

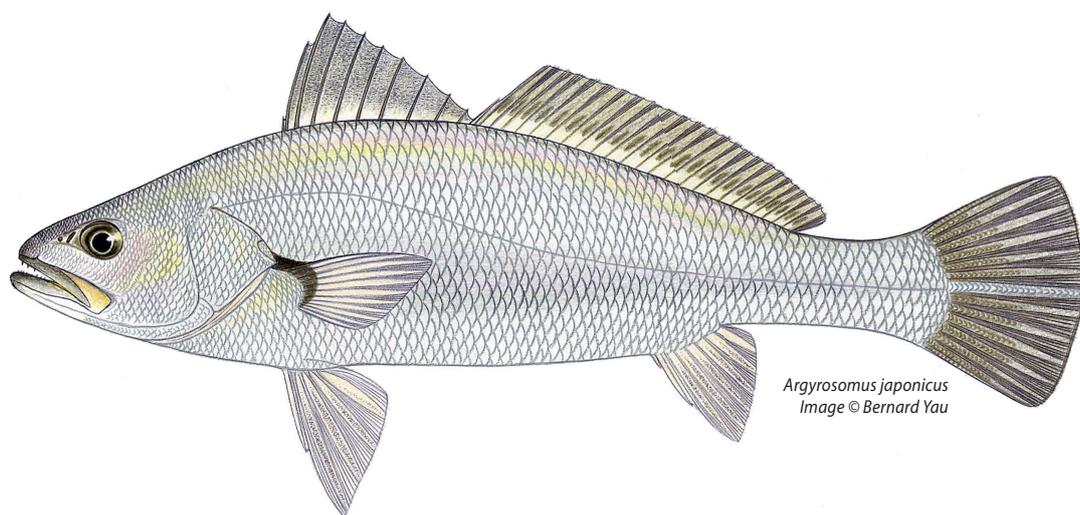
Mulloway

(*Argyrosomus japonicus*)

EXPLOITATION STATUS OVERFISHED

Age composition of samples from commercial catches was indicative of an overfished stock, and the spawning potential ratio was estimated to be below the recommended threshold.

SCIENTIFIC NAME	STANDARD NAME	COMMENT
<i>Argyrosomus japonicus</i>	mulloway	Also known as 'jewfish'. Previously called <i>Argyrosomus hololepidotus</i> .



Background

Mulloway (*Argyrosomus japonicus*) is a nearshore coastal (< 100 m depth) species that also occurs in estuaries. In Australia, mulloway are distributed along the eastern, southern and western seabords from the Burnett River in Queensland to North West Cape in WA. Mulloway also occur in the north-western Pacific and through the Indian Ocean as far west as Africa.

There is limited information available on the stock structure of mulloway. Genetic-based studies have been done only in Australia and the conclusions from these studies are limited as they were based on samples comprising very few individual fish from only a few locations. Some electrophoresis-based evidence showed that a separate sub-population of mulloway occurs in WA compared to the southern (SA and Victoria) and eastern (NSW and Queensland) seabords, and that there may be additional population sub-structuring between fish in SA and NSW. However, preliminary data based on mitochondrial DNA (mtDNA) analysis did

not appear to support this. No other genetic studies have been reported for the species and therefore the degree of genetic division among populations from different seabords and oceans is not well known.

Small (<30 cm total length (TL)) juveniles are found in estuaries and nearshore coastal environments. Sub-adult and adult mulloway occur in estuarine and ocean waters. In estuaries, larger juveniles and sub-adult fish (>40 cm TL) appear to be more abundant in the lower reaches where salinities are nearer to seawater. Large individuals are caught around the mouths of estuaries, in surf zones and around rocky reefs and ridges in offshore waters.

Crustaceans accounted for between 14% and 81% of the reported diet of juveniles. The importance of crustaceans in the diet of mulloway appears to decrease with increasing fish size, with fish and squid being of greater relative importance in the diet of larger mulloway.

Mulloway grow to a large size and are relatively long lived. In South African waters the maximum length was recorded at 181 cm TL, weight of 75 kg and age of 42 years. In a recent NSW study the largest mulloway sampled was 165 cm TL (approximately 35 kg) and fish were aged to a maximum of 24 years. In NSW, size at 50% maturity for males was estimated at 51 cm (2+ years of age) and for females at 68 cm (3+ years of age). Mulloway are known to spawn in summer in Australian waters.

