

Stout Whiting (*Sillago robusta*)

Assessment Authors and Year

This stock status summary condenses findings for Stout Whiting that were detailed in the following full stock assessment report:

Hall, K.C. 2025. Stock assessment report 2024/25 – Eastern School Whiting and Stout Whiting (*Sillago flindersi* and *Sillago robusta*). NSW Department of Primary Industries and Regional Development – Fisheries, Coffs Harbour, 67 pp.

Stock Status

Current stock status	On the basis of the evidence contained within this assessment, Stout Whiting is currently assessed as sustainable for the NSW part of the stock.
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Stock structure & distribution

Stout Whiting (*Sillago robusta*, CAAB 37 330005) is a subtropical species that occurs on both the west and east coasts of Australia in ocean waters to a depth of 70 m. There is strong genetic evidence to suggest that the west and east coast populations of Stout Whiting are separate sub-species or species (Dixon *et al.*, 1987). More recent molecular analyses of Stout Whiting samples from Queensland locations and an otolith chemistry study also suggest that biological sub-stocks are unlikely to exist along the east coast (Ovenden and Butcher, 1999; Sarakinis *et al.*, 2022). Therefore, Stout Whiting in southern Queensland and northern NSW are considered a single eastern Australia biological stock for assessment purposes (Roelofs and Hall, 2021).

Scope of this assessment

This assessment of the stock status of Stout Whiting was completed according to the Status of Australian Fish Stocks (SAFS) criteria (Roelofs *et al.*, 2024), using data (in calendar years) up to and including 2023. Where necessary data for Stout Whiting were adjusted or combined with data for Eastern School Whiting (*Sillago flindersi*), to support determination of a combined trawl whiting total allowable catch (TAC) in New South Wales (NSW) for the 2025-26 fishing season (1 May to 30 April) according to the *NSW Trawl Whiting Harvest Strategy* (NSW DPI, 2022). For the 2024-25 fishing season, the combined NSW TAC for trawl whiting was set at 1,066 t.

The Stout Whiting stock is shared with the Queensland Finfish (Stout Whiting) Trawl Fishery, which has also been subject to a voluntary catch quota since 1998 and is managed by the Queensland Department of Agriculture and Fisheries (DAF) under the recently endorsed Commercial Trawl Fishery (Fin Fish) Stout Whiting Harvest Strategy: 2021–2026 (DAF, 2021). For the 2023 fishing season (based on calendar years), the Queensland TACC for Stout Whiting was set at 1,393 t.

A quantitative stock assessment of the entire biological stock of Stout Whiting is completed by Queensland agencies every 3-5 years, with a significant input of NSW data, including a standardised CPUE series and discard rate estimates (Wortmann and Hall, 2021). The most recent update of the quantitative assessment was completed in 2021 using data up to 2020. However, the

Tier 1 stock assessment for Eastern School Whiting was updated in 2024, so the current year was considered a 'full assessment year' according to the NSW Trawl Whiting Harvest Strategy (NSW DPI, 2022). Therefore, this report summarises existing information on the primary biomass indicator and updates fisheries statistics, biological data and other secondary indicators for Stout Whiting in NSW waters.

The assessment results for Stout Whiting are presented here at the biological stock level –eastern Australia; however, the conclusions and stock status are derived independently by NSW DPI to support catch quota setting and management for the NSW part of the stock and do not reflect a cross-jurisdictional consensus (as for the national SAFS assessments). The most recent update of the national SAFS assessment occurred in 2023, with Stout Whiting assessed as a **sustainable stock** (Jesson-Kerr and Hall, 2024).

Biology

Stout Whiting reach a maximum age of 8 years off southern Queensland, 10 years in northern NSW (near Yamba) and 6 years in central NSW (near Newcastle), with a maximum reported size of 23.7 cm FL (O'Neill *et al.*, 2002; Butcher and Hagedoorn, 2003; Gray *et al.*, 2017). Most of the commercial catch comprises 2- and 3-year-old fish (12 to 18 cm FL) in northern NSW and 1- and 2-year-old fish in central NSW (10 to 13 cm FL) and southern Queensland (slightly larger size, 14 to 17 cm FL) (O'Neill *et al.*, 2002; Gray *et al.*, 2017). Sexual maturity is reached at about 2 years of age and 15 cm FL.

