

FishCare Volunteer Program Angling Survey: Summary of Data Collected and Recommendations

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FishCare Volunteer Program Angling Survey: Summary of data collected and recommendations

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NON-TECHNICAL SUMMARY

Since 1999 the Fishcare Volunteer (FCV) Program has been involved in a survey of anglers through interviews conducted at freshwater and coastal fishing spots throughout NSW.

Information collected includes the location, date and time of interview, the angler's first name, gender, age grouping and home postcode. The initial information captured indicates whether the anglers accept being surveyed and if they have been surveyed before. Information of use to the Program includes whether the anglers are aware of the FCV program and any advisory materials provided to the anglers. Information of use for fisheries management include whether the anglers are licensed, their ranked preferences in how the licence trust monies should be spent and their awareness of fishing regulations.

Information collected of use for scientific catch and effort analyses include the number of anglers in the party, whether they are boat or shore based, the hours fished and their method of angling such as bait, troll, spinning, or fly. Catch information is restricted to the number of fish caught or released by species. Size information is not collected.

This report summarises the information collected in the 2,303 interviews conducted from December 1999 until November 2004. Improvements to the structure of the database are suggested.

The survey highlighted that most anglers tend to be men between the ages 40 to 60. Men over 65 represented a larger proportion of anglers than they do in the national population and youth (<18) is underrepresented in the angling community. This highlights the importance of the role of FishCare Volunteers (FCVs) in bringing fishing to youth through the Fishcare Clinics. Most anglers (90%) were licensed and the public's awareness of fishing regulations is improving, 79% of anglers were regarded as 'well versed' in 2004 compared to 13% in 2000.

The average completed fishing trip was 1 hour 53 minutes whereas the average time spent fishing at the time of the interview of incomplete trips was 3 hours 12 minutes. This is an example of a proven statistical artefact of roving angler surveys known as length-of-stay bias, in which the probability of interviewing an angler is proportional to the duration of his time spent fishing. Anglers who fish longer are more likely to be interviewed in a roving survey hence there is a bias to overestimate the average fishing trip duration, whereas access point surveys that interview anglers at the end of their fishing trip do not have this bias. This then biases the average duration of incomplete fishing trips to be longer than those of anglers that have been interviewed after they have finished fishing. This is accounted for by separating complete and incomplete trips in analyses.

Freshwater fishing trips were longer in duration than those in saltwater. Bait fishing was the most popular method of fishing overall though particularly in saltwater. Freshwater fishers tended to be more diverse in their fishing method with a greater proportion trolling, spinning and fly-fishing than saltwater fishers.

Of all fish caught, 46% were released. Retention rates were higher in freshwater (59%) than saltwater (52%). Presumably there were more undersized fish caught and released in saltwater, although the reason for release was not included in the survey.

If the survey is continued it is recommended that it be designed with structured survey protocols to better represent the NSW angling population. Expansion of the survey to improve geographic coverage and consistency throughout the year is needed. Stratification to weekday/weekend and

time of day are suggested. These recommendations would require an overall increase in the number of anglers surveyed.

The involvement of FCVs in other existing recreational research projects has been successful in providing needed manpower and should be expanded.

The efforts of the FCVs, the Education Officers and the Coordinator need to be commended. The survey provides a baseline of information important in fisheries management and research. As well as providing information on angler activities to NSW DPI through standardised questions, the survey provides a mechanism for FCVs to interact with the public. It is this interaction that is particularly valuable to the programme and to NSW DPI.

1. BACKGROUND

The Fish Care Volunteers (FCVs) have been conducting a survey of anglers by interviews since 1999. The sampling strategy appears to have been ad hoc. The purpose of this report is to summarise the data collected and to provide recommendations. See Appendix 1 for the interview form. The report summarises data collected until November 2004.

The number of interviews done through the period has fluctuated as the priority given to doing the surveys has changed. Initially there was a pilot period from late 1999 to March 2000 when only a few interviews were done. During 2002 and 2003 additional staff were recruited to the programme giving the FCVs more support and the survey expanded as the FCV pool was built and volunteers encouraged to do interviews. Then in 2004, the review of the programme resulted in many of the FCVs leaving the programme and the survey was discouraged. This year, 2006, the FCV Programme is being expanded and the survey is being resumed (though with a lower priority than their other activities).

1.1. Data collected

The questionnaire used by the FCVs formats the information collected. While some catch and effort information is collected, the survey is more dedicated to information of use for management.

General information collected identifies the FCV, location, date and time of the interview. The initial information indicates whether the anglers accept being surveyed and if they have been surveyed before. Social information includes the given name, gender, age group and postcode of the angler. Information of use to the programme includes whether the anglers are aware of the FCV. Advisory materials, such as regulations booklets or ruler stickers given to the angler are recorded. Information pertaining to fisheries management include whether the anglers are licensed, their ranked preferences in expenditure of the licence trust monies and their apparent awareness of fishing regulations.

Information collected for catch and effort analysis include the number of anglers in the party, whether they are boat or shore-based, hours fished and their method of angling (such as bait, troll, spin, or fly). Catch information is restricted to number of fish caught or released by species.

1.2. Potential data not collected

Space on the form limits the amount of information collected, as does keeping the interview succinct so as to not irritate the angler. Additionally there are limitations on the skill of the FCVs to collect biological data.

Information that is not collected, but could be considered, are an indication of target species and measurements of the retained fish. The latter is important for stock assessment however such measurements could be perceived as overlapping the role of the FCV with that of compliance, which has the potential for conflict between FCVs and anglers.

Other questions such as their interaction with compliance officers and their financial expenditure on fishing have application within fisheries management. Though there are privacy issues to consider.

Additional information could be collected and be useful, though caution should be exercised and consideration of the ramifications of recording fish lengths or asking questions on expenditure without clarifying why it is being recorded needs to be thought through.

2. SURVEY RESULTS

2.1. Number of interviews

Interview data have been collected since September 1999; these original data were from the Snowy Mountains Region and were done as a trial and only when an Education Officer was present. In 2000, survey interviews were also started in Lake Illawarra, Central Tablelands and Armidale regions. In 2001, six regions reported interviews, by 2002 18 regions had a total of 736 interviews. There were fewer (16) regions reporting interviews in 2003 though a total of 860 interviews were reached. There was a great reduction in 2004 with funding cutbacks and only 118 interviews in 16 regions are reported (only 5 regions with more than 10 interviews for the year to November). In all 2 303 interviews have been recorded to November 2004.

Port Macquarie region collected the most interviews (482) however these interviews were only conducted in 2002 and 2003. The Snowy Mountains Region has the earliest records with interviews from 1999 to 2002, though none in 2003 and only three interviews reported in 2004. Lake Illawarra has the most consistent data. Interviews have been conducted from January 2000 to late 2004, though the number of interviews in 2004 is considerably lower than previous years. This may be due to a loss of interest by FCVs, attributable to withdrawn support and staff losses.

A number of regions had particularly low numbers of interviews; the northern coast of NSW had a particular paucity of interviews. The Far North Coast and North Coast Regions only had had one interview recorded each, there have only been 3 on the Central Coast Region and 6 in Maclean Region. Most country areas are consistent though Albury had only had three interviews. This is low considering the importance of the Murray River and its impoundments nearby. The remoteness of fishing spots in western regions increases effort and costs to FCVs.

There is inconsistency in the number of interviews among regions. A withdrawal of support from management in 2004 lead to a reduction in the number of interviews.

Table 1. Number of interviews by region and year. Regions are arranged north to south.

