

A role for recreational fisherman in the management of Murray cod: the Angler Catch database.

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Abstract

The NSW DPI Angler Catch Research Programme has been actively collecting catch, effort and size data at freshwater fishing tournaments for four years for the purposes of assessing the quality of recreational fisheries, assessment of fish stocks and determining the success of management strategies.

The programme collects data directly from tournament anglers by means of 'Fishing Report Forms'. This allows recreational fishers a direct involvement in the data collection process. In 2004 the tournaments monitored included four along the Murray River plus two in the Mulwala impoundment. There was also one each along the Gwydir, the Darling at Bourke, the Murrumbidgee and the Lachlan rivers.

The catch, effort and size data collected from these tournaments can be an indicator of the quality of fishing in these areas as well as be useful in stock assessment when compared through time. Some of the tournaments have provided historical data and in particular there are 10 years of tournament information for Lake Mulwala. This impoundment is examined here as a case study.

In addition to discussing the utility of the data some of the collection problems and some limitations are also outlined.

Introduction

The Angler Catch Research Programme (ACRP) was established to collect catch, effort and fish size information at fishing tournaments to determine the quality of recreational fishing, as well as for use in stock assessment and to assess the success of management strategies.

Data are collected directly from recreational fishermen as a fishery-dependent survey and to allow their direct contribution in the process of management of their fishery.

Originally the programme was directed at freshwater fisheries, though now it has expanded to saltwater and all its recreational fisheries.

Coverage in the Murray Darling Basin (MDB)

Since the programme was established in June 2000, its purpose was to expand collection of data from Basscatch events in selected eastern drainage rivers to the western drainage system of the Murray-Darling Basin (MDB) including some impoundments.

So far the programme has collected data from 12 major fishing events in the MDB, at least one in each of the major river systems. There have been two fishing tournaments on the Gwydir River, one along the Darling River at Bourke, one in the Lachlan, one in the Murrumbidgee, two in Lake Mulwala and five along the Murray and its tributaries (**Figure 1**).

Most of these tournaments have been monitored since the beginning of ACRP and hence since their 2001 events. However ACRP also holds historic data on tournaments in Lake Mulwala since 1993.

The tournaments are all particularly large, with around 700 to 1500 anglers fishing over a weekend. This gives an opportunity to sample highly concentrated, targeted angling effort on known lengths of rivers. It should be noted that the events place an emphasis on the release of native fish species, especially Murray cod.

Data Collection

Data are collected via 'Fishing Report Forms' that are issued to each angler. These forms record the effort as hours per day, catch by species and the total lengths of all fish caught. The anglers voluntarily submit the completed forms.

At most of the tournaments in the MDB a prize is awarded via a raffle drawn from the returned forms as an added incentive for their return.

