Statewide Recreational Fishing Survey
2013–14

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Glossary

2000–01 survey	Queensland component of the National Recreational and Indigenous Fishing Survey 2000–01
2010–11 survey	Queensland 2010–11 Statewide Recreational Fishing Survey
Attitudinal/wash-up survey	Final part of the survey that measured the attitudes and awareness of recreational fishers regarding a variety of fisheries issues
Census	Complete count of everyone or everything in a population (e.g. a census of people living in Queensland would survey everyone living in the state)
Crustaceans	Group of invertebrates including lobsters, crayfish, crabs, prawns and yabbies
CW/NW/SW	Central West/North West/South West residential region
Diary survey	The 12 months between November 2013 and October 2014 in which all catch and effort information was reported by fishers—telephone interviewers made regular (minimum of monthly) calls to each household in the survey to accurately record all fishing information
Eligible household	Household that indicated during the screening survey that it was 'very likely' or 'quite likely' to fish in the coming 12 months
Exclusive economic zone	Australian waters out to 200 nautical miles from the coastal baseline
Fish	Includes teleosts (bony fishes) and elasmobranchs (sharks, skates and rays)
Fish stocks	Subpopulations of a particular species that are of interest to fisheries managers
Fishing household	Household that includes a recreational fisher
Fisher day	Measure of fishing effort (e.g. if three people went fishing in the morning and then again in the afternoon, this would represent three fisher days)
Frame	List of households with a phone number included in the Telstra White Pages, from which the sample was selected
Harvest	Part of the catch that is kept
Indigenous fishing	Aboriginal or Torres Strait Islander who is acting under Aboriginal tradition or Island custom and is taking, using or keeping fisheries resources for the purpose of satisfying a personal, domestic or non-commercial communal need
Inshore waters	Waters within 5 km of mainland Australia, Fraser Island, Moreton Island, North Stradbroke Island or South Stradbroke Island
Listed fisher	Recreational fisher living in a household with a home phone or mobile number listed in the Telstra White Pages
Mortality	Used in this report to refer to the loss of fish stocks due to predation, death from disease and removal by fishing
National Recreational and Indigenous Fishing Survey (NRIFS)	Comprehensive survey on recreational and Indigenous fishing conducted nationally in 2000–01—the only survey to date to estimate the total recreational catch by Australians
Non-fishing household	Household that does not include a recreational fisher

Non-intending fisher follow-up survey	Conducted at the end of the diary survey among a sample of households from the original screening survey who reported no intention to fish during the diary period
Offshore waters	Oceanic waters more than 5km from land
Other taxa	All pippis, shellfish and worms collected by fishers
Participation rate	Number of recreational fishers aged 5 years or more who fished in Queensland in the previous 12 months, expressed as a percentage of all people aged 5 years or more living in Queensland
Powerboat	Boat powered by an inboard or outboard motor
Primary sampling unit	Households with a phone number listed in the Telstra White Pages that were randomly selected as part of the screening survey
Private dwelling households	All households in Queensland, excluding businesses and prisons (Australian Bureau of Statistics definition)
Recreational fisher	Someone 5 years old or older who went recreational fishing at least once in a 12-month period
Recreational fishing	Attempted capture of fish, crustaceans or other taxa for non-commercial purposes
Relative standard error (RSE)	Standard error of an estimate divided by the estimate and expressed as a percentage
Representative	A sample that accurately reflects the characteristics of the population as a whole
Queenslanders	People whose usual place of residence is in Queensland
Response rate	Proportion of households who answered all questions in the survey expressed as a percentage of all households in the sample
Sample loss	Households that were identified as not being valid residential households, e.g. they were businesses phone numbers.
Sand whiting complex	Several different species of whiting, dominated by sand whiting but excluding winter whiting (*Sillago ciliata, S. analis and S. sihama*)
Screening survey	First part of the survey, during which approximately 15 000 households were contacted by telephone and their fishing characteristics examined
Standard error (SE)	Estimate of how variable sample means are at estimating the true population mean
Stock status assessment	Process for determining the status of key species in Queensland by collating and assessing the best available information and matching it against clearly defined criteria
Sustainable	Situation where the fish population does not decline over time because of potential threats, such as fishing practices
Uptake rate	Number of households that agreed to start the diary survey expressed as a percentage of all households eligible to start the survey

Summary

This report summarises the key results from the 2013–14 Statewide Recreational Fishing Survey. It includes detailed information on how many Queenslanders fished recreationally and what they caught. Information on fishing participation rates, boat ownership and fishing and diving club membership is also presented.

These results will be of use for stock and sustainability assessments, helping to ensure that fisheries in Queensland are managed on an ecologically, economically and socially sustainable basis. The estimates available are useful to all recreational fishing stakeholders because the time series they add to provides evidence of the changes that occur in recreational fishing over time.

As with the 2010–11 Statewide Recreational Fishing Survey and the 2000–01 National Recreational and Indigenous Fishing Survey, this survey used a telephone–diary method to estimate the fishing activities of Queenslanders. This technique has been successfully used in Queensland and elsewhere in Australia many times since 2000.

During September and October 2013, approximately 15 000 households across Queensland were called by telephone interviewers. Interviewed households were asked whether they had fished recreationally in the previous 12 months and if they intended to fish in the next 12 months. Households that intended to fish were then invited to take part in a 12-month diary survey, which ran from 1 November 2013 to 31 October 2014. Approximately 91% of fishing households agreed to take part in the diary survey.

All fishing information was collected by trained telephone interviewers who called fishers at least monthly, and ensured that all information was recorded accurately. Approximately 92% of all households that started the diary survey participated throughout the entire 12 months.
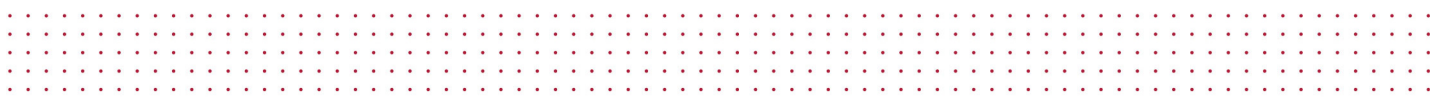
In the 12 months prior to September 2013, an estimated 642 000 Queenslanders went recreational fishing in Queensland, representing 15% of the Queensland population aged 5 years or more. This makes recreational fishing one of the most popular leisure activities in Queensland.

Over one-third of all recreational fishers lived in the Brisbane region, but the participation rate among local residents was highest in the Mackay Hinterland and Far North Hinterland residential regions where 30% and 27.5% of the population were recreational fishers, respectively. More than twice as many males than females were recreational fishers, with the greatest number in the 30–44 years age group.

Most recreational fishers in Queensland were not affiliated with a recreational fishing or dive club. Boat ownership among fishing households was high. Approximately 49% of fishing households owned a boat and most of these were 4–5 m powerboats.

There was a substantial increase in the number of paddle-powered vessels or kayaks used for fishing compared to previous years. Echo sounders and GPS were used on most boats greater than 5 m, and electric motors were used on approximately 15% of boats less than 6 m long.

During the 12 months between November 2013 and October 2014, Queensland residents fished for approximately 2.5 million days in Queensland, similar to the effort in the 2010–11 survey. Fishing with a line was the most popular method and around half of all effort was shore based (the other half was boat based).

Residents living in the Brisbane, Sunshine Coast and Wide Bay-Burnett regions were responsible for nearly 57% of all fishing effort. Fishers did travel away from their local area to fish, but most fished close to where they lived.

Resident recreational fishers caught a diverse range of teleosts (bony fishes) and elasmobranchs (sharks, skates and rays). Yellowfin bream was the most commonly caught fish, with an estimated 1 156 000 caught. Whiting were the next most commonly caught fish, with an estimated 1 090 000 sand whiting complex and 679 000 trumpeter whiting caught. Flathead also formed a considerable part of the total catch, with approximately 412 000 fish caught, of which 85% were dusky flathead (352 000 fish).

Estimates of other commonly caught species were dart (352 000 fish), barred javelin (329 000 fish), pikey bream (234 000 fish), snapper (203 000 fish) and barramundi (174 000 fish) and. Large numbers of freshwater fish were also caught, with Australian bass (171 000 fish) and golden perch (146 000 fish) being the most common.

The recreational catch also included large numbers of non-fish species, such as crustaceans (e.g. crabs), cephalopods (e.g. squid) and other taxa. Mud crabs were the most commonly caught non-fish species, with 1.7 million estimated to have been caught.

Many fish caught are later released; however, the proportion released varies considerably by species. High release rates were reported for Australian bass, barramundi, crabs, cod, groper, javelin, pearl perch, sharks and snapper. Recreational fishers released fish for a variety of reasons, the most common of which related to the fish being too small or below a legal size limit. Catch-and-release fishing was also popular, particularly for freshwater species such as Australian bass.

Despite the population growth in Queensland since the 2010–11 survey, the number of people estimated to have gone recreational fishing at least once in the previous 12 months was lower than the 2010–11 survey estimate. Similar declines in the participation rate of recreational fishing have recently been reported in the Northern Territory and (to a lesser extent) Tasmania.

In this current survey, participation in recreational fishing tended to be lower in the urbanised centres of Queensland compared to their surrounding rural areas. Understanding the reasons why fewer Queenslanders go recreational fishing is beyond the scope of this study. However, previous research suggested that primary reasons for ceasing fishing in Queensland included a lack of time and a loss of interest. Competition for recreational time by other activities may also play a role in explaining the decline.

Cyclonic weather events no doubt had a large impact on fishing activity during the 2010–11 survey. In contrast, relatively calm weather was experienced across most of the state for most of the 12-month period of this current survey. The effect of weather, changes to regulations and other external events should always be considered when making comparisons of catch and effort across the years.

In all surveys, fishers were asked if they fished more or less during the survey period than in the previous 12 months. In the 2010–11 survey, 43% felt they fished less and approximately one-third of those fishers cited weather as the main reason. During this survey, about one-third of fishers felt they fished more often, one-third felt they fished less often and one-third felt they fished about the same— weather being only a minor explanation.

Introduction

Benefits and impacts of recreational fishing

Recreational fishing provides an important source of enjoyment for a large number of Australians. It is particularly popular in Queensland, where a wide range of marine and freshwater fishing opportunities are available. For many people, recreational fishing provides the chance to relax and unwind, to 'get away from it all' and find a quiet spot. For others it provides excitement and the opportunity to socialise with friends and family.

Recreational fishing also provides important economic benefits to Queenslanders. It supports the tackle industry and significantly contributes to the boating industry. In addition, recreational fishing provides an economic stimulus for businesses, both at the fisher's residential locality and around the fishing site (e.g. camp sites, bakeries and fuel suppliers). The development of freshwater fisheries in stocked impoundments has also brought economic benefits to regional areas of Queensland (Rolfe and Prayaga, 2007). These positive benefits of recreational fishing are good reasons to ensure that the activity remains accessible and enjoyable, now and into the future.

However, because recreational fishing often involves harvesting fish, it does impact fish stocks and therefore needs to be monitored to ensure it remains a responsible and sustainable activity. Recreational catch and effort is not insignificant. Queensland's previous survey estimated that Queenslanders fished for 2.6 million days during the 2010–11 survey period (Taylor et al., 2012), and during this survey we estimate they fished for 2.5 million days—both substantial amounts. While an individual fisher may have only a small impact on the status of fish stocks, recreational catch collectively is substantial for numerous species, especially coastal species such as mud crabs, tailor and snapper.

The effects of recreational fishing are not restricted to harvesting fish. Other potential impacts can include the subsequent death of fish released back into the water and disturbances resulting from physical trampling and lost fishing tackle (Lewin et al., 2006). Good fishing practices, such as handling fish properly, can help to reduce these impacts.

Need for recreational fishing information

The Department of Agriculture and Fisheries (DAF) is responsible for advising the Queensland Government on fisheries management issues, the education and enforcement of current fisheries laws and for the monitoring and evaluation of Queensland's fisheries resources. Fish stocks can be over exploited, and care is needed to ensure that the total harvest from all sectors does not exceed levels that would cause fish stocks to decline detrimentally. High quality fishing information from all sectors, including the recreational sector, is required to properly assess Queensland's fisheries.

Over 4.8 million people live in Queensland (Australian Bureau of Statistics, 2015)—many in close proximity to water and fishing opportunities. As has always been the case, Queensland's population is growing in size and changing in culture and attitudes towards many things. Understanding how this growth and these changes affect recreational fishing improves the management of our fisheries resources.

Aims and objectives

The broad aims of this survey were to provide reliable estimates of:

1. the number of Queenslanders who fish recreationally and the participation rate of recreational fishing among Queenslanders by residential region, age and gender

2. boat ownership and fishing and diving club membership among recreational fishers

3. recreational fishing effort by Queenslanders in Queensland (statewide and regional)

4. recreational catch by Queenslanders in Queensland (statewide and regional)

5. recreational fishers' motives for fishing and attitudes to, and awareness of, various fishing and environmental topics.

The first four aims are addressed in this report. A subsequent report focusing on social behaviour, motives for fishing and recreational fishers' attitudes towards various fishing and environmental topics will be released at a later date.

Comparison with previous surveys

The design of this survey is closely modelled on the Queensland component of the 2000–01 National Recreational and Indigenous Fishing Survey (NRIFS) (Henry and Lyle, 2003) and the 2010–11 Statewide Recreational Fishing Survey (Taylor et al., 2012).

The NRIFS was the first and only study to examine recreational and Indigenous fishing across Australia. It achieved this by completing statewide surveys simultaneously in all Australian states and territories. Using a consistent survey design is important, as it allows robust comparisons to be made through time and between states. For example, this current survey can be compared with the NRIFS survey and the 2010–11 survey to reveal inter-decadal changes in recreational fishing activity. Furthermore, the same survey design has been used in Tasmania in 2013–14 (Lyle et al., 2014), the Northern Territory in 2009–10 (West et al., 2012b) and New South Wales in 2013–14. As a result, the estimates in this report can be directly compared with these more recent interstate surveys.

This study has benefitted from a recent Fisheries Research and Development Corporation project, which produced an analysis package known as RecSurvey (Lyle et al., 2010). This analysis package is specifically designed to analyse recreational fishing survey data collected using methods similar to NRIFS. As was the case for the 2010–11 survey, this package was used to complete the detailed statistical analysis presented in this report. The data from NRIFS were also re-analysed using the RecSurvey package as part of the 2010–11 survey—therefore allowing for direct comparison between recreational fishing from surveys in 2000–01, 2010–11 and 2013–14.

The Queensland statewide telephone–diary surveys conducted from 1996 to 2005 (McInnes, 2008) used a different survey design to the current survey. These surveys also estimated the number of recreational fishers and the respective participation rates, and these estimates can be compared to estimates from this current survey.

However, the catch data obtained from these surveys could not estimate the detailed catch and effort statistics with as much confidence as the estimates made from surveys using the current methodology. Estimates made from the current survey methodology are considered to be more

accurate, as the design of the survey gives far greater consideration to known sources of bias (Hartill et al., 2012).

Relevance to fisheries assessments and sustainability

The outputs of this survey will be used in future stock and sustainability assessments. Stock assessments require accurate information on all forms of mortality impacting on a stock. Three types of information are typically required for stock assessments—estimates of the total harvest (recreational, commercial and charter), trends through time, and information on the size and age of the fish removed (Hilborn and Walters, 2003).

This survey will contribute important information used to estimate total harvest and reveal trends through time for numerous recreationally caught species. Information on the size and age of fish harvested by recreational fishers is collected as part of other DAF recreational species monitoring activities.

In summary, this information on recreational fishing helps DAF assess the sustainability of fish stocks. Details of these monitoring processes and stock status assessments are available at www.daf.qld.gov.au.

Relevance to management and industry development

A key part of fisheries management is managing people and their access to fisheries resources (McPhee, 2008). As such, the social information collected as part of this survey will lead to a better understanding of where, how and why people fish. This has the potential to assist in the development of new and enhanced recreational fishing opportunities and could strengthen future policy and management.

The recreational fishing sector is estimated to support about 90 000 Australian jobs (Skirtun et al., 2013). Information on how many Queenslanders fish recreationally, where they live and why they fish will be relevant to many businesses throughout Queensland, including tackle shops, the boating industry and other local business owners who benefit from recreational fishers.

Report structure

The structure of this report is similar to that used in the previous 2010–11 survey (Taylor et al., 2012) so that readers can easily compare results across years. However, because of the large amount of data collected, it is impractical to present all of the estimates here. This report summarises the key findings of the survey, most of which are displayed in tables or graphs.

To provide access to the data from the 2000–01, 2010–11 and 2013–14 surveys DAF has developed a web-based information system (qfish.fisheries.qld.gov.au). This website allows users to create their own data queries online by filtering various fields and data, which provides access to many more estimates than can be presented in this report.

Methods

Survey overview

The survey used a telephone–diary method, involving a multi-phase survey design. The method has been developed to allow for cost-effective collection of recreational fishing data over a broad spatial scale. Descriptions of its methodology and development are provided in Lyle et al. (2002), Henry and Lyle (2003), Jones et al.(2009) and Lyle et al. (2014). The data analysis procedures were completed using the RecSurvey package (Lyle et al., 2010) and the statistical programming language R (R Core Team, 2014). The statistical methodology applied was externally reviewed by an independent statistician. A flow chart of various survey stages is provided in Figure 1 (overleaf).

The Telstra White Pages has previously been used in Queensland as a sampling frame for recreational fishing surveys (McInnes, 2008; Taylor et al., 2012). Sampling from telephone listings is considered a cost-effective way of representatively surveying a large number of recreational fishers spread over a wide geographical area in the absence of other suitable frames (Pollock et al., 1994). This method allows the total recreational catch to be estimated over large spatial scales when combined with regional population estimates (Lyle et al., 2010).

The primary sampling unit for the survey was private dwelling households in Queensland, with recreational fishers within the household representing the secondary unit. Stratified random sampling techniques were used to generate a list of phone numbers to call from the latest Telstra White Pages listings covering all of Queensland. In order to minimise non-contacts, at least 15 attempts to call a household were made before it was classified as non-contactable. The survey design consisted of four main stages:

1. an initial screening survey to gather demographic, fishing and boating information from a sample of the Queensland population

2. a 12-month diary survey during which all recreational fishing activities were recorded from recreational fishers recruited from the screening survey

3. an attitudinal/wash-up survey during which these recreational fishers' opinions on a range of fisheries-related topics were recorded

4. a follow-up survey of non-intending fisher households.

The philosophy of the survey design was to minimise the burden on respondents and maximise the data quality. This was achieved by using extensively trained telephone interviewers and a proven, tried and tested survey design that maintains a very high retention rate of survey participants (Henry and Lyle, 2003; Taylor et al., 2012; Lyle et al., 2014).
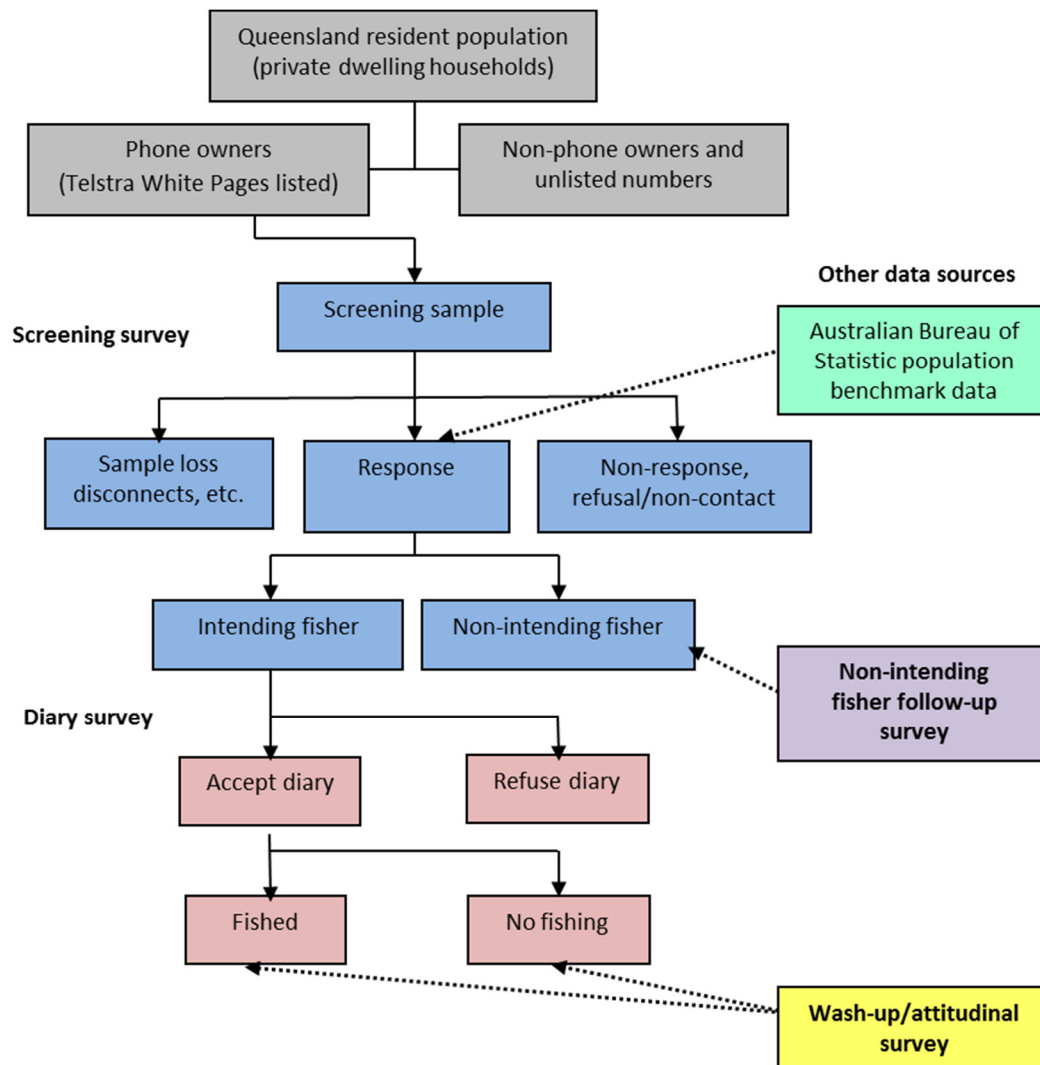
Figure 1: Stages of the 2013–14 Statewide Recreational Fishing Survey—adapted from West et al. (2012a)

Survey stages

Screening survey

The screening survey ran during September and October 2013. The screening survey had two major aims:

1. to collect some initial recreational fishing information
2. to recruit fishing households into the 12-month diary phase

The initial information collected was used to estimate the number of Queenslanders aged 5 years old or more who fished recreationally in the previous 12 months, the participation rate of recreational fishing among Queenslanders, and to make estimates of boat ownership and fishing and diving club membership. Demographic information (e.g. age, gender of occupants) was also recorded and later used in the expansion of survey data.

At the end of the screening survey, all households were asked how likely it was that they would do any kind of recreational fishing in Queensland in the coming 12 months. Any households that answered 'very likely' or 'quite likely' were invited to participate in the next stage—the diary survey.

Diary survey

Prior to the start of the diary survey, each participating household was sent a survey pack containing a letter outlining the reasons for the survey, a species identification guide containing high quality images of the main species or species groups caught by recreational fishers in Queensland, and a simple 'memory jogger' diary. They were encouraged to use the memory jogger diary to write down trip details they might otherwise have forgotten when relaying the information over the phone shortly after each fishing event (e.g. the maximum water depth they fished in).

Just prior to the start of the survey, participating households were contacted by phone and given a final overview of how the survey would work and what they specifically had to report. They were also asked when they next intended to fish and an arrangement was made to call them within a few days of that trip.

The diary survey ran from 1 November 2013 to the 31 October 2014. During this time, all recreational fishing activities were recorded by the telephone interviewers who, in most cases, contacted the fishers within 1 week of the fishing trip. Very little burden was placed on the fishers.

This approach differed to previous recreational fishing surveys conducted by the Queensland government (McInnes, 2008), during which it was the fishers' responsibility to provide specific details of their fishing trips for survey purposes. In those types of self-administered diary surveys it is difficult to correct any inconsistencies in the data, as there is a time delay between fishers completing the forms, returning information and research staff checking the data.

In contrast, contacting the fisher by telephone shortly after each fishing trip shifts the burden of recording the data to the telephone interviewers. In addition, these staff ensured that all questions were answered completely, consistently and accurately.

Each telephone interviewer was assigned a number of recreational fishers who they contacted throughout the survey. This consistency and familiarity developed a rapport between interviewer and recreational fisher. Whenever possible, attempts were made to contact the recreational fishers as soon as possible after each fishing trip. Each household was contacted a minimum of once a month; however, those households that fished more frequently (e.g. weekly) were contacted more often. This ensured that all information was accurately reported and no important information was omitted.

Non-intending fisher households follow-up survey

Non-intending fisher households were households that indicated during the screening survey that they were 'not very likely' or 'not at all likely' to fish during the diary period and, as such, were not part of the diary survey. The objective of this stage of the survey was to account for any unexpected fishing activity (i.e. fishers who 'drop in' as opposed to 'drop out' of the fishery) from 1 November 2013 to 31 October 2014 by these households.

The follow-up survey of non-intending fisher households was completed during November and December 2014. A random sample of 1530 of these households was recontacted and a brief interview was conducted to determine if any fishing activity had occurred during the diary period. This

information was used in the survey calibration process to adjust estimates for any unexpected fishing activity by these 'drop in' households.

Refer to the Appendix for more information on how estimates from the sample were converted to total estimates for the Queensland population aged 5 years or more.

Attitudinal/wash-up survey

In November to December 2014, the main fisher from every household who completed the diary survey was given an attitudinal interview. A wide range of information, including the fisher's attitude and awareness towards fisheries and environmental issues, was recorded. The results from the attitudinal/wash-up survey will be presented in a subsequent report (e.g. For 2010 see McInnes et al., 2012).

Survey scope

The estimates provided in this report only represent the activities of people who normally reside in Queensland, and only their activity within Queensland (i.e. Queenslanders fishing in Queensland). Only Queensland residents 5 years old or more could participate in the diary survey, and only those aged 15 years or more were asked awareness/attitudinal questions in the wash-up survey.

Fishing activities from interstate and overseas fishers were not recorded in this survey, as the Telstra White Pages only contained contact information for occupants of private dwelling households in Queensland. However, information about interstate fishing activity by Queenslanders (e.g. Queenslanders fishing in New South Wales) in this survey was recorded but does not contribute to the estimates presented here.

Therefore, the estimates in this report will underestimate the total number of people fishing recreationally in Queensland and the total recreational catch in Queensland because visitors to Queensland are not included.

Geographical scope

The sample of households was taken from across Queensland and stratified by the nine residential regions as used in the 2010–11 survey (Table 1). The geographical regions used in the 2013-14 survey conform to the Australian Statistical Geography Standard and can therefore be related to population data collected from the 2011 Census (e.g. SA4, SA3 and SA2 or combinations) and subsequent Australian Bureau of Statistics estimates.

In previous surveys (2000–01 and 2010–11), nine residential regions were reported on. In this survey, some of these regions were subdivided to create the subset of 16 residential regions that have been used in some analyses presented in this report (Table 1). The urbanised areas of Queensland, which are related to greater population density, made up the additional regions (Figure 2).

Table 1: The 16 residential regions used in this survey and the corresponding 9 residential regions used in the 2000–01 and 2010–11 recreational fishing surveys

2000–01 and 2010–11 residential regions	2013–14 residential regions
Central West/North West/South West	Central West/North West/South West
Far North	Far North Hinterland
	Cairns
Northern	Northern Hinterland
	Townsville
Mackay	Mackay Hinterland
	Mackay-Whitsunday
Fitzroy	Fitzroy Hinterland
	Rockhampton
	Gladstone
Darling Downs	Darling Downs
Wide Bay-Burnett	Wide Bay-Burnett
Moreton	Sunshine Coast
	West Moreton
	Gold Coast
Brisbane	Brisbane

The survey reported on all fishing activity in Queensland, including the various offshore islands (e.g. in the Torres Strait) and extending seaward to the offshore boundary of the exclusive economic zone.

As a minimum, recreational fishing activities in the survey were reported against 1 of 19 fishing regions, which are referred to as 'fishing regions' throughout this report (Figure 3). However, participants generally gave more precise information, including other states, and reported the town nearest to their fishing location or the water body, reef, river or locally recognised name where they were fishing.

The spatial data collected allows estimates for customised residential regions and fishing regions to be generated, provided the scale is sufficiently large to allow reliable estimates to be made. The regions provided here (Figure 3) therefore represent an example of what can be provided. If estimates for customised regions are required, please contact the Fisheries Queensland data coordinator.
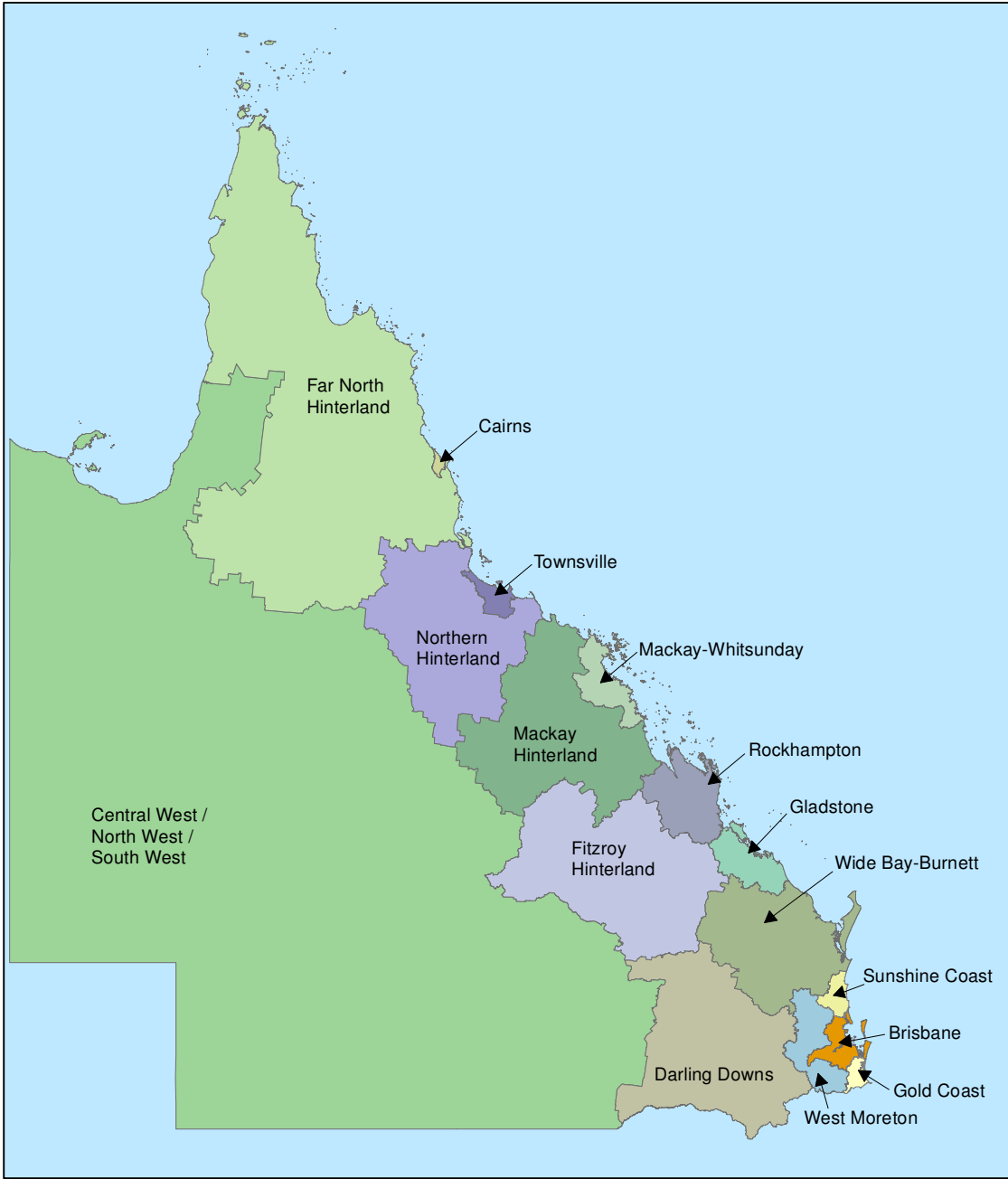
Figure 2: The 16 residential regions of Queensland used in this survey
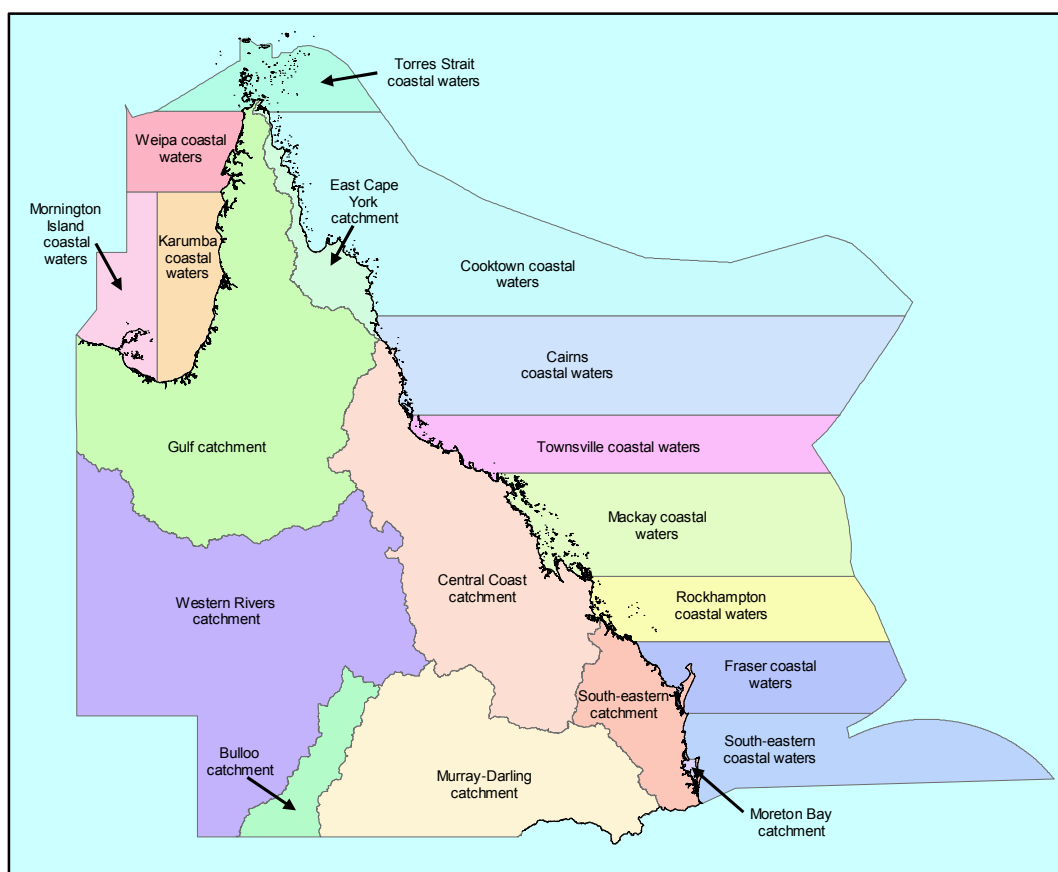
Figure 3: The 19 fishing regions of Queensland used in this survey

Catch, effort and reasons for release

Three terms were applied to catch information and are used throughout this report:

1. catch—all aquatic animals caught, whether harvested or released into the water

2. harvest—those animals that were kept

3. released—those animals that were released back into the water

All catch information (including small animals such as prawns, bait fish and worms) is presented as the number of individual animals caught, not the weight. For large catches of small animals, fishers were asked to estimate the number by sub-sampling their catches and scaling up. For example, for a large catch of prawns, fishers were asked to fill a container and count the number of prawns in the container. They were then asked to estimate how many containers they caught, allowing the catch of prawns to be estimated.