Fishery statistics

Catch information

Commercial

Stout Whiting is targeted in southern Queensland by a small number (2 to 6) of Danish seine and otter trawl vessels in the Finfish (Stout Whiting) Trawl fishery and is also caught and discarded as by-catch in the much larger East Coast Otter Trawl Fishery (Wortmann and Hall, 2021). The latter primarily targets Eastern King Prawn (*Melicertus plebejus*) and is not permitted to land Stout Whiting, but estimated discard mortalities are included in stock assessments. Queensland reported logbook catches, however, only include those taken by the targeted finfish sector.

The reported commercial catches from Queensland have historically far exceeded those taken from NSW waters (Fig. 1). On average, 80% of the annual landed catch is taken in Queensland and 20% in NSW (Roy and Hall, 2016). Queensland commercial catches (not including estimated discards) were over 1,000 t between 2017 and 2021 (Sumpter, 2022), followed by a slight decrease to 974 t in 2022 (Queensland DAF, unpub. data). The Queensland TACCs were set at 1,106 t between 2017 and 2020, with the quota fully or almost fully caught (Wortmann, 2020), and then were recently increased to 1,281 t and 1,393 t in 2021 and 2022, respectively, in response to rising Queensland catch rates (Sumpter, 2022; Jesson-Kerr and Hall, 2024). The TACC was again set at 1,393 t in 2023 and 2024 (Queensland DAF, unpub. data). The main commercial vessel in Queensland, undertook a stratified survey of the stock in 2023, which resulted in lower catch rates and a considerably reduced catch of 393 t.

Initially, in NSW, the trawl whiting fishery focused on Eastern School Whiting and Stout Whiting were discarded at high rates into the early 1990s (Kennelly *et al.*, 1998; Hall, 2020). Most (on average 75%) of the current NSW commercial catch of trawl whiting still comprises Eastern School Whiting. Annual commercial catches of Stout Whiting in NSW state waters (after data adjustments for inaccurate species reporting in northern NSW) increased from <100 t per annum to a peak of 526.7 t in 1998 (Fig. 1). Following a second peak of 479.1 t in 2002, annual catches have remained below 300 t and, since quota was introduced north of Barrenjoey Point, have been below 200 t (Fig. 2).

Commercial catches of Stout Whiting in NSW are almost exclusively taken by the ocean prawn trawl sector along the northern coast, with minor quantities reported by the northern fish trawl sector from the central coast in more recent years (Figs 2 and 3). Although data adjustments for inaccurate species reporting are only applied to prawn trawl catches in northern zones, some misreporting of Stout Whiting as Eastern School Whiting could be occurring further south to produce smaller catches in the fish trawl sector. The sudden increase in fish trawl catches of Stout Whiting in 2020 and 2024 (Fig. 3) may have resulted from greater industry awareness of the need to report correctly and may indicate that fish trawl catches of Stout Whiting were historically greater than reported.

