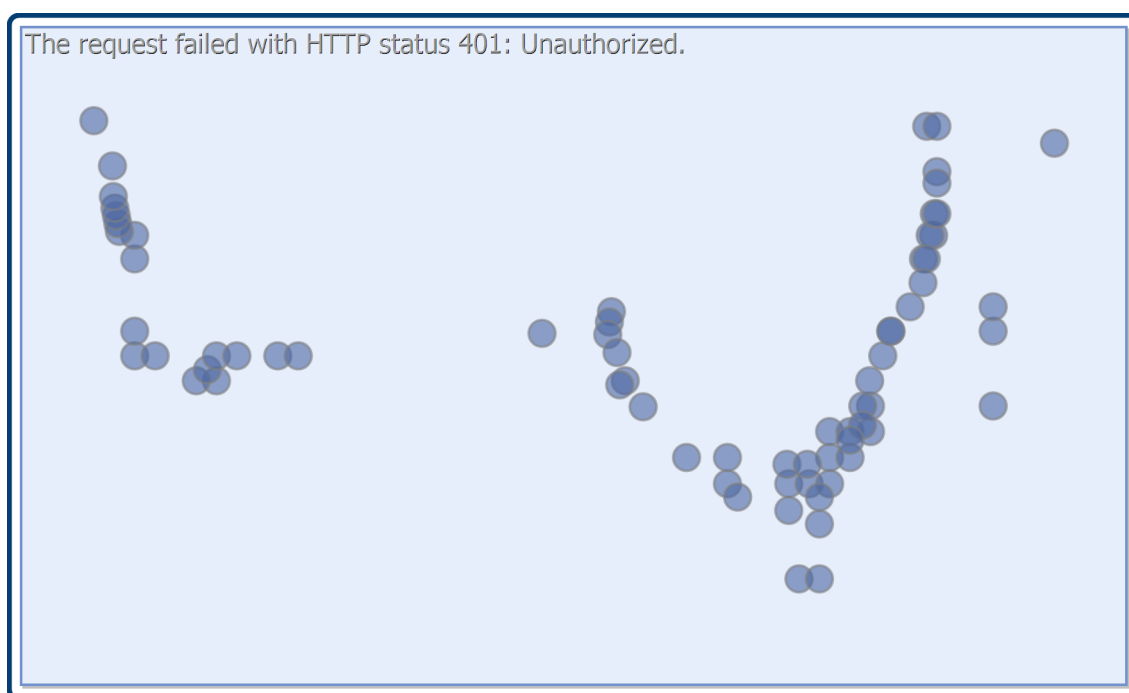
BIOLOGY

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Yellowtail Kingfish biology [Gillanders et al. 1999; Stewart et al. 2001; Stewart and Hughes 2008]

Species	Longevity / Maximum Size	Maturity (50 per cent)
Yellowtail Kingfish	20+ years, 1,900 mm FL	5–10 years, 800–1,250 mm FL

DISTRIBUTION



Distribution of reported commercial catch of Yellowtail Kingfish

TABLES

Fishing methods	Commonwealth	New South Wales	Queensland	South Australia	Tasmania
Charter					
Hook and Line		✓	✓		
Rod and reel					
Spearfishing					
Commercial					
Demersal Gillnet	✓				

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Victoria	Western Australia
✓	
	✓
✓	

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Demersal Longline	✓				
Dropline		✓			
Gillnet					
Hand Line, Hand Reel or Powered Reels					
Handline (mechanised)	✓				
Hook and Line		✓			
Line			✓		
Longline (Unspecified)					
Net			✓		
Otter Trawl	✓				
Pole and Line		✓			
Trolling		✓			
Unspecified				✓	✓
Various		✓			
Recreational					
Hook and Line		✓	✓		✓
Rod and reel					
Spearfishing		✓	✓		

Management Methods	Commonwealth	New South Wales	Queensland	South Australia	Tasmania
Charter					
Bag limits		✓			
Bag/possession limits			✓		
Gear restrictions		✓	✓		
Licence		✓			
Limited entry					
Passenger restrictions					

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	✓
	✓
	✓
✓	
	✓
	✓
✓	
	✓
✓	
	✓
✓	✓

Victoria	Western Australia
✓	
✓	
	✓
	✓
	✓

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Possession limit		✓			
Seasonal or spatial closures			✓		
Size limit		✓			
Size limits			✓		
Spatial closures		✓			
Commercial					
Gear restrictions			✓		
Licence					
Limited entry	✓	✓	✓	✓	
Rotational closures			✓		
Seasonal or spatial closures			✓		
Size limit		✓			✓
Spatial closures		✓			
Trip limits					✓
Vessel restrictions		✓	✓		
Recreational					
Bag and possession limits					✓
Bag limits		✓		✓	
Bag/possession limits			✓		
Boat limits				✓	
Gear restrictions		✓	✓		
Licence		✓			
Possession limit		✓			
Seasonal or spatial closures			✓		
Size limit		✓		✓	✓
Size limits			✓		
Spatial closures		✓			

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✓	
✓	✓
✓	✓
✓	
✓	
✓	✓
✓	✓
✓	✓
	✓
✓	✓
✓	
✓	✓
✓	✓
✓	✓
✓	✓

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Catch	Commonwealth	New South Wales	Queensland	South Australia	Tasmania
Charter			< 1 t		
Commercial	39.1281 t	65.0666 t	1.25796 t	0.78948 t	1.00126 t
Indigenous		Unknown	Unknown	Unknown	Unknown
Recreational		31,184 (± 11,140 SE) individuals (114 t) in 2019–20 [Murphy et al. 2020]	Unknown	2,004 (± 947 SE) retained individuals in 2021–22 [Beckmann et al. 2023]	1,000 individuals in 2017–18 [Lyle et al. 2019]

Commonwealth – Recreational. The Australian government does not manage recreational fishing. Recreational fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters, under their management regulations.