Throughout this report, person-based effort is reported in fisher days, although estimates in fisher hours can also be calculated from the data. Any day that a fisher went fishing is counted as a fisher day. All fishing information in the survey was collected on a fishing event basis. Within a day, a fisher could participate in more than one fishing event and use multiple types of fishing gear. For example, if a fisher used a cast net to collect bait in the morning and then went out line fishing in the afternoon, this was classified as two events but one fisher day (effort day).

For passive fishing methods, such as fishing with crab pots, effort was calculated for the day the gear was retrieved. The total soak time for passive gear was not recorded as a measure of effort.

Fishers were asked to explain the main reasons why they chose to release animals. The interviewers coded each response to one of 17 categories (refer to the Appendix).

Reporting the catch

All care was taken with species identification when collecting information from the recreational fishers. The telephone interviewers ensured that fishers consulted the identification guide when reporting their catch. Species and catch location were also examined to determine unlikely combinations. Those doubtful combinations were double-checked with the fisher before being accepted.

For the purposes of reporting and analysis, many of the species caught have been placed into higher order 'groups' based on their species identification. Several tables in this report present information at this higher level group (e.g. mackerel). Where available, estimates for catch, harvest and release by individual species are presented in the Appendix.

Converting the recreational catch from numbers to weight

Many species harvested by recreational fishers are also harvested by commercial fishers. Comparing the harvest from each sector is of interest to fisheries managers, fisheries scientists and various stakeholder groups, and can assist in sustainability reporting and in the development of management plans.

Diarists in this survey were not required to weigh or measure their fish, as this was considered to be an excessive burden on fishers and self-reported weight information may not have been reliable. Commercial fishers, however, primarily report the weight by species caught and do not report the number harvested. Therefore, a conversion was required in order to compare the recreational and commercial catch.

For the species compared in this report, the recreational harvest was converted from numbers to weight using data collected as part of an ongoing recreational fishing biological monitoring program conducted by Fisheries Queensland. This program collects length data at boat ramps and other locations for a variety of fish species caught at many places across Queensland. For more information on the program, visit www.daf.qld.gov.au.

As the average size of a species varies around the state, a stratified statewide representative sample of lengths is required to calculate useful averages. Using established length-to-weight conversion factors, an average weight for fish caught within the various sampling regions was estimated. These stratified average weights were used to estimate the statewide weight of the recreational catch obtained from this survey. This was then compared to the commercial catch estimates from the same time frame as the diary survey.

Survey estimates and the standard error

All estimates listed in the results have been expanded to the Queensland population and rounded to the nearest thousand or hundred. The only raw data presented relate to the sample and response profiles (Table 2 and Table 4).

The fishing activities estimated in this report are based on sample data and not a census of all Queensland households. As is the case with all sample estimates, they are subject to sampling error. The sampling error is presented as the standard error (SE) for relevant estimates and is shown in brackets following the estimate unless alternatively specified.

In general terms and in the absence of bias, the SE indicates how reliable the estimate is of the true value. The smaller the SE is relative to the estimate, the more precise or better that estimate is, thereby providing greater confidence in that estimate. Error bars on the graphs represent one SE.

The relative standard error (RSE) has been provided in some tables and estimates. The RSE is the SE divided by the estimate and is expressed as a percentage, thus allowing SE's for different estimates to be directly compared. Generally speaking, and in the absence of bias, the smaller the RSE the more precise or better the estimate is—there is greater confidence in the result. We disclose our confidence in the estimates according to the following three categories:

1. An RSE less than 25% indicates that the survey estimate is good

2. An RSE between 25% and 50% indicates that the survey estimate should be interpreted with caution—annotated with a hash symbol (#) throughout this report

3. An RSE of greater than 50% indicates that the estimate is considered too unreliable for general use and is not published—annotated with two hash symbols (##)

Cells in tables that are blank indicate that no data were collected.

Where a zero estimate or a blank is displayed, this should be inferred to mean that the activity is negligible rather than non-existent. This is because catch events may still occur but they are so rare that they were not reported in the survey.

The number of households providing data from which an estimate is made also contributes to the confidence of that estimate. When very few fishers contribute data (e.g. for rarely caught species), estimates can be unreliable. Generally, only estimates derived from 10 or more households are presented here.

Comparison with previous surveys

The estimates from this survey are compared with the previous 2000-01 and 2010-11 surveys in the 'Comparisons with previous surveys' section. To allow comparisons to be made with the 2000–01 survey (NRIFS), those data were restricted to only those fishing events that occurred in Queensland by people who live in Queensland, and re-analysed using the RecSurvey package.

As a result of this, re-analyses estimates from the 2000–01 survey presented here may differ from those presented in the original NRIFS report (Henry and Lyle, 2003).

Testing representativeness of the survey

The estimates of fishing activity presented in this report are based on data provided by a sample of Queensland fishers, not a census of all fishers in the state. Estimates are calculated by expanding the data of each fishing household in the survey according to their demographic benchmarks (i.e. age, gender and residential region), modelled on data obtained from the Australian Bureau of Statistics.

This method assumes that the fishing activities of the fishers in the survey are representative of all fishers in the state. However, since fishers are recruited via the Telstra White Pages, the survey excludes fishers without listed telephone numbers. For the sample to be representative of fishing activity, it's necessary that, within each demographic group, fishing activity is the same between fishers with a listed telephone number (listed fishers) and fishers without a listed telephone number (unlisted fishers).

This assumption was tested in a separate study that ran concurrently with the 2013–14 survey. In that study, fishing activities were compared between listed and unlisted fishers. More than 3000 recreational fishers were interviewed by trained interviewers at 34 tackle stores across Queensland.

Demographic data collected for each fisher included their age, gender, residential region and whether they had a telephone number listed in the Telstra White Pages. The fishing activity of each fisher was measured by the platform use (boat or shore) and target species of their most recent fishing trip.

No significant difference in fishing activity between listed and unlisted fishers of similar demographics was found, supporting the assumption that listed fishers fish in a similar manned to fishers generally. A full description of this survey is provided in the research paper by Teixeira et al. (in prep.).

Results

Sample and response profiles

Screening survey

A total of 15 253 households were telephoned during the screening survey. Of the households telephoned, 84% were classified as valid residential telephone numbers, which represented the net sample for the survey.

The response rates were high in all residential regions, ranging from 71% in the Far North, Northern and Mackay regions to 82% in the Wide Bay-Burnett region (Table 2).

Table 2: Response rates for screening survey by residential region

Residential region[1]	Total households[2]	Initial sample	Sample loss	Net sample	Non-response	Full response	Response rate
Brisbane	791 847	4 777	894	3 883	1 104	2 779	72%
Moreton	380 515	2 725	399	2 326	635	1 691	73%
Wide Bay-Burnett	117 194	1 327	157	1 170	215	955	82%
Darling Downs	93 733	1 464	222	1 242	275	967	78%
CW/NW/SW	27 234	919	140	779	215	564	72%
Fitzroy	85 419	971	136	835	205	630	75%
Mackay	65 863	779	97	682	196	486	71%
Northern	87 654	1 157	176	981	286	695	71%
Far North	104 697	1 134	173	961	282	679	71%
Total	**1 754 156**	**15 253**	**2 394**	**12 859**	**3 413**	**9 446**	**73%**

In 2013–14, the non-response group was largely made up of telephones that were never answered (full non-contact). In the 2010–11 survey, full non-contacts represented 30% of the total non-response, whereas in 2013–14 it represented 52%. This is a significant increase and dominated the non-response reasons in the 2013–14 survey (Table 3).

The reason for this is unclear but it may be due to an increase of call screening by households or a larger number of internet connections where the home phone is rarely answered.

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[1] Refer to Figure 1 for the location of these residential regions.

[2] Number of households modelled from Australian Bureau of Statistics estimated residents population data at time of screening

Table 3: Comparison of proportion of reasons for non-response between 2010–11 and 2013–14

Response type	2010–11	2013–14	Relative % change
Full refusal	24%	16%	Down 33%
Part refusal	42%	29%	Down 30%
Full non-contact	30%	52%	Up 73%
Language/communication difficulties	4%	3%	Down 25%
Other non-response	<1%	<1%	Down 75%
Total	**100%**	**100%**	

Diary survey

A total of 1852 households, comprising 5420 people, started the diary survey. Very few eligible households refused to start the survey and the uptake rate ranged from 88% in the Moreton, Fitzroy and Northern regions to 94% in the Central West/North West/South West (CW/NW/SW) region (Table 4). The percentage of households that completed the 12-month diary survey was very high, ranging from 87% in the CW/NW/SW to 94% in the Moreton and Darling Downs regions.

Table 4: Response rates of households by residential regions

Residential region	Full response at screening	Eligible for the diary survey[3]	Diary survey started	Diary survey completed	Uptake rate among eligibles	Completion rate among uptake
Brisbane	2 779	485	439	409	91%	93%
Moreton	1 691	308	271	256	88%	94%
Wide Bay-Burnett	955	233	217	196	93%	90%
Darling Downs	967	174	159	150	91%	94%
CW/NW/SW	564	124	117	102	94%	87%
Fitzroy	630	184	162	148	88%	91%
Mackay	486	159	147	131	92%	89%
Northern	695	194	171	152	88%	89%
Far North	679	184	169	154	92%	91%
Total	**9 446**	**2 045**	**1 852**	**1 698**	**91%**	**92%**

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[3] All households that indicated that they were 'quite likely' or 'very likely' to fish in the coming 12 months were eligible for the diary survey.

Wash-up survey and non-intending fisher follow up survey

All households that completed the diary survey were eligible to take part in the wash-up survey. Approximately 98% of eligible households agreed to answer all of the questions in the wash-up survey. The results from the attitudinal/wash-up survey will be presented in a subsequent report (e.g. For 2010 see McInnes et al., 2012).

A total of 1530 households were contacted in the non-intending fisher follow-up survey. Again a high level of response was achieved, with 85% of these households completing that survey. The information from the non-intending fisher survey was used in the calibration process to adjust estimates for any unexpected fishing activity by 'drop in' households.

Demographics, participation, club membership and boat ownership

Number of fisher households

In 2013–14, an estimated 308 000 (SE = 7700) households, or 17.5% of all households in Queensland, contained one or more recreational fisher aged 5 years or more who fished in Queensland in the previous 12 months.

Number of fishers

An estimated 642 000 (SE = 18 000) Queenslanders, or 15.1% of the Queensland population aged 5 years or more, went recreational fishing in Queensland in the 12 months prior to November 2013.

Number of fishers by residential region

Over one-third of all recreational fishers in Queensland lived in Brisbane, where an estimated 236 000 recreational fishers resided (Table 5 and Figure 4). The Sunshine Coast region contained approximately 59 000 fishers and the Wide Bay-Burnett region contained 52 000, while all remaining residential regions contained less than 50 000 fishers.

The participation rate of recreational fishing among local residents was highest in the Mackay Hinterland and Far North Hinterland residential regions, where 30.0% and 27.5% of the population were recreational fishers, respectively (Figure 4).

The participation rate was lowest in the Gold Coast region, with just under 8.8% of local residents being recreational fishers. The participation rate in the Brisbane residential region was also low, where only 11.9% of residents were recreational fishers.

Generally, we see lower participation rates but more fishers in the urbanised residential regions (Figure 4) than the adjacent rural regions (Figure 2).

Table 5: Estimated number of recreational fishers in 2013–14 by the 16 residential regions

Residential region	Number of recreational fishers[4]	SE
Brisbane	236 000	13 000
Gold Coast	42 000	4 700
Sunshine Coast	59 000	6 400
West Moreton	17 000	3 600
Wide Bay-Burnett	52 000	3 800
Darling Downs	33 000	3 000
CW/NW/SW	12 000	1 200
Gladstone	12 000	2 000
Rockhampton	22 000	2 800
Fitzroy Hinterland	12 000	2 100
Mackay-Whitsunday	34 000	3 400
Mackay Hinterland	8 000	1 500
Townsville	36 000	3 400
Northern Hinterland	11 000	1 800
Cairns	26 000	3 500
Far North Hinterland	30 000	3 500
Total	**642 000**	**18 000**
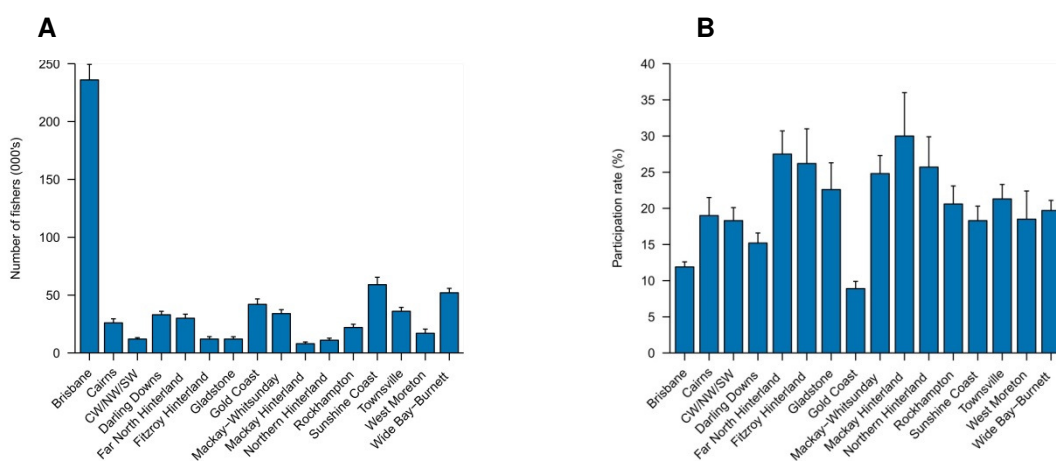
Figure 4: (A) Number of recreational fishers and (B) participation rate (%) by residential region (plus SE)

Number of fishers by gender and age

Recreational fishing was more popular among males than females, and there were more than twice as many male fishers than female fishers. In 2013–14, approximately 436 000 (SE = 12 000) males

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[4] All RSEs for estimates of the number of fishers in this table are less than 15%, indicating good estimates.

went recreational fishing, representing 20.6% of the male resident population of Queensland aged 5 years or more. Approximately 206 000 (SE = 8500) females went recreational fishing, representing only 9.6% of the female resident population aged 5 years or more.

The greatest numbers of recreational fishers were between 30 and 44 years of age, which comprised 25% of all recreational fishers. The least number of recreational fishers were in the 60 years or more age group, which comprised 11% of recreational fishers. The participation rate of recreational fishing was highest in the 5–14 years age group (21.7%) and lowest in the 60 years or more age group (8.7%) (Figure 5). Refer to the Appendix for the number of fishers by gender and age.
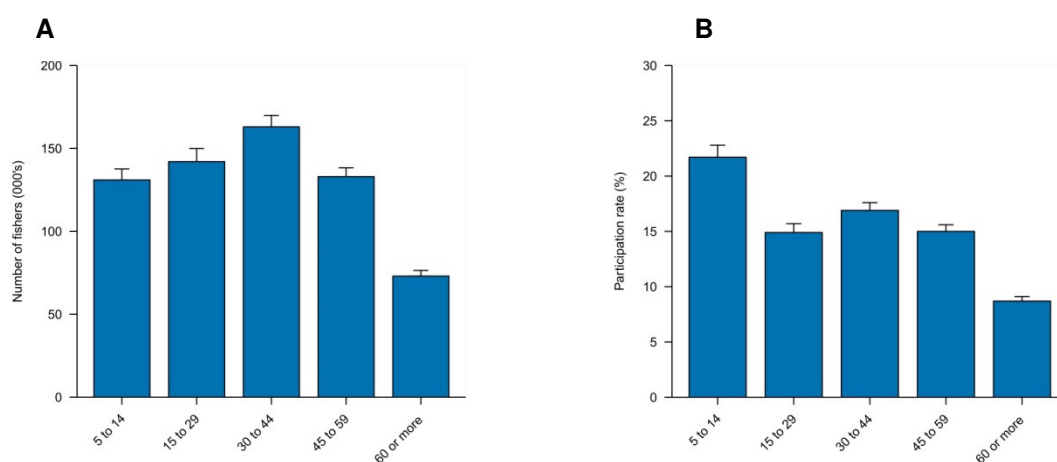
Figure 5: (A) Number of recreational fishers and (B) participation rate (%) by age group (plus SE)

Fishing and diving club membership

The majority of recreational fishers in Queensland were not affiliated with a recreational fishing or diving club. Approximately 11 400 (SE = 1800), or 1.8% of all recreational fishers in Queensland, were members of a fishing or diving club.

The majority of club members lived in the Brisbane and Mackay-Whitsunday residential regions (Figure 6). Whenever the number of affirmative responses in the survey is low (as is the case for club membership), the estimates become imprecise and therefore should be treated as indicative only.
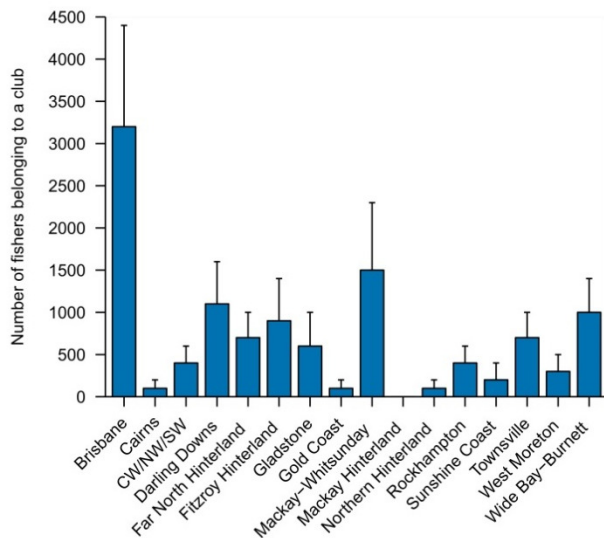
Figure 6: Number of recreational fishers (plus SE) belonging to a recreational fishing or diving club

Household boat ownership

Approximately 260 000 (SE = 7000) households in Queensland reported owning a boat during the screening survey, representing 15% of all households. Close to half of these households were in the south-eastern Queensland residential regions of Brisbane, Gold Coast and Sunshine Coast (Figure 7). Boat ownership differed considerably between fishing and non-fishing households. Approximately 48.7% of households that fished in the 12 months prior to the survey owned a boat, compared to only 7.6% of non-fishing households.
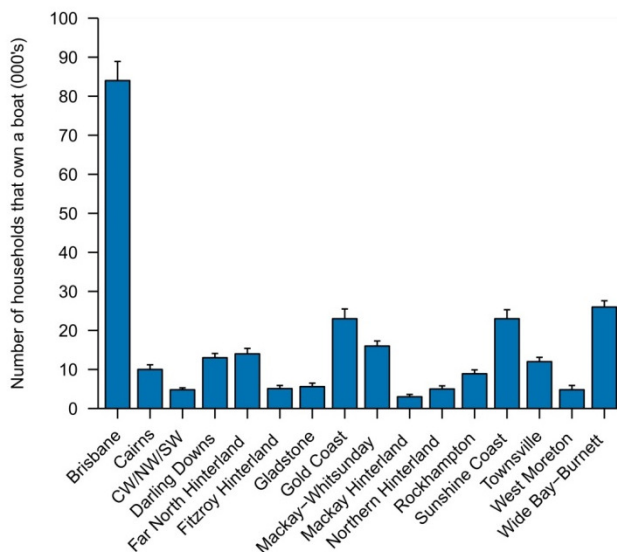
Figure 7: Number of households (plus SE) owning a boat during the screening survey by the 16 residential regions

During the 12-month survey, approximately 168 000 (SE = 7100) households who went fishing also owned a boat. The Gladstone residential region had the highest percentage of fishing households that owned a boat (69.6%), followed by the Mackay-Whitsunday residential region with 67.4% (Figure 8). Boat ownership was lowest in the Gold Coast residential region, with only 37% of fishing households owning a boat. In all regions, few households owned two or more boats (Figure 8).
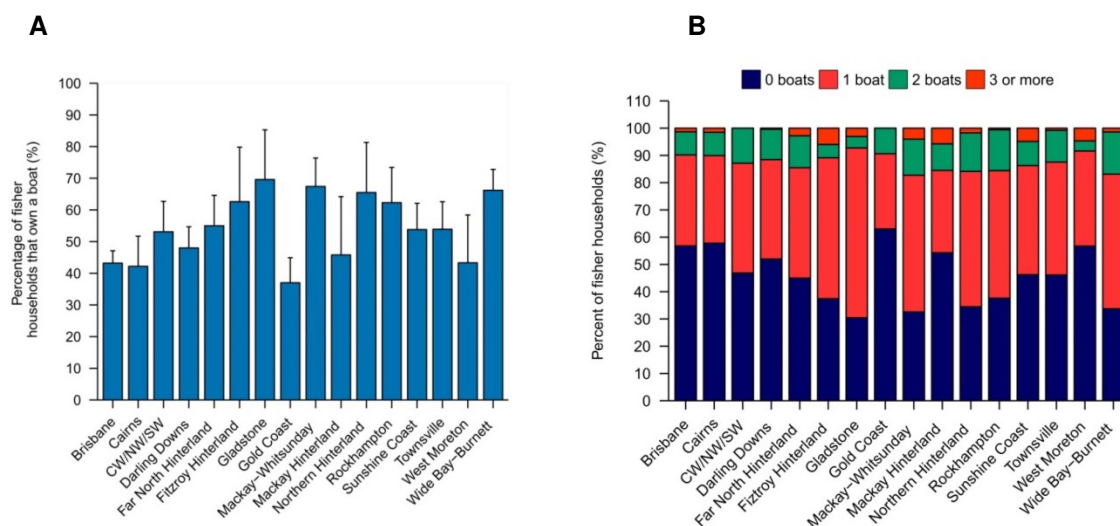
Figure 8: (A) Percentage of fishing households with a boat (plus SE) and (B) household boat ownership by residential region

The Gladstone and Mackay-Whitsunday residential regions had the highest percentage of fishing households that owned a boat, but the residential regions with the largest number of boats owned by fishing households were Brisbane with approximately 68 000 boats and Wide Bay-Burnett with approximately 23 000 boats (Figure 9). The most common length class of boat owned by fishing households across Queensland was 4 m to less than 5 m, followed by the less than 4 m category (Figure 9).
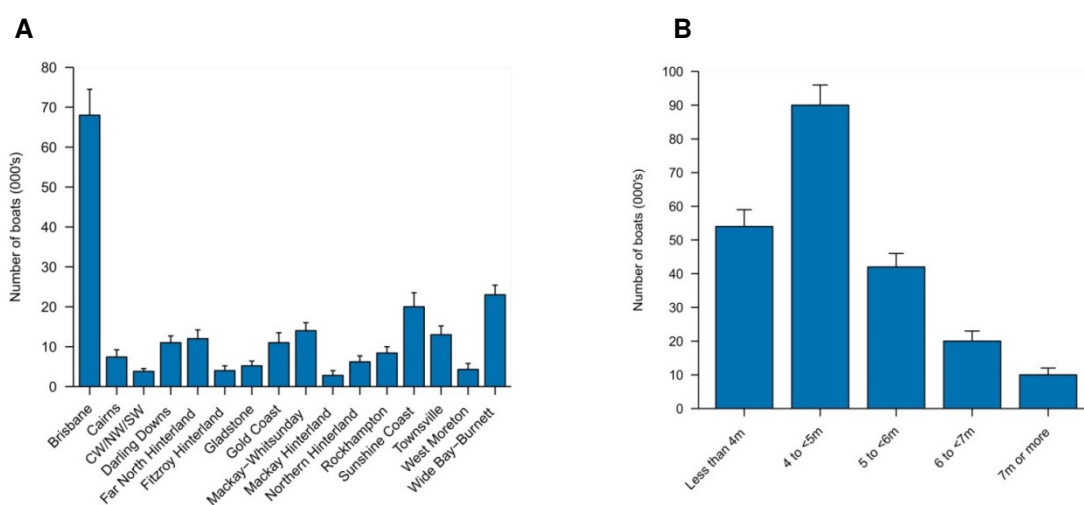
Figure 9: Number of boats (plus SE) owned by fishing households by residential region and size

Although all of these boats were owned by households that fished during the survey, not all of these boats were used for fishing. Across the state, approximately 170 000 (SE = 8200) boats were used for fishing during the diary survey. However, the proportion of boats used for fishing varied by boat size and by residential region. Boats larger than 4 m and owned by fishing households were used for fishing to a greater degree than the smaller boats (i.e. those less than 4 m) (Figure 10). The biggest proportion of boats owned by fishing households being used for fishing occurred in the CW/NW/SW, Mackay-Whitsunday and Northern Hinterland residential regions (Figure 10).
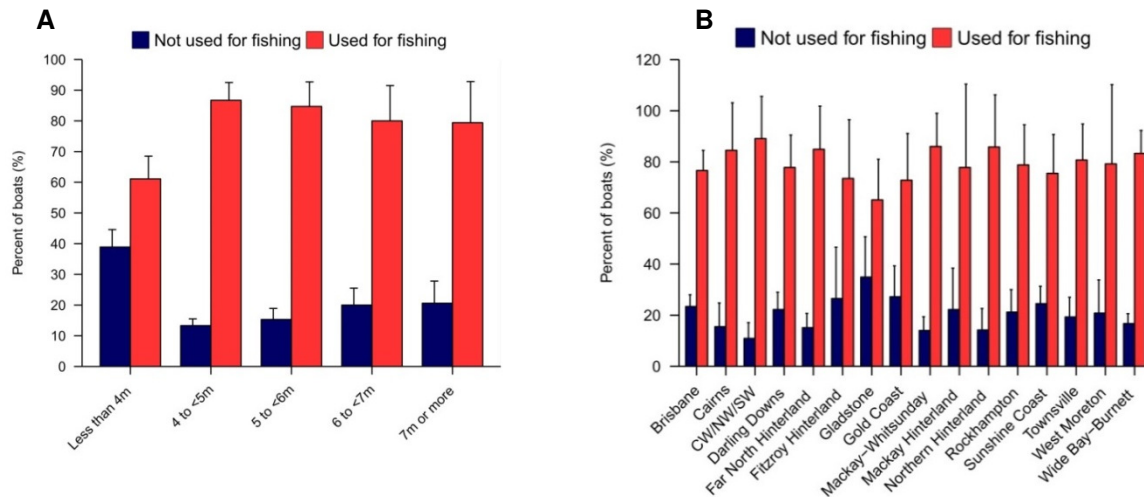
Figure 10: Boat usage by (A) size and (B) residential region (plus SE)

Most of the boats used for fishing were powered by outboard or inboard motors (powerboats). Powerboats made up 85.1% (RSE = 5%) of the fishing boats. Paddleboats, including kayaks, made up approximately 12.5% (RSE = 17%), followed by jet skis and sailboats.

Brisbane and Wide Bay-Burnett had the greatest number of powerboats used for fishing (Figure 11).

The regional analysis for jet skis, paddleboats and sailboats showed that jet skis were only recorded as being used by fishing households for fishing in the Brisbane, Wide Bay-Burnett, Townsville and Far Northern Hinterland residential regions. This does not imply that they are never used elsewhere, but it does suggest that jet skis are not a common fishing vessel.

Paddleboats, including kayaks, also only represented a small proportion of the vessels used for fishing when compared to powerboats; however, they were more popular than jet skis and sailboats (Figure 11).
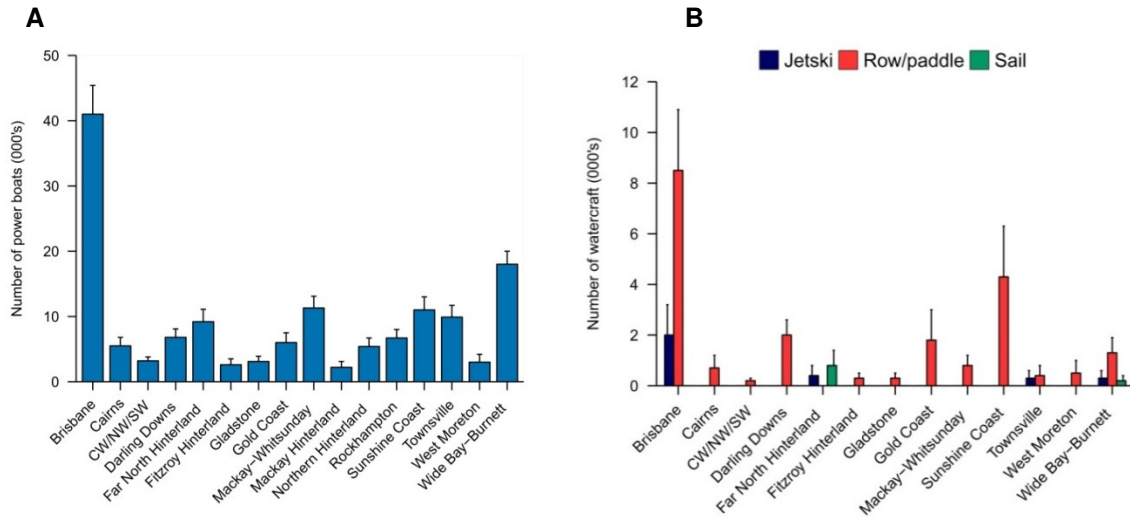
Figure 11: Number of (A) powerboats and (B) watercrafts used by fishing households (plus SE)

Most of the boats that were used for fishing were used exclusively for fishing; however, as the size of boats increased above 6 m, their relative use for other purposes also increased (Figure 12). In each size category, the majority of boats were powered by motors although row/paddleboats were also popular in the less than 4 m category (Figure 13).
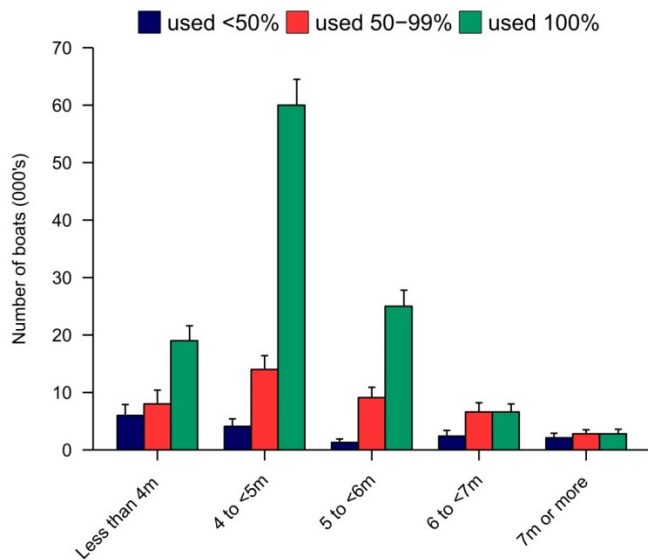
Figure 12: Number (plus SE) of fishing boats by size and percentage of use for fishing
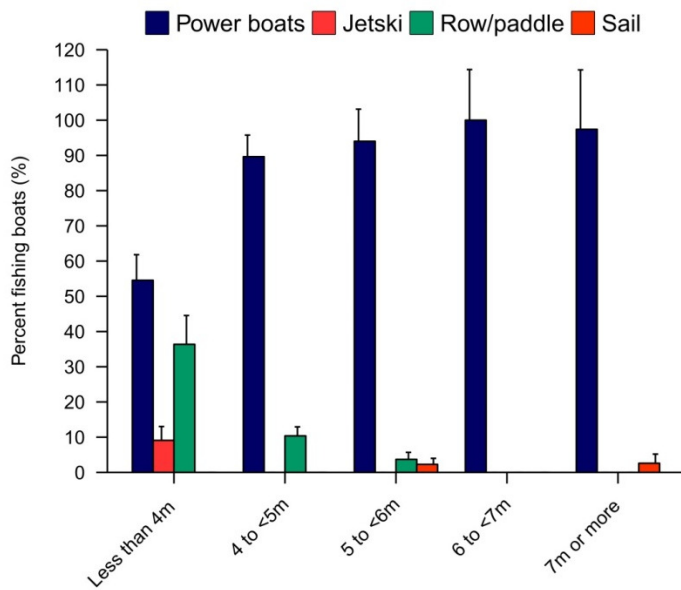
Figure 13: Relative proportions of fishing boats by size and main propulsion (plus SE)

Trailer boats were the most popular fishing boat, with approximately 138 000 (SE = 7100) used for fishing (Figure 14). Car-toppers were the next most popular, with approximately 18 000 (SE = 3000) car-toppers used for fishing. An estimated 9700 (SE = 2000) boats were stored onshore, 3700 (SE = 1200) kept in marinas and the remainder kept on moorings.
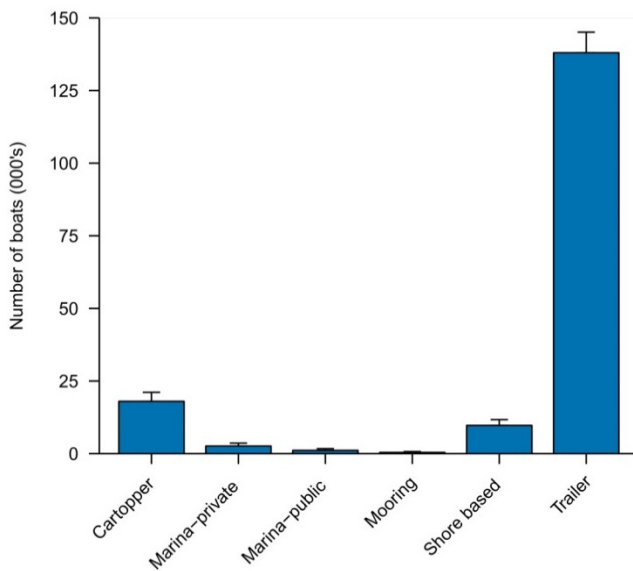
Figure 14: Number of fishing boats (plus SE) by type or storage method

The use of echo sounders and GPS devices varied by boat size (Figure 15). Depth sounders and GPS devices were common in boats more than 4 m long, and approximately one-quarter of smaller boats had them too.

A

B
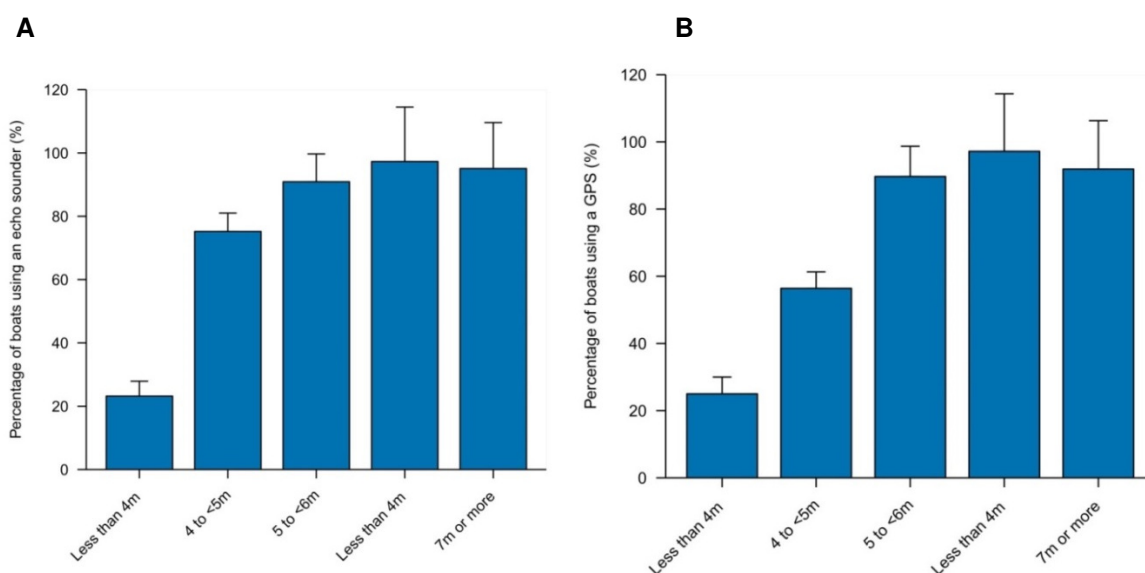
Figure 15: Percentage of fishing boats using (A) echo sounders and (B) GPS by size class (plus SE)

For the first time, this survey collected information on the use of electric motors on fishing boats. Electric motors are often used by fishers to maintain their fishing position or move around more quietly. Electric motors were not as common as depth sounders and GPS devices, but were predominantly found on boats smaller than 6 m. Uptake of this technology was relatively uniform across those size classes at approximately 14.5% of each size class (Table 6).