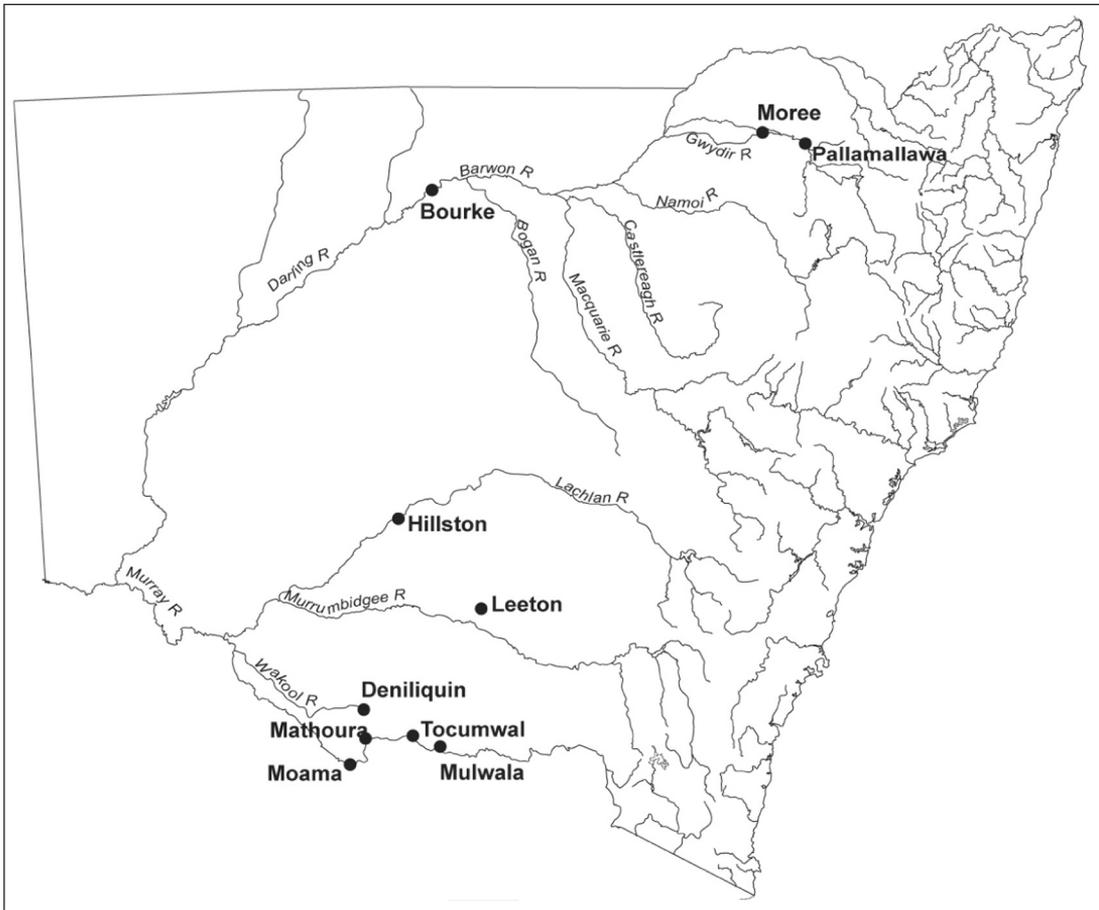


Figure 1. Map showing NSW towns hosting fishing tournaments sampled by ACRP in the Murray-Darling Basin.

The amount of data received by ACRP from fishing tournaments varies with the number of anglers competing and the response by anglers in providing the voluntary data; as many as 796 Fishing Report Form returns have been received from an event (the Tocumwal Classic, 2002). The coverage rates of anglers varies greatly and is dependent on many factors. The two tournaments in Lake Mulwala return 100% of the angler's Fishing Report Forms while some tournaments in the MDB return about 50% of the forms.

The species composition of the catches is easily drawn from the data. Trends in the proportion of the recreational catch of native species or introduced pest species are an indicator of the changes in the 'health' of the waterway's ecosystem. There is considerable difference in the proportion of the catch of important species such as Murray cod and carp among the different tournaments in the major waterways of the MDB.

Tournaments provide intensive fishing effort along a known length of waterway and this effort is repeated annually. This provides important catch rate information that can be compared across a time series of an annual tournament. In addition, the five tournaments monitored by ACRP along the Murray River occur within a two-month period each year and in sequence from east to west. This sequence provides an intensive survey of the recreational fish of the Murray River between Mulwala and Echuca, annually.

Anglers are provided with vinyl measuring tapes and asked to measure all fish caught including those released. This size-structure information is important in stock assessment, particularly as an indicator of recruitment of endemic species such as Murray cod.

Case Study: Lake Mulwala

Lake Mulwala is used as an example as there are two annual fishing events with a long and consistent time series in the lake. These events are the 'Mulwala Classic' and the 'Freshwater Fishing Masters'. ACRP has collected data from the 'Classic' since 1993 and from the 'Masters' since 1995. The Fishing Report Form returns from the 'Classic' are around 250 per year and from the 'Masters' around 150 per year, both tournaments having 100% returns of forms.

In both these tournaments the proportion of Murray cod reported in the catch is very high, around 90%. This proportion is much higher than elsewhere along the Murray, though the fishing in the lake is targeted at Murray cod.