In NSW, significant catches of mulloway are taken by the Estuary General, Ocean Hauling and Ocean Trap and Line fisheries. Mulloway is also a very significant species in the recreational fishery, and catches by this sector are much larger than commercial landings. Better data on the size/age composition of recreational catches would improve the assessment.

Additional Notes

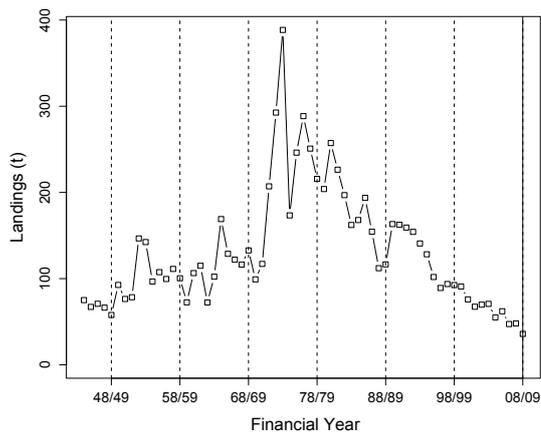
- Commercial landings remain low but catch rates have been more or less stable for the past decade.
- No accurate information on current recreational catches is available. Determining the size composition of recreational catches is considered a high priority.
- Age composition of commercial landings in the early 2000's was indicative of a heavily fished stock (98% < 5 years old).
- Fishing mortality is estimated to be much greater than natural mortality.
- The minimum legal length (45 cm TL) is much smaller than the size at sexual maturity (~70 cm TL) for females. Review of the MLL should occur as part of any recovery program.
- Spawning potential ratio for mulloway (between 5% and 20%) is well below the recommended threshold of 25%.
- There has been confusion over the correct scientific name for mulloway, which has been referred to as *A. hololepidotus*. Griffiths and Heemstra (1995) conclude that Australian mulloway are correctly known as *A. japonicus*.
- There is a minimum legal length of 45 cm TL and a recreational bag limit of 5 mulloway with only 2 fish greater than 70 cm TL.

Catch

Recreational Catch of Mulloway

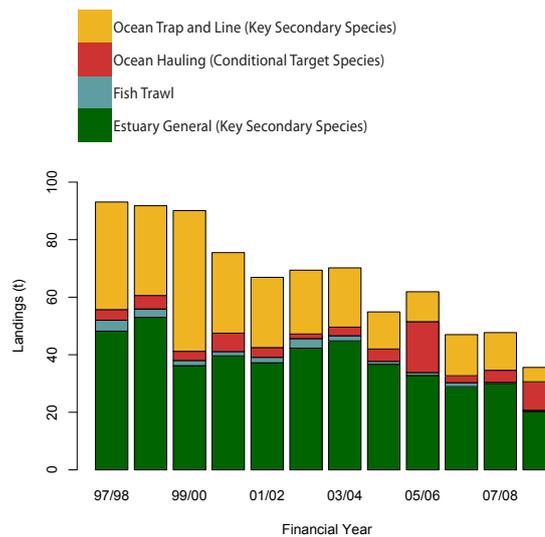
The annual recreational harvest of mulloway in NSW is likely to lie between 100 and 500 t. This estimate is based upon the results of the offsite National Recreational and Indigenous Fishing Survey (Henry and Lyle, 2003) and onsite surveys undertaken by I & I NSW.

Historical Landings of Mulloway



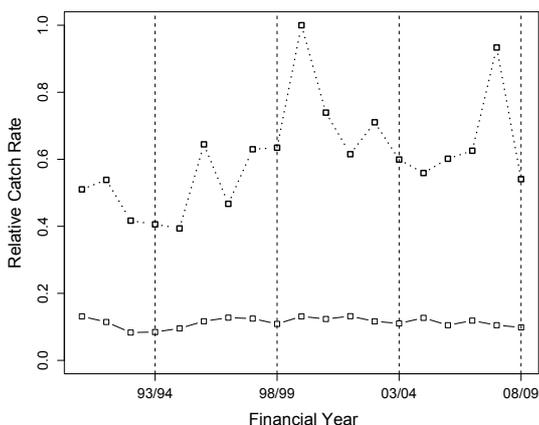
Commercial landings (including available historical records) of mulloway for NSW from 1944/45 to 2008/09 for all fishing methods.

