

# A review of recreational fishing surveys in Australia

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### Introduction

The presentations in this opening Session have provided an international perspective on current and past recreational fishing research. To conclude the first Session, I will provide a perspective of past Australian research, by describing the history and geography of past studies, summarising the type of data that have been collected and commenting on the general utility of these data.

Approximately 110 reports have been located on recreational fishing and it is these that provide the basis of this presentation. The reports have been located through computer and reference searches, bibliographic papers and assistance from workers in all States and the Northern Territory. The data presented for marine and general population surveys are considered to be quantitative, while data for studies concentrating exclusively on freshwater fisheries are qualitative only.

Studies which have not been formally reported (e.g. unpublished data, studies in progress, etc.) have not been included.

### I. History of studies

#### a) *General population surveys (omnibus)*

General population or omnibus surveys elicit broad characteristics and patterns from a sample of the entire target population (e.g. the population of Australia). They are particularly useful for determining demographic patterns and/or where no prior information is available.

To date, only one national general population study has been conducted: the PA Management Consultants' survey of 1984 (PA Management Consultants 1984). This study gave the first and only comprehensive picture of the demographic structure and economic behaviour of Australian anglers as a whole, and its data are still regularly cited.

In addition to the national study, Statewide studies have now been conducted in all States and Territories at least once. The first such study was completed in NSW in 1978 (McNair, Anderson and Associates 1978, cited in Anon 1992), but all other studies have been reported since 1985. In addition to these broad scale surveys, regional surveys have been conducted in

areas such as the Moreton region of SE Queensland and Port Phillip Bay, Victoria.

Historically, therefore, demographic and socio-economic data from general population surveys are relatively recent (i.e. generally post-1984).

### **b) Marine**

Studies of marine fishing also cover a relatively short period. The first reported survey was undertaken in 1972/73 in Serpentine Creek, Queensland, as part of an environmental impact study (Dredge 1974). Following this, a substantial increase in research activity occurred during the 1970s and early 1980s (Figure 1).

While output appears to have declined in the 1990s (Figure 1), the data refer only to published reports. The inclusion of work known to be currently underway, or recently completed, increases the current total to at least 19 studies for 1990-94 (Figure 1).

### **c) Freshwater**

Freshwater recreational fishing studies span a substantially longer time period than other work. The first reported fieldwork that I have located occurred in 1948 on trout lakes in NSW and Tasmania (Lake 1957; Nicholls 1958 a;b). Creel surveys were also conducted in some Victorian lakes in the early 1960s (Hume 1991), while Western Australia carried out research into the recreational trout fishery in 1967/68 (Morrissy 1972).

Despite being commenced well before marine studies, it appears that the number of freshwater studies has not been as high. In addition to those already mentioned,

26 study reports were located from literature searches. Of these, the majority have been conducted in the eastern States. Victoria and New South Wales conducted several studies in the 1970s and 1980s, while Queensland has been particularly active in the last five years.

Of the other States, Tasmania and Western Australia have conducted longer-term surveys. Tasmania has conducted mail surveys of recreational licence holders over the last ten years (Peter Davies pers. comm.), while Western Australia has used a long-running logbook programme of licensed fishers for monitoring the recreational marron fishery (Morrissy and Fellows 1990).

## **2. Location of studies**

Given this historical overview, it is now worth considering the spatial distribution of research activity.

In terms of output of reports of general population and marine surveys, New South Wales has been the most productive State, followed by Queensland and South Australia (Figure 2). When reports of freshwater studies are included, Queensland becomes the leading State and, with New South Wales, is far in advance of all other States.

The spatial distribution of these studies is shown in Figure 3. There is a clear concentration around areas of high population density along the eastern seaboard, and other metropolitan centres around Australia. Workers associated with the Great Barrier Reef Marine Park Authority (GBRMPA) have been particularly active, and nearly 50% of Queensland studies relate to areas within the Park.

The spatial distribution of freshwater studies is a little harder to map meaningfully as most studies have been undertaken in relatively small lakes.

In addition to geographic location, studies can also be categorised by the type of water-body in which they were conducted (Table 1). By far the greatest majority (68%) of marine studies have been undertaken in inshore waters—coastal waters, estuaries and bays. This is not surprising as these areas generally support the greatest concentration of anglers. Further, it might be argued, they represent areas which are most amenable to traditional direct survey methods.

Perhaps for similar reasons, most freshwater studies have been undertaken in lakes. Only three studies that I have located were undertaken in natural rivers, all of which were in Victoria (Hume 1979; Koehn 1984; Myers 1988), although much of the marron data from WA would relate to river catches (Morrissy and Fellows 1990).