The catch per unit effort of Murray cod in these tournaments averages between 1.5 – 2.5 cod per

angler day (**Figure 2**). In the ten years of data displayed there appears to be two five-year cycles. Average CPUE peaked at 2 cod per angler day in 1994 after which it decreased to about 1.6 cod per angler day in 1998. The catch rate increased in 1999 to about 2.5 per angler day after which it declined steadily to 1.7 in 2003.

Murray cod caught at the tournaments in Lake Mulwala averaged in most years around 460-500 mm total length (**Figure 3**). There was some variation in average size though no obvious overall trend. There is some correlation in the later years, with those years with smaller average sized fish corresponding somewhat to the years of higher catch rates. Size frequency plots of the reported catches by anglers do suggest there are pulses of recruitment in Lake Mulwala (**Figure 4**). This is important as the lake is not stocked and indicates a self-sustaining population.

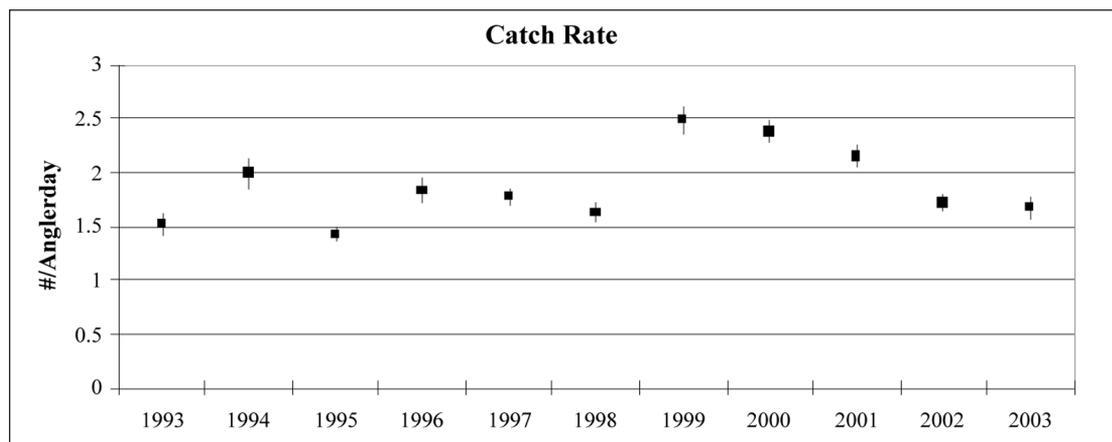


Figure 2. The mean catch rate as number of Murray cod reported per angler day for tournaments in Lake Mulwala from ACRP data. Standard errors are also shown.

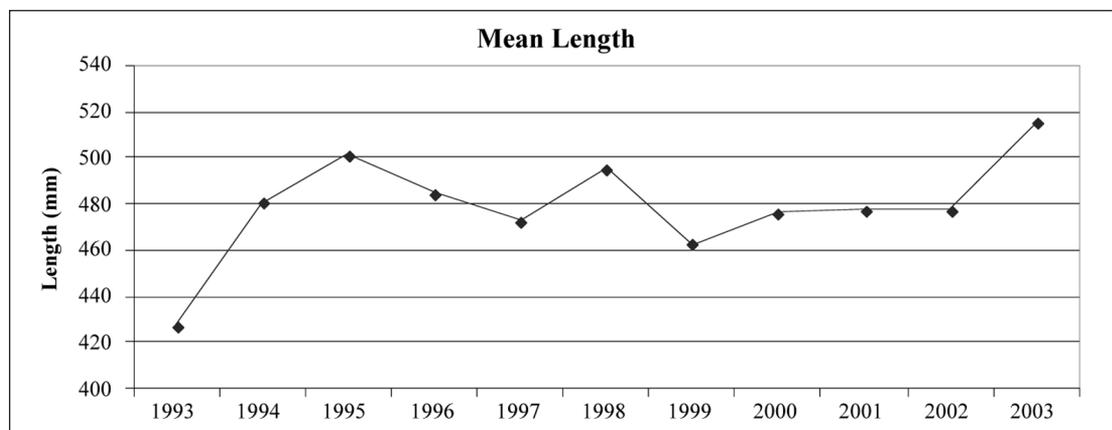


Figure 3. Trends in the mean length of Murray cod reported caught at the Lake Mulwala tournaments 1993-2003