Region	1999	2000	2001	2002	2003	2004	No date	Total
<i>Coastal</i>								
Tweed Heads Region					39	4		43
Far Nth Coast Region						1		1
Maclean Region				5		1		6
North Coast Region						1		1
Coffs Harbour Region				39	27	1		67
Port Macquarie Region				204	278			482
Lake Macquarie Region			14	95	62	12		183
Wallis Lake Region					71	16		87
The Entrance Region				14	31	9		54
Central Coast Region						3		3
Middle Harbour Region				31	4		1	36
Botany Bay Region				57	63	23		143
Lake Illawarra Region		166	43	38	30	23	3	303
Jervis Bay Region				37	13	5		55
Batemans Bay Region				20	61	1		82
Narooma Region				1	34			35
<i>Coastal Regions Total:</i>	<i>0</i>	<i>166</i>	<i>57</i>	<i>541</i>	<i>713</i>	<i>100</i>	<i>4</i>	<i>1581</i>
<i>Inland</i>								
Armidale Region		40	26	1				67
Tamworth Region				35	73			108
Central Tablelands Region		33	49	78	54	1		215
Bathurst Region						14		14
Scone Region					8			8
Nepean Region				29	12			41
Yass Region			18	6				24
Snowy Mountains Region	20	85	84	43		3	6	241
Albury Region				3				3
(blank)							1	1
<i>Inland Regions Total:</i>	<i>20</i>	<i>158</i>	<i>177</i>	<i>195</i>	<i>147</i>	<i>18</i>	<i>7</i>	<i>722</i>
Total	20	324	234	736	860	118	11	2 303

2.2. Individual Fishcare volunteer interview effort

The number of interviews recorded in each region is a function of the number of volunteers involved in the survey, as well as the number of interviews conducted per volunteer. Of the 2 303 interviews recorded 50% can be attributed to 15 of 152 FCVs that recorded at least one interview. One volunteer SWV0096 in Port Macquarie conducted 305 interviews, 13.2% of the total number of interviews. The top two interviewers conducted 422 (18.3%) of the interviews and were both from the Port Macquarie region.

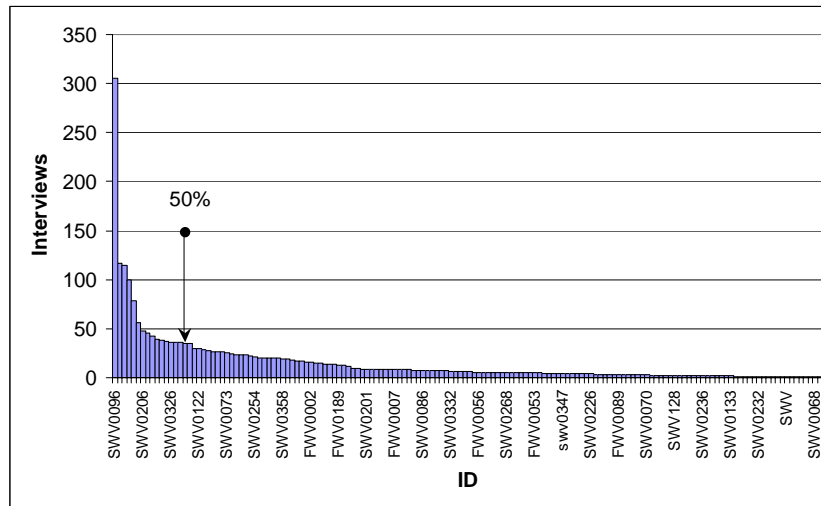


Figure 1. Number of interviews by FCV.

A few volunteers were did a large proportion of the interviews. While this shows the disparity numbers of interviews done among volunteers, it also could show the potential coverage of the survey.

3. ANGLER DEMOGRAPHY

3.1. Angler gender

Most anglers interviewed were male (85%) only 6% were female. In 9% of interviews the gender was not recorded. This seemed particularly the case in Port Macquarie where 32% were not ascribed a gender.

The proportion of women was similar in inland and coastal regions; the proportion of interviewees where the gender was unidentified differed, only 1% were unidentified in inland regions compared to 12% in coastal regions.

Table 2. Percentage of anglers by gender by region.

Region	Unspecified	Female	Male	Total
<i>Coastal</i>				
Tweed Heads Region	16%	9%	74%	43
Far Nth Coast Region			100%	1
Macleay Region			100%	6
North Coast Region	100%			1
Coffs Harbour Region		13%	87%	67
Port Macquarie Region	32%	6%	63%	482
Wallis Lake Region	2%	11%	86%	87
Lake Macquarie Region		5%	95%	183
The Entrance Region	2%		98%	54
Central Coast Region			100%	3
Middle Harbour Region	6%	3%	92%	36
Botany Bay Region	3%	1%	95%	143
Lake Illawarra Region	5%	4%	91%	303
Jervis Bay Region	9%	9%	82%	55
Batemans Bay Region	5%	9%	87%	82
Narooma Region	3%	9%	89%	35
<i>Coastal Regions Total:</i>	<i>12%</i>	<i>6%</i>	<i>82%</i>	<i>1581</i>
<i>Inland</i>				
Armidale Region	4%	7%	88%	67
Tamworth Region		10%	90%	108
Bathurst Region			100%	14
Central Tablelands Region	2%	5%	93%	215
Scone Region			100%	8
Nepean Region		10%	90%	41
Yass Region			100%	24
Snowy Mountains Region	2%	6%	92%	241
Albury Region			100%	3
<i>Inland Regions Total:</i>	<i>1%</i>	<i>7%</i>	<i>92%</i>	<i>721</i>
Total	9%	6%	85%	2 303

3.2. Angler age group

The demography of anglers was gathered by the FCVs assigning the anglers to four age categories. Of the 2 406 anglers categorised, the highest proportion of anglers (39%) was in the 18-40 age group, though almost as many (34%) were in the 40-60 age group. The over 60 year old category comprised 16% of anglers. Children and youths under 18 only made up 6% of anglers. The Australian Bureau of Statistics website has the Australian population categorised as 35% under 15 and 12% over 65 (Australian Bureau of Statistics 2004). The fishing population, therefore, appears to be under represented by youth but a popular pastime for older Australians.

Table 3. Percentage of anglers by age category by area.

Region	Not Recorded	<18	18-40	40-60	>60	Total
<i>Coastal</i>						
Tweed Heads Region	7%	9%	42%	37%	5%	43
Far Nth Coast Region	0%	0%	0%	100%	0%	1
Maclean Region	33%	0%	17%	50%	0%	6
North Coast Region	100%	0%	0%	0%	0%	1
Coffs Harbour Region	6%	3%	34%	38%	20%	80
Port Macquarie Region	2%	13%	33%	30%	23%	482
Wallis Lake Region	13%	3%	28%	28%	29%	87
Central Coast Region	0%	0%	33%	33%	33%	3
Lake Macquarie Region	7%	3%	36%	38%	17%	183
The Entrance Region	6%	4%	39%	43%	9%	54
Middle Harbour Region	8%	3%	44%	31%	15%	39
Botany Bay Region	4%	2%	69%	22%	3%	179
Lake Illawarra Region	12%	5%	50%	31%	3%	314
Jervis Bay Region	6%	13%	23%	39%	19%	67
Batemans Bay Region	6%	4%	58%	31%	2%	85
Narooma Region	0%	3%	57%	34%	6%	35
<i>Coastal Regions Total:</i>	6%	7%	42%	31%	14%	1 661
<i>Inland</i>						
Armidale Region	10%	3%	45%	33%	10%	73
Tamworth Region	5%	1%	43%	45%	6%	108
Bathurst Region	11%	6%	17%	28%	39%	18
Central Tablelands Region	4%	6%	21%	36%	33%	216
Scone Region	8%	8%	50%	25%	8%	12
Nepean Region	4%	2%	65%	22%	7%	46
Orange Region	100%	0%	0%	0%	0%	1
Yass Region	13%	17%	29%	38%	4%	24
Snowy Mountains Region	5%	0%	29%	43%	22%	235
Albury Region	0%	0%	100%	0%	0%	3
Freshwater Inland Region	0%	0%	33%	67%	0%	6
Western Region	33%	33%	0%	33%	0%	3
<i>Inland Regions Total:</i>	6%	3%	33%	38%	20%	745
Total	6%	6%	39%	34%	16%	2 406

4. FISHERIES MANAGEMENT SUMMARY

4.1. Interviewee response to survey

Response from most contacts was positive, 97% of people approached accepted being interviewed. Interestingly, the areas of high refusal rates tended to be around Sydney. In the middle harbour region 4 of the 36 (11%) people approached refused to be interviewed, in Botany Bay Region 10 of the 143 (7%) refused. Lake Illawarra, proximal to Sydney, had 15 of 303 (5%) people refuse. Among the regional centres Bathurst and Tweed Heads regions had the highest refusal rates of 7% and 5% respectively though these represented only 1 of 14 and 2 of 43 people approached respectively. Refusal rates were similar between inland and coastal areas.

Table 4. Contact response to interview as percentage acceptance or refusal by area.