### **3. Summary of information collected**

Having discussed the history and geography of recreational fishing studies in Australia, it is appropriate to consider what information has been collected. Recreational surveys compile substantial amounts of information; reports at times have exceeded 100 pages with up to 60 pages of tables and graphs.

The principal categories of information collected can be seen in Table 2. While this table refers to marine and general population studies, similar results could be expected from freshwater studies.

The most commonly reported parameters were those relating to the recreational

catch—catch per unit of effort (cpue), fishing effort and harvest. Additionally, the biological components of the catch—species and size composition—were also reported, although less commonly.

Many studies also provided demographic information on the surveyed population, while least common were economic data. Of the 34 reports including economic data, the great majority were fishing-related expenditure. It is only recently that studies have been conducted on the economic value of fish to recreational fishing (e.g. Dragun 1991; Staniford and Siggins 1992).

In all categories, either New South Wales or Queensland has compiled the most information (Table 2). However, it should be noted that even in these States, only a dozen or so estimates are available for critical information such as fishing effort and harvest, and some of these are for limited areas only.

### **4. Utility of these studies for management**

Having looked at where, when and what data have been collected, it is appropriate in this forum to comment on the general utility of the results. One important question that this Workshop will need to address is 'To what extent have past studies assisted proper management of Australian fisheries?'. If they have assisted, how and why; if not, why not?

There is no doubt that past results have clarified some of the common characteristics of recreational fisheries. For example, general population studies have shown that demographic parameters of the fishing population are relatively consistent around

the country—at least at the level of resolution of those studies (Table 3).

For example, apart from one WA study (Anon 1984), all results show that between 25 and 36% of the population participate in recreational fishing at least once a year. Similarly, all studies show that males outnumber females in active participation, usually by a ratio of between 2 and 3:1. Furthermore, the most active age group is generally teenagers through to those in their 30s.

Another common characteristic of the fishing population is the frequency with which they participate. Most studies show that nearly half of active fishers participate less than 5 times a year. Only 15% fish more than 20 times a year.

A related statistic is the contribution of a small number of trips to the total catch. Several studies have calculated the percentage of trips which catch 50% of the total catch. Results show a range from 25% down as low as 4.7% (Craik 1986; Henry and Virgona 1980; Anon. 1981) While the proportion of trips is therefore low, I am sure that the percentage of anglers making those trips is even lower. The situation may therefore exist where as low as 3 or 4% of anglers are contributing 50% of the catch.

In addition to identifying common characteristics such as these, past studies have no doubt been very useful in resolving local resource allocation disputes. Many studies cited controversy over resource allocation as a primary reason for instigating the research. The results of these studies no doubt assisted in the resolution of those disputes.

Additionally, the collective results of many studies have now highlighted the biological impact that recreational anglers can have

on fish stocks. This, in addition to data on economic activity, has substantially raised the profile of recreational fishing in political and fisheries management arenas.

Past studies have therefore been very useful in establishing the importance of recreational fisheries, biologically and economically, and quantifying their features. However, in the context of promoting Workshop discussion, it is also important to discuss their limitations. These are, of necessity, generalisations and do not refer to individual studies. I will discuss the limitations in two categories—scale (temporal and spatial) and comparability.

One of the most enduring paradigms of fisheries management is that recreational fishing effort is increasing. And yet, in published reports, there are very few data to support that claim. The principal reason for this is that there are very few areas in Australia for which time series data are available.

Results relating to trends in cpue, harvest and resource allocation are similarly lacking. The best long-term datasets for cpue are those from angling clubs. These have been well used by Queensland workers to give trends in cpue over periods of up to 40 years. However, without comparative effort data, cpue trends can not elicit trends in harvest or resource allocation.

This demonstrates one of the fundamental differences between commercial and recreational fisheries management. Substantial funds are allocated every year to maintaining commercial catch and effort databases, with a view to monitoring trends over time. No commercial fishery would consider management based on once-off surveys. And yet the data available for

recreational fisheries are mostly just that—once-off.

Some exceptions do exist. For example, the barramundi fishery of Northern Territory has information on some areas since 1978; the barramundi fishery of Charlotte Bay has data covering a 4–5 year period; and Malla-coota Inlet and the Gippsland Lakes were the subject of extended surveys in the early 1980s. Additionally, some Victorian and Tasmanian lakes and bays and estuaries in New South Wales and South Australia have been surveyed more than once.

The importance of long term data cannot be overstated, and there is a clear need for recreational fishing studies to be incorporated into a longer term framework.

It is noted in passing that, where data are available, the results either contradict the fishing effort paradigm or are equivocal (e.g. see Griffin this volume).