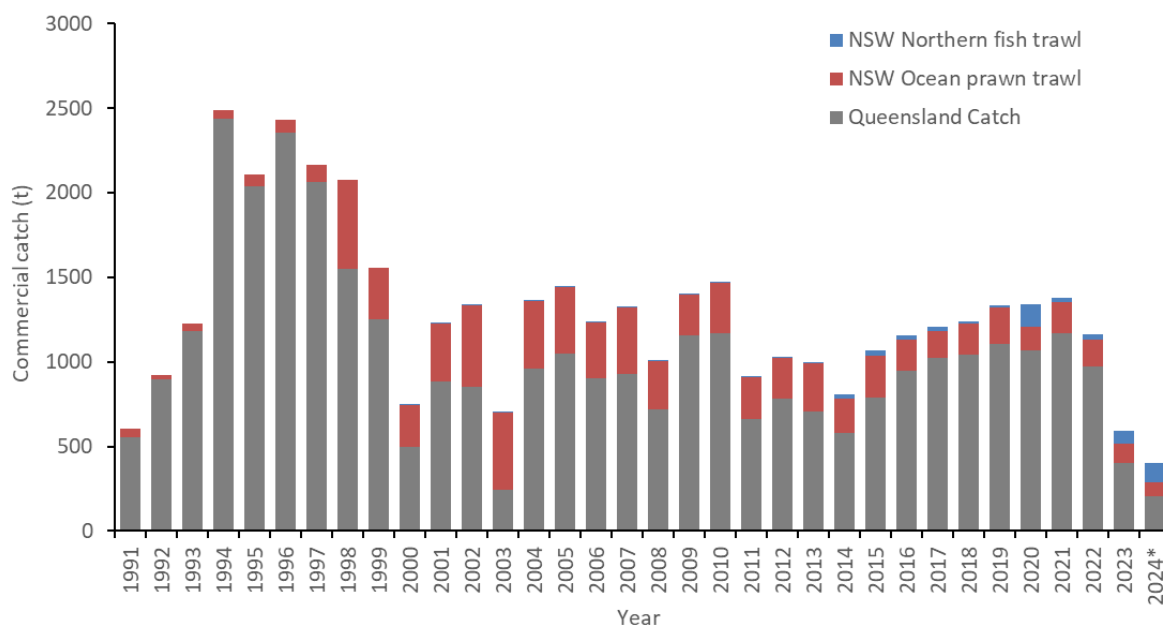


Figure 1. Annual landed commercial catches (tonnes) of Stout Whiting from New South Wales (NSW) and Queensland waters from (1945–2024). *Data for 2024 are incomplete. Queensland data are from DAF (unpub. data).

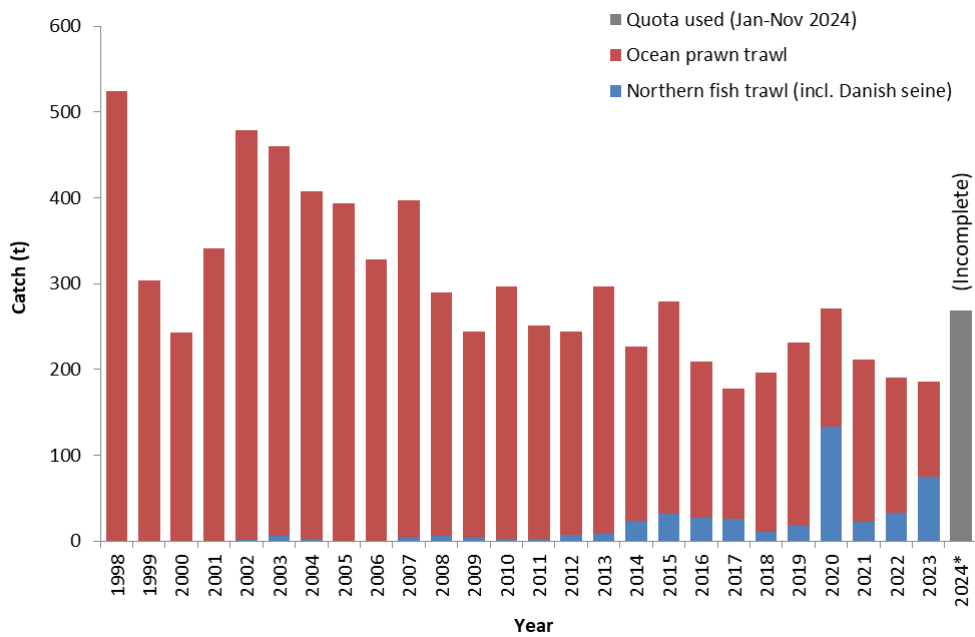


Figure 2. Annual adjusted commercial catches (tonnes) of Stout Whiting in NSW waters (1998–2024) reported for different sectors of the NSW Ocean Trawl Fishery. *Data for 2024 are incomplete and the estimated quota used north of Barrenjoey Point between January and November 2024 is indicated.