Regions	Not Recorded	Accept	Refuse	Interviews
<i>Coastal</i>				
Tweed Heads Region		95%	5%	43
Far Nth Coast Region		100%	0%	1
Macleay Region		100%	0%	6
Coffs Harbour Region		100%	0%	67
North Coast Region		100%	0%	1
Port Macquarie Region		100%	0%	482
Wallis Lake Region		98%	2%	87
Lake Macquarie Region		100%	0%	183
The Entrance Region		98%	2%	54
Central Coast Region		100%	0%	3
Middle Harbour Region		89%	11%	36
Botany Bay Region		93%	7%	143
Lake Illawarra Region	5	93%	5%	303
Jervis Bay Region		95%	5%	55
Batemans Bay Region		96%	4%	82
Narooma Region		100%	0%	35
<i>Coastal Regions Total:</i>	5	97%	3%	1 534
<i>Inland</i>				
Armidale Region		96%	4%	67
Tamworth Region		100%	0%	108
Bathurst Region	1	86%	7%	14
Central Tablelands Region		97%	3%	215
Scone Region		100%	0%	8
Nepean Region		100%	0%	41
Snowy Mountains Region		99%	1%	241
Yass Region		100%	0%	24
Albury Region		100%	0%	3
<i>Inland Regions Total:</i>	1	98%	2%	707
Not Recorded	1	0%	0%	1
Total	7	97%	2%	2 303

Refusal rates of boat or shore based fishermen were similar. Most of the refusals occurred on forms where the fishing platform was not recorded. This may indicate a problem with the approach, though refusals did not appear to be associated with particular FCVs.

Table 5. Contact response to interview as acceptance or refusal by platform, boat or shore.

Platform	Accept	Refuse	N/A	Number
Boat	100%	0%	0%	678
Shore	99%	1%	0%	1 560
Unspecified	29%	62%	9%	65
Total	97%	2%	0%	2 303

4.2. Were interviewees licenced?

Over the time period 1 351 anglers were asked if they had a licence, 1 219 (90.2%) said they had a licence, hence 132 (10%) were not. The two areas with the lowest proportion of licensed fishermen were Lake Illawarra (28.7% unlicensed) and Armidale (27.7% unlicensed).

Note, this summary does not determine whether the anglers were exempt (due to age, in possession of a pensioner card, Aboriginal exemption etc) or fishing illegal. This would be a sensitive question for the FCVs and hence 41% of anglers were not asked. See Appendix 2 for more detail.

Table 6. Number of anglers licensed or not licensed by year.

Year	Not Asked	Licensed	Not Licensed
1999	3	12	5
2000	160	132	32
2001	30	169	35
2002	289	410	37
2003	439	399	22
2004	20	97	1
Total	941	1 219	132

Table 7. The number of anglers licensed or not licensed by area and percentage not licensed given.

Region	Licensed	Not Licensed	% Not Licensed
<i>Coastal</i>			
Tweed Heads Region	19	3	14%
Far Nth Coast Region	1	0	0%
Maclean Region	2	0	0%
Coffs Harbour Region	35	2	5%
North Coast Region	1	0	0%
Port Macquarie Region	155	12	7%
Wallis Lake Region	55	10	15%
Lake Macquarie Region	140	4	3%
The Entrance Region	43	0	0%
Central Coast Region	3	0	0%
Middle Harbour Region	15	0	0%
Botany Bay Region	88	2	2%
Lake Illawarra Region	62	25	29%
Jervis Bay Region	25	6	19%
Batemans Bay Region	46	1	2%
Narooma Region	25	0	0%
<i>Coastal Regions Total:</i>	<i>715</i>	<i>65</i>	<i>8%</i>
<i>Inland</i>			
Armidale Region	39	15	28%
Tamworth Region	40	0	0%
Central Tablelands Region	181	10	5%
Bathurst Region	13	0	0%
Scone Region	7	1	13%
Nepean Region	24	7	23%
Yass Region	19	0	0%
Snowy Mountains Region	187	34	15%
<i>Inland Regions Total:</i>	<i>510</i>	<i>67</i>	<i>12%</i>
Total	1 225	132	10%

4.3. Awareness of fishing regulations

At the time of the interview anglers were offered a NSW Fisheries Rules and Regulations Brochure. If the interviewee was aware of the regulations but not well versed with the size and bag limits they were categorised 'Aware', if they knew size and bag limits of the main species they were likely to encounter they were categorised 'Well Versed' (McElligott pers. com.).

Over the entire period 44% of anglers were categorised as 'well versed' with NSW fishing regulations, 43% were 'aware' 13% were 'unaware' of them. There was a trend of increasing awareness of regulations with 94% being regarded as aware compared to 0% as well versed in 1999, while in 2004 79% were 'well versed' compared to 20% that were 'aware'. The 'unaware' interviewees were lower than 20% in each year and only 1% in 2004.

Table 8. The perceived awareness of the angler to NSW DPI fisheries regulations.

Year	Unaware	Aware	Well Versed	Total
1999	6%	94%	0%	17
2000	18%	69%	13%	311
2001	6%	34%	60%	207
2002	12%	41%	47%	627
2003	15%	37%	48%	776
2004	1%	20%	79%	85
Total	266	863	894	2 023

There is an improvement in the public awareness of fishing regulations.

4.4. Expenditure preferences

Over 1 000 of the contacts were asked where they would like to see their Recreational Fishing Trust money spent. The replies were ranked among six options with '1' being their most important priority for funding. Unfortunately a simple count of the numbers of the rankings does not show a definitive result as many of the respondents ranked more than one option with '1', others only gave one option '1' and did not rank the other options. However, of the responses to this question, 45% gave fish stocking a '1' priority. Research received the fewest '1's with only 17%, however RFAs received the most '6's with 25%. The other categories received '1's about a third of the time.

Note this did not indicate whether interviewees understood the options or their purpose.

Table 9. Ranked response (1 highest, 6 lowest) to priority for Rec. Trust expenditure.

Expenditure	1	2	3	4	5	6	Total
Education	32%	14%	15%	14%	16%	8%	1 103
Fish Stocking	45%	18%	10%	8%	8%	10%	1 090
Habitat Protection	33%	22%	16%	12%	9%	8%	1 068
Enforcement	30%	17%	13%	14%	12%	13%	1 082
Research	17%	13%	17%	20%	20%	13%	1 012
RFAs	32%	12%	12%	9%	11%	24%	1 077
Total	2 045	1 036	895	830	806	820	

The Trust expenditure question is important but appears to be poorly recorded, training should focus on adhering to the structure of the responses.

5. FISHERIES SUMMARY

5.1. Angler effort

Effort determination may be based on a trip as a unit, though a more accurate determination of effort uses hours of fishing as the unit. A catch rate determined as number of fish per hour angling is more accurate than number of fish per trip and is less confounded by the behaviour of the angler.

To calculate hours of fishing effort the survey included the start time and finish time as well as the time of interview. There were 2 066 interviews where a start and stop or interview time were given. These interviews provided an indication of effort; there were 863 interviews providing times in freshwater and 1 203 in saltwater. A stop time was given whether actual or proposed (later than interview time) in 1 224 (59%) cases, of these 936 (45%) had already finished fishing.

The average fishing period (where a stop time was used, if given, or the interview time, if not given) was 3 hours 12 minutes, this time was longer in freshwater (3 hours 52 minutes) than saltwater (2 hours 43 minutes). The average total duration of fishing trips from anglers where a start and finish time were given was 1 hour 53 minutes, the average trip in inland regions was 2 hours 50 minutes and in coastal regions 1 hour 19 minutes. This disparity between incomplete and completed trips is a statistical artefact of roving angler surveys known as length-of-stay bias. This is that the probability of surveying an angler is proportional to the duration of his trip. Therefore the duration of incomplete trips is biased to being longer than completed trips (Pollock, Jones *et al.* 1994).

Table 10. Angler fishing effort by area and region. The number of interviews with a start and stop or interview time recorded (Count) with the stop time, even if later than the interview (Stop Time) and when earlier than the interview (Finished). Period is the mean fishing effort to interview time and Trip Duration is the mean period between start and stop times.