Table 6: The number and proportion of fishing boats in each size class that have an electric motor

Size class	Number of boats with electric motors	SE	Proportion of size class
< 4 m	4 300	1 100	14.7%
4 m to <5 m	11 000	1 900	14.5%
5 m to <6 m	5 100	1 300	14.8%
6 m to <7 m	##	##	##
>= 7 m	##	##	##

The horsepower of powerboats used for fishing is thought to be increasing, mainly because of the relative fall in the cost of engines over time. This survey started to collect information on the size of the main engine(s) so that perceived changes over time can be verified. The majority of powerboats used by fishing households had main engine horsepower within the range of 26–75 hp (Figure 16).
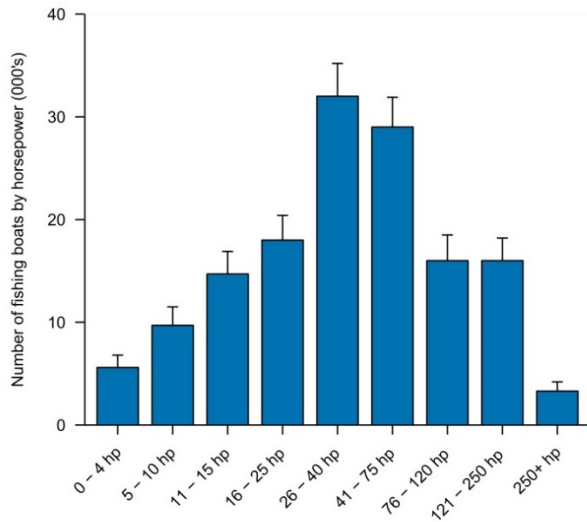
Figure 16: Number of powerboats (plus SE) used for fishing by horsepower

Inter-annual fishing frequency

Approximately 34% of fishers said that they fished less during the survey than in the 12 months prior to the survey, while 37% said they fished more often during the survey. Approximately 29% thought that their fishing effort was similar in the two periods. The principal reasons given to explain a reduction in fishing effort was work or business commitments, followed by home or family commitments, and then changes in personal preference (Figure 17A). The most popular reasons to explain an increase in fishing effort was a change in personal preference, followed by home or family reasons, then access-related reasons for example, buying a boat or kayak (Figure 17B).
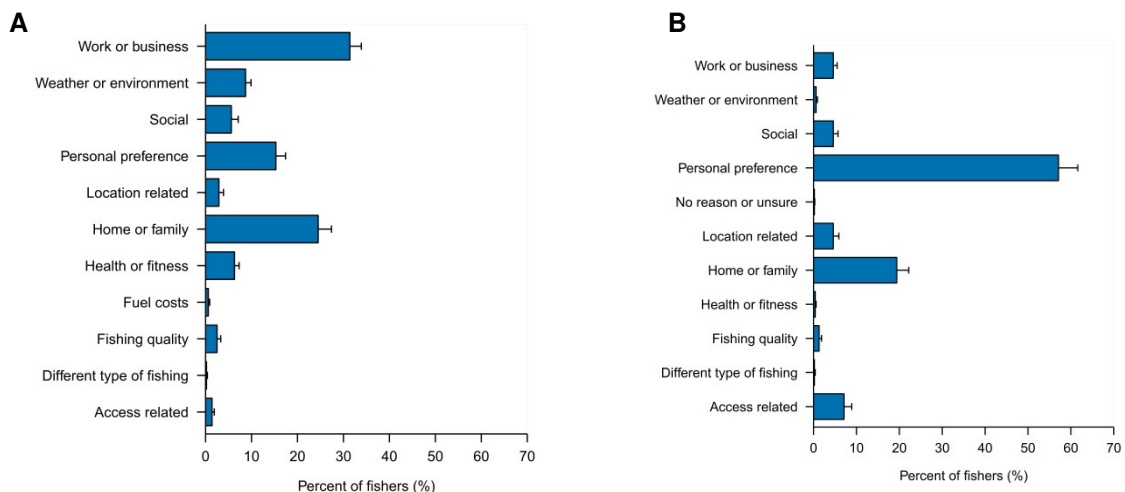
Figure 17: Percentage (plus SE) of reasons for (A) reductions and (B) increases in fishing effort

Some diarists thought that they would go fishing during the survey period, but actually never went. Approximately 40% of this group cited work or business commitments as the reason preventing them from fishing. Home and family (16.5%), health and fitness (12.8%), and personal preference (10.6%) were the next most common reasons (Figure 18).
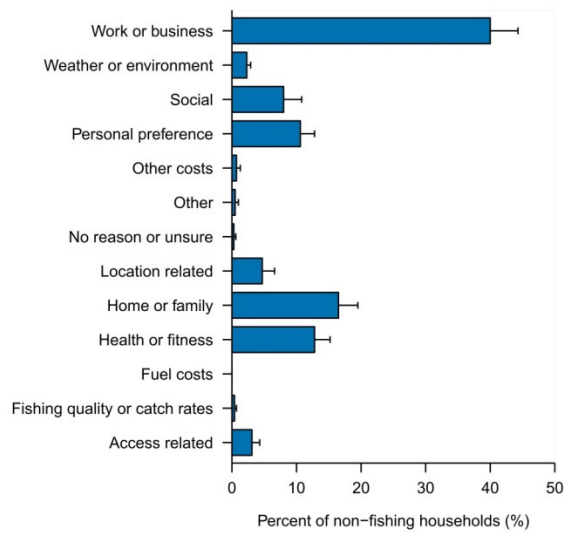
Figure 18: Percentage (plus SE) of reasons for not fishing by diarists who intended to fish

Recreational fishing effort

Total effort

Queensland residents fished for approximately 2.5 million days (SE = 114 000) during the 12 months from 1 November 2013 to 31 October 2014. Of the fishers in the survey, the average number of days fished was 3.6 days.

Effort by residential region

Fishing effort varied across the 16 residential regions. Fishers who resided in the Far North Hinterland and Mackay-Whitsunday regions fished the most on average (4.2 days), followed closely by those residing in West Moreton (4.1 days) and Wide Bay-Burnett (4.0 days) (Figure 19). However, Brisbane residents accounted for 39% of all effort days (Figure 20), fishing for a total of 992 000 days (SE = 91 000) (Table 7).
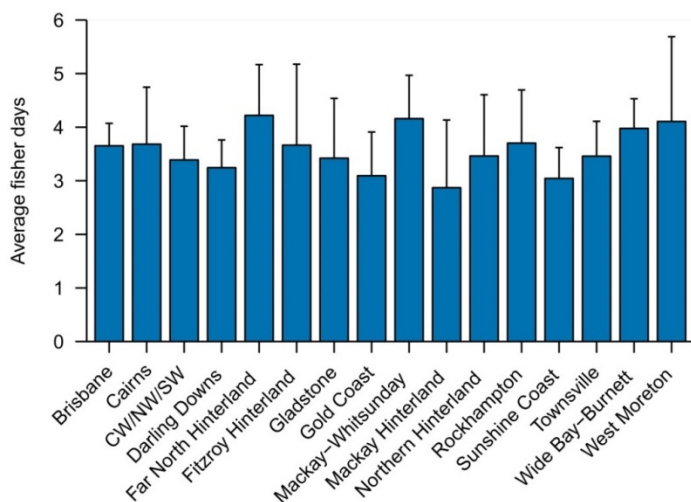
Figure 19: Average number of days (plus SE) fished within each residential region
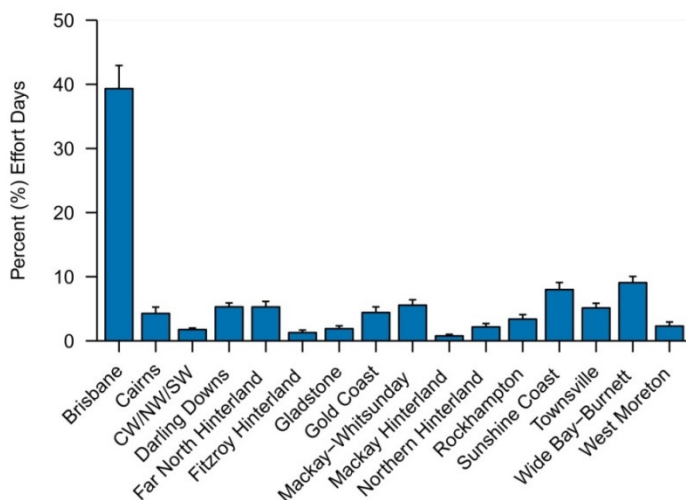
Figure 20: Percentage of total effort days (plus SE) by residential region

Table 7: Fishing effort by fishers of each residential region[5]

Residential region	Number of fisher days	SE
Brisbane	992 000	91 000
Cairns	108 000	25 000
Central West/North West/South West	45 000	6 100
Darling Downs	134 000	15 000
Far North Hinterland	134 000	22 000
Fitzroy Hinterland	#33 000	10 000
Gladstone	48 000	11 000
Gold Coast	112 000	22 000
Mackay-Whitsunday	141 000	21 000
Mackay Hinterland	#19 000	6 100
Northern Hinterland	55 000	13 000
Rockhampton	86 000	18 000
Sunshine Coast	202 000	28 000
Townsville	130 000	18 000
Wide Bay-Burnett	229 000	24 000
West Moreton	#58 000	16 000

Effort by fishing region

The south-eastern catchment accounted for 35% of all effort days, or 882 000 days (SE = 58 000) (Table 8). The Central Coast catchment and south-eastern coastal waters collectively accounted for 25% of all effort days. Reliable estimates could not be obtained for the Bulloo catchment, Cooktown coastal waters, Mornington Island coastal waters, Torres Strait coastal waters or Weipa coastal waters.

Table 8: Fishing effort within each fishing region[6]

Fishing region	Number of fisher days	SE
Bulloo catchment	##	##
Cairns coastal waters	116 000	21 000
Central Coast catchment	334 000	31 000
Cooktown coastal waters	##	##
East Cape York catchment	#25 000	7 800
Fraser coastal waters	217 000	24 000
Gulf catchment	60 000	12 000
Karumba coastal waters	#10 000	4 100
Mackay coastal waters	85 000	11 000

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[5] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

[6] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. No data were reported for the Bulloo catchment.

Fishing region	Number of fisher days	SE
Moreton Bay catchment	303 000	44 000
Mornington Island coastal waters	##	##
Murray–Darling catchment	73 000	11 000
Rockhampton coastal waters	72 000	10 000
South-eastern catchment	937 000	64 000
South-eastern coastal waters	187 000	25 000
Torres Strait coastal waters	##	##
Townsville coastal waters	84 000	12 000
Weipa coastal waters	##	##
Western Rivers catchment	#16 000	6 400

Effort by residential region and fishing region

Fishers tended to fish mostly in their local areas (**Figure 21**). For example, Brisbane residents fished mostly in the south-eastern catchment, and Mackay-Whitsunday residents fished mostly in the Central Coast catchment. However, some fishers did travel away from their local areas. For example, south-eastern coastal waters was a popular fishing region for Darling Downs residents.
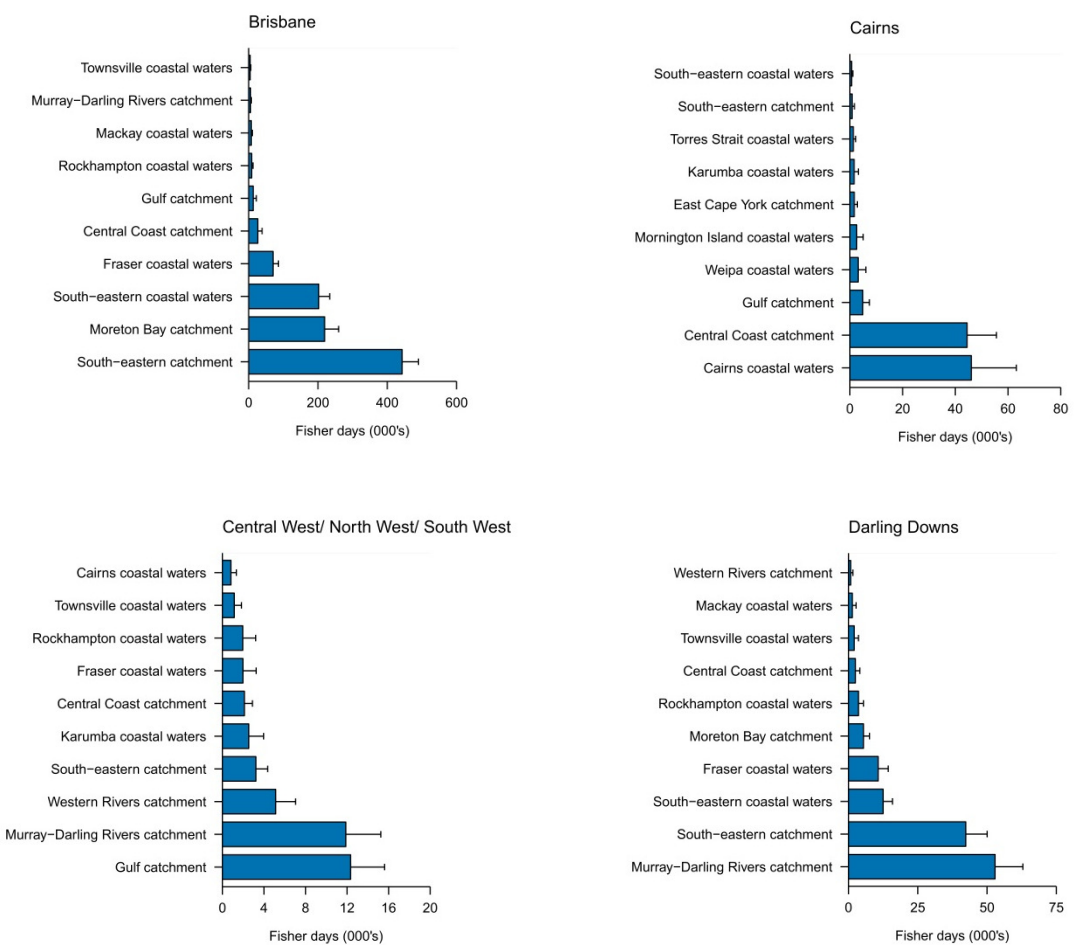
Figure 21: Effort within each fishing region by residents of each residential region (plus SE)
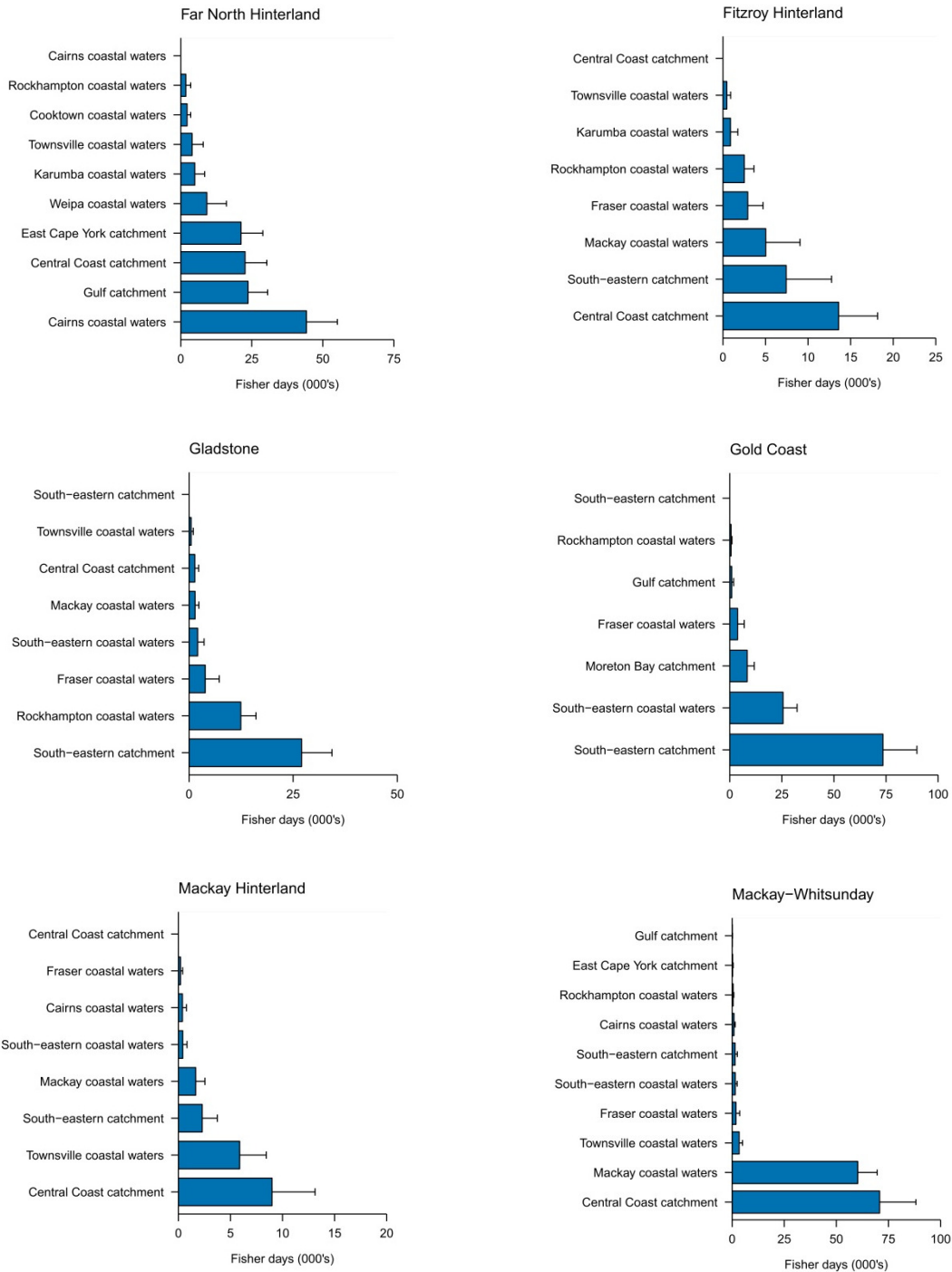
Figure 21: Fishing effort within each fishing region by residents of each residential region (plus SE)
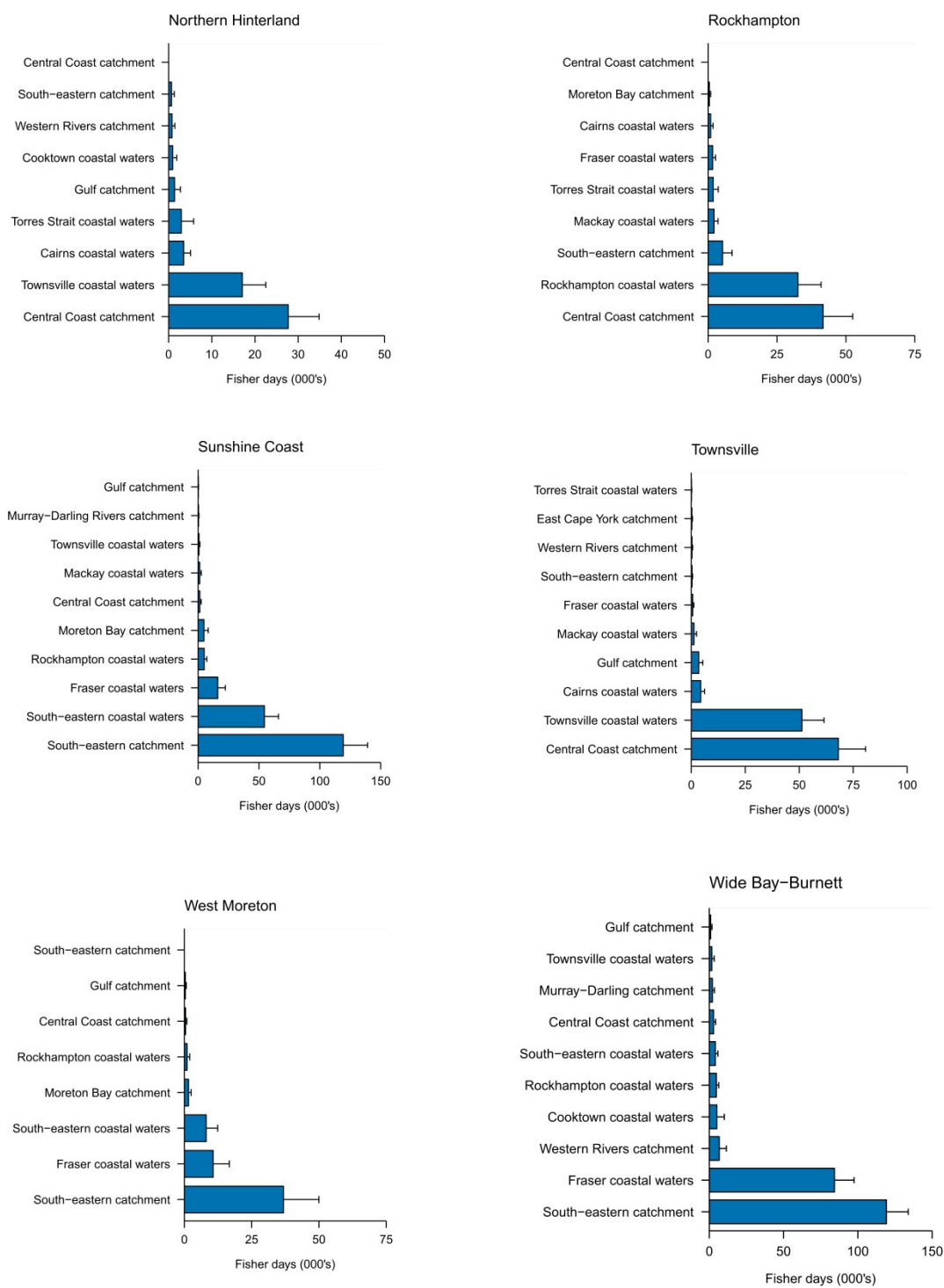
Figure 21: Fishing effort within each fishing region by residents of each residential region (plus SE)

Effort by water body

The majority of fishing effort days occurred in estuaries or enclosed coastal waters (1.3 million days, SE = 71 000), followed by inshore waters (786 000 days, SE = 58 000) (Figure 22). Effort days were similar across freshwater rivers (151 000 days, SE = 18 000), offshore waters (175 000 days, SE = 14 000) and public lakes and dams (163 000 days, SE = 23 000), but comparatively few days were spent fishing in private lakes and dams (#21 000 days, SE = 7300).
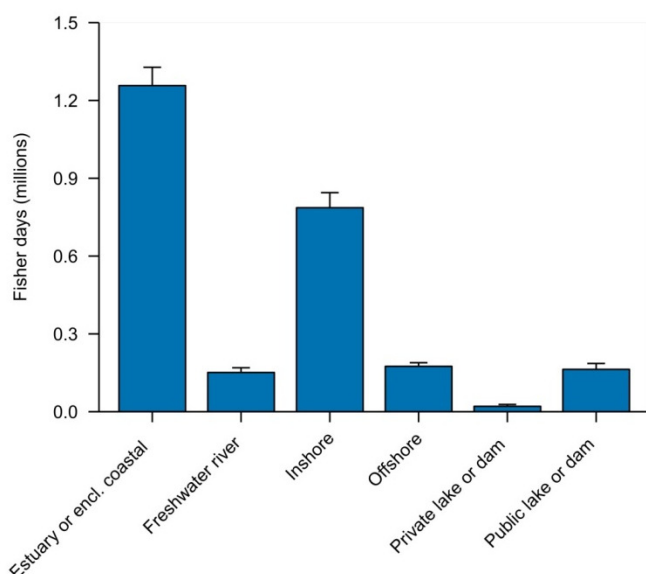
Figure 22: Effort days (plus SE) by water body

Effort by fishing method

Line fishing was by far the most common fishing method, accounting for approximately 2.3 million days (SE = 109 000) (Figure 23).

Pot fishing was the next most common method, accounting for 280 000 days (SE = 29 000), while cast net fishing accounted for 87 000 days (SE = 12 000). Dive fishing accounted for 13 000 days (SE = 5800), while other fishing methods (e.g. hand collection, pumps and spades) collectively accounted for 171 000 days (SE = 21 000). People may fish using several different methods on the same day, for example they may set pots and fish using lines, representing a day's effort for each method. Therefore summing effort across methods will be greater than estimating effort irrespective of method.
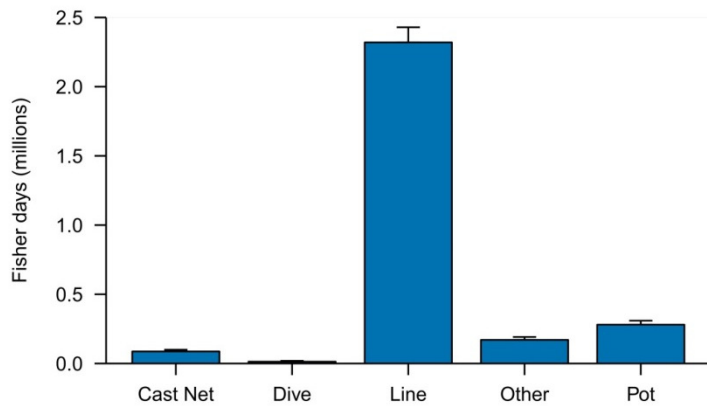
Figure 23: Effort days (plus SE) by fishing method

Effort by fishing platform

Statewide, fishing effort was roughly equal between boat fishing and shore fishing. However, the relative importance of boat versus shore fishing varied across the 19 fishing regions (Figure 24).

In Karumba, nearly all fishing was done from a boat. Conversely in the south-eastern coastal waters, more than half was done from the shore.

Estimates presented below for Cooktown coastal waters, Mornington Island coastal waters, Torres Strait coastal waters or Weipa coastal waters should be treated with caution given the scarcity of data highlighted in Table 8.
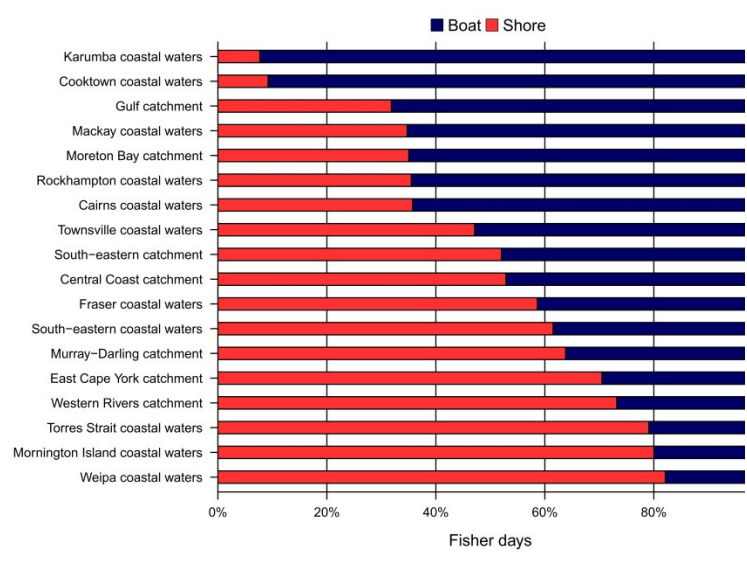
Figure 24: Percentage of effort days from the shore or boat by fishing region

Effort by season

Summer was the most popular season to go fishing, accounting for approximately 792 000 fisher days (SE = 46 000) (Figure 25), or 31% of all effort days.

Winter was the least popular season (493 000 days, SE = 32 000), while similar days were spent fishing in autumn (654 000 days, SE = 42 000) and spring (613 000 days, SE = 37 000).
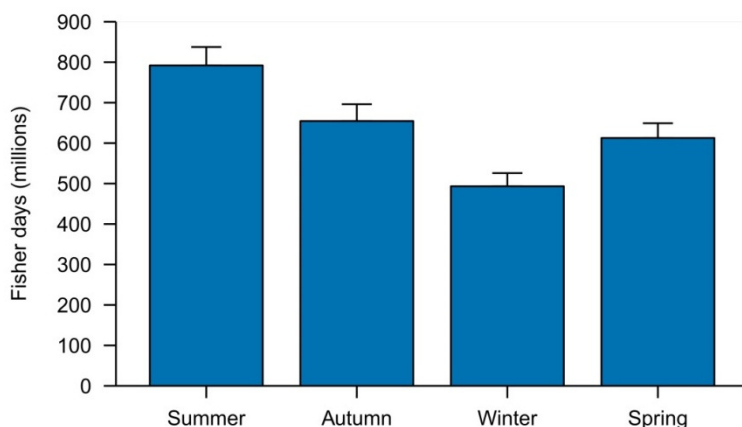
Figure 25: Effort days (plus SE) by season

Effort by fishing depth

Fishing depth was recorded for most boats that went bottom fishing. Of these, 47% of all effort days were spent fishing at depths of 0–9 m (Figure 26).

The percentage of deepwater fishing (40 m+) varied across the state (Figure 27). For example, south-eastern coastal waters accounted for 27% of deepwater effort days in trips where depth was recorded.
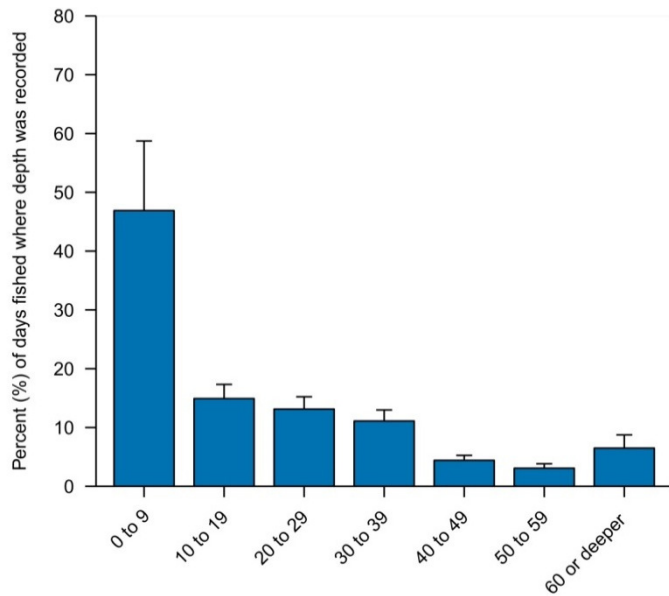
Figure 26: Percentage of effort days (plus SE) by depth fished (m) for trips where depth was recorded
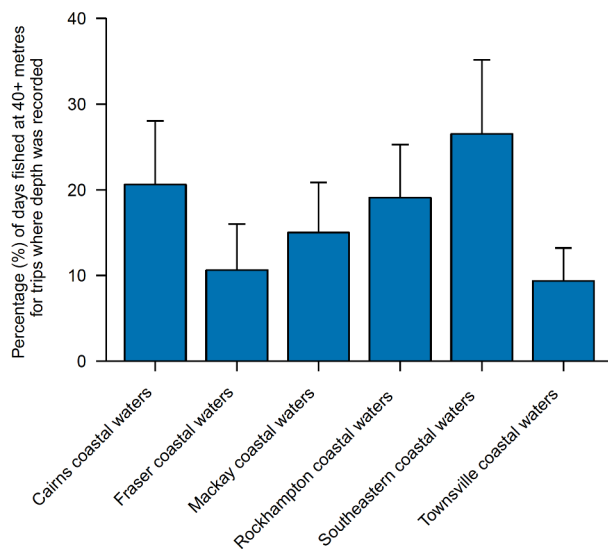
Figure 27: Percentage of effort days (plus SE) in coastal waters (fishing regions) deeper than 40 m where depth was recorded

Recreational catch

Total catch summary

All estimates that follow represent the total catch (numbers of fish) by Queenslanders aged 5 years or more, fishing in Queensland between 1 November 2013 and 31 October 2014.

Estimates in this section are presented at the level of species or in some cases, species group. When reporting at the species level, the species common name is used e.g. dusky flathead, and where reporting at the species group, all relevant species are combined and referred to using a group name e.g. all flathead species are combined and referred to as 'flathead '. The Appendix provides estimates at the level of the lowest taxonomic group (e.g. species level) that was recorded during the survey.

Overall, yellowfin bream was the most commonly caught fish, with an estimated 1 156 000 caught. Whiting were the next most commonly caught fish, with 1 090 000 sand whiting complex and 679 000 trumpeter whiting caught. Flathead also formed a considerable part of the total catch, with approximately 412 000 fish caught, of which 85% were dusky flathead (352 000 fish).

Other commonly caught species were dart (352 000 fish), barred javelin (329 000 fish), pikey bream (234 000 fish), snapper (203 000 fish) and barramundi (174 000 fish) and. Large numbers of freshwater fish were also caught, with Australian bass (171 000 fish) and golden perch (146 000 fish) being the most common.

The recreational catch also included large numbers of non-fish species, such as crustaceans (e.g. crabs), cephalopods (e.g. squid) and other taxa. Mud crabs were the most commonly caught non-fish species, with 1.7 million estimated to have been caught.

Catch, release and harvest of all species

Table 9 presents estimates of catch, release and harvest of all species groups (fish and non-fish). Species groups differed in their relative release proportions (Table 10).

Release rates were low among small crustaceans and those fish commonly used as bait (e.g. mullet, herring and pilchards), while high release rates were recorded for species such as barramundi, sharks and rays.