Landings by Commercial Fishery of Mulloway



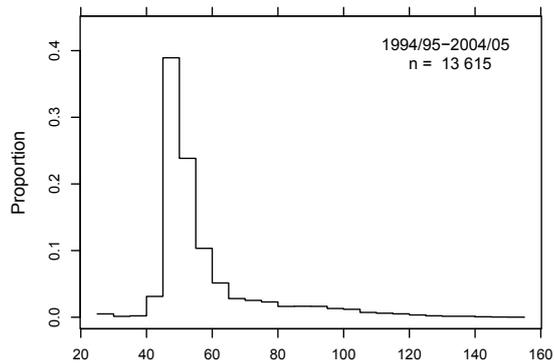
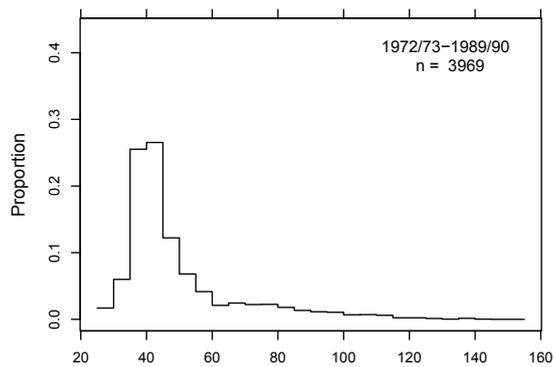
Reported landings of mulloway by NSW commercial fisheries from 1997/98. Fisheries which contribute less than 2.5% of the landings are excluded for clarity and privacy.

Catch Per Unit Effort Information of Mulloway Harvested by Handline in NSW

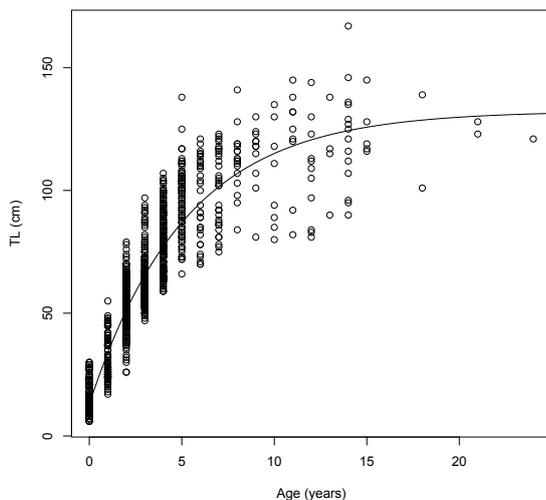


Catch rates of mulloway harvested using handlines for NSW. Two indicators are provided: (1) median catch rate (lower solid line); and (2) 90th percentile of the catch rate (upper dashed line). Note that catch rates are not a robust indicator of abundance in many cases. Caution should be applied when interpreting these results.

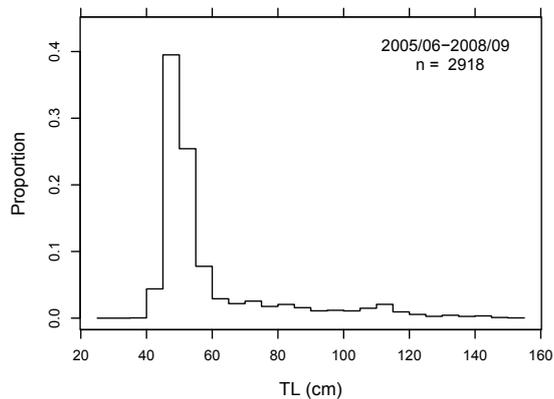
Length Frequency of Mulloway



Growth Curve of Mulloway



Age-length data with fitted growth curve for mulloway (Silberschneider and Gray, 2009). Lengths are presented as total length (TL).



The length distribution of commercial landings of mulloway reflects changes in the minimum legal length (MLL) through time. There was no MLL prior to 1978/79 when a MLL of 38 cm total length (TL) was imposed, and this was increased to 45 cm TL in 1992/93. Since the mid 1990s the majority of mulloway in commercial landings have been between 45 and 60 cm TL.

Further Reading

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Please visit the CSIRO website, <http://www.marine.csiro.au/caab/> and search for the species code (CAAB) 37 354001, common name or scientific name to find further information.