Region	Interviews	Number with Stop Time	Number that Finished	Period (hours:mins)	Trip Duration (hours:mins)
<i>Inland</i>					
Armidale Region	53	33	27	2:35	1:14
Tamworth Region	138	127	113	4:32	3:27
Central Tablelands	263	176	116	3:40	2:29
Scone Region	13	13	13	8:43	8:43
Bathurst Region	12	12	8	3:37	3:06
Nepean Region	45	15	7	1:59	1:07
Snowy Mountains	3	3	1	2:00	2:00
Snowy Region	315	273	198	4:03	3:24
Yass Region	21	3	3	3:45	0:26
<i>Inland Regions Total:</i>	<i>863</i>	<i>655</i>	<i>486</i>	<i>Average 3:52</i>	<i>Average 2:50</i>
<i>Coastal</i>					
Tweed Heads Region	31	23	15	2:52	2:09
Far Nth Coast	1	1	1	1:30	1:30
Macleay Region	4		0	2:30	-
North Coast	0		0	-	-
Coffs Harbour Region	59	26	22	2:21	1:31
Port Macquarie Region	180	23	17	1:18	0:07
Wallis Lake region	81	51	41	2:47	1:46
The Entrance Region	53	44	37	3:43	3:17
Lake Macquarie Region	191	146	122	4:05	3:01
Central Coast Region	5	5	3	2:18	2:18
Middle Harbour Region	27	6	2	1:57	0:32
Botany Bay Region	130	68	33	2:47	1:25
Lake Illawarra Region	269	38	32	1:53	0:24
Jervis Bay region	56	48	42	4:43	4:16
Batemans Bay Region	89	70	69	3:19	2:40
Narooma Region	27	20	14	3:37	2:23
<i>Coastal Regions Total:</i>	<i>1 203</i>	<i>569</i>	<i>450</i>	<i>Average 2:43</i>	<i>Average 1:19</i>
Total	2 066	1 224	936	Average 3:12	Average 1:53

5.2. Fishing method

The fishing method employed was recorded for 2 552 anglers. Bait fishing was the most common method. It was particularly common in saltwater with 86.9% of anglers using bait compared to 42.2% in freshwater.

In saltwater spinning was the second most common method, though only by 6.4% of anglers were spinning, few anglers used the other methods: troll 3.1%, fly 1.5% and other 2.1%.

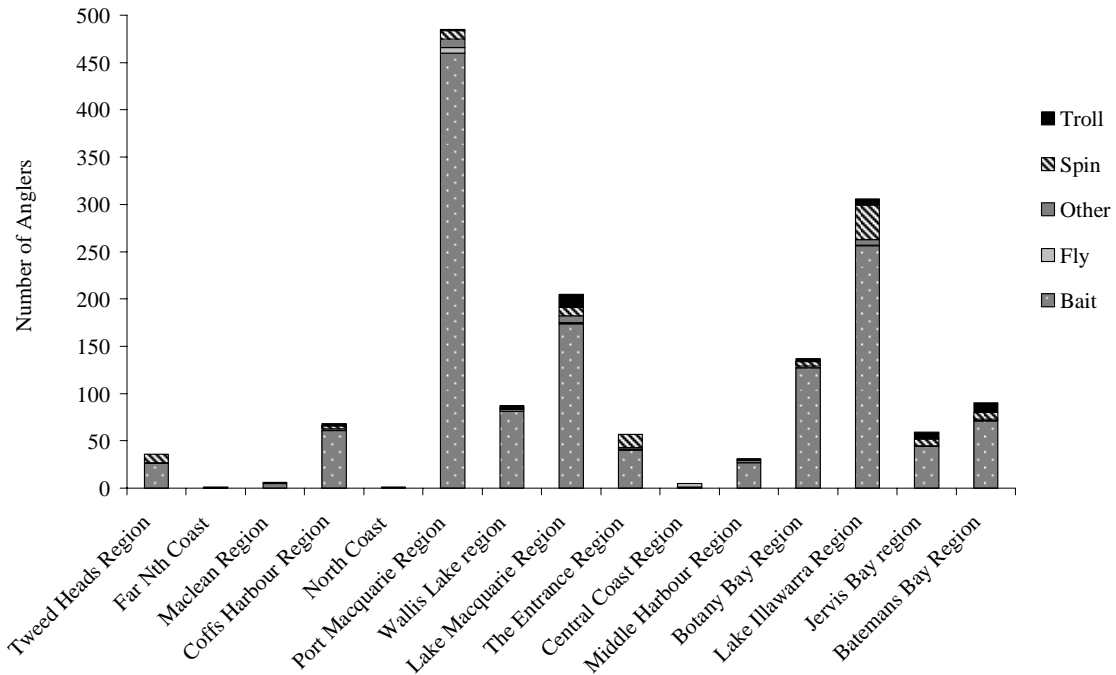


Figure 2. Fishing method by number of anglers surveyed in coastal regions in NSW.

Freshwater anglers were more varied in their methods. The second most common fishing method was trolling comprising 22.4% of anglers, fly-fishing was used by 18.8% and spinning by 16.5% of anglers. Trolling was the most common form of fishing in the Snowy region and fly-fishing the most common method in the central Tablelands region. Spinning was the most common in the Armidale region.

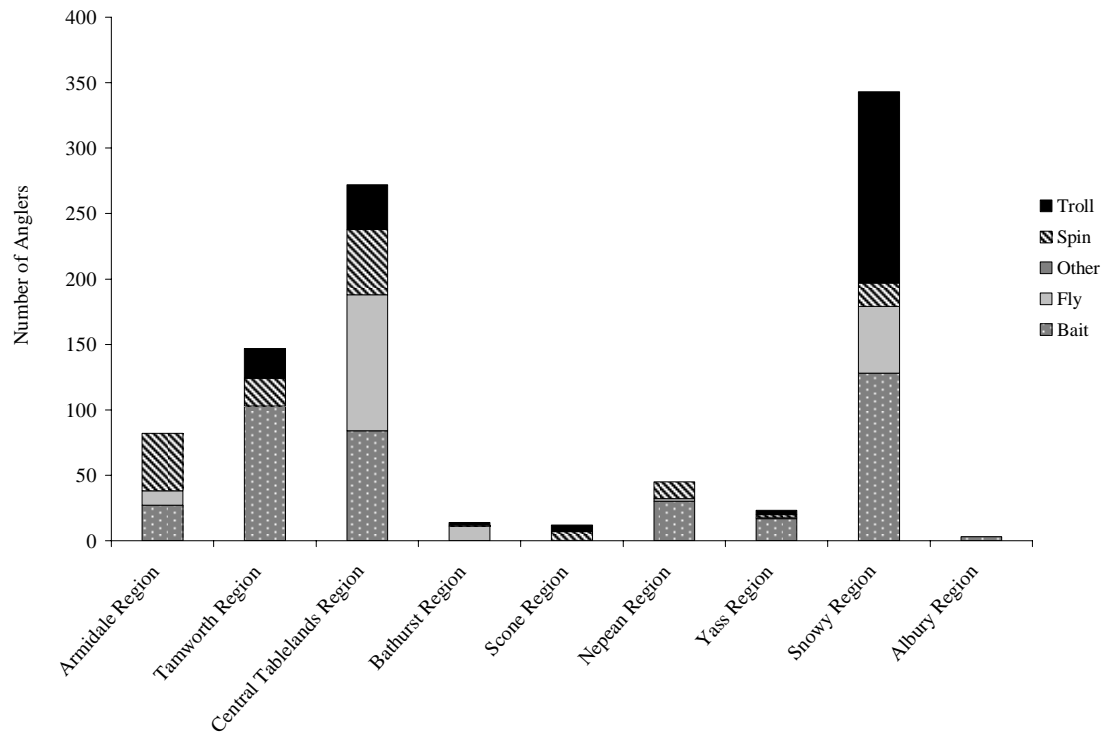


Figure 3. Number of anglers by fishing method from inland regions in NSW.

5.3. Catch

FCVs recorded 10 914 fish caught in all regions for the six years. There were 2 633 fish recorded in freshwater areas and 8 281 fish in saltwater regions. Overall 5 910 (54%) fish were retained and 5 004 (46%) were released. Retention rates were slightly higher in freshwater (59%) than in saltwater (52%). Most fish were recorded from Lake Macquarie region in 2003. Note Lake Macquarie in 2003 had the most interviews recorded.

Table 11. Number of fish recorded by year and region. The table also includes the number retained and released.

