

# *The recreational fishery for Murray cod in the Murray-Darling Basin – Results from the National Recreational and Indigenous Fish Survey*

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## *Abstract*

The National Recreational and Indigenous Fishing Survey (NRIFS) (Henry & Lyle, 2003). was designed with the principal objective of collecting nationally consistent and comparable fishery statistics for the non-commercial components of Australian fisheries.

A key feature of the NRIFS is the ability to provide estimates of recreational catch and effort across all jurisdictions within Australia. For each State/Territory, angling effort and catch were estimated for all fishers, regardless of their 'home' State/Territory. This paper provides the first comprehensive estimate of the recreational catch of Murray cod within the Murray-Darling Basin (MDB).

The NRIFS projected that over 566,000 recreational fishers fished in the MDB during the survey period. It was estimated that around 106,000 Murray cod were caught and retained in the MDB and 368,000 were caught and released (a release rate of over 77%).

The weight of the retained Murray cod catch in the MDB was calculated to be around 216 tonnes on the basis of NRIFS data for estimated number of fish caught and revised values of mean weight.

## *Introduction*

The National Policy for Recreational Fishing in Australia (1994) highlighted the need for a national approach to recreational fisheries research. Following a feasibility study and pilot project the National Recreational and Indigenous Fishing Survey was implemented in 2000.

The broad objectives of the survey were to quantify the non-commercial components of Australian fisheries on a National, State and Regional level. Separate components to examine indigenous fishing in Northern Australia and the fishing activity of overseas visitors were included in the survey.

The survey of recreational fishing was conducted over a 12-month period from March 2000 to April 2001 and involved several phases. The primary data sources for the NRIFS were a general population screening survey, a diary survey and an attitudinal survey. The major functions of the screening survey were to estimate the level of participation in recreational fishing, provide a socio-demographic profile of recreational fishers and recruit fishers to participate in the diary survey. Fishing and fishing-related expenditure were then monitored over a 12-month period using the diary survey. Nationally over 44,000 households were surveyed by telephone in the screening survey. Fishers from 8,500 households (17,100 fishers) completed the diary phase of the survey. Full details of the NRIFS methodology are provided in Henry and Lyle (2003).

The survey was designed to provide robust estimates of participation, fishing effort and catch at National, State and Regional levels. At the Regional level, zone boundaries were defined by management needs. For example, the Murray-Darling Basin was defined as a priority management region and the reporting boundaries used in the survey encompassed all tributaries that drained into the MDB. Each State fisheries agency was responsible for managing participating diarists under their jurisdiction.

For example, if a 'home' diarist fished in another State, all aspects of that fishing trip were recorded by the 'home' agency. At the completion of the survey all data were amalgamated to enable analysis across State and Regional residential boundaries.

The MDB ranges across Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia. The NRIFS data can provide the basis for robust estimates of recreational catch and effort across this entire region. For the first time, it is possible to provide estimates for the Murray cod fishery across all of these jurisdictions. In this paper we focus on aspects of the fishery for Murray cod in the MDB using data from the NRIFS.



*Table 1. Estimated numbers of anglers who fished the MDB by state of residence and estimated number of fishers who targeted Murray cod.*

State of Residence	Estimated No. Fishers	% Fishers	Murray Cod Targeters (No. Fishers)	% Cod Targeters
VIC	237,276	41.90%	67,751	29.0%
NSW	181,300	32.00%	43,030	24.0%
SA	77,313	13.70%	11,266	15.0%
QLD	47,236	8.30%	1,963	4.0%
ACT	19,499	3.40%	1,219	6.0%
NT	1,788	0.30%	3	100.0%
TAS	1,047	0.20%	332	
WA	715	0.10%	455	64.0%
Total	566,174	100.00%	126,019	22.0%

## *Number of Recreational Fishers in the MDB*

An estimated 566,000 recreational fishers fished in the Murray-Darling Basin during the survey period. About 237,000 (42%) of these fishers were residents of Victoria followed by NSW (32%) South Australia (14%) and Queensland (8%) (Table 1). A small number of fishers (about 4% of all fishers) from the ACT, Northern Territory, Tasmania and Western Australia also fished in the MDB during the survey period.