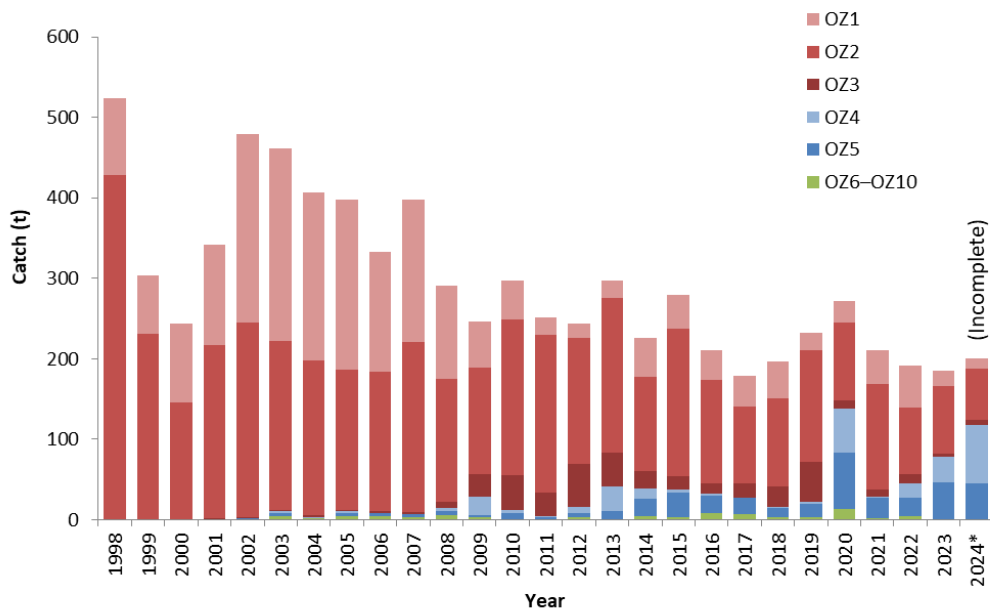


Figure 3. Annual adjusted commercial catches (tonnes) of Stout Whiting from the NSW Ocean Trawl Fishery (1998–2024) reported in different fishing zones (OZ1–OZ10) each covering one degree of latitude from north to south. Catches in OZ6 and further south (negligible amounts) were aggregated for confidentiality reasons. *Data for 2024 are incomplete.

Recreational & Charter boat

Recent estimates of recreational catches of combined trawl whiting (Eastern School Whiting and Stout Whiting) from NSW waters have been based on biennial telephone surveys of Recreational Fishing Licence (RFL) Households, comprised of at least one fisher possessing a long-term (1 or 3 years duration) fishing licence and any other fishers resident within their household, excluding other long-term licence holders. In all recent surveys, reports of trawl whiting catches have been rare (~0.1% of surveyed households reported trawl whiting catches in the most recent survey) and consequently estimates have a high standard error (SE) and questionable reliability. Nevertheless, the most recent estimate of the recreational harvest of combined trawl whiting in NSW was approximately 259 ($\pm$ 257 SE) fish or around 0.04 t during 2021/22 (Murphy *et al.*, unpub. data), which was considerably smaller than in previous surveys: 9,882 ($\pm$ 4,040) fish in 2019/20, 10,933 ($\pm$ 8,016) fish in 2017/18 and 4,995 ($\pm$ 2,078) fish in 2013/14 (West *et al.*, 2015; Murphy *et al.*, 2020, 2022). Irrespective of the data quality, recreational catches are clearly negligible relative to commercial catches, comprising approximately 0.1% of the total harvest of trawl whiting from NSW waters.

Eastern School Whiting and Stout Whiting are also rarely reported in logbook catches of the NSW Charter Boat Fishery and these catches are similarly considered insignificant in comparison with commercial catches (Gray and Kennelly, 2016; Hughes *et al.*, 2021).

Indigenous

The annual Aboriginal harvest of Stout Whiting in NSW waters is currently unknown, but is also assumed to be small and to have a negligible impact on the stock biomass.

Illegal, Unregulated and Unreported

The level of illegal, unregulated and unreported fishing is unknown; however, there is considerable inaccurate reporting to individual trawl whiting species on catch returns, particularly in northern NSW waters. Data in OZ1 and OZ2 have been adjusted accordingly, which affects total catch amounts for each species. In addition, large quantities of trawl whiting catches in 2016–2018 were reported without accurate location information and other large catches in 2019 and 2020 on the south coast in OZ8 were deemed invalid and have been partially removed from total catches.

Fishing effort information

Commercial fishing effort for Eastern School Whiting was collected as number of days fished on monthly records prior to July 2009 and as number of hours fished per daily event after July 2009. To form a longer time series of effort, recent daily events were re-aggregated, with effort in fisher days estimated from the number of fishing events entered for each fisher in each month where Eastern School Whiting was reported on at least one day.

The annual reported effort for Stout whiting by the prawn trawl sector has declined steadily from a peak of 8,827 fisher days in 2002 to just 1,918 fisher days and 9,864 fisher hours in 2023 (Fig. 4).