Region	1999	2000	2001	2002	2003	2004	Caught	Released	Total
<i>Inland</i>									
Albury Region				3			1	2	3
Armidale Region		211	154	3			68	300	368
Bathurst Region						191	187	4	191
Central Tablelands Region		36	118	204	245		475	128	603
Nepean Region				43	33		28	48	76
Scone Region					60		31	29	60
Snowy Mountains						7	7	0	7
Snowy Region	24	175	182	151		2	292	242	534
Tamworth Region				207	526		424	309	733
Yass Region			56	2			45	13	58
<i>Inland Regions Total:</i>	<i>24</i>	<i>422</i>	<i>510</i>	<i>613</i>	<i>864</i>	<i>200</i>	<i>1 558</i>	<i>1 075</i>	<i>2 633</i>
<i>Coastal</i>									
Batemans Bay Region				152	773	10	451	484	935
Botany Bay Region				150	376	234	312	448	760
Central Coast Region						15	9	6	15
Coffs Harbour Region				162	213	1	170	206	376
Far Nth Coast						1	1	0	1
Jervis Bay Region				221	136	1	273	85	358
Lake Illawarra Region		621	177	18	42	45	486	422	908
Lake Macquarie Region			95	843	886	230	1129	925	2054
Maclean Region				77			65	12	77
Middle Harbour Region				39	1		37	3	40
Narooma Region					100		47	53	100
North Coast						1		1	1
Port Macquarie Region				468	682		609	541	1150
The Entrance Region				70	333	97	197	303	500
Tweed Heads Region					266	30	112	184	296
Wallis Lake region					379	331	454	256	710
<i>Coastal Regions Total:</i>		<i>621</i>	<i>272</i>	<i>2 200</i>	<i>4 187</i>	<i>996</i>	<i>4 352</i>	<i>3 929</i>	<i>8 281</i>
Total	24	1 043	782	2 813	5 051	1 196	5 910	5 004	10 914

5.4. Catch composition

The diversity of species recorded was greater in saltwater regions with 1 443 species categories reported compared to 32 in freshwater.

The most common taxon reported was bream comprising 26.7% of total fish caught, followed by flathead 13.7% and snapper 4.8%. Rainbow trout was the sixth most commonly reported overall (4.1%) but were the most numerous among freshwater fish reported (17.2%), followed by carp (14.5%) and bass (13.2%). Note the fish were not reported to actual species in many cases such as which species of bream or flathead.

Bream were ubiquitous in the catches among saltwater regions, flathead were common in the areas with large estuaries and saltwater lakes. Snapper were common in areas such as Jervis Bay and Coffs Harbour. In freshwater, trout dominated the snowy areas while carp were common in the central areas and Murray cod along the NSW southern border.

See Appendix 4 for catch composition figures.

5.5. Catch rates

The catch rate information was calculated as total number of fish per hour fished by region by year. This is a rough indicator of fishing success though it does not take many factors into account. Overall the average catch rate was 0.82 fish per hour fishing. The highest catch rates were recorded in Wallis Lake with 2.1 fish per hour an average for 60 anglers interviewed. The average catch rate in freshwater was 0.36 fish per hour while in saltwater that was 1.03 fish per hour.

Many interviews (10%) had incomplete time information; this compromises the calculation of catch rates.

By way of comparison with other earlier more rigorous studies, in 1984 the overall catch rate of anglers in Sydney Harbour was found to be 1.26 fish per angler hour (Henry 1984), the FCV survey produced a much lower CPUE for Middle Harbour of 0.2 fish per angler hour, though this was for only 36 interviews done. The catch rate in Botany Bay, with 143 interviews done, was 0.96 fish per angler hour. An assessment on Lake Macquarie did not recommend comparing overall catch rates (Steffe, Murphy *et al.* 2005).

Table 12. Mean Catch per Unit Effort expressed as number of fish caught per angling hour from FCV interviews in inland regions of NSW.

Region	1999	2000	2001	2002	2003	2004	Mean (fish/hr)
Tamworth Region				0.28	0.57		0.49
Armidale Region		0.49	0.99	0.00		0.00	0.64
Bathurst Region						0.34	0.52
Central Tablelands Region		0.00	0.37	0.11	0.19	0.00	0.18
Ebor Region						0.00	0.00
Nepean Region				0.16	0.07	0.00	0.11
Scone Region					1.20	0.00	0.76
Yass Region			0.00	0.00			0.00
Snowy Mountains Region	0.42	0.42	0.41	0.28		1.06	0.38
Albury Region				0.00			0.00
Freshwater Inland Region						0.00	0.00
Western Region						0.00	0.00
Mean	0.42	0.38	0.46	0.20	0.44	0.22	0.36

Table 13. Mean Catch per Unit Effort expressed as number of fish caught per angling hour for five years of FCV interviews in coastal regions of NSW.

Region	2000	2001	2002	2003	2004	Mean (fish/hr)
Tweed Heads Region				1.13	1.33	2.00
Far Nth Coast Region					0.67	0.67
Macleay Region			2.68		0.00	1.14
North Coast Region					0.00	0.00
Coffs Harbour Region			1.00	0.70	2.54	1.47
Port Macquarie Region			0.82	0.26		0.47
Hastings Region					0.23	0.26
Lake Macquarie Region		0.23	1.66	1.88	1.25	1.57
Wallis Lake Region				1.36	2.97	1.76
The Entrance Region			0.23	1.01	2.15	1.11
Central Coast Region					0.60	0.61
Middle Harbour Region			0.00	0.00	0.64	0.20
Botany Bay Region			0.78	0.63	1.16	0.97
Wollongong Region						1.03
Lake Illawarra Region	0.40	0.81	0.00	0.33	0.16	0.42
Jervis Bay Region			0.70	0.69	0.84	1.27
Batemans Bay Region			1.09	1.83	1.98	1.72
Montague						0.00
Narooma Region				0.13		0.13
Mean	0.40	0.63	1.02	0.87	1.44	1.03

6. SUMMARY AND RECOMMENDATIONS

The efforts of the FCVs should be praised as considerable amounts of data have been collected. The survey collects information on recreational fishing in NSW that includes demographic and fisheries data as well the public's perception of and their needs for fisheries management.

The survey found that most anglers tend to be males between 40-60 years old. Surveyed anglers had a comparatively high component of those aged over 65 compared to the national population but youth was underrepresented in the angling community. Most anglers (90%) stated that they were licensed and the public's awareness of fishing regulations is improving. Anglers rated stocking as the highest priority for trust expenditure and research as the lowest. RFAs received a relatively low priority.

The average completed fishing trip was 1 hour 53 minutes in duration; whereas the average time spent fishing at the time of the interview was 3 hours 12 minutes. Freshwater fishing trips were longer in duration than those in saltwater. Bait-fishing was the most popular form of fishing overall. Though freshwater fishers tended to be more diverse in their fishing method with a greater proportion trolling, spinning and fly-fishing.

Of all fish caught, 46% were released. Retention rates were higher in freshwater (59%) than saltwater (52%). Presumably this was mainly due to undersized fish, though the reason for release was not asked.

Catch composition and catch rates varied considerably among regions and years. Missing time information compromises the calculation of catch rates. Improving the time recording and structure of the survey will improve this data.

The FCVs should be encouraged to complete all fields, the time fields were often incomplete, and the trust expenditure question was often not categorised 1-6 as needed. These problems can easily be improved by training.

It is important that the FCVs and the public do not confuse the role of FCVs and enforcement. A potential question not asked is if the angler has had any interaction with enforcement officers. Angler compliance with licensing requirements would be better determined through the enforcement officer's activities. Rather the FCVs could ask if the angler qualified for a licence exemption. Having size data of the fish recorded would be useful though this protracts the duration of the interview and resembles enforcement action monitoring compliance with minimum size regulations.

The survey is broad in the subjects it covers. It collects data on angler demography, information pertaining to the anglers' awareness of fisheries management initiatives such as the FCV programme and fisheries regulations as well as their preferences for recreational trust money expenditure. The survey also collects catch and effort information. However the scope of the survey and the relatively low number of interviews, limits the utility of the survey for stock assessment of recreationally important species. Research would benefit from the data collection being better structured. Continuation of this survey requires an improvement in the number of interviews; in particular some consistency in the number of interviews among regions and through time to ensure it is representative of the regions is important. In most areas this would also mean an increase in the numbers of interviews. This would require training of the FCVs in survey methods and for FCVs to appreciate representative sampling. There are 323 FCVs listed at the time of writing, this is a substantial pool of people that are sufficiently interested in fisheries to volunteer

their time to the program. Obviously with a large group of people their enthusiasm and available time is varied. Probably the first stage of planning a structured survey is to ask each FCV how much time they can commit to doing a survey (remembering that they are volunteers). Depending on availability, dates could then be selected to be survey days. Key waterways within each region should be identified as well as each waterway's main access points (NSW Waterways are a source of information on access point usage). The current data may provide pilot information in some areas though others would require a pilot study be undertaken. Depending on volunteer resources something in the order of at least two weekend days and one weekday per month might provide sufficient data.