Murray cod were targeted by 22% of anglers as either a primary or secondary target species in the MDB during at least one fishing trip in the survey period (Table 1).

## *Fishing Effort in the MDB*

The primary units of fishing effort reported in the NRIFS were fishing 'events'. An event was defined as a single fishing episode. Separate events were recorded where there was a change in region, water body type, target species or fishing method. Table 2 lists the estimated number of fishing events by State of occurrence i.e. where fishing events took place. There were

an estimated 2.7 million fishing events in the MDB during the survey period. This includes fishing events for all species (finfish and invertebrates). About 53% of the fishing events occurred in NSW followed by Victoria (28% of events), Queensland (7%), South Australia (12%) and the ACT (1%) (Table 2).

*Table 2. The estimated number of fishing events in the MDB by state – all species targeted.*

State of Effort (where fishing took place)	Estimated No. of Events	%
NSW	1,426,298	52.90%
VIC	750,545	27.80%
QLD	180,401	6.70%
SA	311,109	11.50%
ACT	26,622	1.00%
Total	2,694,976	100.00%

## Target Species

Finfish were targeted in over 2.4 million fishing events in the MDB. Golden perch were the main finfish target species in the MDB, being targeted in about 29% of the fishing events. Salmonids were targeted in about 19% of the events and Murray cod were targeted in 16% of finfish events in the MDB (**Table 3**).

**Table 3. Species listed as principal or secondary target species per event in the MDB.**

Target Group*	No. Finfish Target Events	% Finfish events
Golden perch	697,564	28.80%
Trout/salmon	462,223	19.10%
Cod – Murray	388,643	16.10%
Demersal – unspecified	218,792	9.00%
Redfin perch	212,857	8.80%
All other	201,193	8.30%
Surface-pelagic – Unspecified	106,895	4.40%
European carp	59,225	2.40%
Australian bass	27,863	1.20%
Catfish	17,387	0.70%
Cod (various)	11,740	0.50%
Other	11,185	0.50%
Small baitfish	3,220	0.10%
Grunters/trumpeters	493	0.00%
Total	2,419,281	100.00%

\*For full description of species common names and species group names used in the NRIFS Final Report see Henry and Lyle (2003).

## MDB Finfish Catch

The NRIFS estimated that over 4.6 million finfish were caught and retained during the survey period in the MDB (**Table 4**), an estimated 3.4 million finfish were caught and released, for a total catch of over 8 million finfish in the MDB.

## Murray Cod Catch in the MDB

### Retained Catch

An estimated 106,000 Murray cod were caught and retained in the MDB during the survey period. This represents around 2% of the retained finfish catch by number in the MDB (**Table 4**).

The weight of Murray cod caught was calculated for each jurisdiction as the product of the best available estimate of mean weight and the estimated number of fish (**Table 5**). The mean weight of retained Murray cod in NSW and Queensland was assumed to be 1kg in Henry and Lyle (2003), however the legal minimum length for Murray cod in NSW is 50cm, which approximates to 2kg per fish. NSW DPI tournament data from NSW (Park 2005) suggests that the legal size of 50cm is the modal size among the recreational catch. The legal minimum length for Murray cod caught in Queensland is 60cm, which is equivalent to a weight of approximately 4kg. For determining the total weight of the retained catch, we have thus assumed a mean weight of 2kg for retained Murray cod in NSW and SA but 4kg for Queensland, which gives an estimated Murray cod retained catch of approximately 216 tonnes for the MDB.

### Released Catch

Over 77% of Murray cod caught in the MDB were released. This release rate was the second highest for finfish species among the MDB catch (**Table 4**).

### Total Catch (retained plus released fish)

The total catch of Murray cod in the MDB by number was estimated to be 475,000 fish, which is about 6% of the entire finfish catch for the MDB. A small proportion of the National Murray cod catch was taken outside of the MDB boundaries (around 1.5% of the National catch). These fish were mainly stocked fish taken mostly from private and public impoundments outside the MDB drainage area (**Table 5**). Over 91% of the total MDB catch was taken in NSW, followed by Victoria (8%), Queensland, South Australia and the ACT (<1% of total catch each).



Table 4. Estimated numbers of finfish caught and retained, caught and released and the total catch for the MDB.