Table 9: Catch, release and harvest of species groups[7]

Species/group	Catch		Harvested		Released	
	Total	SE	Total	SE	Total	SE
Barramundi	#174 000	49 000	42 000	7 700	#132 000	44 000
Bream	1 417 000	144 000	397 000	44 000	1 000 000	107 000
Catfish	452 000	67 000	#37 000	10 000	415 000	66 000
Cephalopod	#26 000	7 800	#23 000	6 700	##	##
Cobia	#7 600	2 000	#5 400	1 600	#2 200	900
Cod and groper	242 000	29 000	36 000	5 100	206 000	27 000
Coral trout	170 000	28 000	103 000	18 000	66 000	14 000
Crab	1 976 000	233 000	457 000	55 000	1 500 000	187 000
Eel	#27 000	8 600	##	##	#25 000	8 400
Emperor	201 000	25 000	97 000	13 000	104 000	16 000
European carp	#50 000	18 000	#50 000	18 000	##	##
Finfish (other)	1 100 000	148 000	681 000	139 000	384 000	40 000
Flathead	412 000	81 000	139 000	17 000	#273 000	70 000
Freshwater bass, cod and perch	335 000	64 000	91 000	18 000	244 000	57 000
Garfish	#104 000	33 000	#94 000	32 000	#10 000	4 100
Grunter and trumpeter	143 000	32 000	#41 000	16 000	102 000	22 000
Herring and pilchard	#466 000	174 000	#361 000	133 000	#105 000	49 000
Javelin	383 000	80 000	107 000	20 000	276 000	65 000
Jewfish	#121 000	35 000	37 000	9 000	#84 000	31 000
Lobster	##	##	##	##		
Mackerel	155 000	23 000	100 000	16 000	55 000	12 000
Mollusc	#560 000	190 000	#553 000	190 000	##	##
Morwongs and sweetlips	73 000	17 000	30 000	6 900	#43 000	13 000
Mullet	243 000	54 000	216 000	51 000	#27 000	8 200
Non-fish (other)	#12 000	3 900			#12 000	3 900
Parrotfish	53 000	10 000	30 000	5 900	#23 000	5 800
Pearl perch	#25 000	7 400	#11 000	2 900	#14 000	5 400
Pike	33 000	7 700	#14 000	5 100	#19 000	5 200
Prawn	2 400 000	550 000	2 300 000	545 000	#60 000	26 000
Shark and ray	193 000	28 000	#6 400	2 500	186 000	27 000
Snapper	203 000	43 000	#56 000	15 000	148 000	36 000
Tailor	170 000	40 000	#111 000	28 000	59 000	14 000
Threadfin and Australian salmon	#103 000	29 000	54 000	12 000	#50 000	21 000
Trevally and amberjack	520 000	111 000	#188 000	57 000	332 000	68 000
Tropical snapper and sea perch	653 000	61 000	216 000	24 000	437 000	47 000
Tuna	#13 000	4 400	#7 600	3 300	##	##
Whiting	1 783 000	214 000	997 000	164 000	785 000	88 000
Worm	##	##	##	##	##	##
Wrasse	#67 000	18 000	23 000	4 700	#44 000	17 000
Yabby (freshwater)	#520 000	175 000	#479 000	172 000	#41 000	16 000
Yabby (marine)	3 600 000	556 000	3 300 000	500 000	#318 000	148 000

[7] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were collected.

Table 10: Percentages of species groups that were released

Percentage of species group released			
0–25%	**26–50%**	**51–75%**	**76–100%**
Prawn	Cobia	Emperor	Barramundi
Yabby (freshwater)	Tailor	Pearl perch	Cod and groper
Yabby (marine)	Finfish (other)	Pike	Catfish
Garfish	Mackerel	Morwongs and sweetlips	Eel
Mullet	Coral trout	Trevally and amberjack	Shark and ray
Herring and pilchard	Parrotfish	Wrasse	Non-fish (other)
	Whiting	Flathead	
	Threadfin and Australian salmon	Tropical snapper and sea perch	
		Jewfish	
		Grunter and trumpeter	
		Bream	
		Javelin	
		Freshwater bass, cod and perch	
		Snapper	
		Crab	

Reasons for release

Recreational fishers released their catch for a variety of reasons, which were recorded as one of 17 categories. Overall, the most common reasons for release were 'catch and release', 'too many or more than the bag limit', 'too small or under size limit' and 'unwanted' (Table 11).

The 'too small' category was recorded for any occasion when fishers mentioned 'too small', without mentioning words like 'legal limit' or 'under size'. If fishers mentioned 'legal limit' or 'under size', the category 'under size limit' was recorded.

An overlap exists between some reasons. For example, a fisher may say a fish was 'too small' to keep and it may also have been smaller than the legal size. This survey was careful not to alter the behaviour of fishers and so did not prompt fishers to remove any overlap. Therefore, 'too small' and 'under size limit' are combined in Table 11, as are 'too many', which relates to a personal preference, and 'more than bag limit'.

Being too small or under the legal size limit were common reasons for release of many species. 'Catch and release' was an important reason for freshwater species such as Australian bass and other freshwater cod species. 'Unwanted' was a less common reason for release of most species, except for sharks where this was reported in 90% of cases.

Table 11: Percentage of species released by reasons (%)—note that percentages may not add up to 100% because this table contains only four possible reasons for release

Species/group	Reason for release			
	Catch and release	Too many or more than bag limit	Too small or under size limit	Unwanted
Australian bass	72%	1%	25%	2%
Barramundi	14%	37%	45%	4%
Barred javelin	16%	2%	80%	2%
Blue threadfin	2%	16%	74%	8%
Cod and groper (unspecified)	12%	2%	70%	16%
Coral trout (unspecified)	3%	0%	95%	1%
Dart (unspecified)	6%	0%	92%	1%
Freshwater cod (unspecified)	57%	0%	35%	8%
Golden perch	33%	16%	46%	6%
Hussar	1%	0%	92%	8%
King threadfin	10%	1%	88%	0%
Mangrove jack	8%	9%	77%	6%
Morwong and sweetlip (unspecified)	0%	0%	70%	9%
Moses snapper	17%	1%	82%	1%
Northern sand flathead	33%	1%	62%	1%
Parrotfish and tuskfish	0%	7%	88%	5%
Pearl perch	0%	0%	100%	0%
Pikey bream	27%	1%	70%	3%
Red emperor	0%	0%	100%	0%
Redthroat emperor	1%	4%	94%	0%
Sand whiting complex	8%	0%	91%	0%
School mackerel	5%	22%	73%	0%
Sharks	3%	1%	5%	90%
Silver javelin	6%	1%	92%	1%
Snapper	1%	0%	98%	1%
Sooty grunter	60%	10%	21%	8%
Spanish mackerel	1%	4%	93%	1%
Spotted mackerel	9%	0%	86%	4%
Stripey snapper	6%	4%	90%	1%
Tailor	7%	3%	88%	2%
Trevally (unspecified)	27%	19%	50%	5%
Trumpeter whiting	5%	10%	83%	2%
Yellowfin bream	12%	3%	82%	3%

Targeted catch vs actual catch

Fishers often don't catch what they are targeting. For example, in this survey only one household reported that they targeted and caught sharks. However, the survey estimates that more than 80 000 sharks were caught, with most of them released. The survey estimated that 100% of the beach worms, marine yabbies and pippis caught were being targeted, as were 95% of mud crabs. Marine prawns, red claw and Australian bass were also commonly caught when targeted (Table 12).

Species that require less exclusive techniques or fishing methods are more often caught by fishers not specifically targeting them. These species tend to display characteristics such as generalist feeding and living within communities of other species, such as yellowfin bream and northern sand flathead. The species where >75% of the catch was caught by people targeting them required either reasonably specialised techniques or the people lived in places where the diversity of fish caught is low (Table 12).

Table 12: Percentage of catch where fishers caught what they were targeting

0–25%	26–50%	51–75%	76–100%
Mangrove jack	Tailor	Blue swimmer crab	Beach worms
School mackerel	Sooty grunter	Barramundi	Marine yabbies
Spanish mackerel	Coral trout	Oxeye herring	Pippi/cockle
Dusky flathead	Barred javelin	Golden perch	Mud crab
Murray cod	Mullet	Small baitfish	Marine prawns
Crimson and saddletail snapper	Snapper	Trumpeter whiting	Red claw
Morwong and sweetlip	Blue threadfin		Australian bass
Spotted mackerel	Dart		
Redthroat emperor	Silver javelin		
Yellowfin bream	Sand whiting complex		
King threadfin			
Northern sand flathead			
Red emperor			
Cod and grouper (unspecified)			
Barracuda			
Sharks and rays			

Harvest weights and comparison with commercial catch

This survey does not specifically collect the weights or the lengths of fish caught by recreational fishers because of the additional difficulties involved in collecting this information. A biological collection program run by DAF collects representative length information for a suite of fish popular among recreational fishers. This information can be used to provide an estimate of the weight of these species caught by recreational fishers in Queensland (Table 13).

The recreational harvest of these popular species is significant when compared to the commercial harvest. For example, the recreational harvests of snapper and yellowfin bream are not significantly different to the commercial harvest, whereas the recreational harvest of dusky flathead is more than twice the commercial harvest.

Table 13: Estimated weight of recreational and commercial harvest during the survey period

Species	Number of fish	Average individual fish weight (kg)[8]	Recreational harvest weight (kg)	SE of Recreational harvest weight	Commercial harvest weight (kg)
Barramundi	42 000	4.21	131 000	27 000	763 000
Dusky flathead[b]	117 000	0.86	101 000	12 000	42 000
Pearl perch	11 000	1.12	12 000	3 300	19 000
Sand whiting complex[b]	482 000	0.20	96 000	14 000	203 000
Snapper	56 000	1.47	82 000	22 000	64 000
Spanish mackerel	34 000	7.22	243 000	37 000	555 000
Spotted mackerel	26 000	2.60	65 000	16 000	88 000
Tailor	110 000	0.68	75 000	19 000	56 000
Yellowfin bream[b]	323 000	0.39	125 000	15 000	110 000

Catch by water body

The most popular water body for recreational fishing was estuaries and enclosed coastal waters, within which 57% of the total catch took place. This was followed by inshore (ocean) waters, which accounted for a further 27% of total catch. Of the total catch, 7% occurred in offshore (ocean) waters, while the remainder occurred in freshwater rivers, lakes and dams (public and private).

Trumpeter whiting and sand whiting complex were the most commonly caught species groups in inshore waters (Table 14). Dart, yellowfin bream, tailor and snapper were also an important part of the inshore catch.

Reef-associated species dominated the offshore catch—coral trout was the most commonly caught species group, while cod, groper, red emperor, parrotfish and tuskfish were also important. Yellowfin bream was the most commonly caught species in estuaries and enclosed coastal waters, followed by sand whiting complex, barred javelin and dusky flathead.

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[8] Average weights are calculated at smaller spatial regions before being weighted and scaled up to a statewide estimate.
[b] The commercial harvest of sand whiting, yellowfin bream and dusky flathead are predominantly those species, but may include a small proportion of similar species.

Table 14: Total catch of all species groups in estuaries or enclosed coastal waters, inshore waters and offshore waters[9]

	Water body					
	Estuary or enclosed coastal		**Inshore**		**Offshore**	
Species/group	**Total catch**	**SE**	**Total catch**	**SE**	**Total catch**	**SE**
Australian bass	##	##				
Barramundi	#134 000	47 000	#23 000	8 800	##	##
Barred javelin	#266 000	70 000	#52 000	14 000	##	##
Blue threadfin	#31 000	11 000	##	##	##	##
Cod and groper (unspecified)	72 000	17 000	81 000	15 000	86 000	16 000
Coral trout (unspecified)			#34 000	10 000	135 000	21 000
Dart (unspecified)	#4 500	1 800	#347 000	105 000		
Dusky flathead	#260 000	71 000	90 000	16 000	##	##
Hussar	##	##	##	##	60 000	130 00
King threadfin	#20 000	6 500	21 000	17 000	##	##
Mangrove jack	68 000	16 000	#19 000	4 700	#3 800	1 400
Morwong and sweetlip (unspecified)	##	##	#12 000	4 300	#55 000	15 000
Moses snapper	74 000	16 000	#44 000	12 000	#18 000	4 500
Mulloway	#42 000	19 000	#8 200	3 200	##	##
Northern sand flathead	36 000	7 800	#17 000	4 600	##	##
Parrotfish and tuskfish	#4 500	2 100	26 000	5 500	68 000	11 000
Pearl perch	##	##	##	##	#22 000	7 300
Pikey bream	#192 000	48 000	40 000	8 800	##	##
Red emperor			#5 100	1 600	69 000	17 000
Redthroat emperor			#12 000	4 000	66 000	12 000
Sand whiting complex	637 000	82 000	453 000	86 000		
School mackerel	##	##	#17 000	4 300	#15 000	5 500
Sharks	17 000	3 900	#50 000	14 000	#42 000	12 000
Silver javelin	#36 000	10 000	16 000	6 700	##	##
Snapper	#12 000	3 700	#129 000	38 000	62 000	16 000
Spanish mackerel	##	##	#16 000	6 500	36 000	6 000
Spotted mackerel	##	##	#22 000	6 300	#15 000	5 100
Stripey snapper	##	##	#41 000	12 000	27 000	5 300
Tailor	#37 000	17 000	#129 000	32 000	##	##
Trevally (unspecified)	#1 600	700	#2 500	1 200	#12 000	4 200
Trumpeter whiting	#204 000	58 000	#474 000	157 000	##	##
Yellowfin bream	909 000	110 000	229 000	41 000	#17 000	7 800

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[9] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

Catch by fishing method

Nearly half of the total catch (46%) was taken by line fishing, making it by far the most popular fishing method. Cast nets (17%) and crab pots (13%) were also important. The remaining 23% of the total catch was taken by other methods (e.g. seine nets and equipment for gathering bait such as rakes, forks/spades and pumps), while less than 1% of the total catch was taken by spearfishing.

Catch by fishing region

Species caught differed across the 19 fishing regions. For example, sand whiting complex, trumpeter whiting and yellowfin bream were the most important species in south-eastern coastal waters, while red claw was the most important species in the south-eastern catchment (i.e. rivers and estuaries).

Reef-associated species, such as coral trout, were most important in coastal waters in the north of the state, such as Cairns and Townsville. European carp and golden perch were frequently harvested in freshwater regions, such as the Murray–Darling catchment and the Western Rivers catchment (Figure 28).

Figure 28: Top 10 species caught (harvested and released) by fishing region (plus SE)—in some regions, fewer than 10 species were caught, in which case all species are shown (no data were reported for the Bulloo catchment)

Fraser coastal waters

Gulf catchment

Karumba coastal waters

Mackay coastal waters

Moreton Bay catchment

Mornington Island coastal waters

Figure 28 : Top 10 species caught (harvested and released) by fishing region (plus SE)—in some regions, fewer than 10 species were caught, in which case all species are shown (no data were reported for the Bulloo catchment

Figure 28 : Top 10 species caught (harvested and released) by fishing region (plus SE)—in some regions, fewer than 10 species were caught, in which case all species are shown (no data were reported for the Bulloo catchment

Figure 28 : Top 10 species caught (harvested and released) by fishing region (plus SE)—in some regions, fewer than 10 species were caught, in which case all species are shown (no data were reported for the Bulloo catchment

Catch by residential region

Most fishers reported catching species found in their local region (Figure). Whiting (sand and trumpeter) were commonly caught by residents in the south-eastern residential regions (Gold Coast, Brisbane and Wide Bay-Burnett), while residents from the state's north (e.g. Cairns and Townsville) commonly caught reef species, such as coral trout and crimson and saddletail snapper.

However, people do travel to go fishing and fishers reported catching species that occur outside their residential region. For example, people living in the Darling Downs commonly reported catching sand whiting and yellowfin bream, which are marine species. Residents of the Central West/North West/South West region caught diverse species, such as golden perch (freshwater), coral trout (reef) and mud crabs (estuarine).
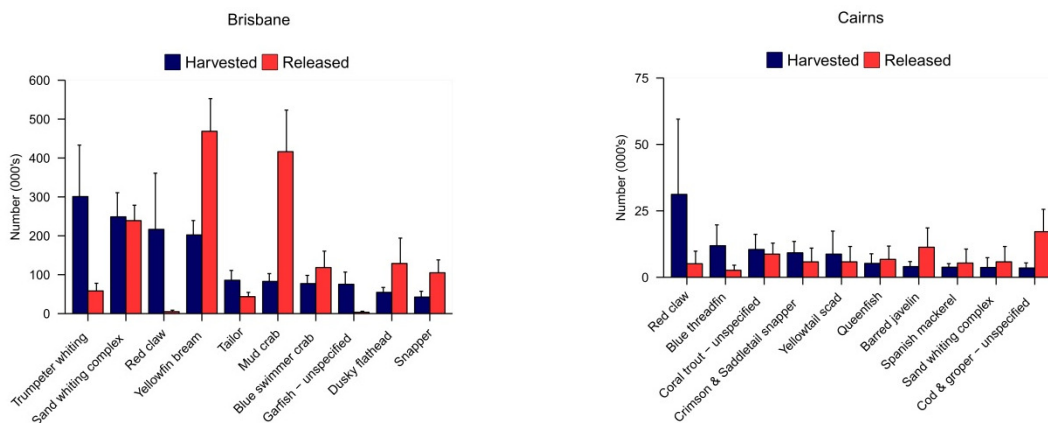
Figure 29: Top 10 species caught (harvested and released) by fishers of each residential region (plus SE)
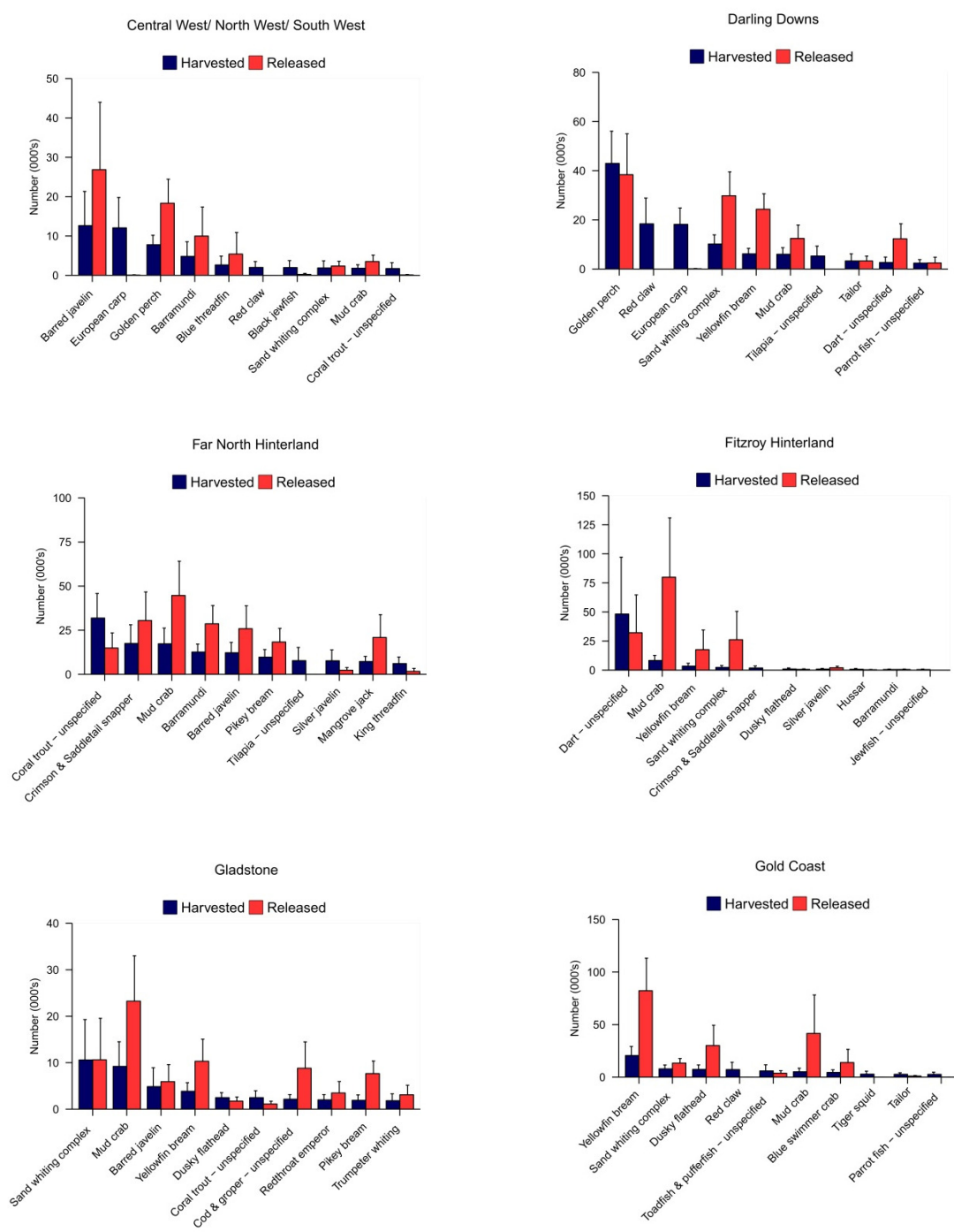
Figure 29 : Top 10 species caught (harvested and released) by fishers of each residential region (plus SE)
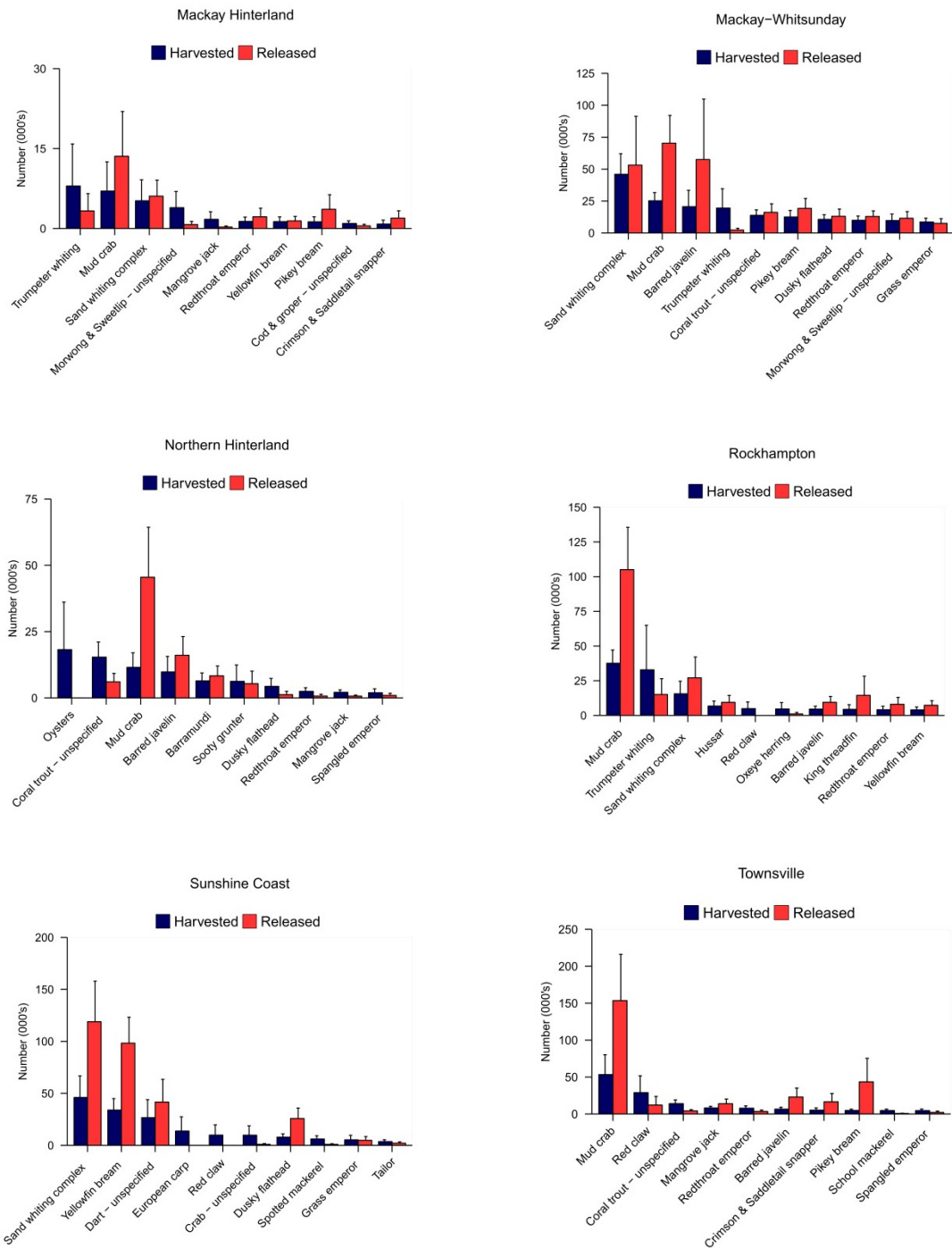
Figure 29 : Top 10 species caught (harvested and released) by fishers of each residential region (plus SE)
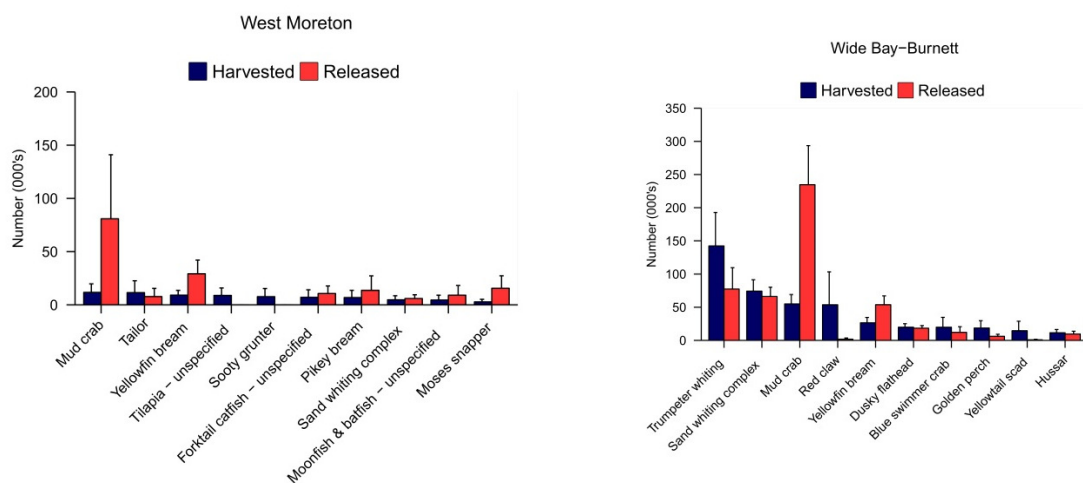
Figure 29 : Top 10 species caught (harvested and released) by fishers of each residential region (plus SE)

Catch by platform

Overall, 53% of the total catch was taken when fishing from a boat, while 47% was taken when shore fishing. The contribution of the catch taken from a boat or the shore varied for the different species groups (Table 15). For example, tailor were mostly caught from the shore, while yellowfin bream were mostly caught from boats.

Table 15: Total catch of all species groups from a boat or the shore[10]

	Platform			
	Boat		**Shore**	
Species/group	**Total catch**	**SE**	**Total catch**	**SE**
Australian bass	#141 000	49 000	#30 000	15 000
Barramundi	#126 000	47 000	#48 000	12 000
Barred javelin	#270 000	71 000	#59 000	25 000
Blue threadfin	#39 000	12 000	##	##
Cod and groper (unspecified)	204 000	27 000	#35 000	9 700
Coral trout (unspecified)	166 000	28 000	##	##
Dart (unspecified)	##	##	#338 000	105 000
Dusky flathead	#271 000	78 000	81 000	11 000
Hussar	69 000	14 000		
King threadfin	#18 000	6 200	##	##
Mangrove jack	64 000	16 000	#27 000	7 800
Morwong and sweetlip (unspecified)	72 000	17 000	##	##
Moses snapper	101 000	17 000	#36 000	11 000

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[10] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

	Platform			
	Boat		Shore	
Mulloway	#39 000	14 000	##	##
Northern sand flathead	34 000	7 700	20 000	4 700
Parrotfish and tuskfish	95 000	13 000	##	##
Pearl perch	#24 000	7 400	##	##
Pikey bream	#163 000	45 000	71 000	14 000
Red emperor	74 000	17 000		
Redthroat emperor	76 000	13 000	##	##
Sand whiting complex	600 000	96 000	490 000	73 000
School mackerel	34 000	7 500	#2 500	900
Sharks	91 000	16 000	##	##
Silver javelin	#49 000	13 000	#5 400	2 400
Snapper	194 000	42 000	##	##
Sooty grunter	#5 000	2 500	#77 000	23 000
Spanish mackerel	47 000	6 700	##	##
Spotted mackerel	34 000	7 300	##	##
Stripey snapper	68 000	14 000	##	##
Tailor	#56 000	26 000	#113 000	30 000
Threadfin and Australian salmon	##	##	##	##
Trevally (unspecified)	#15 000	4 300	##	##
Trumpeter whiting	#636 000	170 000	#44 000	12 000
Yellowfin bream	778 000	123 000	378 000	41 000

Species profiles

Australian bass (*Macquaria novemaculeata*)

Overall, 8% of Australian bass caught were harvested and 92% were released. In this survey, catches were reported only from the south-eastern catchment (Figure 30A). This does not mean that none were caught elsewhere. Rather, it implies that there was little activity elsewhere. The majority of bass (79%) were caught in public lakes and dams (Figure 30B).

Most were caught from boats (82%), with the remainder caught from the shore (18%) (Figure 30C). Examining catch through the year reveals a seasonal reduction during the winter months (June–August) (Figure 30D). Australian bass were only reported as being caught while line fishing, so if other methods were used they were rarely successful (Figure 30E).
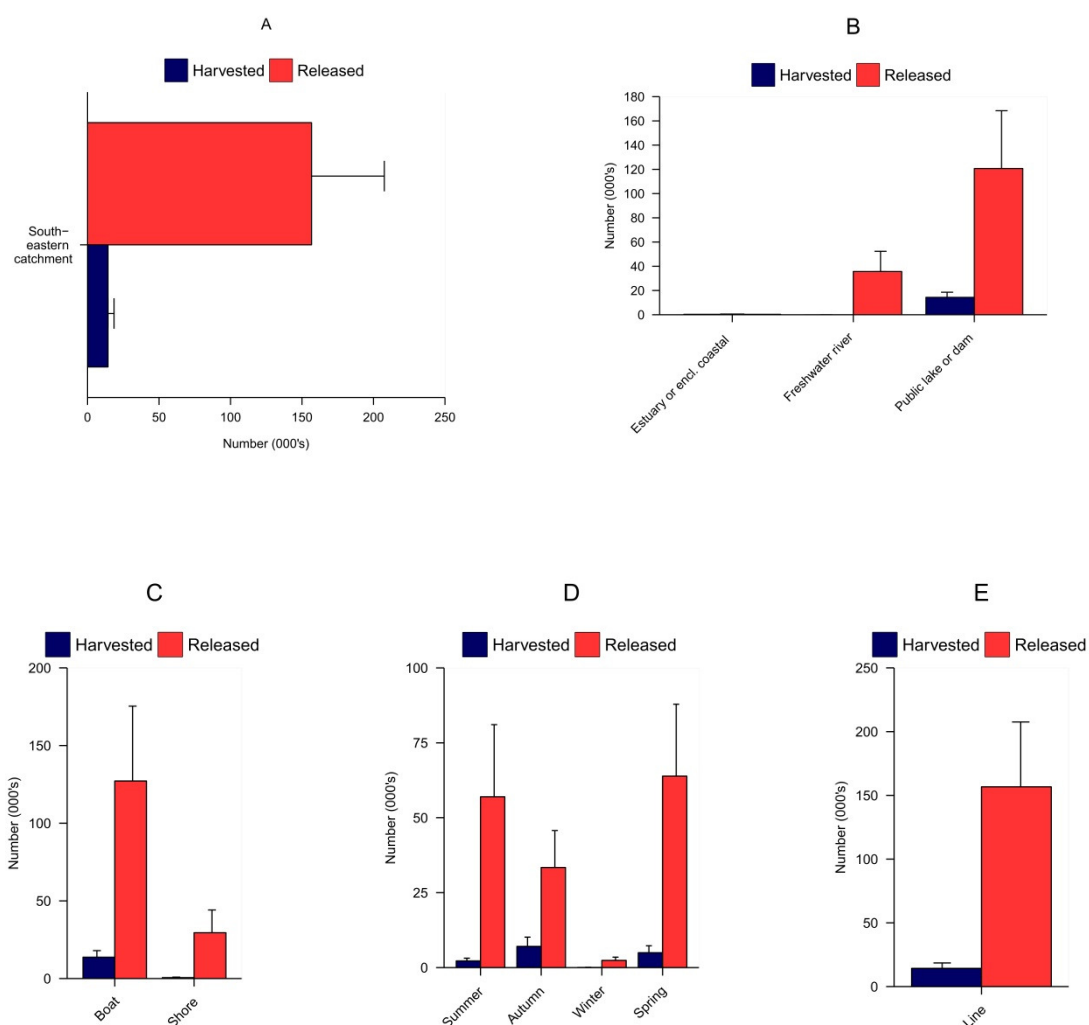
Figure 30: Australian bass catch information by fishing region, water body, platform, season and method (plus SE)

Barramundi (*Lates calcarifer*)

Overall, 24% of barramundi caught were harvested and 76% were released. Catches were more common in northern Queensland; however, there were some catches within the south-eastern catchment (Figure 31A). The majority (77%) were caught in estuaries (Figure 31B).

Most were caught from boats (73%), with the remainder caught from the shore (27%) (Figure 31C). Examining catch through the year reveals a reduction through the spring and summer months (Figure 31D). Almost all barramundi were caught using fishing lines (Figure 31E).
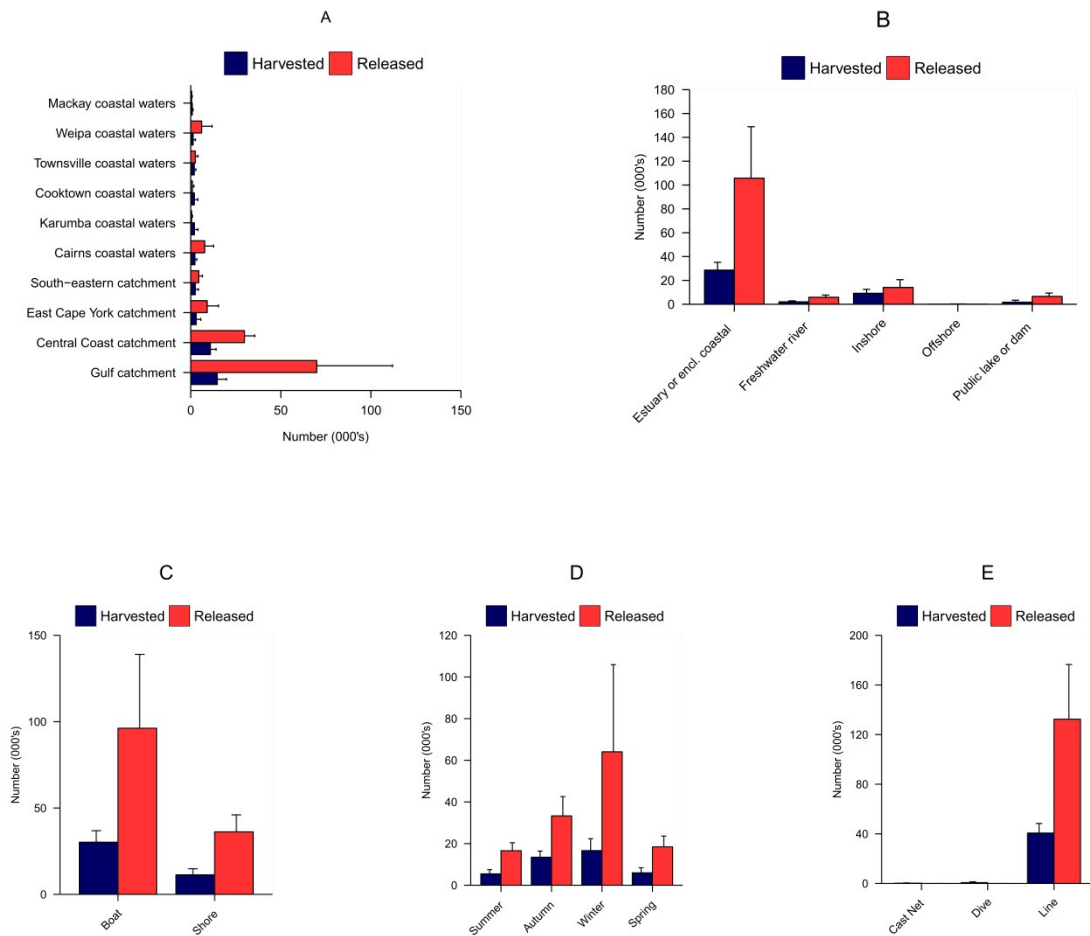
Figure 31: Barramundi catch information by fishing region, water body, platform, season and method (plus SE)

Coral trout (*Plectropomus spp.* and *Variola* spp.)