In addition to temporal scale, the majority of studies have been limited in spatial scale, with a high proportion of marine studies conducted in estuaries and bays. While this has no doubt resolved immediate and local concerns, and is satisfactory for stock assessments of localised and sedentary stocks, it is of limited value for stock assessment of migratory and widespread species. Where concerns for these types of stocks exist, recreational data over larger spatial scales (i.e. covering the distribution of the species) are needed.

The second area that needs attention is that of comparability between studies. This in turn can be split into two components. The first concerns the fairly arbitrary way in which survey responses have been categorised. For example, demographic data used to report participation rates have

defined populations of 10+, 13+, 14+, 15+ and 17+. Similarly, the collation of ages of anglers have used widely varying categories of age groups. The categories used for frequency of fishing (i.e. days per year) vary significantly, often even with studies conducted by the same organisation. Results reporting expenditure on fishing-related items have grouped data into a wide range of categories.

While this may seem a minor criticism, these variations make it very difficult to compare the results of different studies. If improvements are to be made in the collection of time series data, it seems to me that standardisation in the way of reporting these results is necessary. Further, it would facilitate comparisons between recreational fisheries in different areas.

The second component which makes comparisons difficult is the lack of reporting of variation associated with many estimates. This applies particularly to estimates of cpue, effort and harvest. Again, comparisons over time will make reporting of error terms obligatory, and would greatly facilitate comparisons between fisheries.

I would like to note that current research appears to be addressing some of these issues. Longer temporal scales have been incorporated into projects in Queensland and NT, with a longitudinal component in current and planned surveys. Larger spatial scales are being addressed by surveys in NSW and SA.

There is no doubt that the question of scale has been recognised by past researchers. As always, funding has been a critical limiting factor. Changes in the criteria for Fisheries Research and Development Corporation (FRDC) funding have been largely

responsible for both the level and scale of several current projects, and this positive change in funding criteria should be formally acknowledged.

In conclusion, a substantial body of quantitative information exists on recreational fishing in Australia. The majority of this has been collected over the last twenty years, and covers a large proportion of the high effort fishing areas of the country. It represents a substantial series of baseline data upon which could be built a second generation of studies, providing on-going repeated measures to determine long-term trends in recreational fishing. It is hoped that input from such a wide variety of backgrounds as exists at this Workshop can provide the focus and impetus for this to occur.

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**Table 1.** Summary of survey area types for recreational fishing studies in Australia to 1993.

(a) Marine and general population studies (n = 84)

Type of waterbody	All waters	Inshore				Offshore	Intertidal
		Estuary	Bay	Coastal			
Number of studies	16	23	13	21	9	2	
(%)	(19)	(28)	(15)	(25)	(11)	(2)	

(b) Freshwater studies (n = 26)

Type of waterbody	All waters	Lakes	Rivers
Number of studies	4	19	3
(%)	(15)	(73)	(12)

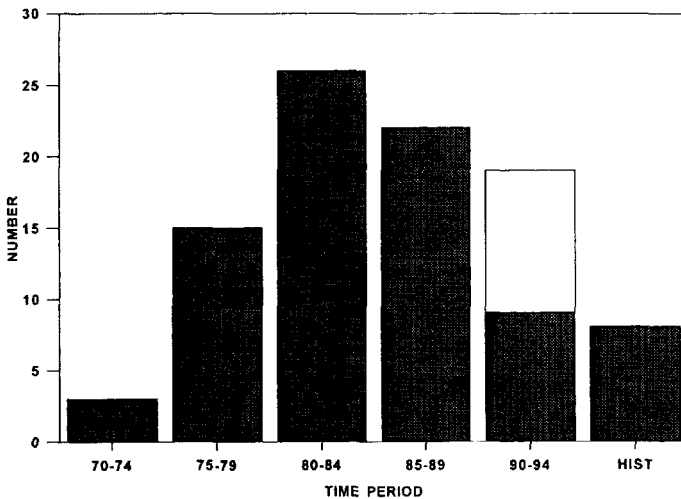
**Table 2.** Categories of information collected during marine and general population studies (n = 84) of recreational fishing in Australia 1972–1993.