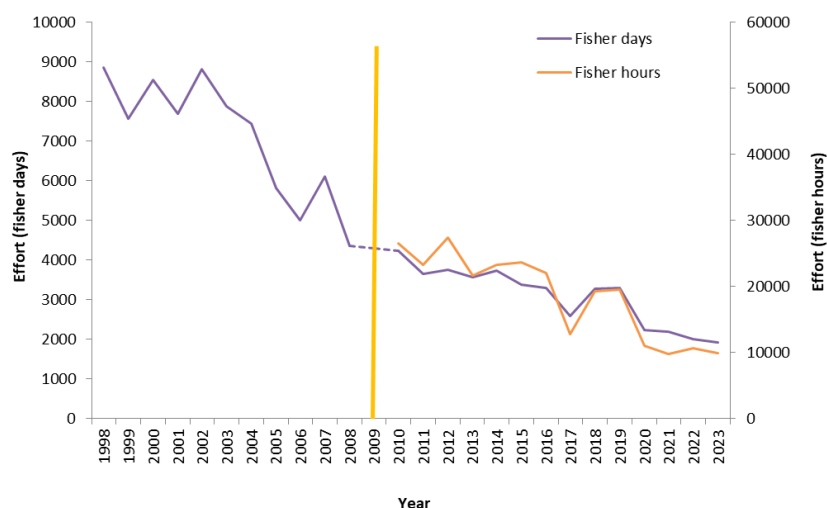


Figure 4. Annual adjusted effort (fisher days and fisher hours) for fishers in the ocean prawn trawl of the NSW Ocean Trawl Fishery that reported landing Stout Whiting on at least one day in a given month.

Catch rate information

Standardised catch rates (catch-per-unit-effort, CPUE) for Stout Whiting taken by the ocean prawn trawl sector were compiled from monthly records (in kg per day) between 1998 and 2008 and daily event records (in kg per hour) between 2010 and 2023.

The mean standardised catch rates of Stout Whiting in the prawn trawl sector rapidly declined between 1998 and 2000 to more than 50% below the long-term average, then steadily increased and have remained above or near the long-term averages since 2006 (Fig. 5). This suggests that the Stout Whiting stock in northern NSW may have declined following the peak trawl whiting catches in the late 1990s, but has since recovered.

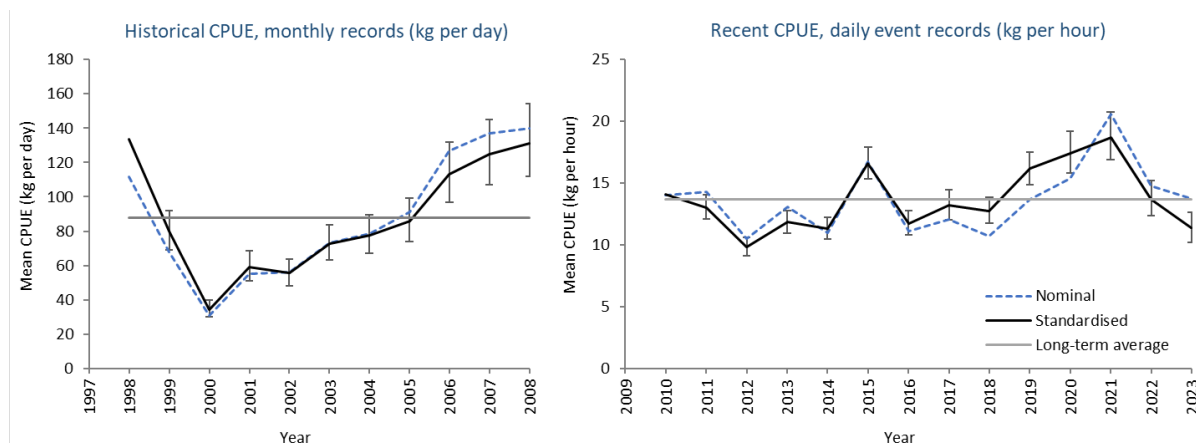


Figure 5. Mean standardised catch rates (catch-per-unit-effort, CPUE) of Stout Whiting for the ocean prawn trawl sector of the NSW Ocean Trawl Fishery, estimated from monthly records (1998–2009) in kg per day (left) and from daily event records (2010–2023) in kg per hour (right). The dashed and solid lines indicate the nominal and standardised mean CPUE ($\pm$ 95% confidence intervals), respectively; and the grey horizontal line indicates the long-term averages for each series.