Overall, 61% of coral trout caught were harvested and 29% were released. Generally, catches were restricted to the northern half of Queensland's coastal waters (Figure 32A). Of the total coral trout catch, 80% were caught in offshore waters, with the remaining 20% caught in inshore waters (Figure 32B).

The vast majority (98%) were caught from boats (Figure 32C). Catch peaked over the summer months (Figure 32D). Nearly all coral trout were caught using lines, with few taken while diving (Figure 32E).
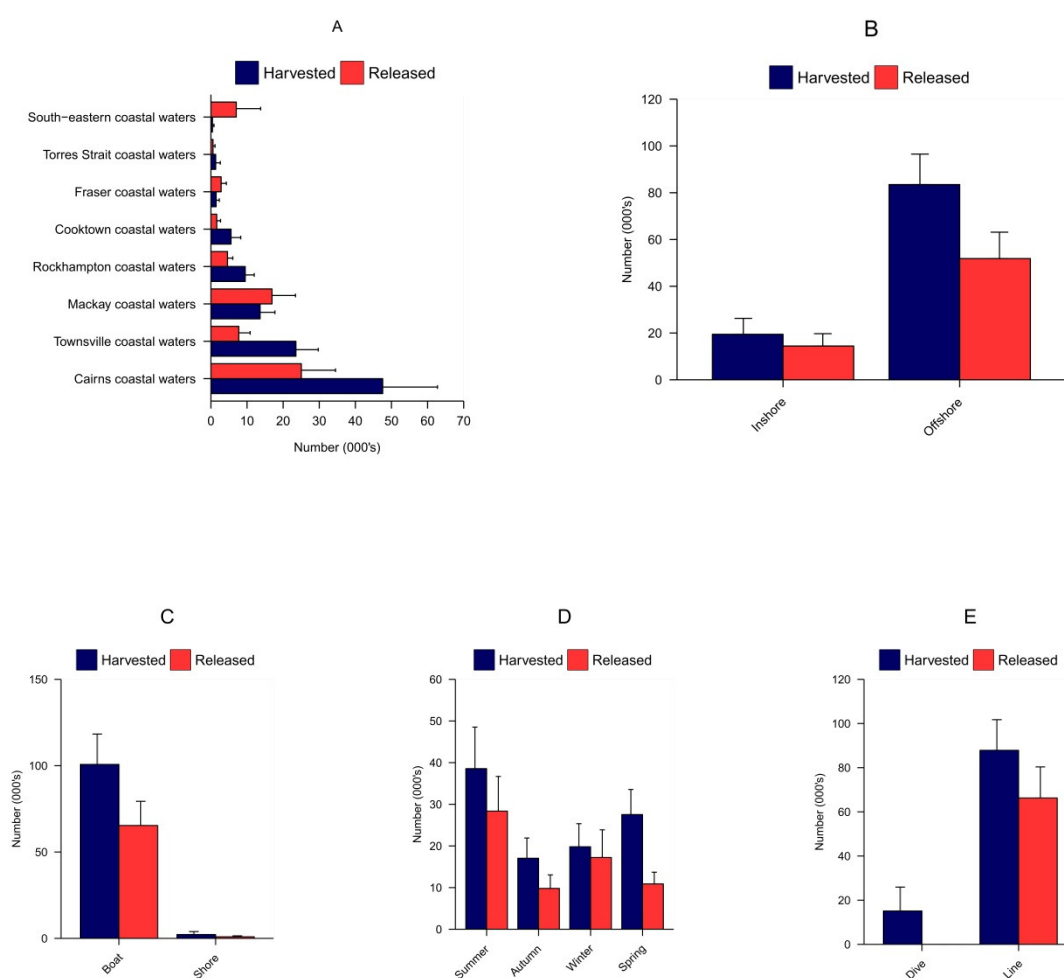
Figure 32: Coral trout catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Dusky flathead (*Platycephalus fuscus*)

Overall, 33% of dusky flathead caught were harvested and 67% were released. Catches were highest in the south-eastern catchment (Figure 33A). The majority (74%) were caught in estuaries or enclosed coastal waters (Figure 33B) and from boats (77%) (Figure 33C).

Catch was relatively steady through the year (Figure 33D). Nearly all dusky flathead were caught by line (Figure 33E).
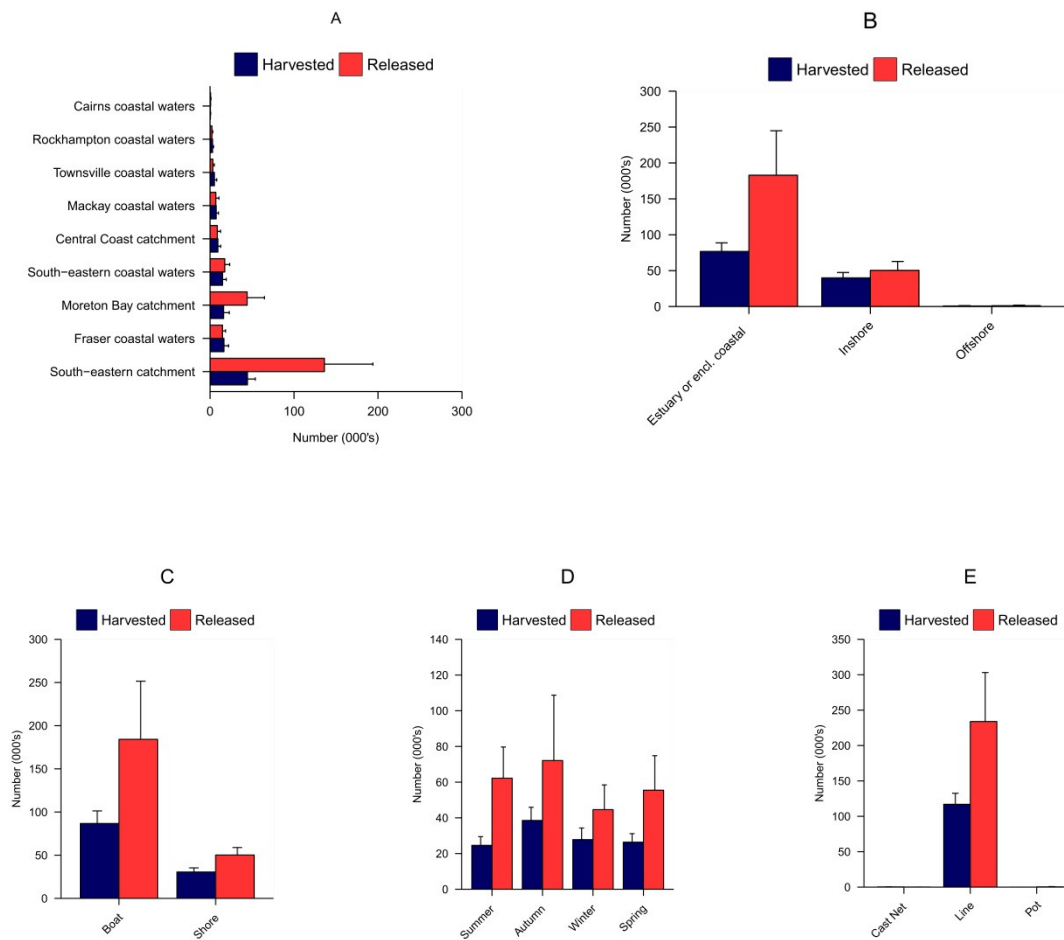
Figure 33: Dusky flathead catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Mud crab (*Scylla serrata* and *S. olivacea*)

Overall, 20% of mud crabs caught were harvested and 80% were released. Catches were greatest in the Central Coast catchment and south-eastern catchment (Figure 34A). The majority (92%) were caught in estuaries or enclosed coastal waters (Figure 34B).

Fishing from a boat accounted for 91% of the catch (Figure 34C). Catch peaked in summer, declining through the winter months (Figure 34D). Almost all mud crab were caught in pots (Figure 34E).
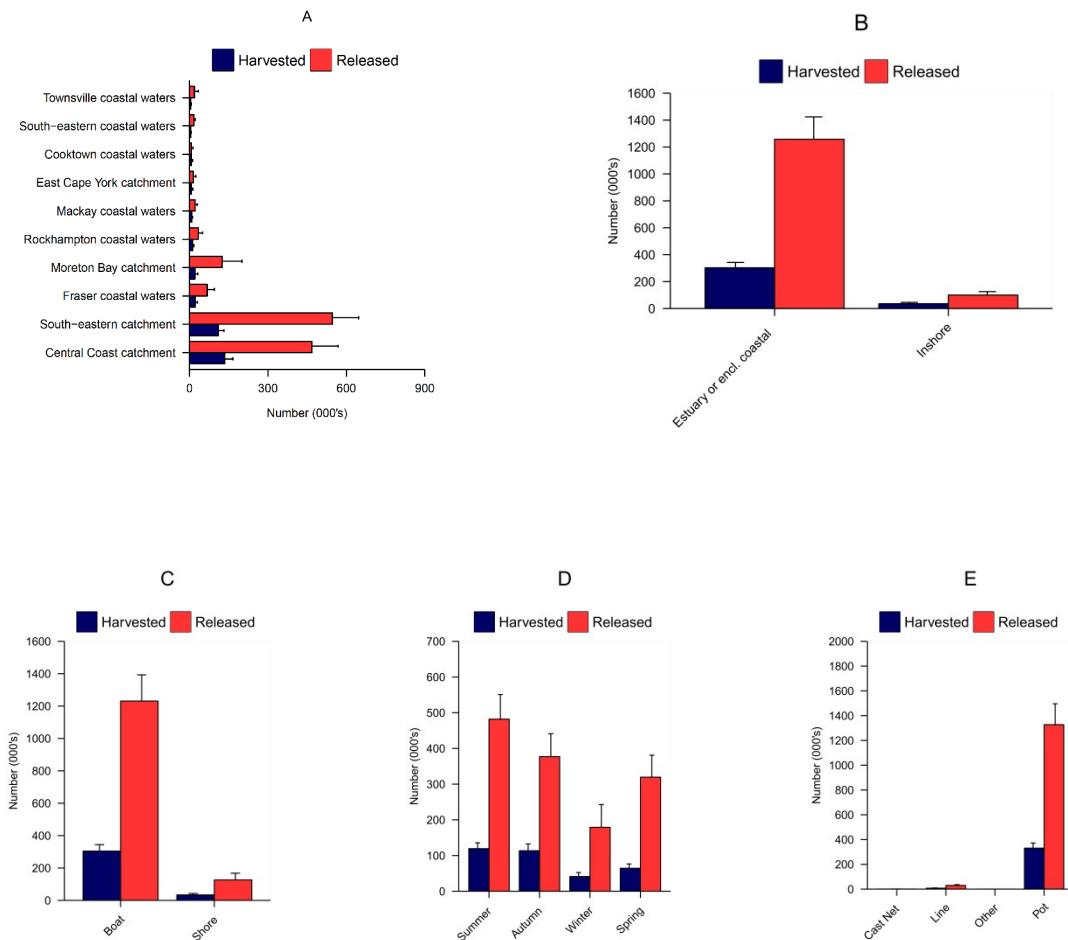
Figure 34: Mud crab catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Sand whiting complex (*Sillago ciliata, S. analis* and *S. sihama*)

Overall, 44% of sand whiting caught were harvested and 56% were released. Catches were greatest in Queensland's southern marine waters (Figure 35A). Of the total sand whiting catch, 58% were caught in estuaries or enclosed coastal waters, with the remainder caught in inshore waters (Figure 35B).

Fishing from a boat accounted for 55% and 45% were caught from the shore (Figure 35C). Catch declined slightly in the winter months (Figure 35D). The majority of sand whiting were caught by line (Figure 35E).
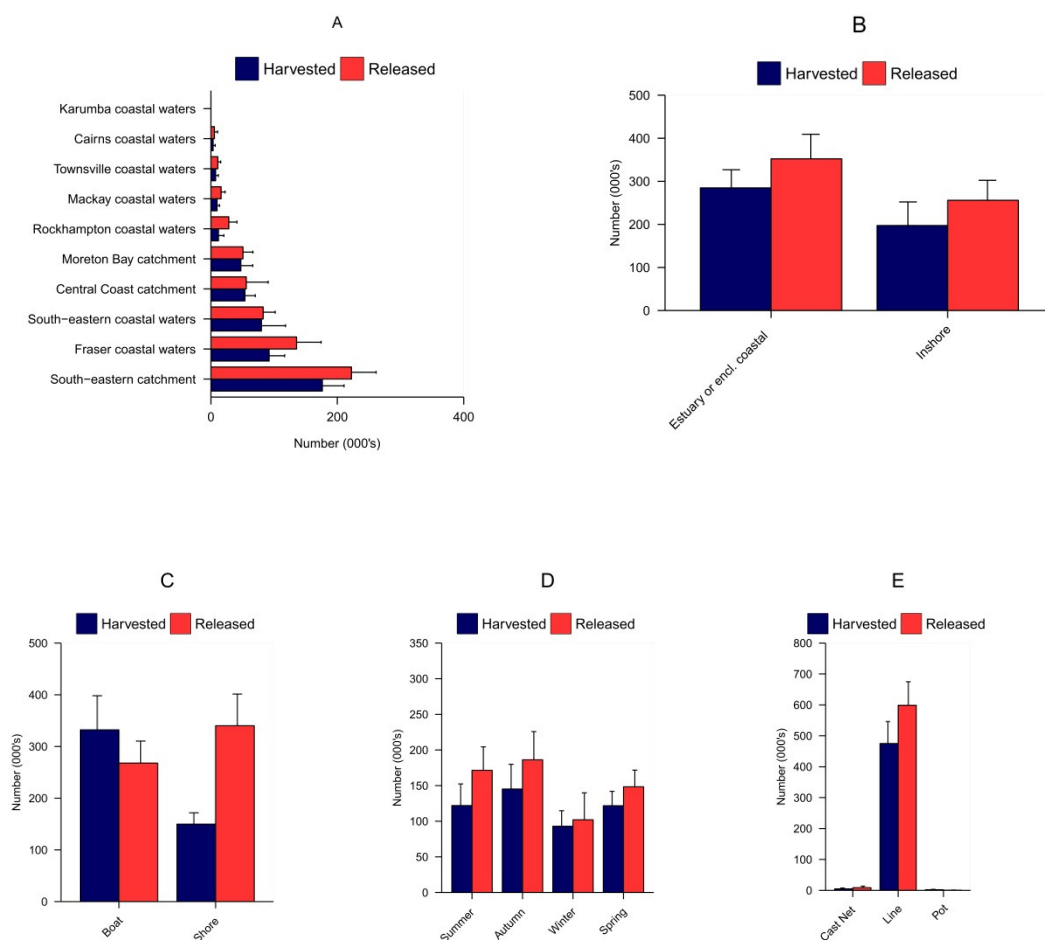
Figure 35: Sand whiting complex catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Snapper (*Pagrus auratus*)

Overall, 27% of snapper caught were harvested and 73% were released. Catches were greatest in Queensland's southern marine waters (Figure 36A). The majority (64%) of snapper were caught in inshore waters (Figure 36B) and most (95%) were caught from a boat (Figure 36C).

Catch was highest in summer and lowest during spring (Figure 36D), however, the harvest was greater in winter, indicating that larger fish were more catchable during the winter. All snapper were caught by line (Figure 36E).
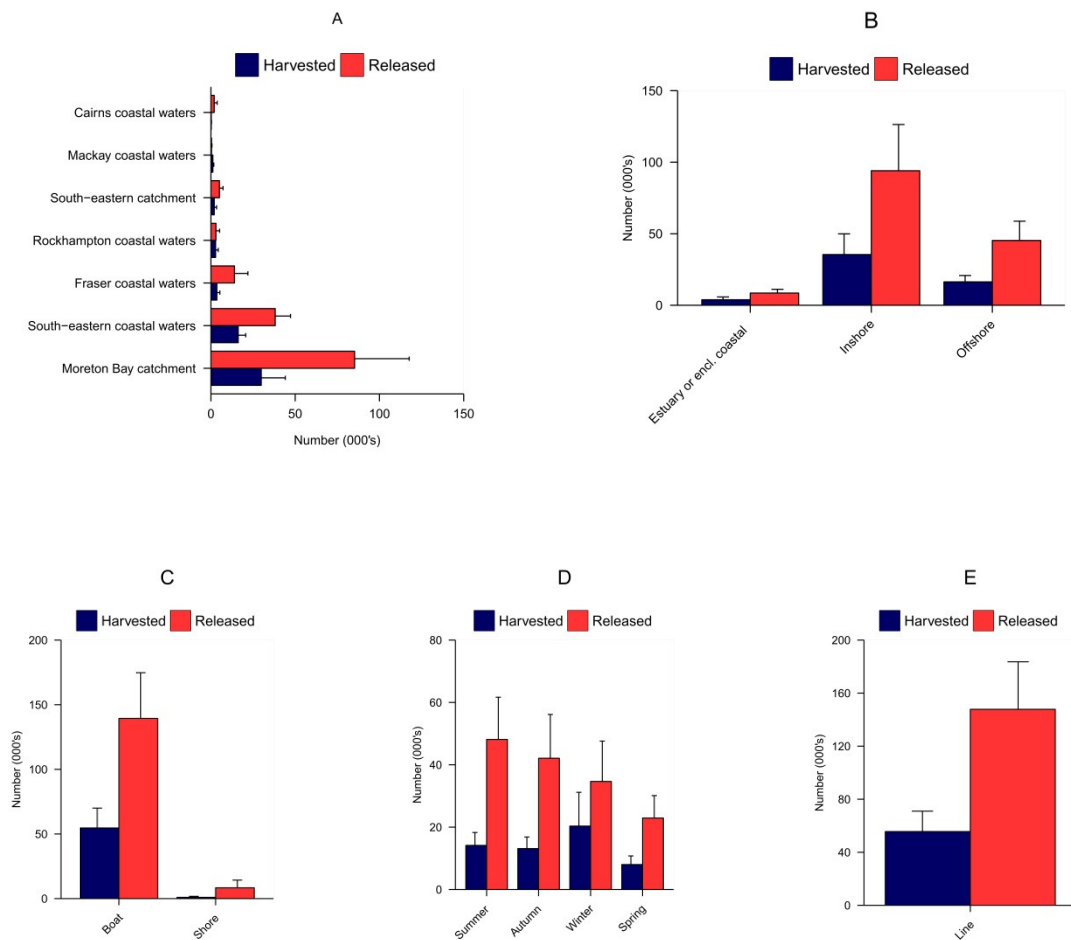
Figure 36: Snapper catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Spanish mackerel (*Scomberomorus commerson*)

Overall, 63% of Spanish mackerel caught were harvested and 37% were released. Catches were greatest in Cairns coastal waters followed by south-eastern coastal waters (Figure 37A). The majority (66%) were caught in offshore waters, while 30% were caught in inshore waters and the remainder in estuaries or enclosed coastal waters (Figure 37B).

Most (86%) Spanish mackerel were caught from a boat (Figure 37C). Catch was fairly consistent throughout the year (Figure 37D), however a greater proportion were harvested during summer. Nearly all Spanish mackerel were caught by line (Figure 37E).
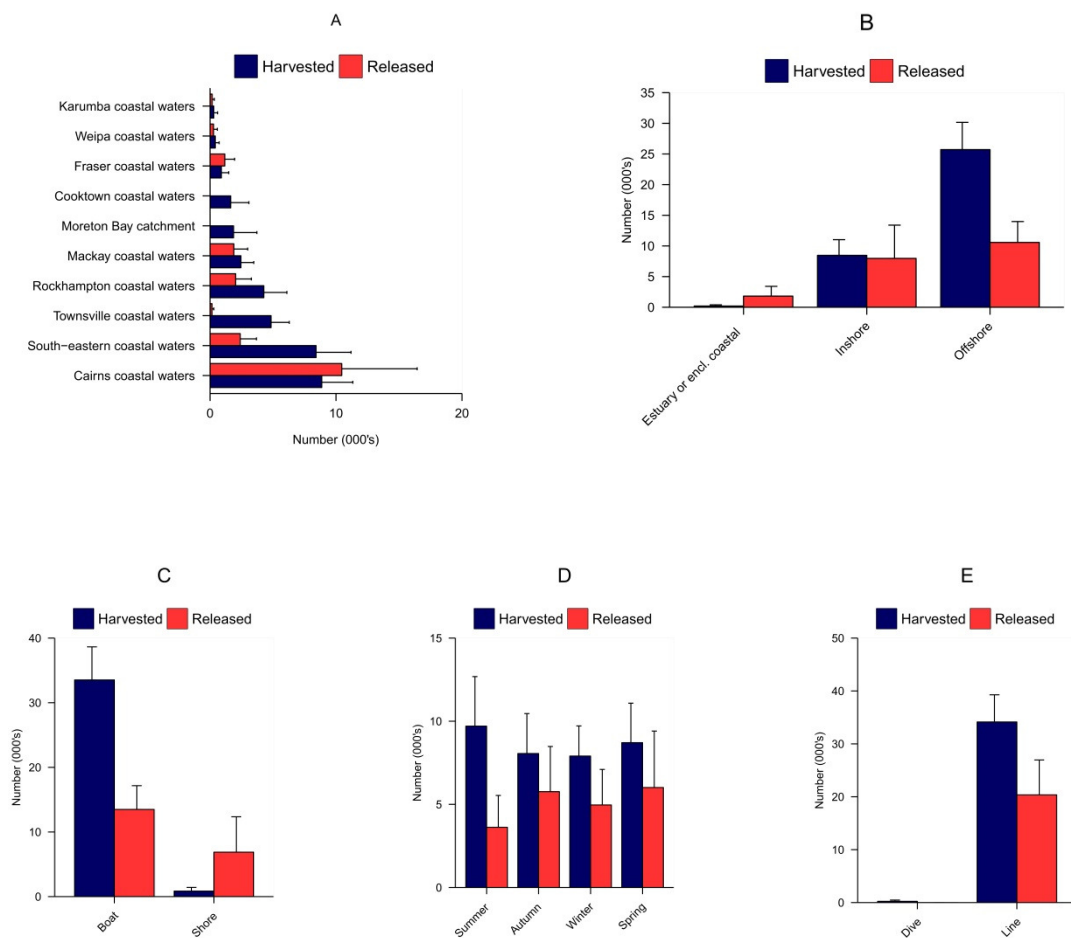
Figure 37: Spanish mackerel catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Tailor (*Pomatomus saltatrix*)

Overall, 65% of tailor caught were harvested and 35% were released. Catches were greatest in Fraser coastal waters (Figure 38A). The majority (76%) were caught in inshore waters (Figure 38B) and most (67%) were caught from the shore (Figure 38C).

Catch changed throughout the year, with the majority being caught during winter and spring (Figure 38D). All tailor were caught by line (Figure 38E).
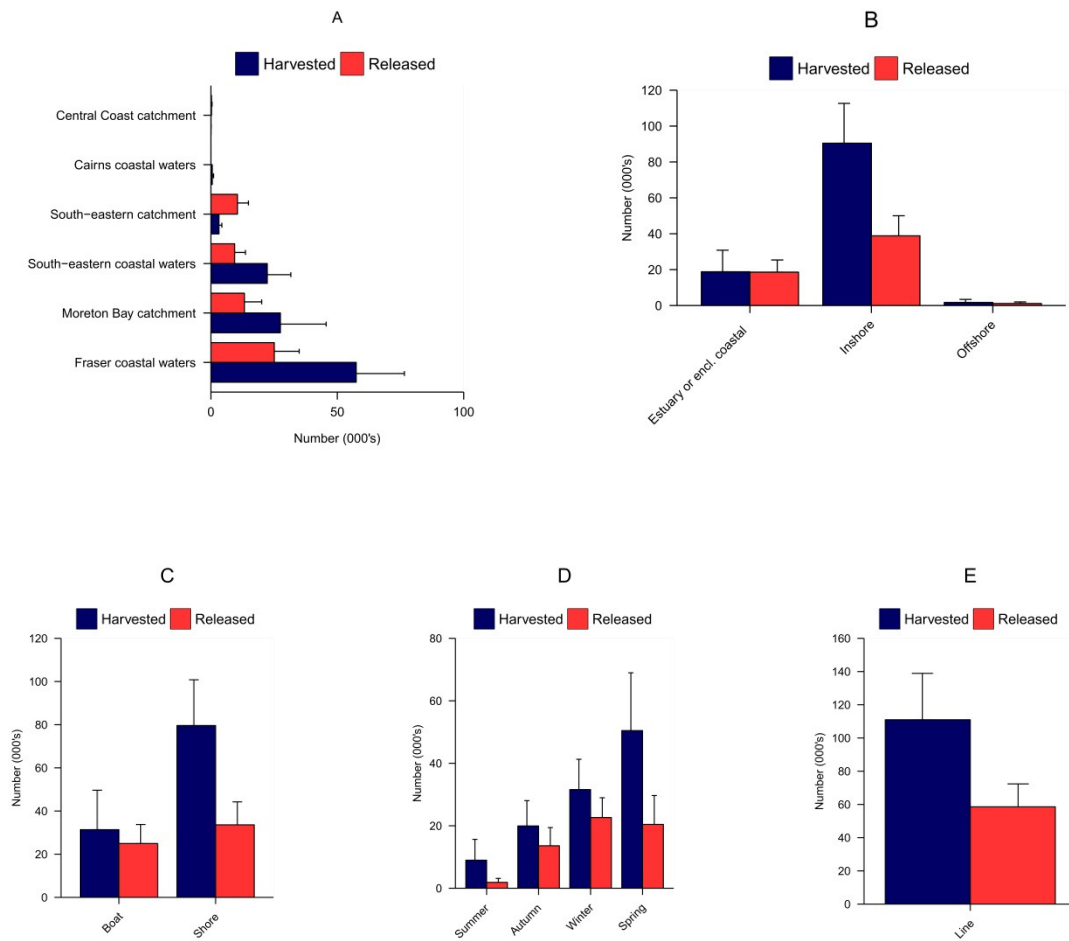
Figure 38: Tailor catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Yellowfin bream (*Acanthopagrus australis*)

Overall, 28% of yellowfin bream caught were harvested and 72% were released. Catches were greatest in Queensland's southern marine waters (Figure 39A). The majority (79%) were caught in estuaries or enclosed coastal waters (Figure 39B).

Fishing from a boat accounted for 67% and 33% were caught from the shore (Figure 39C). Catch was greatest in autumn and lowest in spring (Figure 39D). Nearly all yellowfin bream were caught by line (Figure 39E).
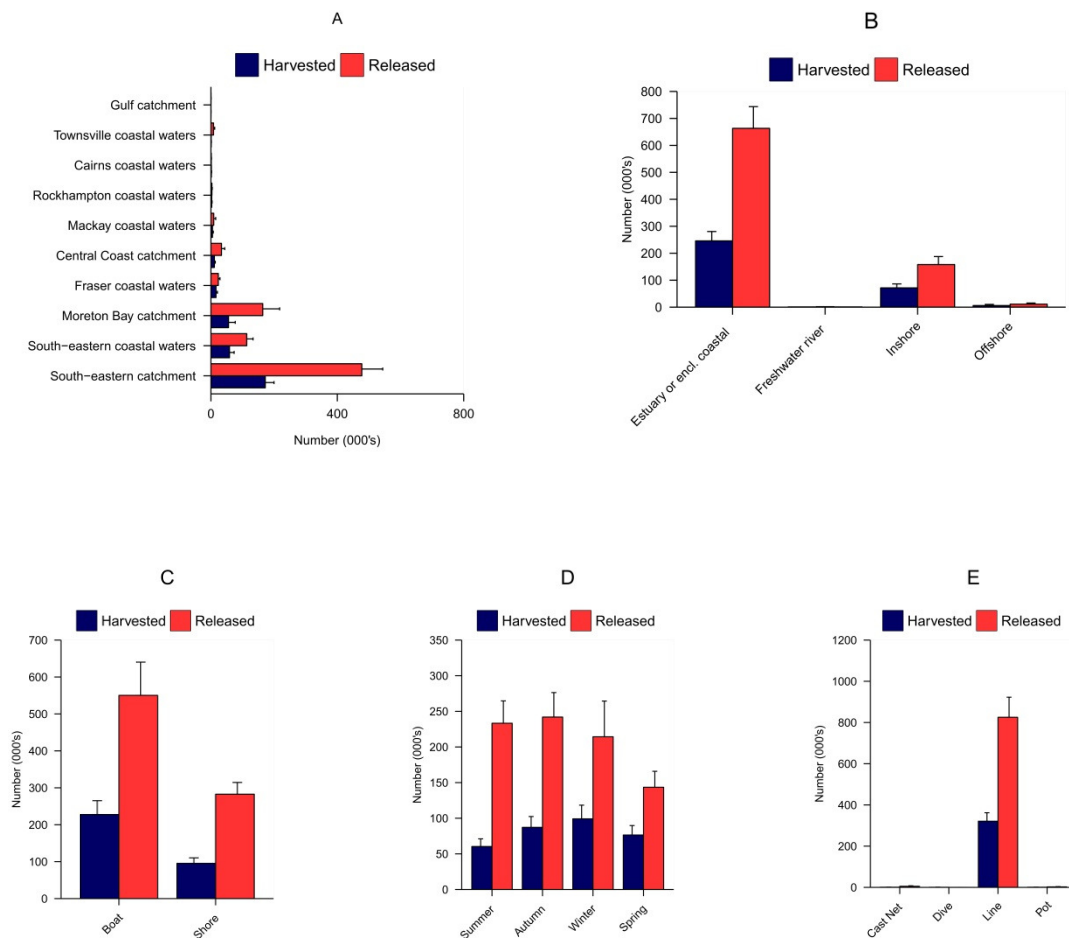
Figure 39: Yellowfin bream catch information by (A) fishing region, (B) water body, (C) platform, (D) season and (E) method (plus SE)

Regional profiles

Brisbane

Compared to the other regions in the survey, the Brisbane region is small but it has a large population. Its local waters include the Brisbane River, Moreton Bay, oceanic waters, as well as several freshwater lakes and rivers. These waters offer a variety of fishing habitats, which provide access to a diverse range of local temperate and migratory tropical species.

Approximately 236 000 people, or 11.9% of the Brisbane population, were recreational fishers. This was less than the state average of 15.1%. Fishing was popular across all age groups, although the greatest numbers of recreational fishers were in the 15-29 years and 30-44 years age groups (Figure 40). There were more male fishers than female fishers across all ages.

Brisbane residents spent more days fishing from the shore than from boats (Figure 41).
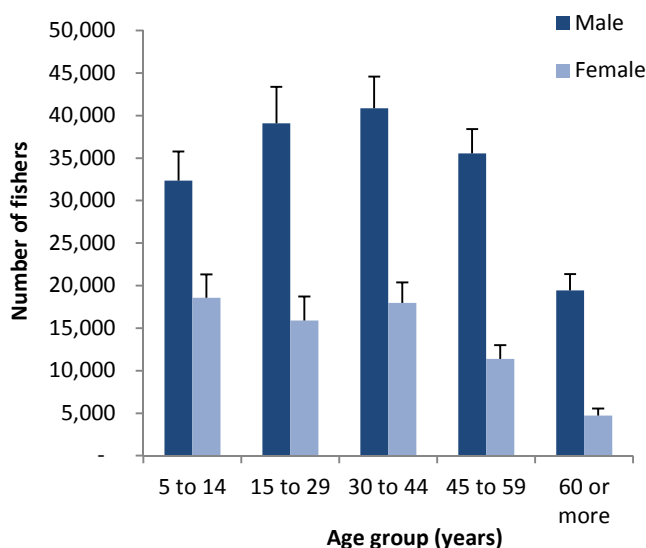
Figure 40: Number of Brisbane fishers by age group and gender
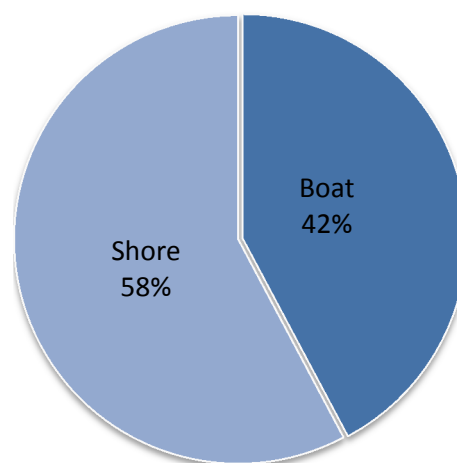
Figure 41: Percentage of days fished by platform by Brisbane residents

Brisbane residents tended to fish where they live (Figure 43). They spent most of their time fishing in the south-eastern corner of the state. The most popular fishing regions were the shores, rivers and estuaries of the south-eastern catchments (Figure 42). Coastal waters in the south-east and around Fraser Island were also popular. A small number of fishers travelled considerable distances to fish in the Central Coast and Gulf catchments. Estuaries and enclosed coastal waters (e.g. southern Moreton Bay) were the most popular water bodies, followed by inshore oceanic waters
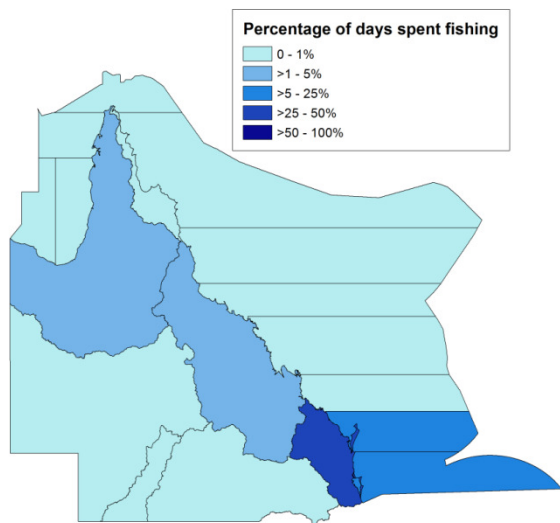
Figure 43: Percentage of days fished by fishing region by Brisbane residents
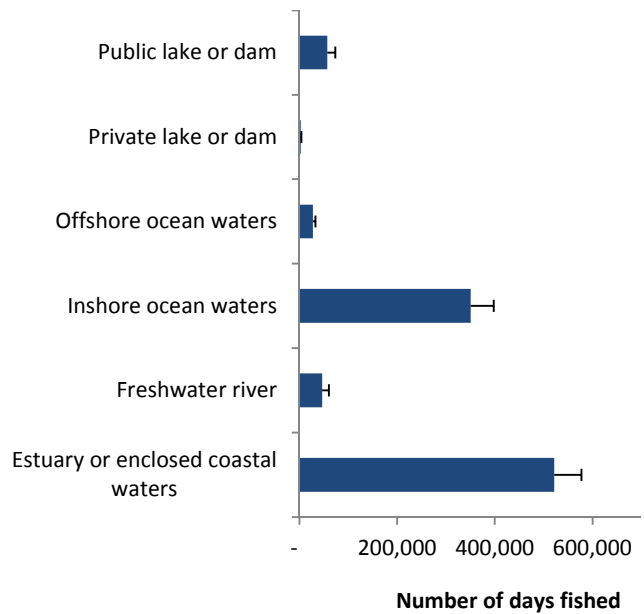
Figure 42: Number of days fished by water body by Brisbane residents

Summer was the most popular time of year for Brisbane residents to go fishing (Figure 44). There were also seasonal peaks during the school holidays of April, July and September/October. The most commonly targeted species by Brisbane residents were mud crab, sand whiting, snapper, tailor and bream. The most commonly harvested fish were trumpeter whiting and sand whiting (Figure 45). Yellowfin bream were also commonly caught, but most were released. Commonly caught non-fish species included mud crabs, blue swimmer crabs and red claw.
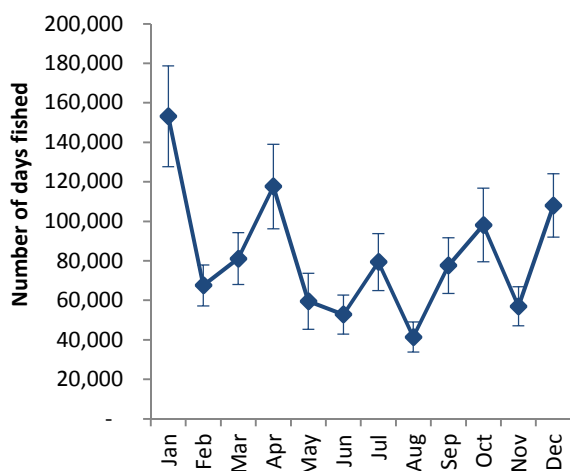
Figure 44: Number of days fished by month by Brisbane resident
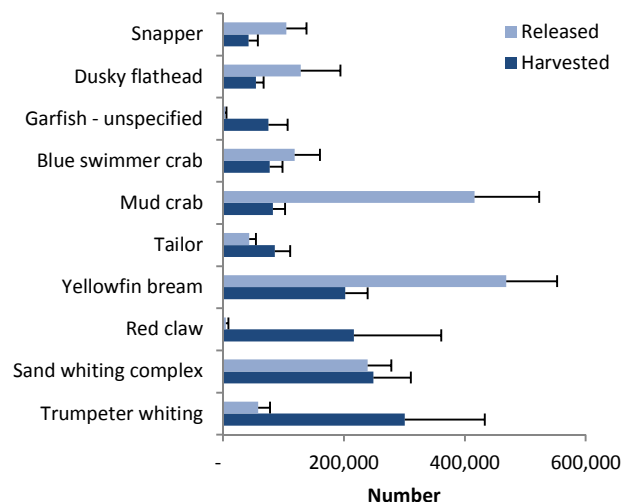
Figure 45: Top 10 species caught by Brisbane residents

Gold Coast

Situated in the state's far south-east corner, the Gold Coast is geographically small but has a large population relative to the other regions in this survey. It is a coastal city, and provides access to various fishing habitats ranging from freshwater dams, urbanised and natural estuaries, enclosed coastal waters, open beaches and ocean. The 2013 survey was the first to split the Gold Coast from the larger Moreton region, providing more insight into this unique Queensland region.