The survey could then be structured to be stratified into key areas in each region (Appendix 5), weekend versus weekday and within a day into 4-hour time slots. For temporal stratification, 0600-1000 hrs; 1000-1400 hrs; 1400-1800 hrs would be appropriate time slots. Access point and roving surveys at aggregation points such as break walls should be selected depending of the mobility of the FCV and the nature of the waterway. Standardising the survey locations would improve the survey (Appendix 5). Head counts and Bus Stop surveys (in which trailer counts are done at boat ramps) would be particularly useful on larger waterways such as Sydney Harbour and Lake Macquarie; a small boat would be useful in these areas to improve coverage.

The FCV Programme assigns its activities to 10 inland and 16 coastal regions, it is unclear how the regions were established but it would be useful for fisheries research if based on watersheds. Moreover, the societal aspects of the survey should also be considered in the geographic stratification of regions.

The FCVs are of greatest benefit in supporting existing structured scientific projects. Many FCVs currently support data collection by the Angling Research Tournament Monitoring Programme at fishing tournaments; this should be expanded (Figure 4). The survey could also focus on key tournament areas at times outside of tournaments. This could then be compared with the tournament data to assess the impact of particularly large tournaments both on the fish populations as well as providing an opportunity for local opinion to be recorded. This local opinion could also provide background for tournament codes of conduct. Particular tournaments to be considered include those at Evans Head, Coffs Harbour, Port Stephens and those along the Murray River. FCVs have also been utilised in previous scientific recreational fishery surveys, such as at Lake Macquarie and proved invaluable in providing much needed man-hours required to conduct a large survey (Steffe, Murphy *et al.* 2005).

The efforts of the FCVs, the Education Officers and the Coordinator need to be commended. The survey provides a baseline of information important in fisheries management, research and on public opinion. As well as providing information to NSW DPI the survey structures the information collected and provides a mechanism for FCVs to interact with the public. It is this interaction that is particularly valuable to the programme and to NSW DPI.

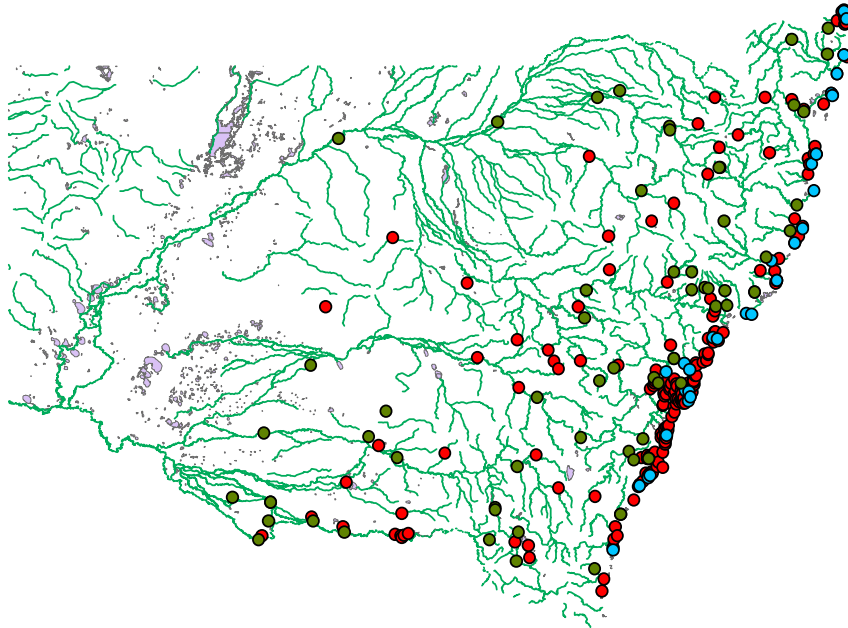


Figure 4. Location of freshwater (green) and saltwater (blue) tournaments monitored relative to the locations of 334 of the Fishcare Volunteers (red).

7. REFERENCES

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- Steffe, A.S., Murphy, J.J., Chapman, D.J. and Gray, C.C., 2005. An assessment of changes in the daytime recreational fishery of Lake Macquarie following the establishment of a 'Recreational Fishing Haven'. NSW Department of Primary Industries - Fisheries Final Report Series No. 79. 103pp.

APPENDICES

Appendix 1: The Fishcare Volunteer Interview Survey Form



NSW FISHCARE
VOLUNTEER PROGRAM

INTERVIEW LOG – Coffs Harbour Region Volunteer ID _____

Area: _____ Location: _____ Date: _____

***** Remember to introduce yourself and explain what you do and why? ask if its OK to ask some questions relating to their fishing and fishing in general*****

Refusal Cease interview politely
 Acceptance Continue politely Interviewed before: Y N

DATA Name _____ Time _____ Sex _____ Postcode _____

Age: <18 18-40 40-60 >60 Number of fishers in group _____

Where fished: _____ Accessed by Boat Shore

Are you aware of the Fishcare Volunteer Program: Y N How? _____

Do you mind me collecting some catch data? Y N If Yes politely thank for cooperation.

Catch Data				Remember: Record all fish species caught (including pests)	
Method	Time spent	Fish Type	Catch	Release	
Bait	Start				
Troll	Finish				
Fly	Start				
Spin	Finish				
Other					

Other Comments: _____

Licence Expenditure		Advisory material given	
Education <input type="checkbox"/>	Enforcement <input type="checkbox"/>	Rules/ Regs <input type="checkbox"/>	Rulers <input type="checkbox"/>
Fish stocking <input type="checkbox"/>	Research <input type="checkbox"/>	Fishnotes <input type="checkbox"/>	Local closure <input type="checkbox"/>
Habitat Protection <input type="checkbox"/>	Recreational only areas <input type="checkbox"/>	Other <input type="checkbox"/>	
Rank level of support from 1 to 6 (1: full support → 6: least support)		_____	
Other _____		_____	

Other comments: _____

Evaluation Report: *Please tick the most appropriate box/s*

Angler seems the following regarding fishing rules: unaware aware well versed licence holder

Appendix 2: Are interviewees licensed?**Table 14.** Survey results of whether anglers were licensed at time of interview by region and year.

Region	Licensed	1999	2000	2001	2002	2003	2004	Total
Albury Region	Unspecified				3			3
	No							
Armidale Region	Unspecified		6	6	1			13
	No		15					15
Batemans Bay Region	Unspecified				7	27	1	35
	No					1		1
Bathurst Region	Unspecified						1	1
	No							
Botany Bay Region	Unspecified				15	33	5	53
	No				1		1	2
Central Coast Region	Unspecified							
	No							
Central Tablelands Region	Unspecified		2	1	10	10	1	24
	No		2	1	5	2		10
Coffs Harbour Region	Unspecified				13	17		30
	No				1	1		2
Far Nth Coast Region	Unspecified				25	9	1	35
	No							
Jervis Bay Region	Unspecified				20		4	24
	No				6			6
Lake Illawarra Region	Unspecified		149	18	20	20	6	213
	No		10	10	5			25
Lake Macquarie Region	Unspecified		7	15	13	10	17	62
	No				34	5		39
Maclean Region	Unspecified				4			4
	No							
Middle Harbour Region	Unspecified						1	1
	No				18	2		20
	Unspecified							
	No				13	2		15

Table 14 – continued.