Stock Assessment

Stock Assessment Methodology

Year of most recent assessment:

The most recent update of the quantitative stock assessment for Stout Whiting was in 2021 using data up to 2020 (Wortmann and Hall, 2021). Nevertheless, the current year was considered a 'full assessment year' according to the NSW harvest strategy (NSW DPI, 2022), because the Tier 1 stock assessment for Eastern School Whiting was updated in 2024.

Assessment method:

The 2021 update of the Stout Whiting stock assessment developed a two-fleet integrated age-structured population dynamic model using Stock Synthesis v. 3.30.15 (Methot and Wetzel, 2013; Methot *et al.*, 2019). Since then, fisheries statistics and standardised catch rates for the prawn trawl sector of the NSW Ocean Trawl Fishery have been updated and assessed each year (Hall, 2025). Catch rates were standardised using the r-package 'rforcpue' (Haddon, 2023).

Main data inputs:

Commercial landings – reported annual catch, taken from fisher logbooks for the Queensland Finfish trawl sector (1990–2023) and NSW OTF (1998–2023).

Estimated discards and rates – reported discard weights for the Queensland Finfish trawl sector (1990–2016) and estimated by-catch for the Queensland East Coast otter trawl sector from reported boat-days of effort (1991–2013). Estimated discard rates from NSW onboard observer programs (1992–1995 and 2014–2019).

Commercial catch rates – reported annual catch-per-unit-effort (CPUE) data for two fleets – Queensland Finfish mixed Danish seine and otter trawl in catch-per-hour and catch-per-shot from daily records (1990–2016); NSW OTF prawn and fish trawl fleet (including Danish seine and otter trawl methods in Queensland analyses, and with Danish seine excluded in NSW analyses) in catch-per-day from monthly records (1998–2008) and catch-per-hour for daily event records (2010–2023).

Length compositions – random samples of two 5 kg boxes from every fishing trip by vessels in the Queensland Finfish trawl fleet (1991–2016); length frequencies were statistically re-weighted by region.

Proportions-at-age data – from sectioned otoliths collected from fish sampled for length compositions from the Queensland Finfish trawl fleet (1991–2016).

Key model structure & assumptions:

- **Population biomass modelling**

Assumptions: a single-sex model (length data are not available by sex), with an equal sex ratio throughout the lifespan; growth according to the von Bertalanffy growth curve and average annual recruitment following a Beverton–Holt stock–recruitment relationship; age and length data for the NSW fleet were the same as the Queensland fleet; the population was at an unfished biomass and equilibrium age-structure at the start of 1945; population abundance is proportional to standardised catch rates; the selectivity of fleets, rate of natural mortality and growth (mean size-at-age) are constant over time; and selectivity is logistic for all fleets. More detail on model assumptions are provided in Wortmann and Hall (2021) and Methot and Wetzel (2013).

- **Standardised catch rates**

Assumptions: annual catch rates are a relative index of abundance and not unduly influenced by factors that are not accounted for through standardisation.

Sources of uncertainty evaluated:

The 2021 Queensland stock assessment included six additional model runs to assess model sensitivity to the fixed input parameters, including the effects of varying the natural mortality (from $M=0.6$ to 0.55 , 0.07 or 0.85 per year) and reducing or increasing the trawl bycatch estimate (Wortmann and Hall, 2021).

Status Indicators - Limit & Target Reference Levels

The stock status of Stout Whiting was assessed against the following performance indicators and reference points outlined in the *NSW Trawl Whiting Harvest Strategy* (NSW DPI, 2022).

Biomass indicator or proxy	Spawning stock biomass depletion (as a percentage of the estimated unfished spawning stock biomass) estimated every 3–5 years from population biomass modelling; and standardised CPUE-based reference points in interim years.
Biomass Limit Reference Point	Blim of 20% of unfished spawning stock biomass. Current catch rates are assessed relative to long-term averages and levels in the last full assessment year.
Biomass Target Reference Point	Btarg of 48% of unfished spawning stock biomass.
Fishing mortality indicator or proxy	Current harvest levels relative to the estimated recommended biological catch (RBC) from population biomass modelling; and fishing mortality estimates from catch-curve analyses and total catches and discards relative to estimated RBCs in interim years.
Fishing mortality Limit Reference Point	Level of fishing mortality (Flim) above which overfishing is occurring and biomass is depleting toward Blim.
Fishing Mortality Target Reference Point	Level of fishing mortality (Ftarg) that would result in a spawning stock biomass of Btarg.