Approximately 42 000 people, or 8.8% of the Gold Coast population, were recreational fishers. This was less than the state average of 15.1%. 30-44 year olds represented the greater number of fishers (Figure 46). There were more male fishers than female fishers across all ages.

Gold Coast residents spent more days fishing from the shore than from boats (Figure 47).
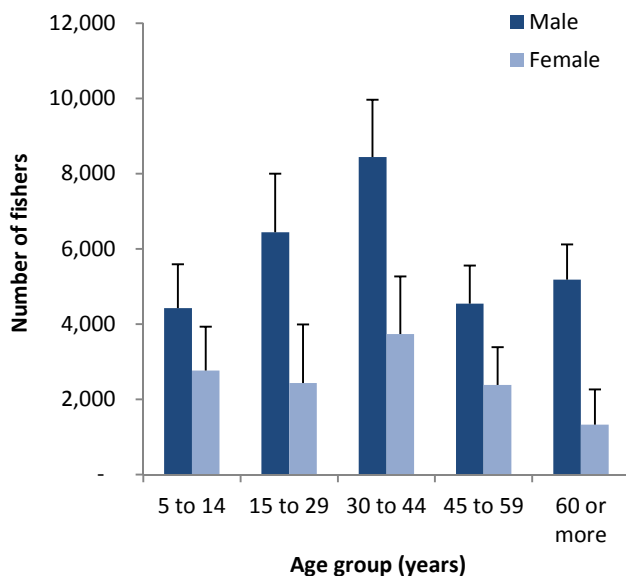
Figure 46: Number of Gold Coast fishers by age group and gender
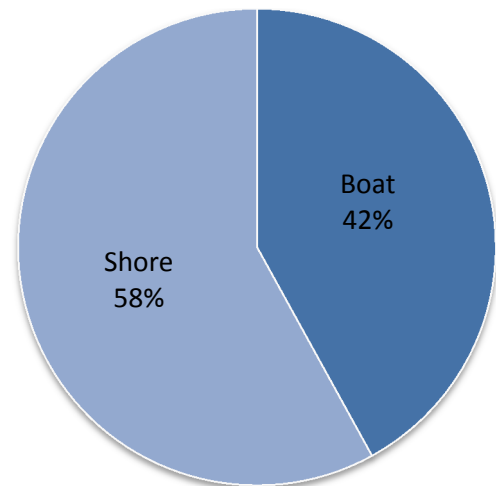
Figure 47: Percentage of days fished by platform by Gold Coast residents

Residents of the Gold Coast tended to fish where they live, they spent most of their time fishing in the south-eastern corner of the state (Figure 48). The most popular fishing region was the south-eastern catchment. Estuaries and enclosed coastal waters (e.g. southern Moreton Bay) were the most popular water bodies (Figure 49). South-eastern coastal waters were also popular for fishing, particularly inshore waters. Far fewer days were spent fishing in freshwater rivers, lakes or dams.
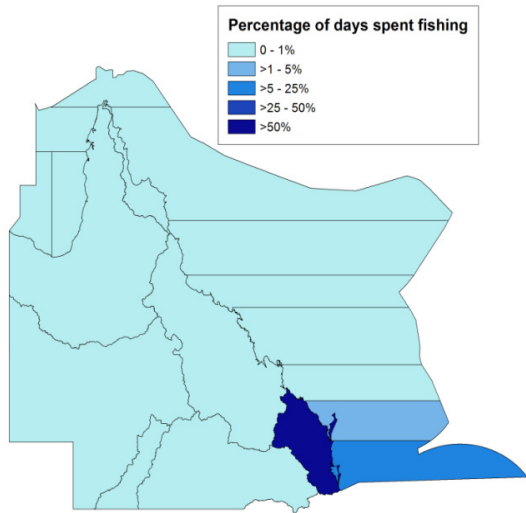
Figure 48: Percentage of days fished by fishing region by Gold Coast residents
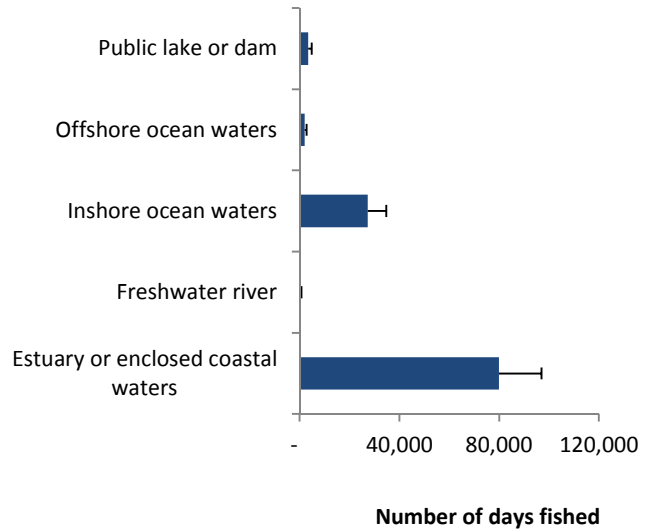
Figure 49: Number of days fished by water body by Gold Coast residents

January was the most popular time of year for Gold Coast residents to go fishing (Figure 50). There were also seasonal peaks during the school holidays of April, June and September. The most commonly targeted species were mud crabs, tailor, flathead (dusky and other), and sand whiting. Yellowfin bream were the most commonly harvested fish by number, followed by sand whiting and dusky flathead (Figure 51). For many species, a larger proportion of the catch was released, for example, yellowfin bream, dusky flathead and mud crabs.
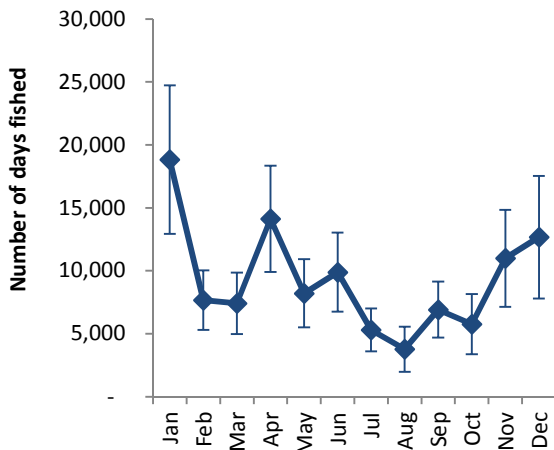
Figure 50: Number of days fished by month by Gold Coast residents
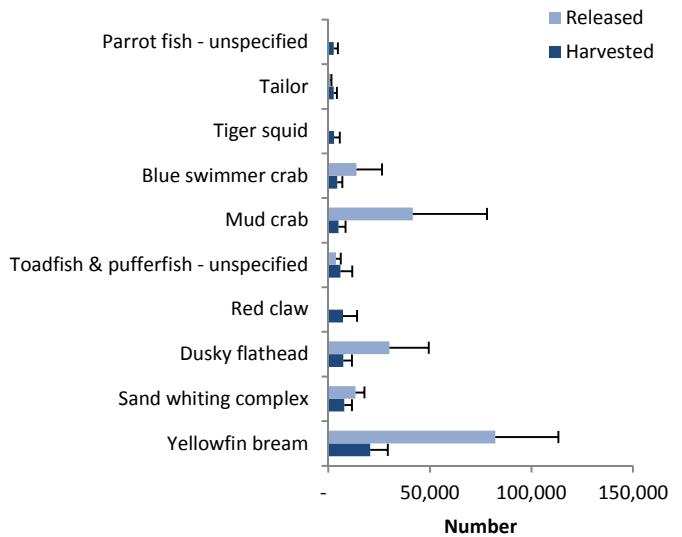
Figure 51: Top 10 species caught by Gold Coast residents

Sunshine Coast

The Sunshine Coast region is a geographically small area in the state's south-east. It comprises many localities along an approximately 60km stretch of coastline. The 2013 survey was the first to split the Sunshine Coast from the larger Moreton region. The region provides fishers with access to a variety of marine, estuarine and freshwater environments.

Approximately 60 000 people, or 18.3% of the Sunshine Coast population, were recreational fishers. This was more than the state average of 15.1%. Fishing was popular across all ages, with the most fishers being in the 30-44 years age group (Figure 53). There were more male fishers than female fishers across all ages.

Sunshine Coast residents spent more days fishing from the shore than from boats (Figure 52).
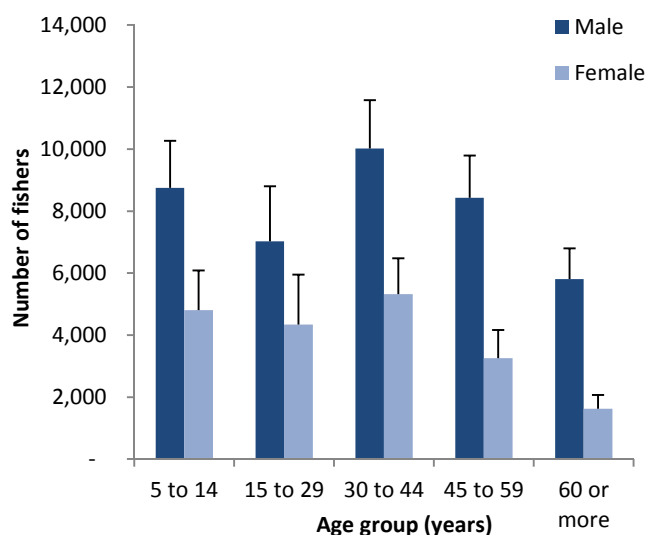
Figure 53: Number of Sunshine Coast fishers by age group and gender
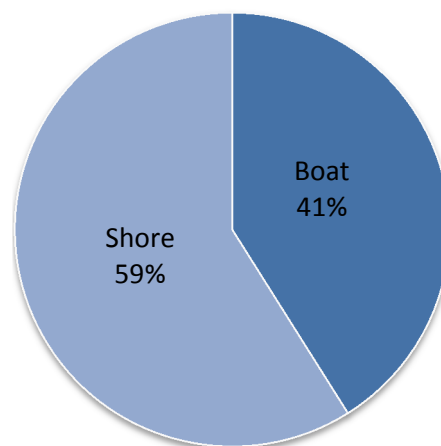
Figure 52: Percentage of days fished by platform by Sunshine Coast residents

Sunshine Coast residents spent most of their time fishing in the south-eastern corner of the state (Figure 54). Some fishers also travelled to go fishing in Fraser coastal waters and Rockhampton coastal waters. The most popular fishing region was the south-eastern catchment. Estuaries and enclosed coastal waters were the most popular water bodies, followed by inshore ocean waters (Figure 55). South-eastern coastal waters were also popular for fishing, particularly inshore waters.
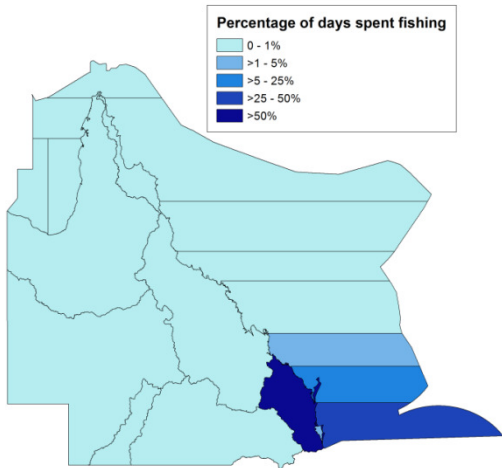
Figure 54: Percentage of days fished by fishing region by Sunshine Coast residents
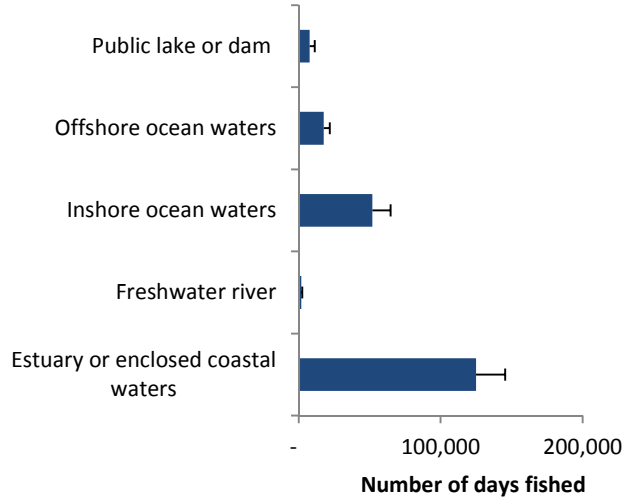
Figure 55: Number of days fished by water body by Sunshine Coast residents

December was the most popular time of year for Sunshine Coast residents to go fishing (Figure 56). There were also seasonal peaks near the school holidays of April, July and September. The most commonly targeted species by Sunshine Coast residents were sand whiting, flathead, bream, whiting and mud crab. The most commonly harvested fish were sand whiting, yellowfin bream and dart (Figure 57). Most of these fish were released.
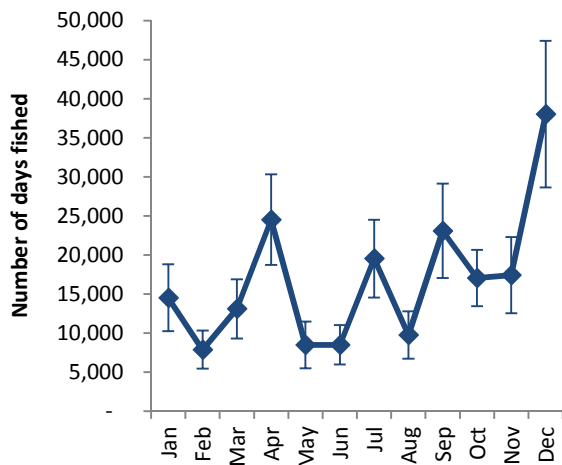
Figure 56: Number of days fished by month by Sunshine Coast residents
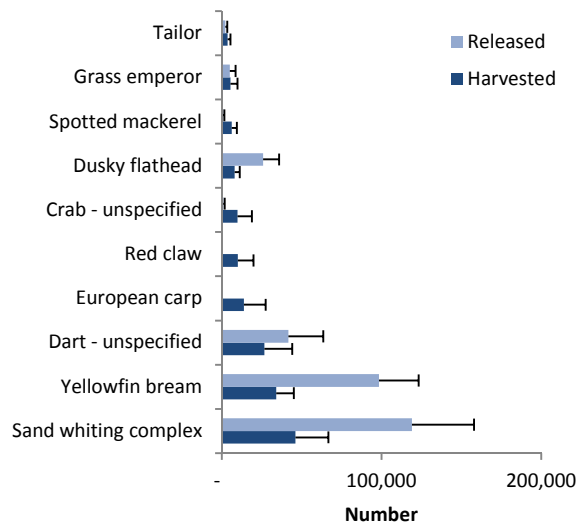
Figure 57: Top 10 species caught by Sunshine Coast residents

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West Moreton

The West Moreton region is a geographically small area in the state's south-east. It has a relatively small population. The 2013 survey was the first to exclude the Gold Coast and Sunshine Coast regions from the more rural West Moreton region. West Moreton contains no marine borders but access to marine fishing locations is only a short drive to the Gold Coast, Brisbane and Sunshine Coast. West Moreton does have many freshwater rivers, lakes and dams.

Approximately 17 000 people, or 18.5% of the West Moreton population, were recreational fishers. This was more than the state average of 15.1%. Fishing was popular across all ages, especially up to 44 years of age (Figure 58). There were more male fishers than female fishers across all ages.

Perhaps due to the limited access to open water, West Moreton residents spent far more days fishing from the shore than from boats (Figure 59).
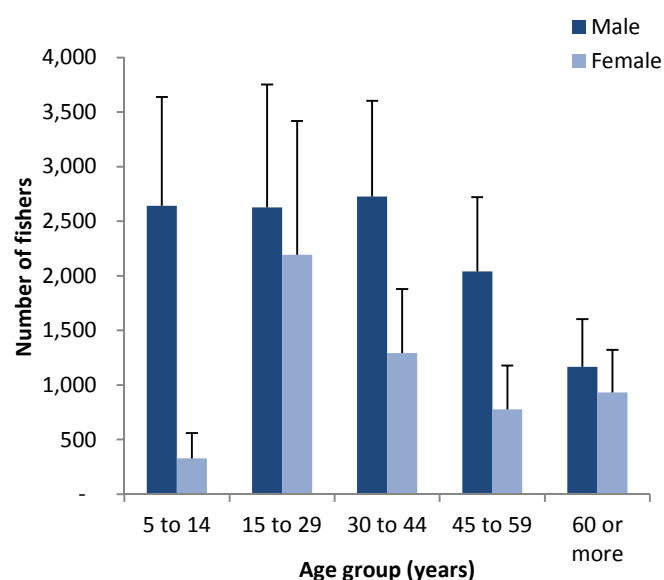
Figure 58: Number of West Moreton fishers by age group and gender
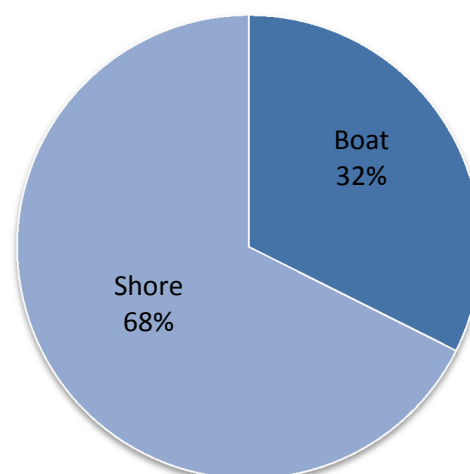
Figure 59: Percentage of days fished by platform by West Moreton residents

West Moreton residents spent most of their time fishing in the south-eastern corner of the state (Figure 60). The most popular fishing region was the south-eastern catchment. Public lakes and dams were the most popular water body to fish in, followed closely by estuaries and enclosed coastal waters (Figure 61). South-eastern coastal waters and Fraser coastal waters were also important fishing regions. In the ocean, inshore areas (i.e. beach fishing or within 5km of the coast) were far more important than offshore areas.
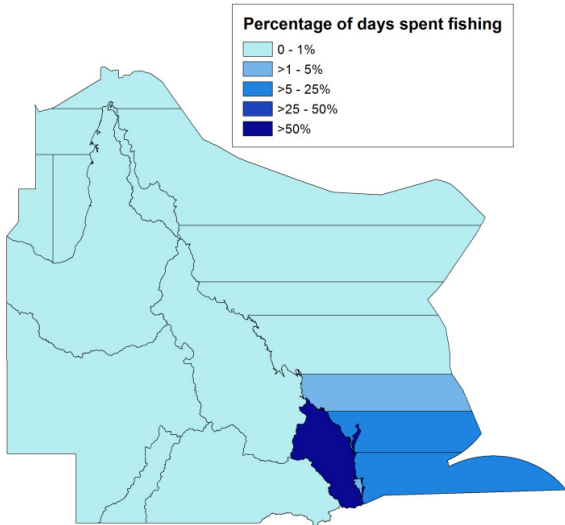
Figure 60: Percentage of days fished by fishing region by West Moreton residents
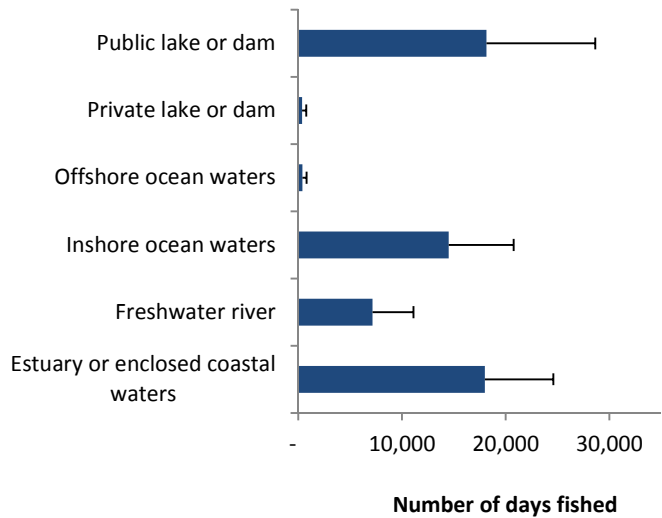
Figure 61: Number of days fished by water body by West Moreton residents

January and February were the most popular times of year for West Moreton residents to go fishing (Figure 62). There were also peaks during April, July and September, coinciding with school holidays. The most commonly targeted species by West Moreton residents were Australian bass, tailor, dusky flathead, Moses snapper and yellowfin bream. The most commonly harvested fish were tailor and yellowfin bream (Figure 63). Mud crabs were the most commonly harvested species by number, but most were released.
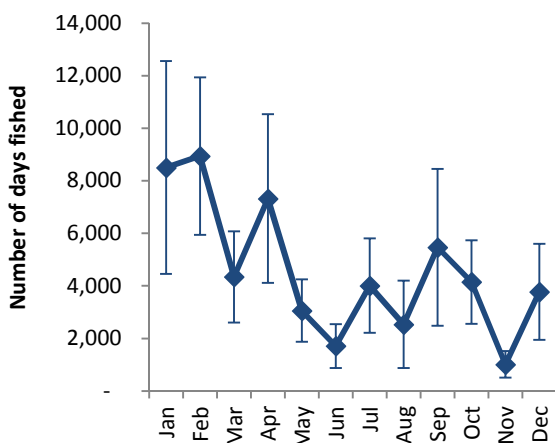
Figure 62: Number of days fished by month by West Moreton residents
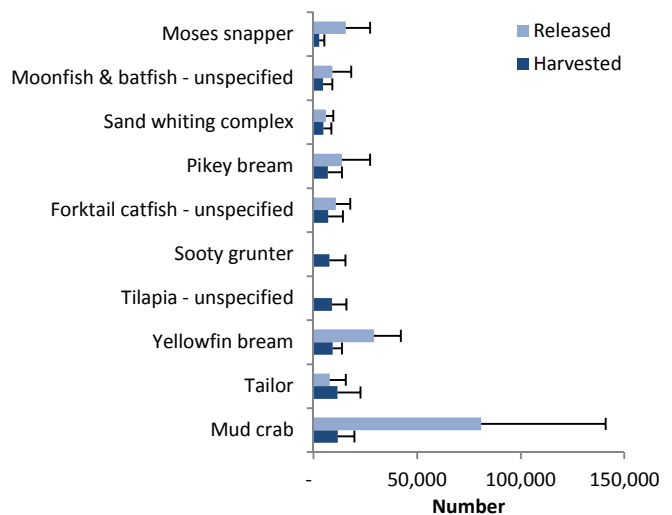
Figure 63: Top 10 species caught by West Moreton residents

Wide Bay-Burnett

The Wide Bay-Burnett region is a geographically large area, and includes the urban areas of Bundaberg, Hervey Bay and Maryborough. It also includes extensive rural areas as well as Fraser Island. Wide Bay-Burnett offers fishers many opportunities from mangrove-fringed estuaries, freshwater rivers, lakes, Hervey Bay and the Great Sandy Strait.

Approximately 52 000 people, or 19.7% of the Wide Bay-Burnett population, were recreational fishers. This was more than the state average of 15.1%. The number of fishers was similar across all age groups (Figure 64). In other regions there tended to be relatively fewer fishers 60 or more years old. There were more male fishers than female fishers across all ages.

In contrast to people in more southerly residential regions, Wide Bay-Burnett residents spent more time fishing from boats than from the shore (Figure 65).
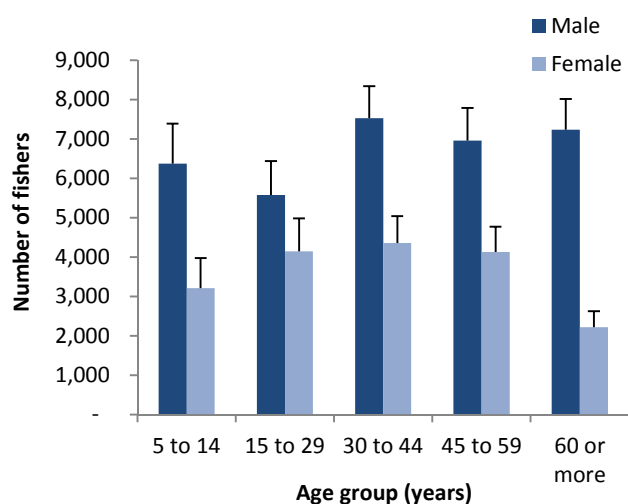
Figure 64: Number of Wide Bay-Burnett fishers by age group and gender
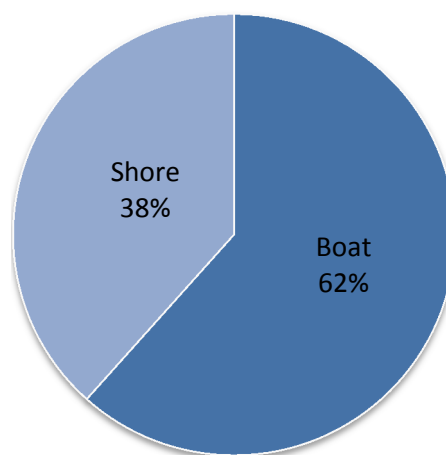
Figure 65: Percentage of days fished by platform by Wide Bay-Burnett residents

Wide Bay-Burnett residents spent most of their time fishing in the south-eastern catchment (Figure 66). Fraser coastal waters were also a popular fishing region. Fishers also travelled north and west to fish in the Western Rivers catchment, the Central Coast catchment and Cooktown coastal waters. Estuaries and enclosed coastal waters were the most popular water body to fish in (Figure 67). More time was spent fishing in inshore areas than offshore areas.
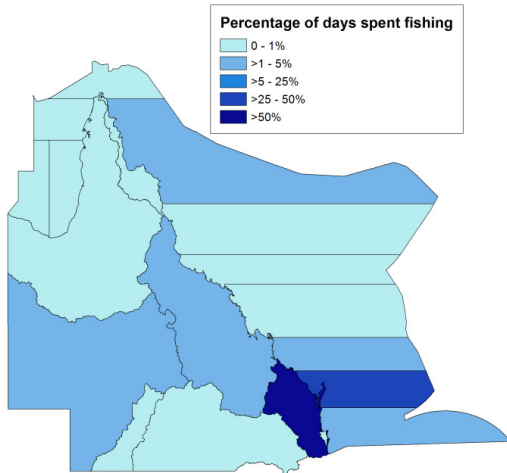
Figure 66: Percentage of days fished by fishing region by Wide Bay-Burnett residents
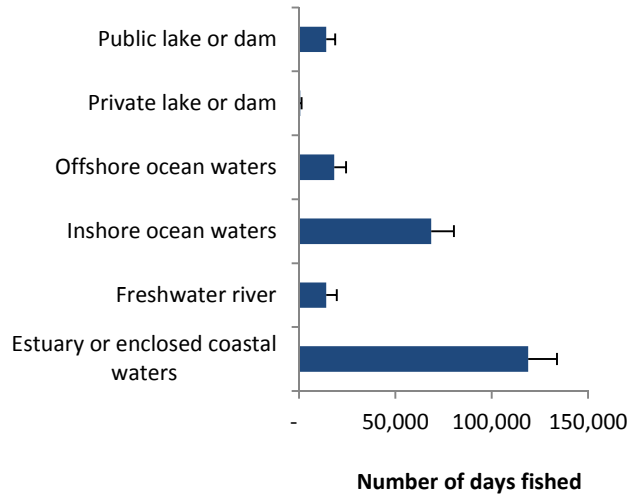
Figure 67: Number of days fished by water body by Wide Bay-Burnett residents

January and December were the most popular times of year for Wide Bay-Burnett residents to go fishing (Figure 68). There was also a peak in April, coinciding with the school holidays. Fishing activity dropped off over winter. The most commonly targeted species by Wide Bay-Burnett residents were mud crab, sand whiting, bream, golden perch and flathead (Figure 69). Trumpeter whiting were the most commonly harvested fish, followed by sand whiting. Mud crabs were also commonly caught, but more than two-thirds were released.
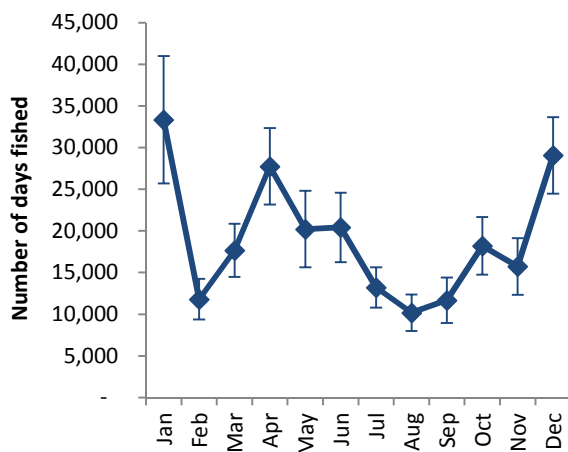
Figure 68: Number of days fished by month by Wide Bay-Burnett residents
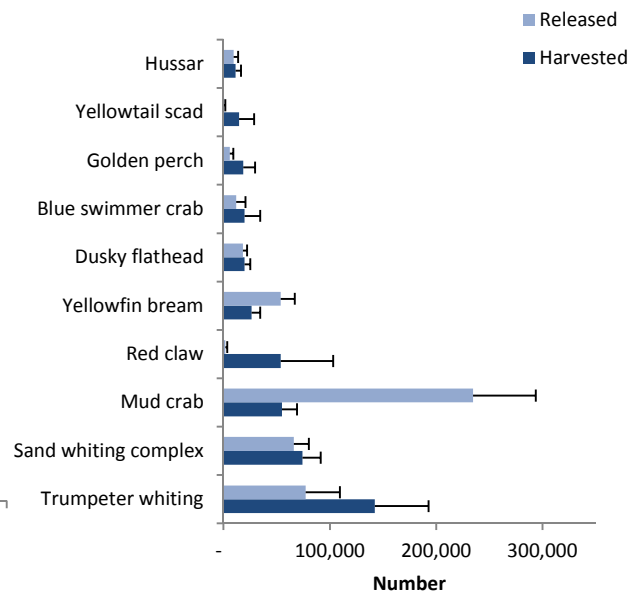
Figure 69: Top 10 species caught by Wide Bay-Burnett residents

Darling Downs

The Darling Downs is a geographically large region in southern Queensland. Its major urban centres include Toowoomba, Roma, Dalby and Warwick. It has no borders to the ocean, so most fishing opportunities are freshwater based. Several large lakes are accessible to Darling Downs residents, as are the rivers and creeks within the Murray-Darling basin. The Gold Coast and Sunshine Coast provide the closest access to marine waters.

Approximately 33 000 people, or 15.2% of the Darling Downs population were recreational fishers. This was similar to the state average of 15.1%. The greatest numbers of fishers were in the 45-59 years age group (Figure 70). There were more male fishers than female fishers.