Region	Licensed	1999	2000	2001	2002	2003	2004	Total
Narooma Region	Unspecified				1	9		10
	No							
	Yes					25		25
Nepean Region	Unspecified				8	2		10
	No				5	2		7
	Yes				16	8		24
North Coast Region	Unspecified							
	No							
	Yes						1	1
Port Macquarie Region	Unspecified				89	226		315
	No				10	2		12
	Yes				105	50		155
Scone Region	Unspecified							
	No					1		1
	Yes					7		7
Snowy Mountains Region	Unspecified	3	3	4	10			20
	No	5	5	24				34
	Yes	12	77	56	33		3	181
Tamworth Region	Unspecified				27	41		68
	No							
	Yes				8	32		40
The Entrance Region	Unspecified				5	4	2	11
	No							
	Yes				9	27	7	43
Tweed Heads Region	Unspecified					21		21
	No					3		3
	Yes					15	4	19
Wallis Lake Region	Unspecified					22		22
	No					10		10
	Yes					39	16	55
Yass Region	Unspecified			1	4			5
	No							
	Yes			17	2			19
Total Unspecified:		3	160	30	289	439	20	941
Total No:		5	32	35	37	22	1	132
Total Yes:		12	132	169	410	399	97	1 219

Appendix 3: Have respondents been previously interviewed?**Table 15.** Survey results of whether anglers had been previously interviewed by region and year.

Region	Response	1999	2000	2001	2002	2003	2004	Total
Albury Region	Unspecified							
	No				100%			100%
	Yes							
	Number				3			3
Armidale Region	Unspecified			12%				4%
	No		95%	81%	100%			90%
	Yes		5%	8%				6%
	Number		40	26	1			67
Batemans Bay Region	Unspecified					5%		4%
	No				90%	90%		89%
	Yes				10%	5%	100%	7%
	Number				20	61	1	82
Bathurst Region	Unspecified						7%	7%
	No						57%	57%
	Yes						36%	36%
	Number						14	14
Botany Bay Region	Unspecified				9%	5%	13%	8%
	No				88%	84%	78%	85%
	Yes				4%	11%	9%	8%
	Number				57	63	23	143
Central Coast Region	Unspecified							
	No						100%	100%
	Yes							
	Number						3	3
Central Tablelands Region	Unspecified		6%		1%	4%		2%
	No		88%	51%	62%	63%	100%	64%
	Yes		6%	49%	37%	33%		34%
	Number		33	49	78	54	1	215
Coffs Harbour Region	Unspecified							
	No				95%	74%		85%
	Yes				5%	26%	100%	15%
	Number				39	27	1	67
Far Nth Coast Region	Unspecified							
	No						100%	100%
	Yes							
	Number						1	1
Jervis Bay Region	Unspecified				8%			5%
	No				81%	62%	60%	75%
	Yes				11%	38%	40%	20%
	Number				37	13	5	55

Table 15 – continued.

Region	Response	1999	2000	2001	2002	2003	2004	Total
Lake Illawarra Region	Unspecified		7%	2%			17%	5%
	No		90%	95%	95%	100%	74%	91%
	Yes		4%	2%	5%		9%	4%
	Number		166	43	38	30	23	300
Lake Macquarie Region	Unspecified			7%	1%		8%	2%
	No			93%	93%	81%	75%	87%
	Yes				6%	19%	17%	11%
	Number			14	95	62	12	183
Macleay Region	No				80%		100%	83%
	Yes				20%			17%
	Number				5		1	6
Middle Harbour Region	Unspecified				13%			11%
	No				84%	100%		86%
	Yes				3%			3%
	Number				31	4		35
Narooma Region	Unspecified							
	No				100%	94%		94%
	Yes							
	Number				1	34		35
Nepean Region	Unspecified							
	No				93%	83%		90%
	Yes				7%	17%		10%
	Number				29	12		41
North Coast Region	Unspecified							
	No						100%	100%
	Yes							
	Number						1	1
Port Macquarie Region	Unspecified				2%			1%
	No				93%	97%		95%
	Yes				5%	3%		4%
	Number				204	278		482
Scone Region	Unspecified							
	No					13%		13%
	Yes					88%		88%
	Number					8		8
Snowy Mountains Region	Unspecified	10%	2%	1%			67%	3%
	No	75%	75%	32%	37%		33%	52%
	Yes	15%	22%	67%	63%			45%
	Number	20	85	84	43		3	235
Tamworth Region	Unspecified							
	No				94%	70%		78%
	Yes				6%	30%		22%
	Number				35	73		108
The Entrance Region	Unspecified				7%			2%
	No				37%	87%	100%	91%
	Yes					5%		7%
	Number				14	31	9	54

Table 15 – continued.

Region	Response	1999	2000	2001	2002	2003	2004	Total
Tweed Heads Region	Unspecified					3%		2%
	No					90%	100%	91%
	Yes					8%		7%
	Number					39	4	43
Wallis Lake Region	Unspecified					3%	13%	5%
	No					77%	75%	77%
	Yes					20%	13%	18%
	Number					71	16	87
Yass Region	No			100%	100%			100%
	Yes							
	Number			18	6			24
<i>Total Unspecified:</i>		<i>10%</i>	<i>5%</i>	<i>3%</i>	<i>3%</i>	<i>1%</i>	<i>11%</i>	<i>3%</i>
<i>Total No:</i>		<i>75%</i>	<i>86%</i>	<i>62%</i>	<i>85%</i>	<i>85%</i>	<i>75%</i>	<i>82%</i>
<i>Total Yes:</i>		<i>15%</i>	<i>9%</i>	<i>35%</i>	<i>12%</i>	<i>13%</i>	<i>14%</i>	<i>15%</i>
Total		20	324	234	736	860	118	2 292

Appendix 4: Catch composition.

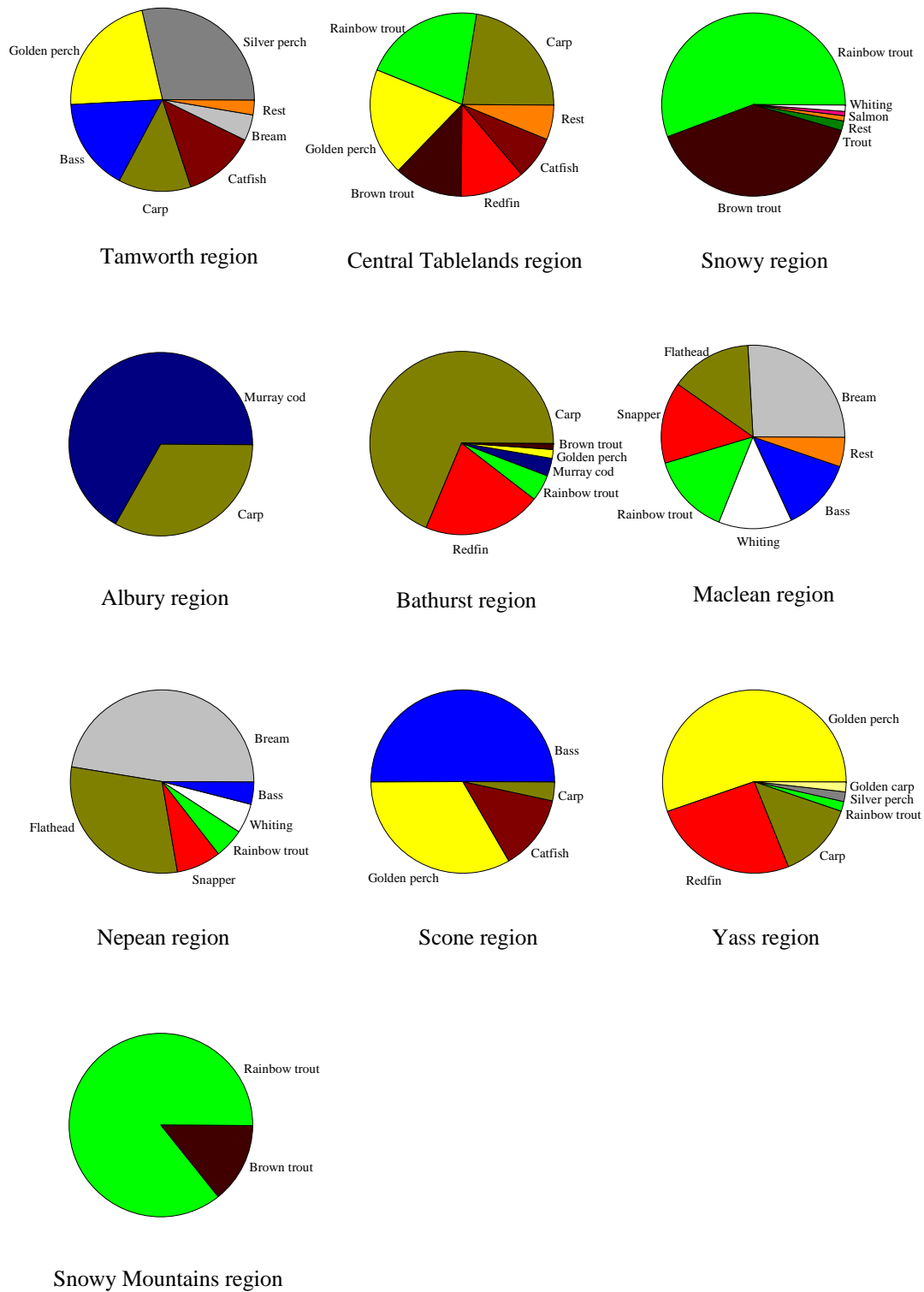


Figure 5. Catch composition from FCV surveys of inland anglers, by region for 1999-2004.