Commonwealth – Indigenous. The Australian government does not manage non-commercial Indigenous fishing (with the exception of the Torres Strait). In general, non-commercial Indigenous fishing in Commonwealth waters is managed by the states or territory immediately adjacent to those waters. In the Torres Strait both commercial and non-commercial Indigenous fishing is managed by the Torres Strait Protected Zone Joint Authority (PZJA) through the Australian Fisheries Management Authority (Commonwealth), Department of Agriculture Fisheries and Forestry (Queensland) and the Torres Strait Regional Authority. The PZJA also manages non-Indigenous commercial fishing in the Torres Strait.

Commonwealth – Commercial (Management Methods/Catch). Data provided for the Commonwealth align with 2021–22 financial year.

Western Australia – Recreational (Catch). State-wide survey of boat-based recreational fishing in Western Australia 2020–21 [Ryan et al. 2022]. Shore-based catch (if any) is largely unknown.

Western Australia – Recreational (Management Methods). A boat-based recreational fishing licence required.

Western Australia – Charter (Catch). The charter catch is an estimate based on numbers of fish caught multiplied by an average weight.

Queensland – Indigenous (Management Methods). For more information see: <https://www.daf.qld.gov.au/business-priorities/fisheries/traditional-fishing>

Queensland – Recreational Fishing (Catch). Data with high uncertainty (Residual Error > 50 %) have been excluded and listed as unknown. More information is available at: <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/monitoring-reporting/statewide-recreational-fishing-surveys>

Queensland – Commercial (Catch). Queensland commercial and charter data have been sourced from the commercial fisheries logbook program. Further information is available through the Queensland Fisheries Summary Report: <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-research/data/queensland-fisheries-summary-report>

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Victoria	Western Australia
Unknown	< 0.5 t
0.4225 t	1.55225 t
Unknown	Unknown
Unknown	5.4 (\pm 2.3 SE) t (2020–21)

New South Wales – Recreational (Catch). Murphy et al. [2022]

New South Wales – Indigenous (Management Methods).

<https://www.dpi.nsw.gov.au/fishing/aboriginal-fishing>

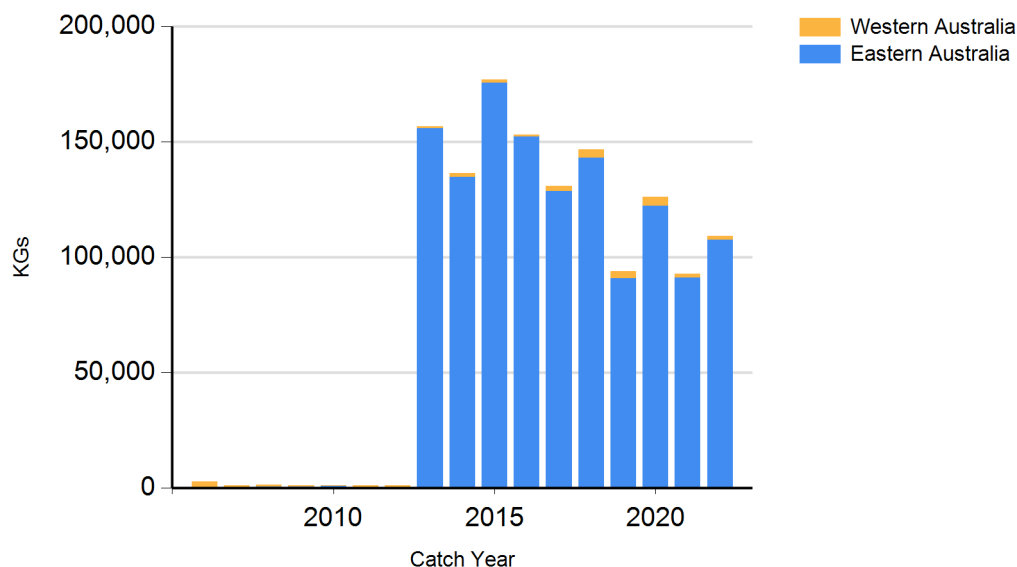
Victoria – Indigenous (Management Methods). A person who identifies as Aboriginal or Torres Strait Islander is exempt from the need to obtain a Victorian recreational fishing licence, provided they comply with all other rules that apply to recreational fishers, including rules on equipment, catch limits, 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*.

Tasmania – Commercial (catch). (a) Catches reported for the Tasmanian Scalefish Fishery are for the period 1 July to 30 June the following year. The most recent assessment available is for 2021–22; (b) A combined trip limit of 250 kg (with snapper and striped trumpeter) is in place for commercial scalefish licence and rock lobster licence holders.

Tasmania - Indigenous (Management Methods). In Tasmania, Indigenous persons engaged in traditional fishing activities in marine waters are exempt from holding recreational fishing licences but must comply with all other fisheries rules as if they were licensed. For details, see the policy document 'Recognition of Aboriginal Fishing Activities' (<https://fishing.tas.gov.au/Documents/Policy%20for%20Aboriginal%20tags%20and%20allotting%20an%20UIC.pdf>).

Tasmania – Recreational (Management Methods). The species is subject to a minimum size limit of 450 mm total length. A bag limit of five fish and a possession limit of ten fish is in place for recreational fishers.

CATCH CHART



Commercial catch of Yellowtail Kingfish - note confidential catch not shown

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