Darling Downs residents spent more time fishing from the shore than from boats (Figure 71).
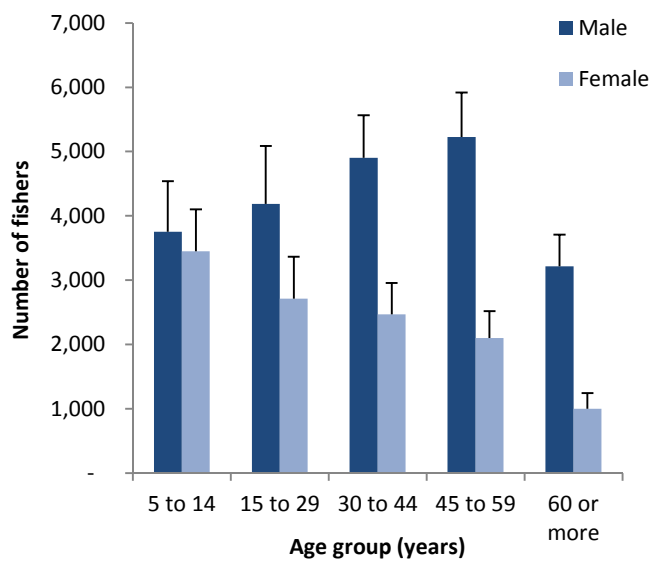
**Figure 70: Number of Darling Downs fishers by age group and gender**
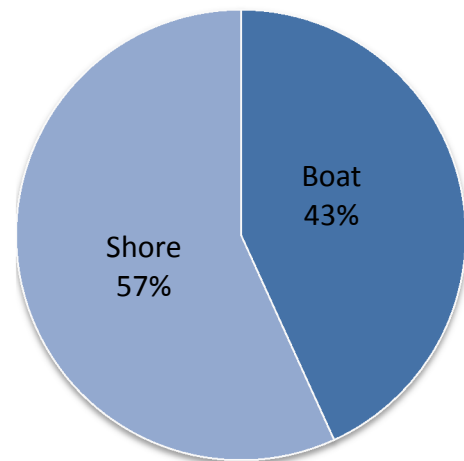
Figure 71: Percentage of days fished by platform by Darling Downs residents

Darling Downs residents spent most of their time fishing in the Murray-Darling catchment and the south-east catchment (Figure 72). They also enjoyed fishing in the south-eastern coastal waters and Fraser coastal waters. A number of fishers travelled to the Central Coast to go fishing. Public lakes and dams, and estuaries and enclosed coastal waters were the most popular water bodies to go fishing in (Figure 73).
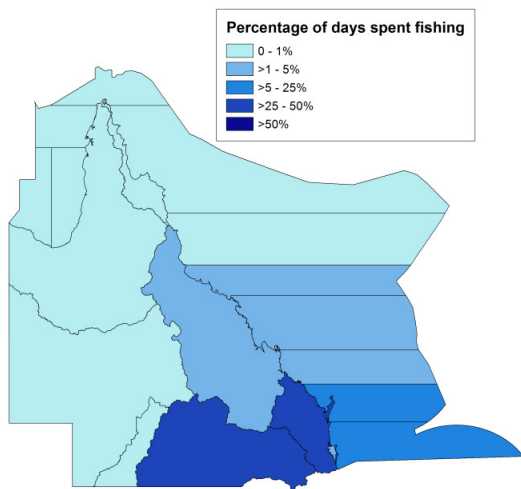
Figure 72: Percentage of days fished by fishing region by Darling Downs residents
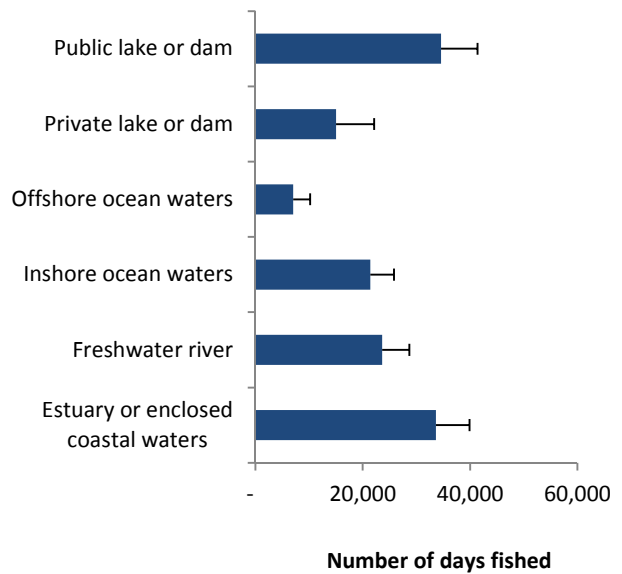
Figure 73: Number of days fished by water body by Darling Downs residents

Summer was the most popular time of year for Darling Downs residents to go fishing (Figure 74). There were also peaks during April and September, coinciding with school holidays. The most commonly targeted species were golden perch, red claw, mud crab, Australian bass and sand whiting. Golden perch was the most commonly harvested fish (Figure 75). Sand whiting and yellowfin bream were also important, but most were released. Red claw was the most commonly harvested non-fish species. Fishers also caught a large number of European carp (a pest species).
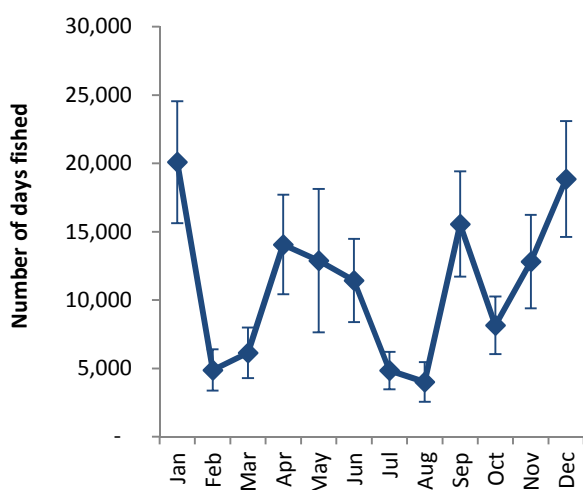
Figure 74: Number of days fished by month by Darling Downs residents
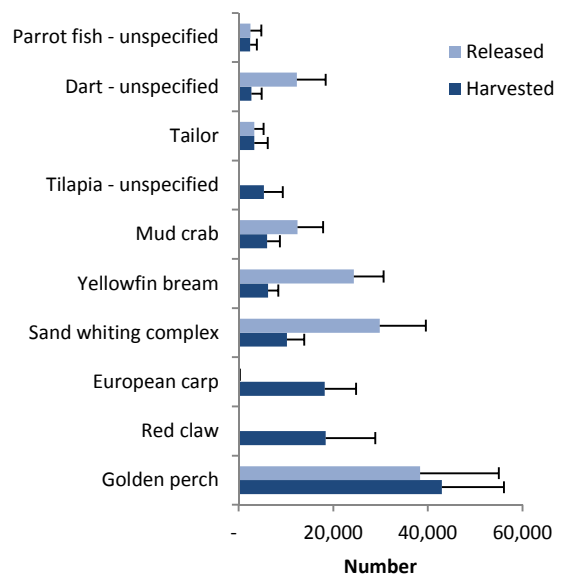
Figure 75: Top 10 species caught by Darling Downs residents

Central West/North West/South West

The CWNWSW region is the largest geographic area in the survey, but it is sparsely populated. Its only marine border is in the Gulf of Carpentaria, but it includes many freshwater rivers, lakes and dams. This means that most CWNWSW residents have to travel considerable distances to fish in estuaries or marine areas.

Approximately 12 000 people, or 18.3% of the CWNWSW population, were recreational fishers. This was greater than the state average of 15.1%. The greatest numbers of fishers were 30-44 years of age (Figure 76). There were more male fishers than female fishers.

CWNWSW residents spent almost equal days fishing from the shore as from a boat (Figure 77).
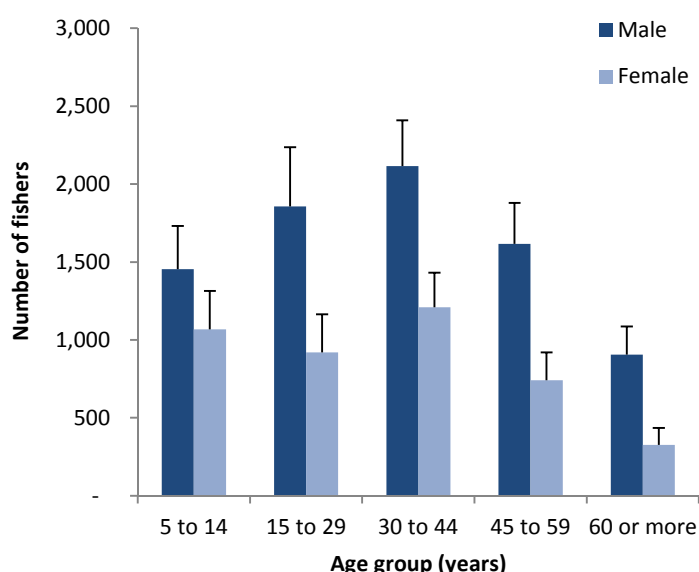

**Figure 76: Number of CWNWSW fishers by age group and gender**
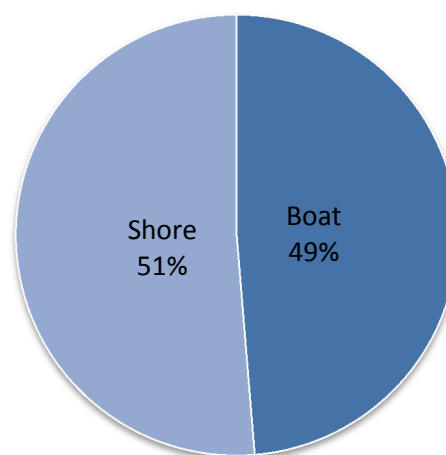
Figure 77: Percentage of days fished by platform by CWNWSW residents

CWNWSW residents went fishing in many different regions across the state. The catchments around the Gulf and the Murray-Darling River were the most popular fishing regions, followed by the Western Rivers catchments and South-eastern catchments (Figure 78). The coastal waters near Karumba were also important. Freshwater rivers were the most popular water body, followed closely by estuaries and enclosed coastal waters (Figure 79). A considerable number of days were spent fishing in inshore ocean waters.
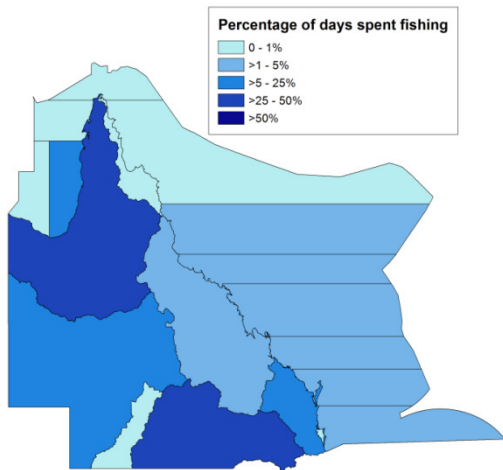
Figure 78: Percentage of days fished by fishing region by CWNWSW residents
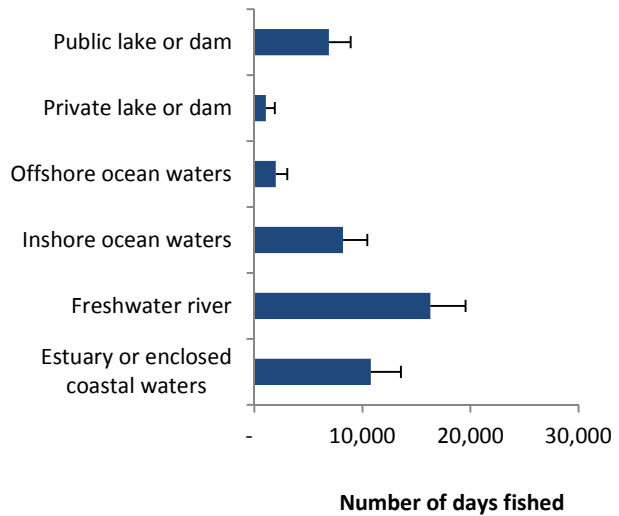
Figure 79: Number of days fished by water body by CWNWSW residents

April was the most popular time of year for CWNWSW residents to go fishing (Figure 80). There were also peaks during October, December and January. The most commonly targeted species were golden perch, barramundi, barred javelin, mud crab and sand whiting. Barred javelin was the most commonly harvested fish but it had a high release rate (Figure 81). European carp, a pest species, were commonly caught, but not released. Golden perch and barramundi were also commonly caught, but most were released. Red claw and mud crab were popular non-fish species.
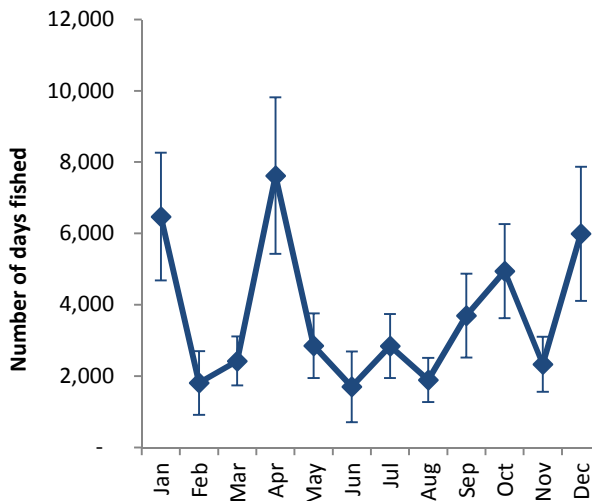
Figure 80: Number of days fished by month by CWNWSW residents
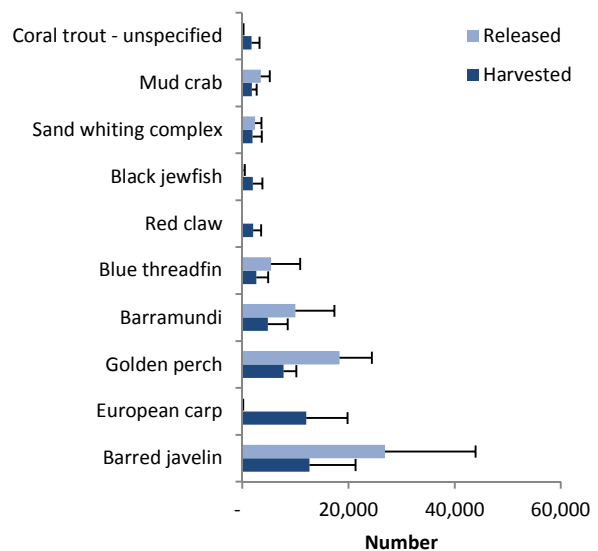
Figure 81: Top 10 species caught by CWNWSW residents

Gladstone

The Gladstone region surrounds the industrial city of Gladstone in central Queensland. The 2013 survey was the first to split the urbanised region from the larger, rural Fitzroy Hinterland region. Gladstone provides easy access to the Calliope and Boyne rivers as well as the enclosed coastal waters of the narrows and Gladstone Harbour. The region provides a variety of tropical, estuarine and freshwater fishing opportunities.

Approximately 12 000 people, or 22.6% of the Gladstone population, were recreational fishers. This was greater than the state average of 15.1%. Fishing participation was popular across all age groups, but dropped from among people aged 60+ years (Figure 82). There were more male fishers than female fishers.

Almost two thirds of the fishing effort by Gladstone residents was done from boats and a third from the shore (Figure 83).
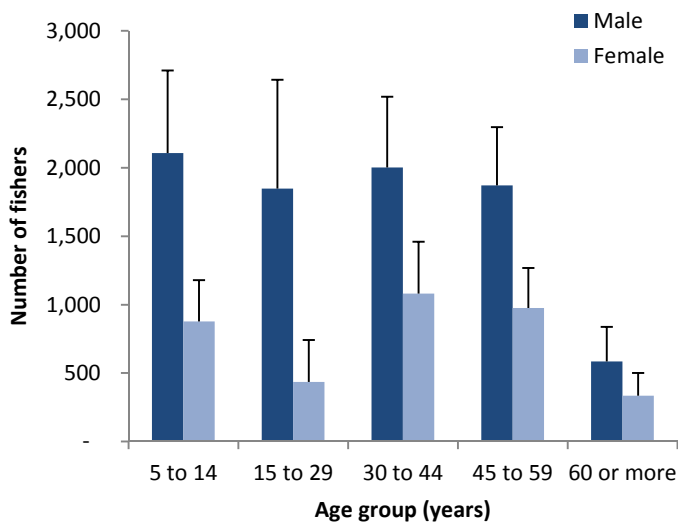
Figure 82: Number of Gladstone fishers by age group and gender
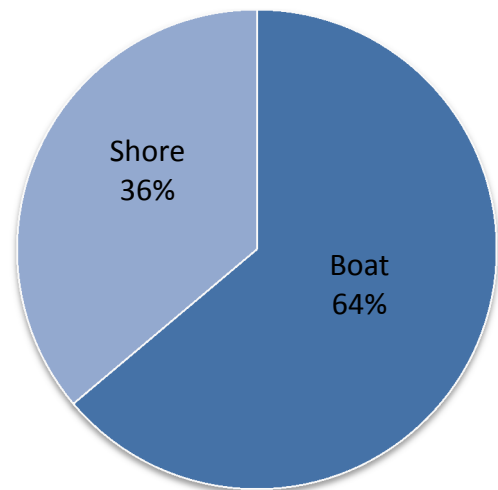
Figure 83: Percentage of days fished by platform by Gladstone residents

Gladstone residents spent most of their time fishing in the south-eastern catchments (Figure 84). Estuaries and enclosed coastal waters were by far the most popular water body (Figure 85). The coastal waters around Gladstone and Fraser Island were also important fishing regions. More days were spent fishing in inshore ocean waters than offshore ocean waters.
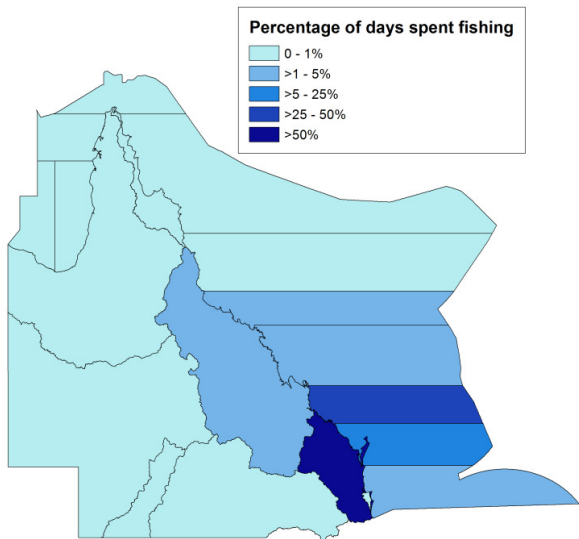
Figure 84: Percentage of days fished by fishing region by Gladstone residents
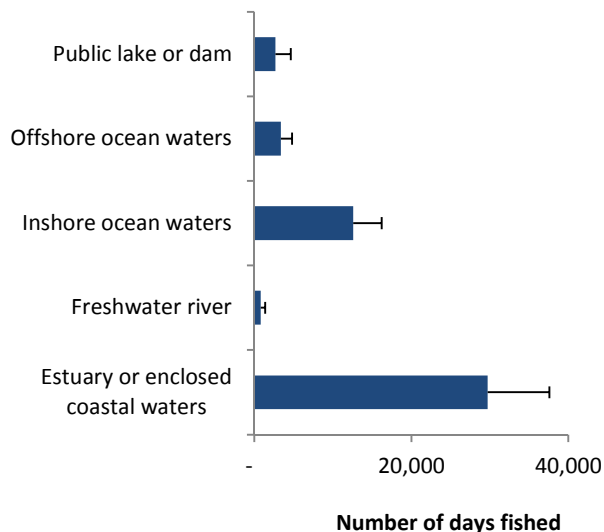
Figure 85: Number of days fished by water body by Gladstone residents

September was the most popular time of year for Gladstone residents to go fishing (Figure 87). There was also a peak during April, coinciding with the Easter school holidays. The most commonly targeted species were mud crab, sand whiting, barred javelin, barramundi and yellowfin bream. Sand whiting was the most commonly harvested fish, although equal numbers were released (Figure 86). Mud crabs were also commonly caught, but more than half were released.
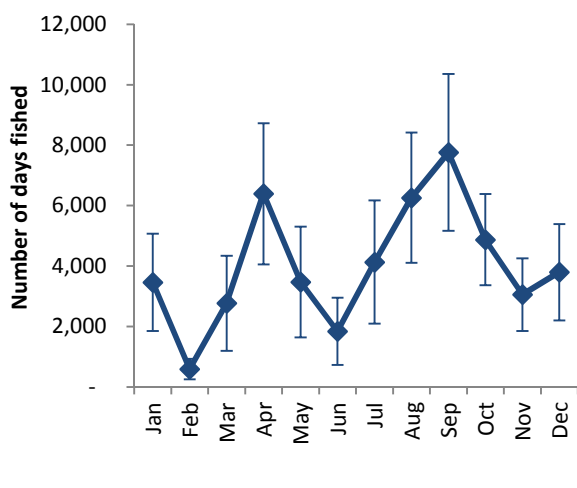
Figure 87: Number of days fished by month by Gladstone residents
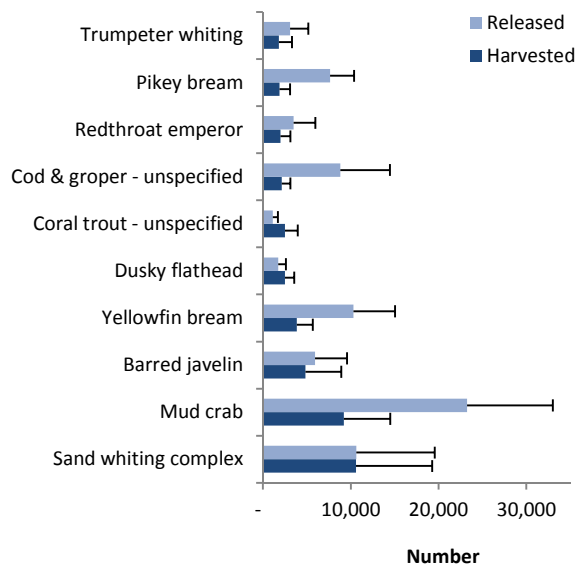
Figure 86: Top 10 species caught by Gladstone residents

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Rockhampton

The Rockhampton region surrounds the city of Rockhampton in central Queensland. The 2013 survey was the first to split the urbanised region from the larger, rural Fitzroy Hinterland. Rockhampton is situated inland from the coast along the Fitzroy River. Its climate and waters are tropical, providing a range of fishing opportunities. The region provides access to various freshwater, estuarine and marine environments.

Approximately 22 000 people, or 20.6% of the Rockhampton population, were recreational fishers. This was greater than the state average of 15.1%. Fishing participation was popular across all age groups, with the greatest number being 30-44 years of age (Figure 88). Overall, there were more male fishers than female fishers, although they were roughly equal among 5-14 year olds.

Rockhampton residents spent more time fishing from boats than from the shore (Figure 89).
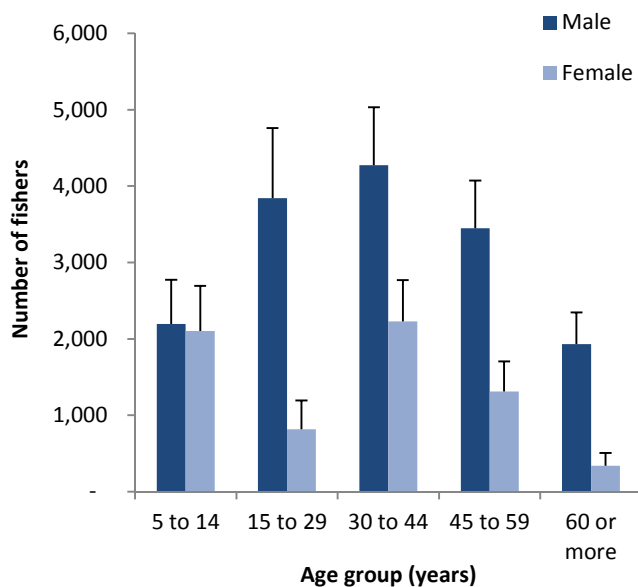
Figure 88: Number of Rockhampton fishers by age group and gender
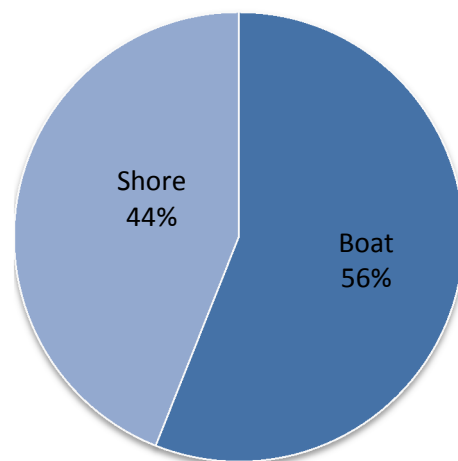
Figure 89: Percentage of days fished by platform by Rockhampton residents

Rockhampton residents spent most of their time fishing in the catchments of the Central Coast and Rockhampton coastal waters (Figure 90). The south-eastern catchments were also popular fishing destinations. Some fishers travelled considerable distances to go fishing in Cairns and Torres Strait coastal waters. Overall, estuaries and enclosed coastal waters were the most popular water bodies to go fishing in (Figure 91). When fishing in coastal waters, fishers spent more time in the inshore areas than offshore areas.
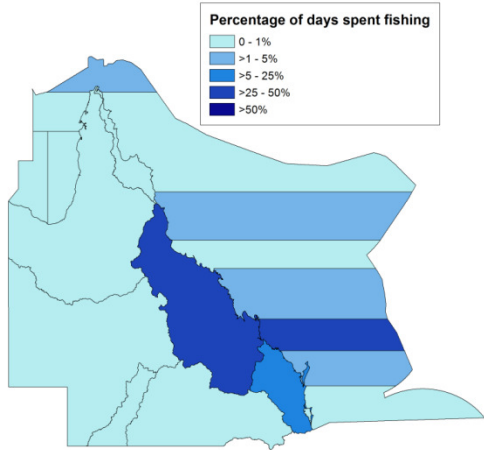
Figure 90: Percentage of days fished by fishing region by Rockhampton residents
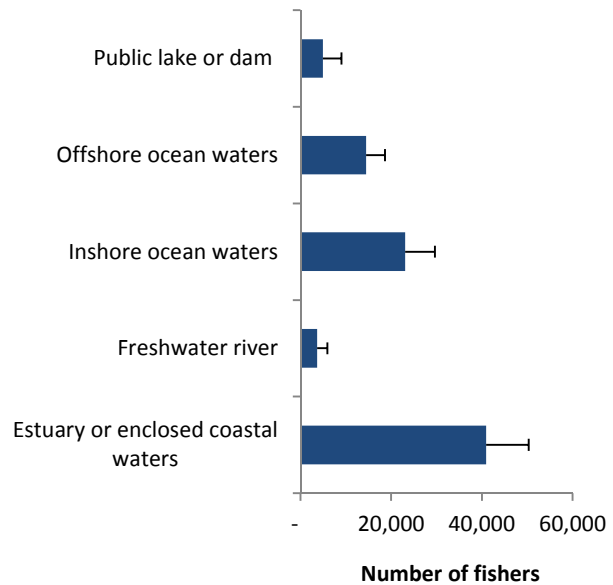
Figure 91: Number of days fished by water body by Rockhampton residents

April was the most popular time of year for Rockhampton residents to go fishing, coinciding with the Easter school holidays (Figure 92). There was also a peak in fishing in December. The most commonly targeted species were mud crab, barramundi, Spanish mackerel, sand whiting and other whiting. Mud crabs were the most commonly caught species by number, but most were released (Figure 93). Trumpeter whiting were the most frequently harvested fish, followed by sand whiting.
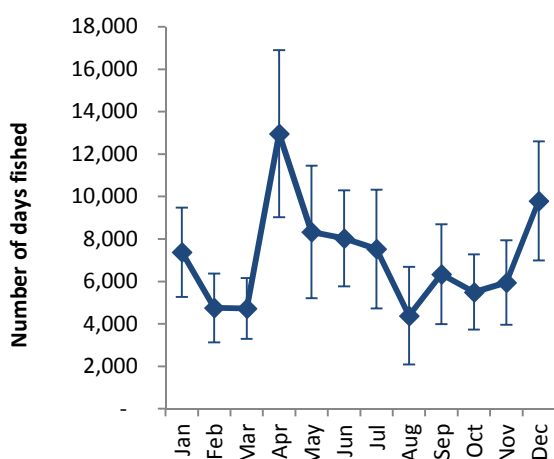
Figure 92: Number of days fished by month by Rockhampton residents
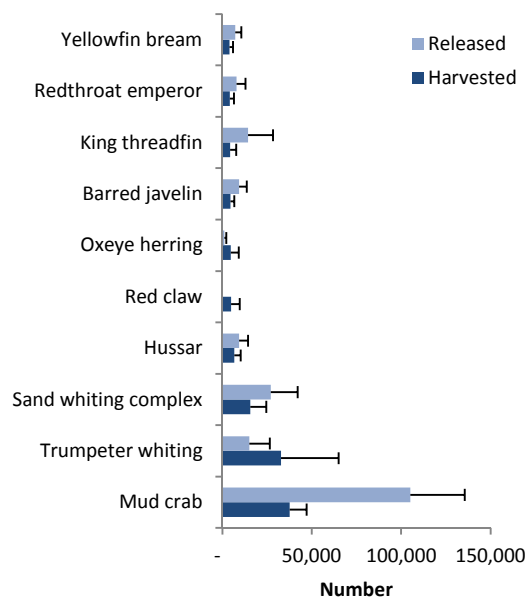
Figure 93: Top 10 species caught by Rockhampton residents

Fitzroy Hinterland

The Fitzroy Hinterland region encompasses the rural areas of the Fitzroy. The 2013 survey was the first to exclude the Gladstone and Rockhampton metropolises from the region. Emerald is the major urban area of the Fitzroy Hinterland region. Fitzroy Hinterland residents have access to variety of and freshwater rivers and dams. Residents of this region can and do travel to the coast to access marine fishing opportunities.

Approximately 12 000 people, or 26.2% of the Fitzroy Hinterland population, were recreational fishers. This was far greater than the state average of 15.1%. Fishing participation was especially popular among 30-44 year olds (Figure 94). Overall there were more male fishers than female fishers, however the only significant difference in gender balance was seen in the 30 to 44 years and 60 or more years age groups.

Fitzroy Hinterland residents spent more time fishing from the shore than from boats (Figure 95).
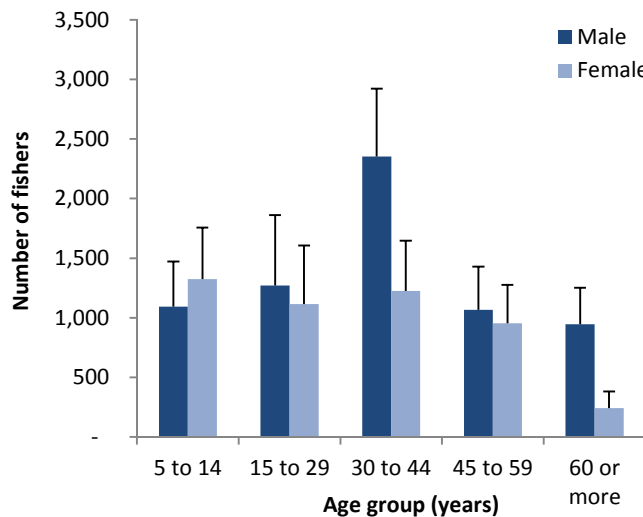
Figure 94: Number of Fitzroy Hinterland fishers by age group and gender
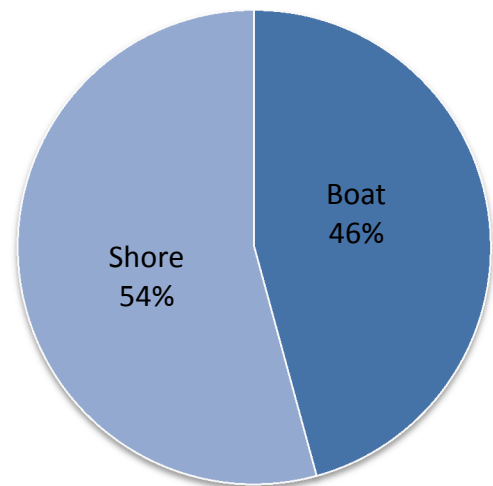
Figure 95: Percentage of days fished by platform by Fitzroy Hinterland residents

Fitzroy Hinterland residents spent most of their fishing in the Central Coast catchments (Figure 96). The south-eastern catchment was also a popular region. Estuaries and enclosed coastal waters were the most popular water body overall (Figure 97). The coastal waters around Mackay, Rockhampton and Fraser Island were also important fishing regions. More days were spent fishing in inshore ocean waters than offshore ocean waters.
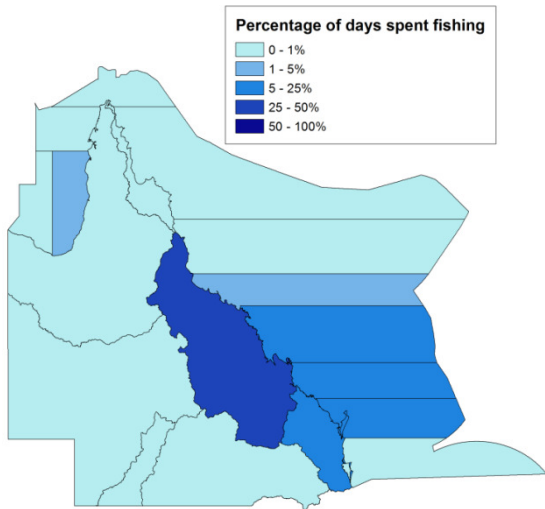
Figure 96: Percentage of days fished by fishing region by Fitzroy Hinterland residents
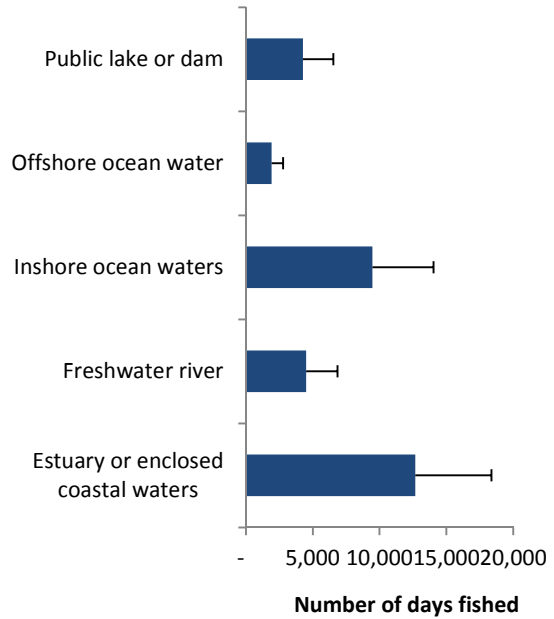
Figure 97: Number of days fished by water body by Fitzroy Hinterland residents

June was the most popular time of year for Fitzroy Hinterland residents to go fishing (Figure 98). There were also peaks during April and October. Fishing activity dropped off during August. The most commonly targeted species by Fitzroy Hinterland residents were barramundi, mud crab, bream, northern saratoga and dart (Figure 99). Dart was the most commonly harvest fish overall. Mud crabs were commonly caught, but most were released. Likewise, yellowfin bream and sand whiting were often caught but more were released.
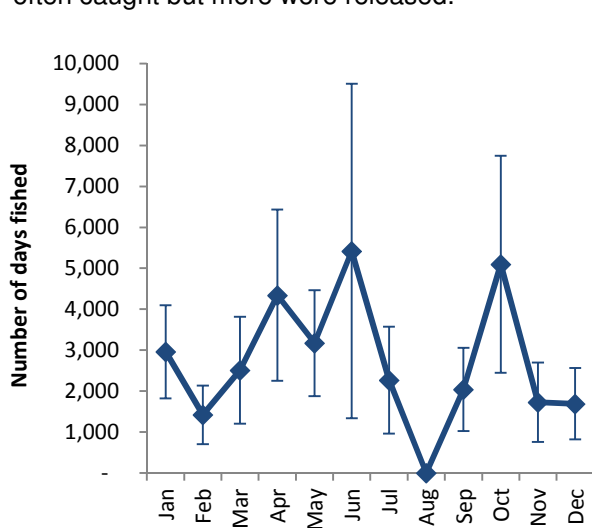
Figure 98: Number of days fished by month by Fitzroy Hinterland residents
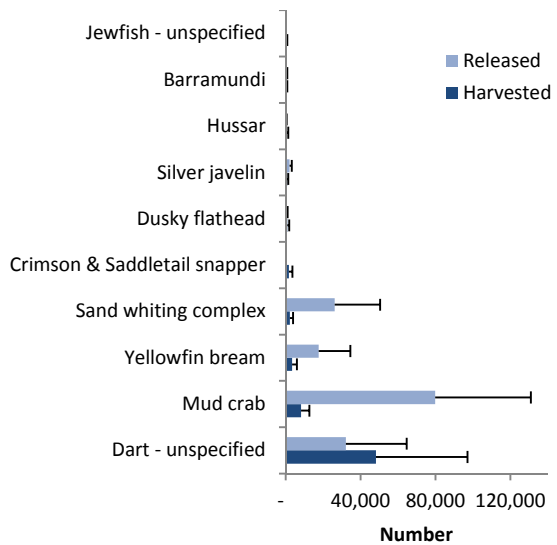
Figure 99: Top 10 species caught by Fitzroy Hinterland residents

Mackay-Whitsunday

The Mackay-Whitsunday region encompasses Mackay, Proserpine and Airlie Beach. The 2013 survey was the first to exclude this Mackay-Whitsunday region from the larger, rural Mackay Hinterland. Mackay is located on the banks of the Pioneer River. Mackay-Whitsunday residents have many tropical fishing opportunities. The region provides access to mangrove-lined estuaries, freshwater rivers and marine environments of the Great Barrier Reef.