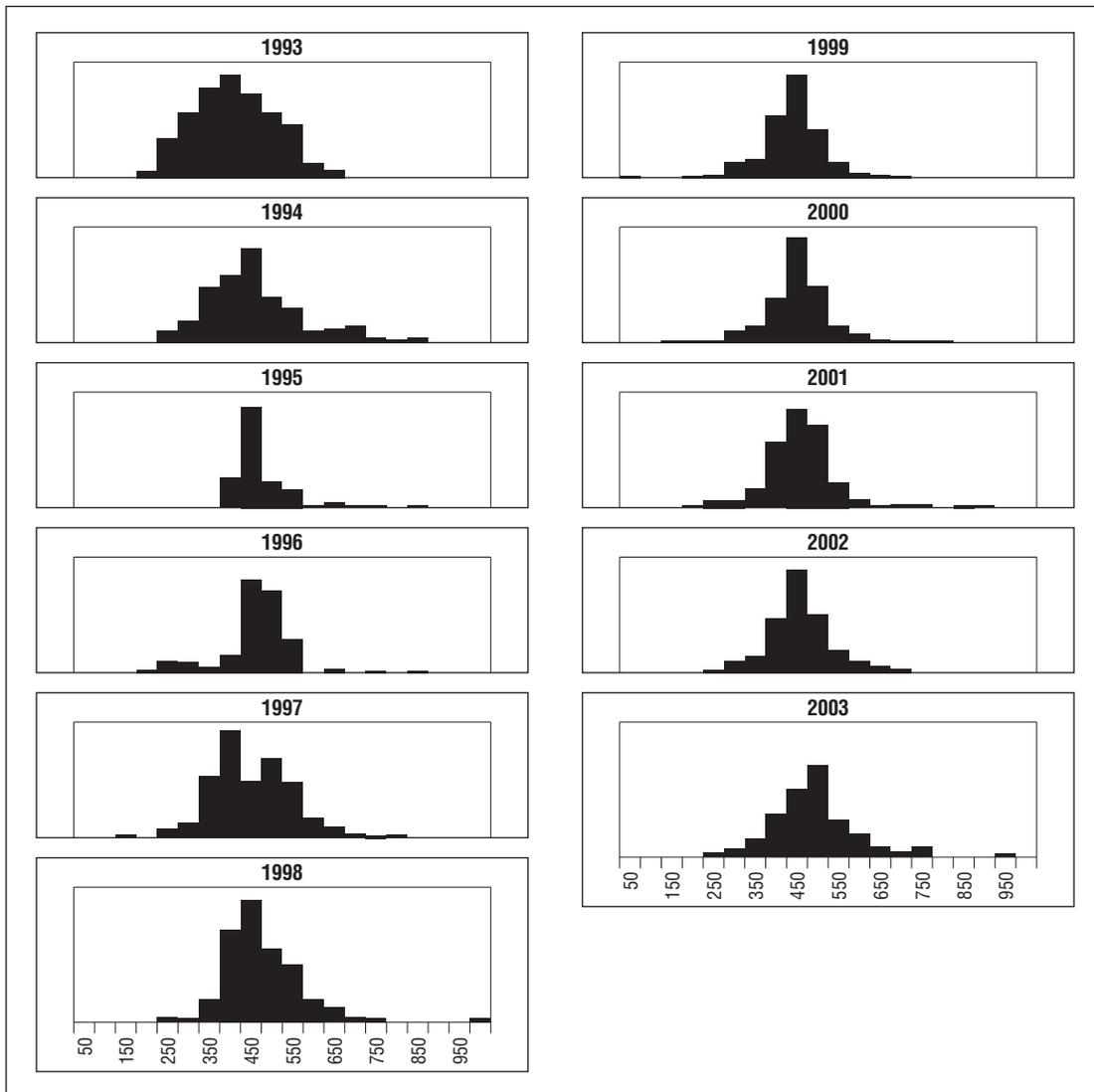


Figure 4. Length frequency histograms of Murray cod reported by tournament anglers in Lake Mulwala for the years 1993-2003. Lengths are in millimetres.