Stock Assessment Results

The most recent update of the Queensland quantitative stock assessment in 2021 included total catches, a standardised CPUE index and estimated discard rates from NSW along with more comprehensive data inputs from Queensland spanning the period 1945 to 2020. Unfortunately, size and age data were not available for Stout Whiting from NSW waters at the time of the stock

assessment, so information from the Queensland commercial fleet was applied to the NSW fleet. Size and age structures of Stout Whiting in Queensland are comparable to those in NSW, so this was considered acceptable; however, there are plans to ensure that NSW data are included in the next full assessment.

Since the last full assessment, Stout Whiting catch rates in the NSW OPT fleet have fluctuated, but remained near the long-term average and are currently just below the level they were in 2020 at the time of the last stock assessment. Meanwhile, the annual standardised catch rates for the Queensland Stout Whiting Fishery increased by over 50% between 2019 and 2021, to reach the highest CPUE levels on record and well above the long-term average (Sumpter, 2022). In particular, catch rates in the northern zones (between Fraser Island the Sunshine Coast) showed the greatest increase over the 2 years, while those in the southern zones were already well above the long-term averages and remained steady at those elevated levels (Sumpter, 2022).

No updated CPUE data were available for the Queensland part of the stock for the current assessment year and the quantitative stock assessment is now due for update. However, the main commercial vessel undertook a stratified trawl survey of the Queensland part of the stock in 2023 and preliminary results suggest that the spawning biomass estimates were close to those estimated from the 2021 quantitative stock assessment.

Stock Assessment Result Summary

Biomass status in relation to Limit	The most recent full assessment for Stout Whiting in 2021 (using data up to 2020), estimated that the current spawning stock biomass was at 42% of unfished biomass in 2020 and at the level for maximum sustainable yield (MSY) (Wortmann and Hall, 2021). Updated standardised catch rates from the NSW part of the stock (including data up to 2023 in this report), remain near the long-term average, despite a slight decrease over the last 2 years. Updated catch rates for the Queensland part of the stock had rapidly increased and were the highest on record in 2021 (Sumpter, 2022), although no new data were available for the last 2 years. On the basis of the above evidence, the biomass of the Stout Whiting biological stock is unlikely to be recruitment impaired.
Biomass status in relation to Target	The biomass modelling from 2021 predicted that the stock would recover from 42% to 48% of unfished biomass within 3 years if fished at an RBC of 2,018 t for the whole biological stock (Wortmann and Hall, 2021). Recent increases in Queensland catch rates suggest that the stock biomass may be recovering towards the target; however, the fleetwide analyses were heavily influenced by significantly increased catch rates in northern zones (Sumpter, 2022). Over the same period, NSW statewide daily CPUE indices and Queensland catch rates from southern zones remained relatively stable near the long-term averages. In the absence of updated catch rates from Queensland and the slight decrease in catch rates for the NSW part of the stock over the last 2 years, the assessment is uncertain about the biomass status in relation to the target reference point.
Fishing mortality in relation to Limit	Results from the 2021 Queensland population biomass modelling suggested that current levels of harvest are below that needed to maintain the biomass at the level for MSY (Wortmann and Hall, 2021). On the basis of the above evidence, the current level of fishing mortality is considered unlikely to cause the biomass to become recruitment impaired.
Fishing mortality in relation to Target	Recent and current harvest levels have been below that estimated to rebuild the stock to the target reference point of 48% of unfished biomass.
Current SAFS stock status	Stout Whiting was assessed as a sustainable stock under the SAFS framework in 2023 (Jesson-Kerr and Hall, 2024).

Fishery interactions

The NSW Ocean Trawl Fishery gears interact with other commercial and non-commercial by-catch marine species, a range of endangered, threatened and/or protected (ETP) species and marine habitats. The Ocean Trawl Fishery share management plan mandates that otter trawl nets must be fitted with at least one bycatch reduction device of an approved design to reduce incidental catches of small prawns and juvenile fish. Mesh size and other gear restrictions are regulated to increase the

target species selectivity of otter trawl and Danish seine nets and cod ends. Research results to date suggest that these measures significantly decrease the levels of by-catch associated with these fishing gears (Broadhurst and Kennelly, 1996; Broadhurst *et al.*, 1996, 1997, 1999, 2005, 2006).