State	CPUE	Effort	Harvest	Species Comp <sup>n</sup>	Size Comp <sup>n</sup>	Demo-graphic	Eco-nomic
National	—	1	1	—	—	2	2
QLD	16	13	12	10	12	7	8
NSW	14	11	12	14	7	13	6
VIC	7	7	7	7	5	8	9
TAS	1	1	—	—	—	1	1
SA	13	8	7	10	6	6	3
WA	5	5	4	3	1	5	3
NT	4	4	4	—	3	4	2
<b>Total</b>	60	50	47	44	34	46	34

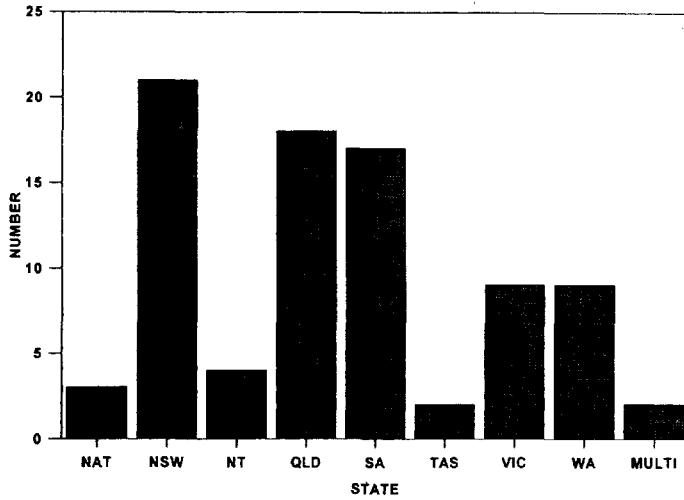
**Table 3.** Common demographic characteristics of the recreational fishing population of Australia.

	Participation rate (%)	Male: Female	Most active age
National	34	2:1	25-44
QLD	30	2.2:1	20-44
NSW/ACT	30	—	—
VIC	36 28	2:1	14-24
TAS	25	3:1	31-40
SA	26	3:1	10-19
WA	43 27	2.2:1	13-24 25-34
NT	35	2:1	15-22

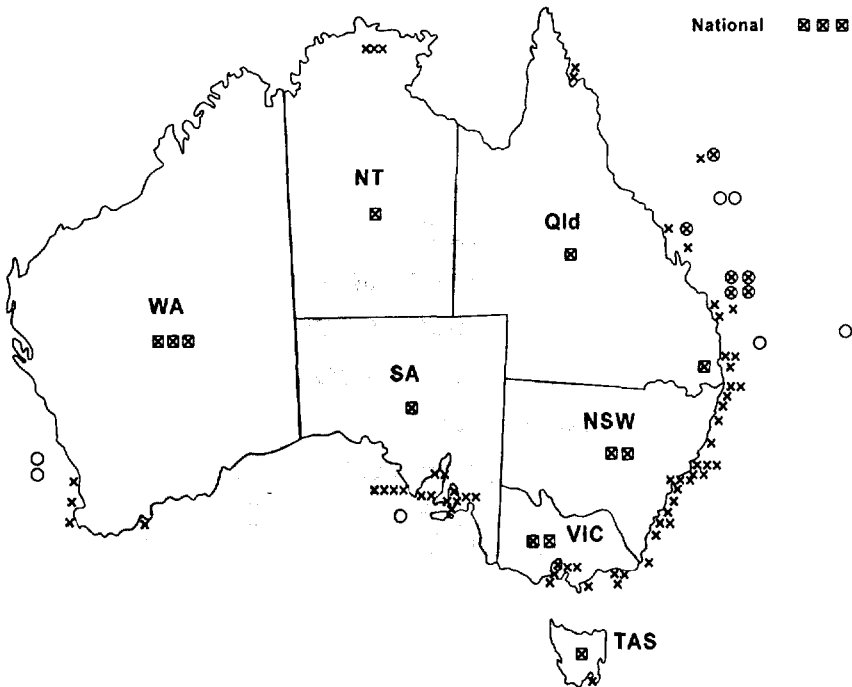
Sources: National—PA Management Consultants 1984; Qld—ABS 1985; NSW/ACT—McNair, Anderson and Associates 1978; Vic—Beinssen 1978; MacDonal and Hall 1987; Tas—Tasmanian Dept. Sport and Recreation 1986; SA—Philipson *et al.* 1986; WA—Anon 1984; ABS 1987.



**Figure 1.** Summary of the number of Australian marine, estuarine and general population studies of recreational fishing undertaken from 1972-1994. Studies have been allocated to the periods during which field work was carried out but, where field work overlapped time periods, they were allocated to the period in which field work was initiated. The unhatched area in 1990-94 indicates the number of studies known to the author to be underway at the time of writing (Nov. 1994). HIST = studies which analysed historical data sets.



**Figure 2.** Summary of the number of completed marine and general population studies of recreational fishing in each State and the Northern Territory, as well as multi-State and national studies, from 1972-93.



**Figure 3.** Spatial distribution of marine, estuarine and general population studies of recreational fishing in Australia from 1972-93. Symbols; x = inshore/estuarine; x with circle = offshore; O = extended areas; square with cross = general population surveys.