Common name*	Number Kept	Number Released	Total Catch	% Finfish Catch
Carp	1,913,788	244,636	2,158,424	27.65%
Golden perch	902,625	723,566	1,626,191	20.83%
Redfin perch	834,359	729,627	1,563,986	20.04%
Silver perch	164,334	381,406	545,741	6.99%
Murray cod	105,984	368,651	474,635	6.08%
Trout – rainbow	125,742	268,831	394,573	5.06%
Trout – brown	129,133	246,452	375,585	4.81%
Small baitfish	210,112	603	210,715	2.70%
Catfish – freshwater	69,230	88,734	157,964	2.02%
Macquarie perch	2,082	110,338	112,421	1.44%
Catfish – other	17,423	36,951	54,375	0.70%
Trout – unspecified	23,413	25,531	48,943	0.63%
Cod – unspecified	9,238	21,750	30,988	0.40%
Blackfish – river	7,359	3,111	10,470	0.13%
Australian bass	4,647	5,541	10,188	0.13%
Spangled perch	2,477	6,884	9,361	0.12%
Trout cod	0	8,088	8,088	0.10%
Other finfish	3,630	1,536	5,166	0.07%
Eel – unspecified	730	1,740	2,470	0.03%
Mullet – unspecified	315	1,577	1,892	0.02%
Bony bream	1,674	0	1,674	0.02%
Tench	668	516	1,184	0.02%
Roach	0	241	241	0.00%
Total No.	4,528,964	3,276,313	7,805,277	100.00%

\* For full description of species common names and species group names used in the NRIFS Final Report see Henry and Lyle (2003).

Table 5. Estimated numbers of Murray cod caught and retained, caught and released, the total catch and estimates of total retained catch weight for the MDB by state of jurisdiction.

State	No. Kept	No. Released	Total Catch	% Released	% MDB Total Catch	Assumed Mean Wt.	Est. retained Catch (kg)
NSW	91,705	340,898	432,603	78.80%	91.14%	2.0	183,410
VIC	11,843	24,321	36,164	67.25%	7.62%	2.3	27,239
QLD	158	2,378	2,536	93.76%	0.53%	4.0	633
SA	2,278	448	2,725	16.43%	0.57%	2.0	4,555
ACT	0	607	607	100.00%	0.13%	—	—
Total – MDB	105,984	368,651	474,635	77.67%	100.00%		215,838
Outside MDB	2,368	4,823	7,191	67.1%			
National Total (all States)	108,352	373,474	481,826	77.5%			

## Discussion

The NRIFS data has demonstrated Murray cod to be a highly prized species among anglers who fish the Murray-Darling Basin. Over 22% of all recreational fishers targeted Murray cod at some time during their fishing trips during the survey period.

The high release rate (77% of all fish captured were returned to the water) may suggest a high compliance rate with the legal minimum size for Murray cod and/or highlight the sportfish status of Murray cod. In recent times there has been a growing trend among anglers to practise catch and release fishing, especially for species that have a high conservation status such as Murray cod.

Data on recreational fishing have been traditionally collected on a fragmented basis by individual States, but the results from the NRIFS show the importance of collecting data which can provide information that is not dependent on the State of residence of fishers, and is consistent over the whole area of interest. NRIFS data show that most of fishers who fish the MDB reside in Victoria but the majority of fishing events in the MDB occur in NSW. The disparity between the State of residence of most anglers and the State in which most fishing activity occurs being largely due to the Murray River forming the border between NSW and Victoria but being classified as NSW waters.

The NRIFS has proven to be a valuable tool in assessing recreational fisheries across large regions of Australia. For the first time it has made it possible to provide an estimate of the recreational catch of Murray cod for the entire Murray-Darling Basin. Estimates based on a finer scale, such as estimates for the Murray or Darling Rivers also can be provided from the data collected in the NRIFS. The estimates of catch weight are based on conservative assumptions of mean weight of retained fish, and the collection of data to provide better estimates for this aspect of the estimates would be an important priority for future research and monitoring of the recreational fishery.

## References

- Henry, G.W. and J.M. Lyle (Eds.) 2003. The National Recreational and Indigenous Fishing Survey. NSW Fisheries Final Report Series No. 48 [FRDC Project No. 99/158], p188.
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