Benefits of Tournament Monitoring

Tournament monitoring collects data directly from anglers in a competitive (targeted effort) situation. Because of the nature and number of freshwater tournaments in NSW, ACRP is able to cover broad-scale (state-wide) as well as intensive (e.g. along the Murray River) fishing activity on recreationally important species. Tournaments also provide highly targeted fishing effort in a defined section of waterway.

The methodology is useful for collecting species composition, catch rate and size information on

recreationally important species especially in Western Drainage areas where other sources of this information are limited.

The tournaments promote catch and release fishing; this is to reduce the impact on susceptible endemic species such as Murray cod. A hooking mortality study would help verify this.

The collection of data is relatively inexpensive since anglers voluntarily provide data. NSW Fishcare Volunteers are also utilised to help promote the programme and collect data.

Collecting fishing data from tournament anglers allows direct involvement by the angling community. By directly contributing

information that is used to improve the management of their fishery, anglers develop a sense of responsibility for fisheries management. Anglers are further motivated if given feedback. Provision of summaries of the data collected by ACRP to the tournament organisers improves the sense of involvement by the angling community and resultantly improves the data being received.

Weaknesses of Tournament Monitoring

A problem in voluntary-reporting systems is to motivate reporting. In the larger MDB tournaments the number of anglers submitting Fishing Report Forms compared to the number of anglers competing is low, which may bias the results as the data collected may not be representative of all anglers. Increasing the reporting rates in tournaments is a focus of ACRP.

As the anglers record all information, the data, including the taxonomic accuracy, are unverified. While most keen anglers are skilled in identifying their target fish, the level of accuracy of species identification has not been tested and would be variable among anglers. The variability of the ratios of trout cod and Murray cod caught among tournaments and years may be an effect of this. Tournament result data are being collected to help with verification.

Each tournament is different, i.e. the tournament structures are non-standardised. The differences in structure, ethos, rules and target species among tournaments result in different tactics and methods employed by the anglers. Efforts to encourage standardisation are being made. ACRP was originally set up to collect data from 'Basscatch' research tournaments. These were standardised tournaments located on a few eastern drainage rivers dedicated to collecting scientifically useful data on bass. There are no such dedicated standardised tournaments in the Western Drainage rivers as yet, though clearly there is scope for such.

In addition to angler-derived data there is also need for recreational fishery (angler)-independent assessment surveys. There is a need for independent sampling to 'ground truth' the results, particularly with the potential for bias in voluntarily supplied data.

Conclusion

The Angler Catch Research Program was established to collect information on NSW recreational fisheries. It is a recreational fishery-dependent survey that collects information directly from anglers. As well as being a mechanism for monitoring recreational fishing in NSW, it also allows anglers a direct role in the management of their fishery.

There are problems associated with collection of data from tournament anglers. These include a lack of standardisation of tournaments, low reporting rates and the non-verification of angler reporting. These problems are being addressed by ACRP through briefings at tournaments, liaison with the anglers and collection of the tournaments' own records. Fishery-independent surveys will also be important for verification of angler data.

The tournaments monitored in the MDB are geographically broad covering all the major Western Drainage waterways in NSW. However sampling of tournaments also covers high levels of targeted effort for some important endemic species such as Murray cod in finite sections of the Murray River. Thus the data collected are useful in state-wide assessments of riverine health, especially with regard to the distributions and relative numbers of susceptible endemic species like Murray cod compared to introduced pest species (e.g. carp). The data are also useful in examining trends in population densities and demography of Murray cod. This is due to the nature of tournaments providing intensive fishing effort targeting prized species such as Murray cod over a regular period annually, in consistent and defined sections of a waterway such as the Murray River. The long time series of data collected at tournaments held in Lake Mulwala is useful in assessing the status of its Murray cod population. The value of the Angler Catch database is further enhanced when considering the sequence of other tournaments along the Murray River and hence the scale of angler-generated data for Murray cod

Thus the Angler Catch Research Programme with its angler-generated data is a valuable tool for managing Murray cod in the MDB. Importantly it also directly involves anglers in the management of important fisheries resources.