Interactions with animals protected under the Environment Protection and Biodiversity Conservation Act 1999 include marine mammals (dolphins, seals and sea lions), seabirds, some shark species, and seahorses and pipefish (sygnathids). The ETP species that interact with the Ocean Trawl Fishery were subjected to a detailed risk assessment in the environmental impact statement (EIS) for the fishery (NSW DPI, 2004). All 11 ETP species identified in the EIS were considered to be at moderate/low or low risk. An updated threat and risk assessment for all components of the NSW marine estate was completed in 2017 (Fletcher and Fisk, 2017). The Ocean Trawl Fishery was considered a moderate threat to ETP species along the north coast and a low threat to ETP species along the south coast. Interactions with grey nurse sharks and sygnathids were identified as the main concerns.

Compulsory reporting in commercial logbooks of all interactions with ETP species was mandated for the Ocean Trawl Fishery in 2005 and these are reported annually to the Department of Environment and Energy (NSW DPI, 2017). Data on incidental interactions with by-catch, ETP species and associated mortalities were also collected during the most recent fish trawl (2014–2016) and prawn trawl (2017–2019) observer surveys.

The majority of available trawl ground in NSW waters is likely to be dominated by sandy habitat with little reef structure, and fishers typically try to avoid high topography, hard, structured habitats to prevent net damage. Large areas within NSW marine parks are closed to trawling and provide areas for habitat protection. The use of bobbins on ground ropes of fish trawl nets is prohibited north of Seal Rocks and the maximum size of bobbins is limited south of Seal Rocks to minimise damage to reef habitats. More information on the potential effects of trawl gears on the soft seabed biota is warranted, as impacts to these less protected habitats are likely to be more significant.

Stakeholder engagement

Results of the current stock assessment were presented to industry members via video conference on 12 December 2024. Feedback suggested that: prawn catch rates and prices had been strong over recent years, leading to decreased targeting of whiting by the prawn trawl sector and some increased discarding since quota introduction, due to migration of quota southwards to the fish trawl sector; that data adjustments that allocate 100% of combined trawl whiting catches in OZ1 to Stout Whiting may be flawed because schools of spawning Eastern School Whiting are encountered in northern NSW at certain times of the year; and any fishing in deeper waters is likely to be taking Eastern School Whiting. This feedback will be incorporated into future stock assessments, but should also be considered while interpreting current results.

Qualifying Comments

The following are important considerations for interpreting the stock assessment results for determining a basket TACC for Eastern School Whiting and Stout Whiting in NSW waters:

- The two most recent updates of the joint Tier 1 stock assessment for Eastern School Whiting in 2020 and 2024 and the Queensland quantitative stock assessment in 2021 for Stout Whiting included increased amounts of NSW data.
- Outcomes from these assessments are considered relevant for determining stock statuses and informing TACC determination in NSW waters. Including greater quantities of age and length data from NSW waters in future assessments will strengthen their relevance over time.
- The uncertainty in the species composition of NSW catch histories should be considered when interpreting the results of stock assessments.

- Ongoing inaccurate reporting of multi-day trips as single fishing events further compromise the accuracy of current NSW catch-rate data.
- Improving the accuracy of whiting species composition, location of capture and effort reporting will help improve the quality of future stock assessments.
- Temporal and spatial variation in discard rates of both species in NSW waters differ from those in other jurisdictions and have likely changed again since quota introduction and are another source of uncertainty in the NSW harvest data that are not adequately accounted for in assessments.
- With a basket TACC and inaccurate reporting of separate catches for each species, there is an increased risk of undetected depletion in one of the stocks, especially if the distribution of fishing effort or species distributions change.
- Data assessed in this report date only as far back as 1941. Trawl fishing in NSW waters is known to have occurred since at least 1920. Before export markets for trawl whiting developed in the 1970, they were considered trash fish and likely had high discard mortality despite the small landings reported. No attempt was made to account for any extra historical discard mortality (above that proportional to catch sizes) in the modelling and stocks were assumed to be at their unfished biomass at the start of the catch time series.

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