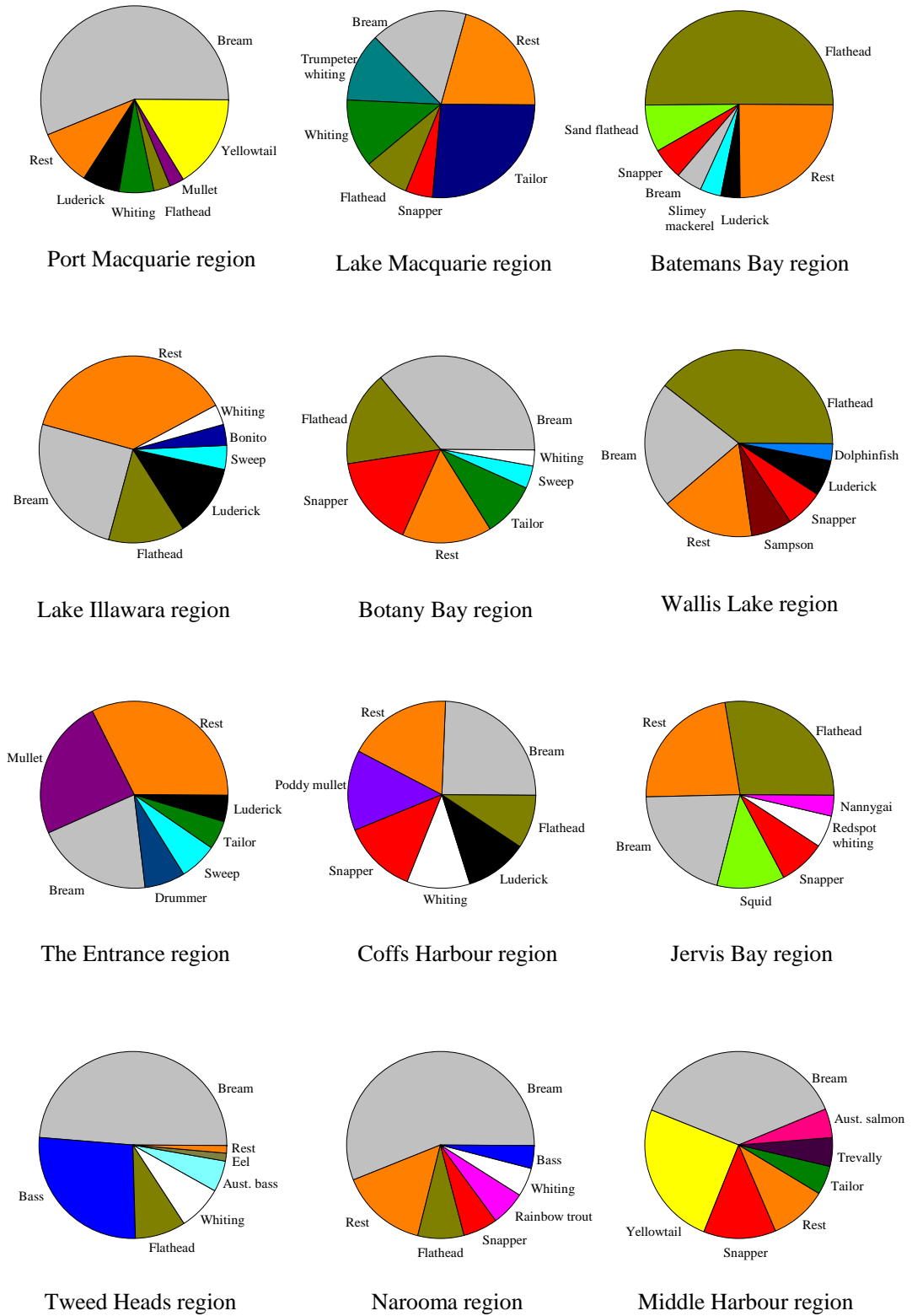


Figure 6. Catch composition of coastal anglers from FCV surveys, by region for 1999-2004.

Appendix 5: Potential access and aggregation points for survey.**Table 16.** Number of FCVs by FCV coastal region, principal waterway and potential access and aggregation points for survey.

FCV Region	Number of Main Waterway FCVs		Potential Access and Aggregation Points
Tweed Heads	19	Tweed River	Jack Evans Boat Harbour Fingal Chinderah Terranora Creek
Clarence	9	Clarence River	Seven Mile Beach Esplanade Jetty Road, South Arm Rosny Esplanade, Montague Bay Yamba Breakwall
Coffs Harbour	16	Coffs Harbour	Coffs Harbour Coffs Jetty
Port Macquarie	14	Port Maquarie	Port Marina, off Park St Port Macquarie Breakwall Laurieton Breakwall
Wallis Lake	11	Myall Lakes	Forster adjacent to the Forster Beach Caravan Park Tuncurry
Lake Macquarie	13	Lake Macquarie	Swansea Boat Ramp Wangi Wangi Boat Ramp
The Entrance	8	The Entrance	Ungalla Rd Blacksmiths Norah Head, Street Name Terrigal Haven
Long Reef	15	Pittwater / Port Jackson	Little Manly Cove Manly Reservoir Narrabeen Pittwater Ungalla Rd Blacksmiths
Middle Harbour	18	Port Jackson	Roseville Ramp, Healey Way Tunks Park, Brothers Ave Clontarf Beach:Clontarf Reserve Spit Bridge
Botany Bay	26	Botany Bay	Penhryn Rd, Banksmeadow - Botany Bay Kyeemagh, Mutch Ave (Cooks River) Sans Souci, The Promenade (Kogarah Bay) Blakehurst, Princes Hwy (Dover Park, Kogarah Bay) Tom Ugly's Bridge, Princes Hwy (south side) Port Hacking- Tonkin Park Turriel Bay
Lake Illawarra	23	Lake Illawarra	Lake Illawarra –Windang, Warilla Shellharbour Bass Point

Table 16 – continued.

FCV Region	Number of Main Waterway FCVs		Potential Access and Aggregation Points
Jervis Bay	26	Jervis Bay	Murrays Beach, Jervis Bay Rd Prince Edward Ave, Crookhaven Heads Holden Street, Vincentia, Huskisson
Batemans Bay	7	Clyde river	Boat Harbour Smoke Point
Montague	8	Wagonga Lake	Mystery Bay Wagonga Inlet
Eden	4	Twofold Bay	Twofold Bay Merimbula
Coastal FCVs	217		

Table 17. Number of FCVs by FCV inland region, principal waterway and potential access and aggregation points for survey.

FCV Region	Number of Main Waterway FCVs		Potential Access and Aggregation Points
Armidale	15	Copeton Dam, Gara River	Copeton Dam
Tamworth	6	Lake Keepit	Lake Keepit State Park
Grafton	7	Clarence River	Grafton Copmanhurst
Orange	3	Macquarie River/ Lake Burrendong	Burrendong State Recreation Area
Mudgee	3	Lake Windamere	Lake Windamere
Bathurst	8	Ben Chifley Dam / Murrumbidgee River	Ben Chifley Dam
Braidwood	12	Shoalhaven	Upper Shoalhaven
Wagga	9	Murrumbidgee River	Lake Burrenjuck
Cowra	4	Lake Wyangala	Wyangala Dam
Nepean	8	Nepean River	Camden on the Nepean River
Scone	2	Lake Glenbawn	Glenbawn Dam
Snowy	13	Lake Eucumbene / Jindbyne	Lake Eucumbene Jindabyne
Yass	1	Lake Burrinjuck	Lake Burrinjuck
Corowa	15	Murray River	Echuca Tocumwal Deniliquin Lake Mulwala
Inland FCVs	106		

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