Approximately 34 000 people, or 24.8% of the Mackay-Whitsunday population, were recreational fishers. This was far greater than the state average of 15.1%. Fishing participation was especially popular among 15-29 year olds and 45-59 year olds (Figure 100). There were more male fishers than female fishers.

Mackay-Whitsunday residents spent more time fishing from boats than from the shore (Figure 101).
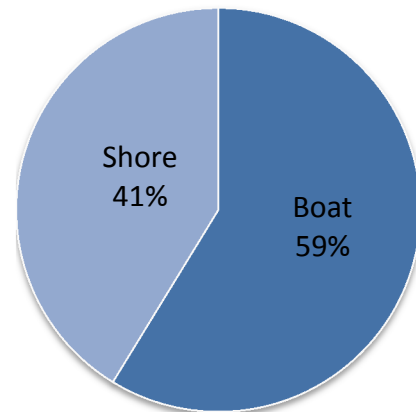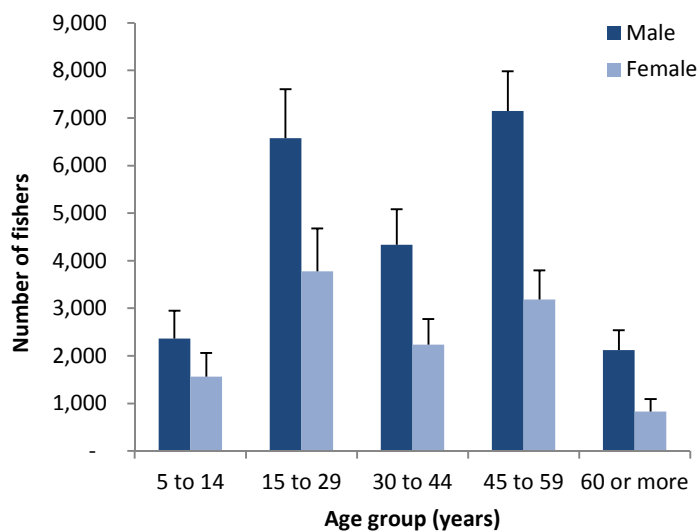
Figure 100: Number of Mackay-Whitsunday fishers by age group and gender

Figure 101: Percentage of days fished by platform by Mackay-Whitsunday residents

Mackay-Whitsunday residents did most of their fishing in the Central Coast catchments (Figure 103). Mackay coastal waters were also popular. Estuaries and enclosed coastal waters were the most popular water body to go fishing in overall, followed by inshore ocean waters (Figure 102). Few days were spent fishing in freshwater river, lakes or dams.
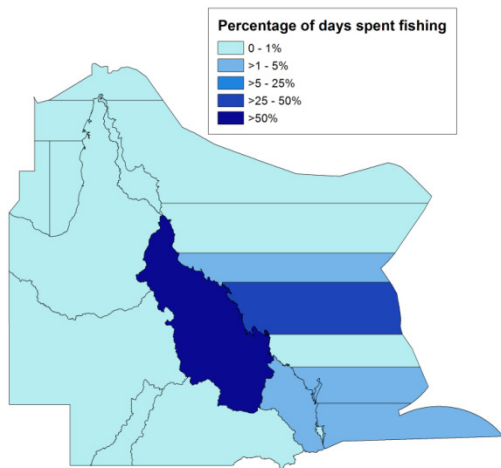
Figure 103: Percentage of days fished by fishing region by Mackay-Whitsunday residents
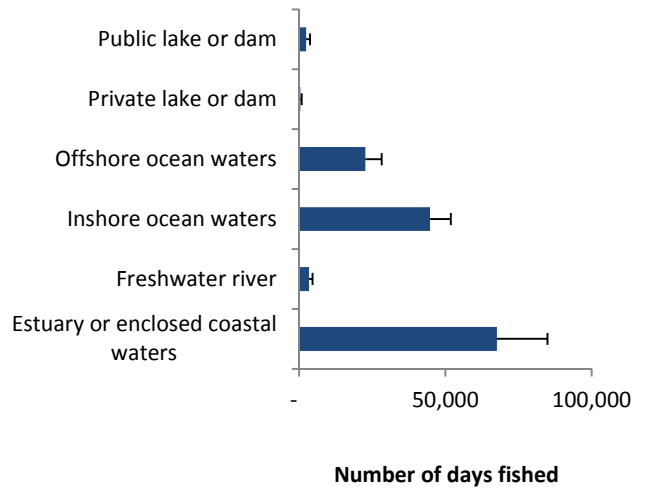
Figure 102: Number of days fished by water body by Mackay-Whitsunday residents

April was the most popular time of year for Mackay-Whitsunday residents to go fishing, coinciding with the Easter school holidays (Figure 104). Fishing activity was fairly constant throughout winter and peaked again in December. The most commonly targeted species by Mackay-Whitsunday residents were mud crab, barred javelin, barramundi, coral trout and yellowfin bream. Sand whiting were the most commonly harvested fish. Barred javelin were also commonly caught, but had high release rates (Figure 105). Likewise, mud crabs were the most commonly caught non-fish species, but many more were released than kept.
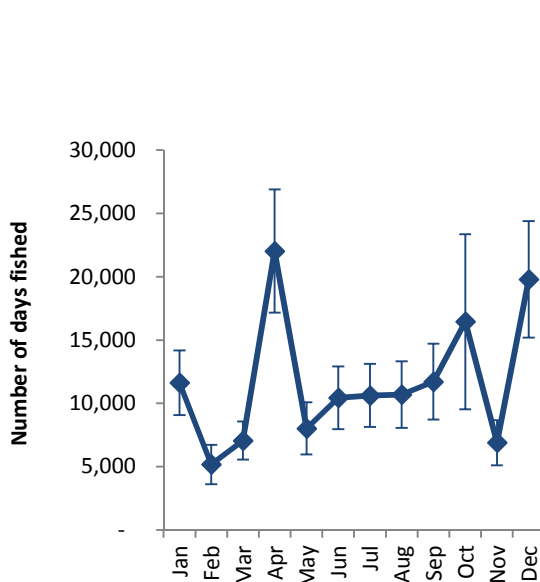
Figure 104: Number of days fished by month by Mackay-Whitsunday residents
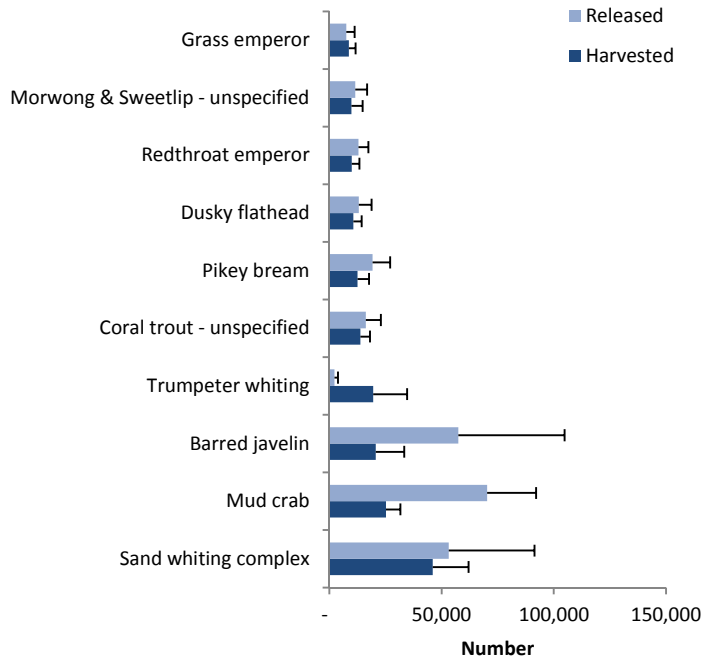
Figure 105: Top 10 species caught by Mackay-Whitsunday residents

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Mackay Hinterland

The Mackay Hinterland region is a large rural area in central Queensland but it is sparsely populated. The 2013 survey was the first to exclude the more urbanised Mackay-Whitsunday area from the region. The Mackay Hinterland region provides many fishing opportunities in mangrove-fringed estuaries and freshwater rivers. It also meets the coast north and south of Mackay–Whitsunday region, providing access to a range of marine environments.

Approximately 8 000 people, or 30.0% of the Mackay Hinterland population, were recreational fishers. This was almost double the state average of 15.1%. Fishing participation was especially popular among 30-44 year olds (Figure 107). There were more male fishers than female fishers overall, but most fishers aged 5-14 years were female.

Mackay Hinterland residents spent slighlty more time fishing from the shore than from boats (Figure 106).
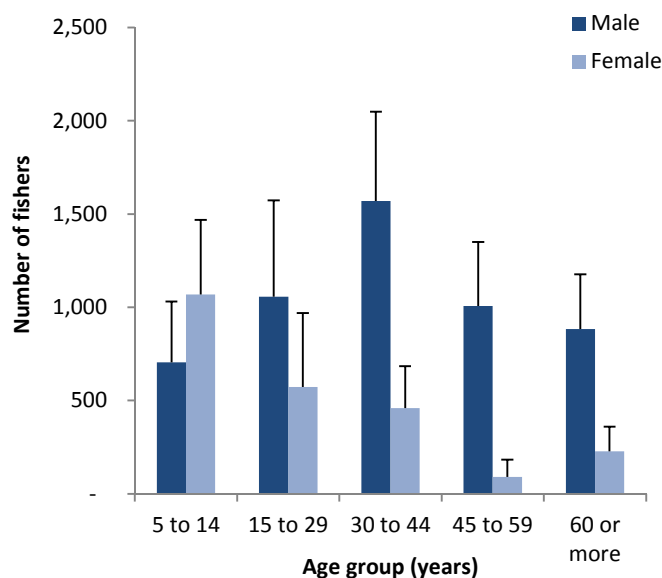
Figure 107: Number of Mackay Hinterland fishers by age group and gender
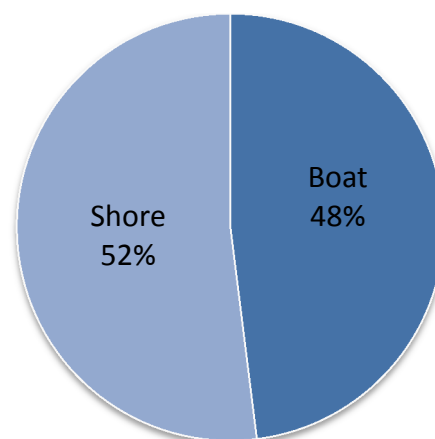
Figure 106: Percentage of days fished by platform by Mackay Hinterland residents

Mackay Hinterland residents spent most of their time fishing in the Central Coast catchments and the Townsville coastal waters which ajoin the northern coastal boundary of the region (Figure 108). Catchments in the south-east and Mackay coastal waters were also popular fishing regions. Estuaries and enclosed coastal waters were the most popular water body to go fishing in overall, followed by inshore ocean waters (Figure 109).
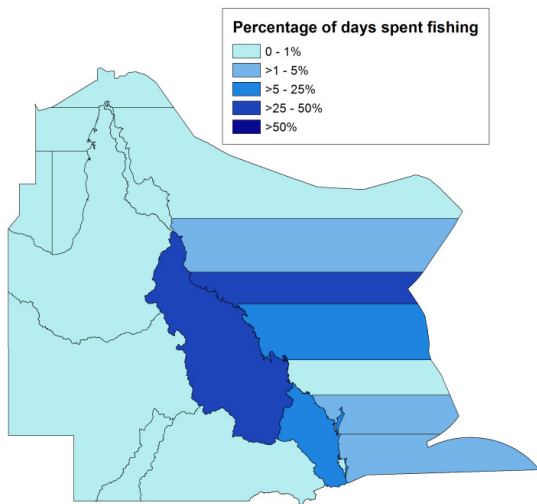
Figure 108: Percentage of days fished by fishing region by Mackay Hinterland residents
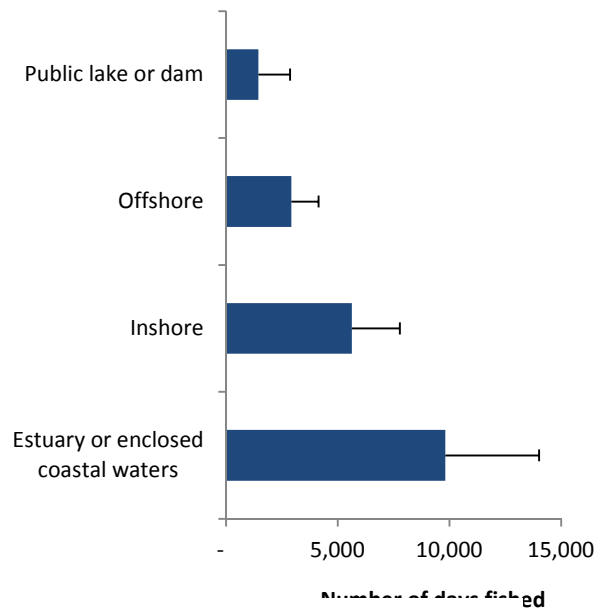
Figure 109: Number of days fished by water body by Mackay Hinterland residents

July was the most popular time of year for Mackay Hinterland residents to go fishing (Figure 110). There were also peaks in September and December, coinciding with school holidays. The most commonly targeted species by Mackay Hinterland residents were mangrove jack, mud crab, trumpeter whiting, sand whiting and crimson and saddletail snapper. Trumpeter whiting and sand whiting were the most commonly harvested fish (Figure 111). Mud crabs were also commonly caught. The larger standard errors for these estimates mean that they are indicative only and are a result of the lower population of people in the region.
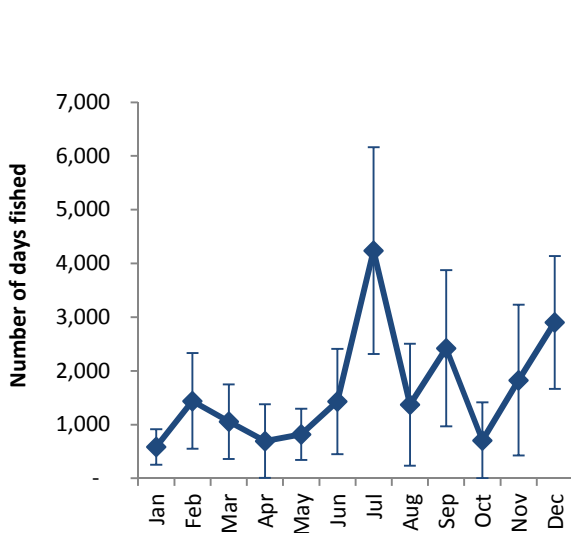
Figure 110: Number of days fished by month by Mackay Hinterland residents
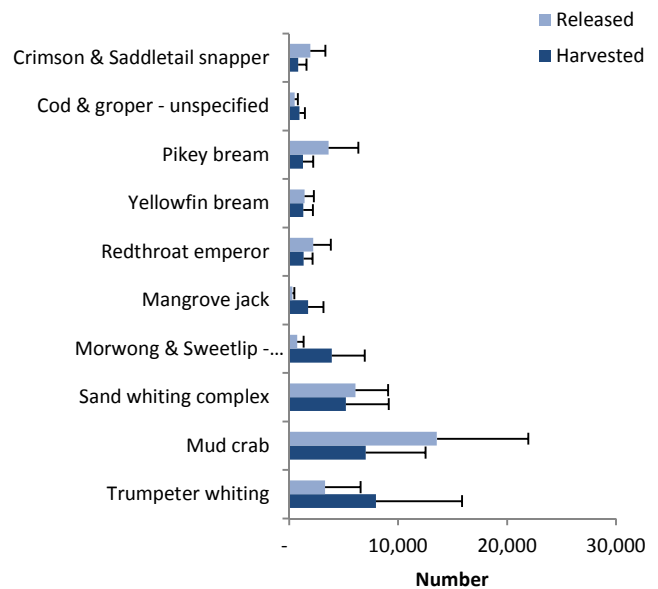
Figure 111: Top 10 species caught by Mackay Hinterland residents

Townsville

The Townsville region is a geographically small area in the state's north-east, encompassing the city of Townsville. The 2013 survey was the first to split Townsville from the larger Northern Hinterland region. Townsville is a coastal city, situated next to Cleveland Bay. Townsville fishers have access to many tropical species that inhabit the Great Barrier Reef, as well as the mangrove-lined estuaries, freshwater rivers and billabongs that occur throughout the city's surrounding areas.

Approximately 36 000 people, or 21.3% of the Townsville population were recreational fishers. This was greater than the state average of 15.1%. Fishing was especially popular among 15-29 year olds and 30-44 year olds (Figure 113). There were more male fishers than female fishers, although they were roughly equal in the 5-14 years age group.

Townsville residents spent more days fishing from boats than from the shore (Figure 112).
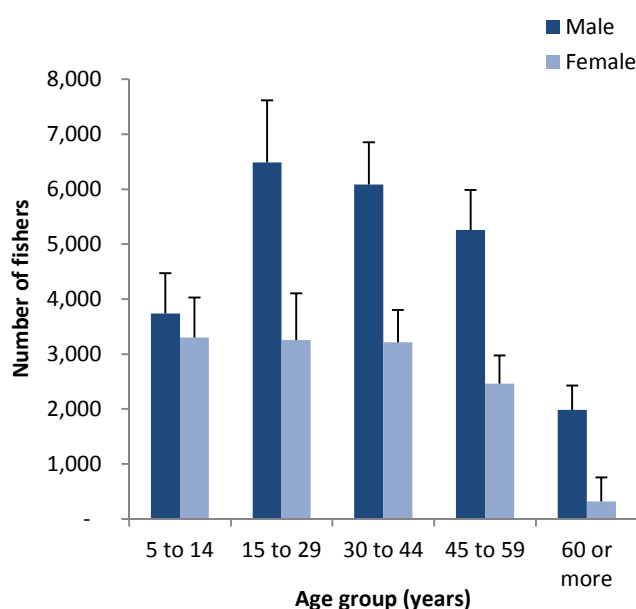
Figure 113: Number of Townsville fishers by age group and gender
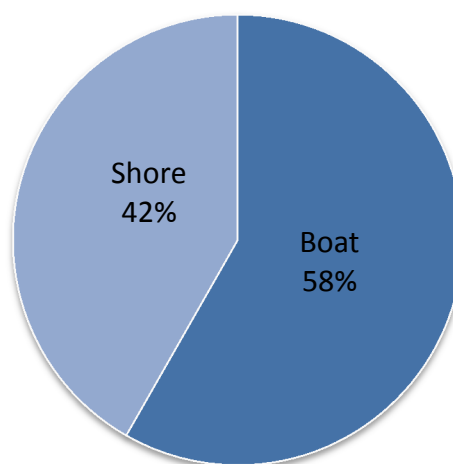
Figure 112: Percentage of days fished by platform by Townsville residents

The estuaries and enclosed coastal waters of the Central Coast catchments were popular fishing locations for Townsville residents (Figure 115, Figure 114). Townsville coastal waters were also popular, but more time was spent in inshore areas than in offshore areas. Some fishers travelled west to fish in the Gulf catchments, and north to fish in Cairns coastal waters.
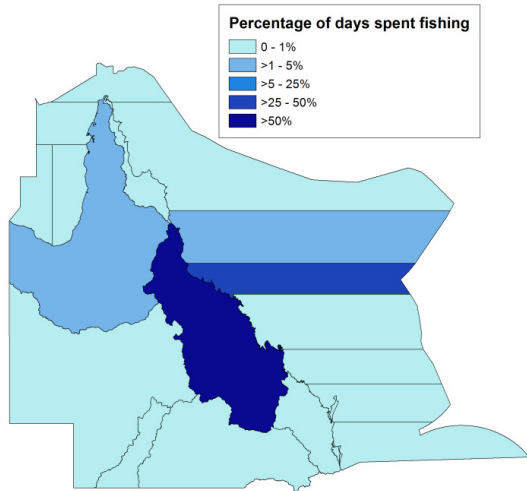
Figure 115: Percentage of days fished by fishing region by Townsville residents


Number of days fished
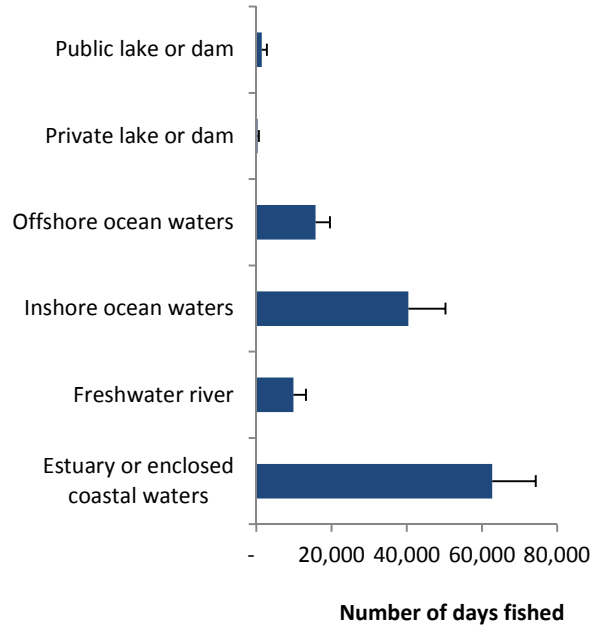
Figure 114: Number of days fished by water body by Townsville residents

April was the most popular time of the year for Townsville residents to go fishing (Figure 116). There were also seasonal peaks in July, September and December. The most commonly targeted species by Townsville residents were mud crab, barramundi, coral trout, Spanish mackerel and mangrove jack (Figure 117). Mud crabs were the most commonly harvested species by number. Coral trout was the most commonly harvested fish, followed by mangrove jack.
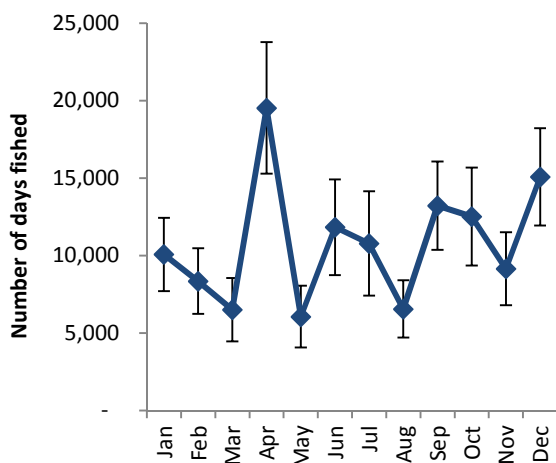
Figure 116: Number of days fished by month by Townsville residents
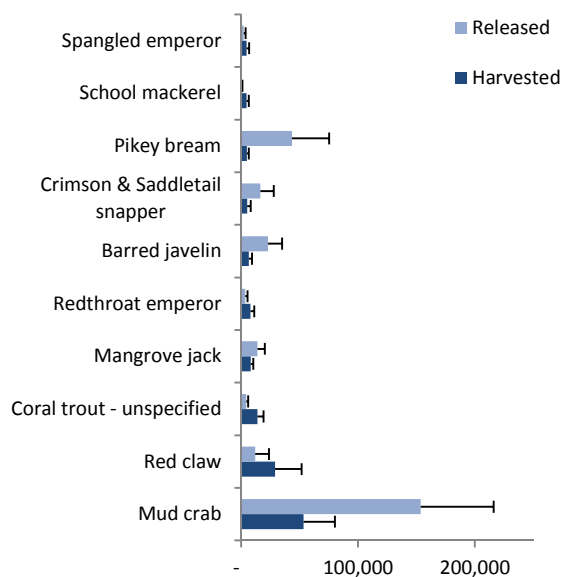
Figure 117: Top 10 species caught by Townsville residents

Northern Hinterland

The Northern Hinterland region is a geographically large area in the state's north-east. The 2013 survey is the first to exclude Townsville from the region. The region's towns include Ayr and Ingham and it meets the coast both north and south of the Townsville region. Northern Hinterland residents have access to a variety of tropical fishing locations, from mangrove-fringed estuaries, to freshwater rivers and the Great Barrier Reef.

Approximately 11 000 people, or 25.7% of the Northern Hinterland population, were recreational fishers. This was greater than the state average of 15.1%. People aged 15-29 years and 60 or more years accounted for most recreational fishers in the region (Figure 118). There were more male fishers than female fishers.

Northern Hinterland residents spent more days fishing from boats than from the shore (Figure 119).
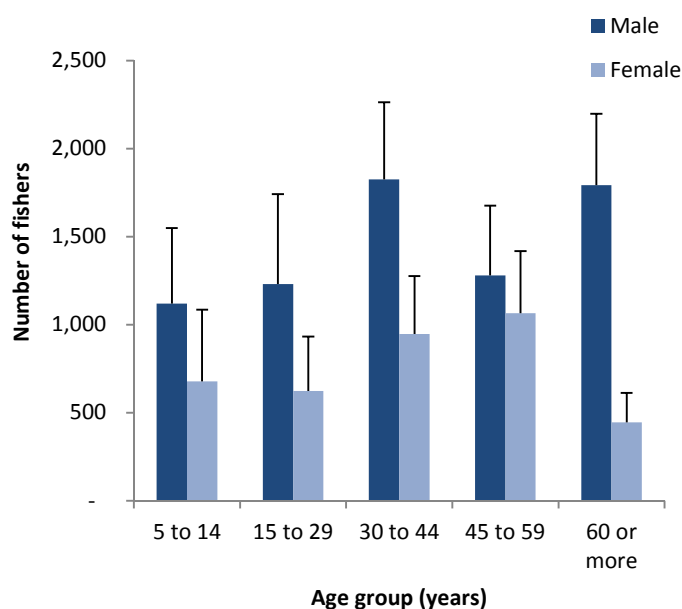
Figure 118: Number of Northern Hinterland fishers by age group and gender
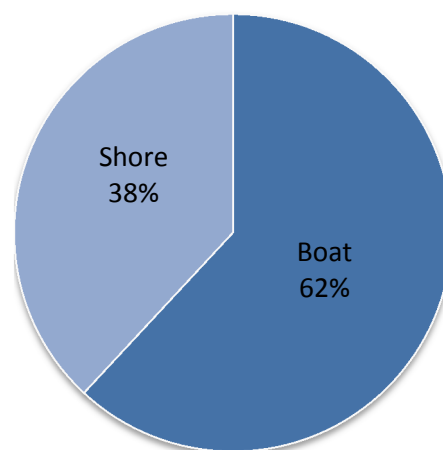
Figure 119: Percentage of days fished by platform by Northern Hinterland residents

Northern Hinterland residents went fishing in a variety of different fishing regions. Most time was spent fishing in the catchments of the Central Coast, followed by Townsville coastal waters (Figure 120). The coastal waters around Cairns and the Torres Strait were also important fishing regions. Some fishers travelled to fish in the catchments of the Gulf, the Western Rivers and the south-east and the coastal waters of Cooktown. Estuaries or enclosed coastal waters were the most popular water bodies to fish in, followed by inshore ocean waters (Figure 121).
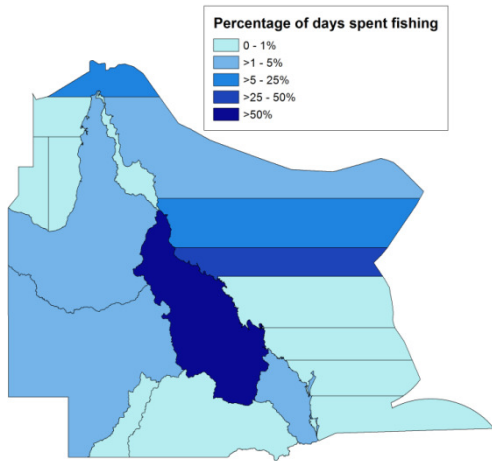
**Figure 120: Percentage of days fished by fishing region by Northern Hinterland residents**
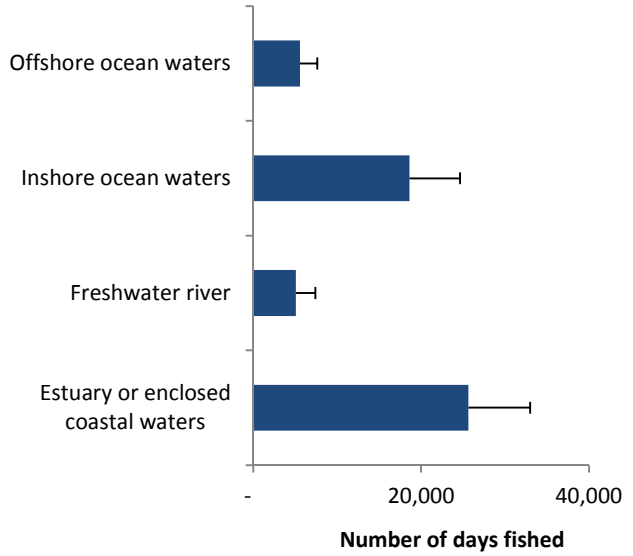
Figure 121: Number of days fished by water body by Northern Hinterland residents

January and February were the most popular times of the year for Northern Hinterland residents to go fishing (Figure 122). There were also peaks during April and September, coinciding with school holidays. The most commonly targeted species by Northern Hinterland residents were barramundi, mud crab, dusky flathead, barred javelin and bream. Coral trout was most commonly harvested fish, followed by barred javelin and barramundi (Figure 123). Mud crabs were also commonly caught.
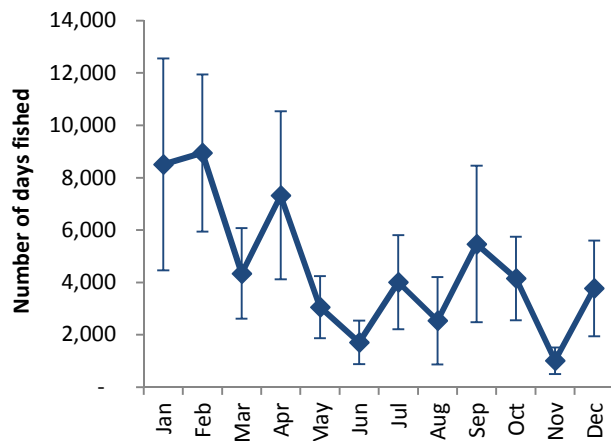
Figure 122: Number of days fished by month by Northern Hinterland residents
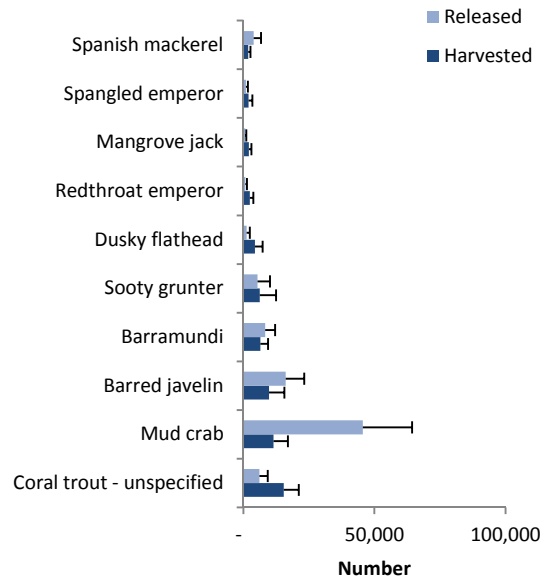
Figure 123: Top 10 species caught by Northern Hinterland residents

Cairns

The Cairns region is a geographically small area in the state's north-east, encompassing the urbanised Cairns metropolis. The 2013 survey was the first to split Cairns from the larger Far North region. Cairns is a coastal city, situated on the shores of Trinity Bay and Trinity Inlet. Cairns fishers have access to plenty of tropical species that inhabit the Great Barrier Reef, as well as the mangrove-lined estuaries, freshwater rivers and billabongs that occur throughout the city's surrounding areas.

Approximately 26 000 people, or 19.0% of the Cairns population, were recreational fishers. This was greater than the state average of 15.1%. Fishing was popular across all age groups, although the 30-44 year olds and 45-59 year olds accounted for most recreational fishers in the region (Figure 124). There were more male fishers than female fishers, although they were roughly equal in the 5-14 years age group.

Cairns residents spent more days fishing from the shore than from a boat (Figure 125).
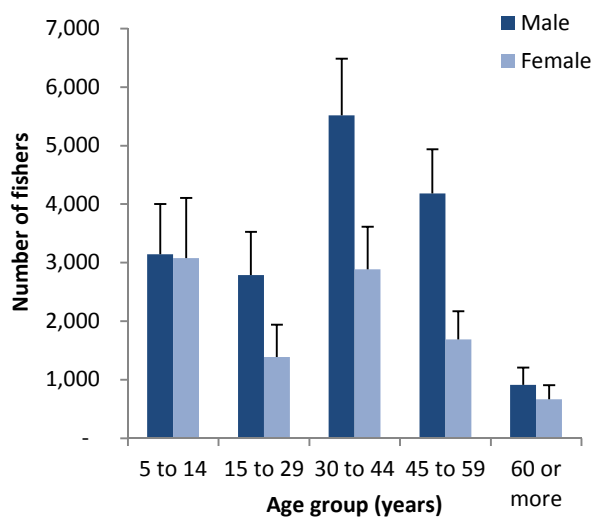
Figure 124: Number of Cairns fishers by age group and gender
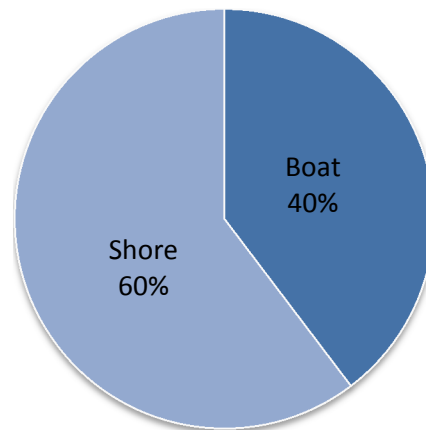
Figure 125: Percentage of days fished by platform by Cairns residents

The Central Coast catchment and Cairns coastal waters were popular fishing locations for Cairns residents (Figure 126).Some fishers travelled north and west to fish in the Gulf's catchments and coastal waters, as well as the Cape York catchments and Torres Strait coastal waters. Estuaries and enclosed coastal waters were the most popular water body to fish in (Figure 127).
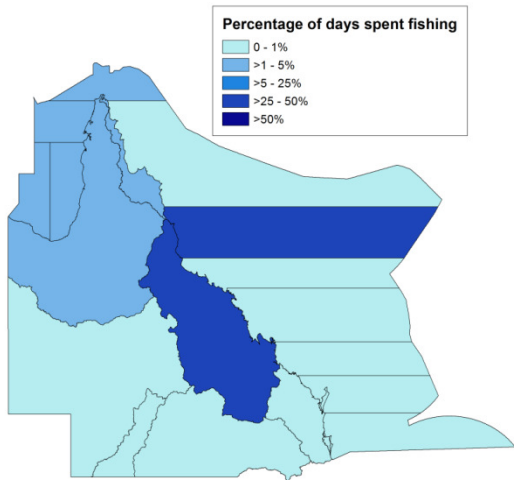
**Figure 126: Percentage of days fished by fishing region by Cairns residents**
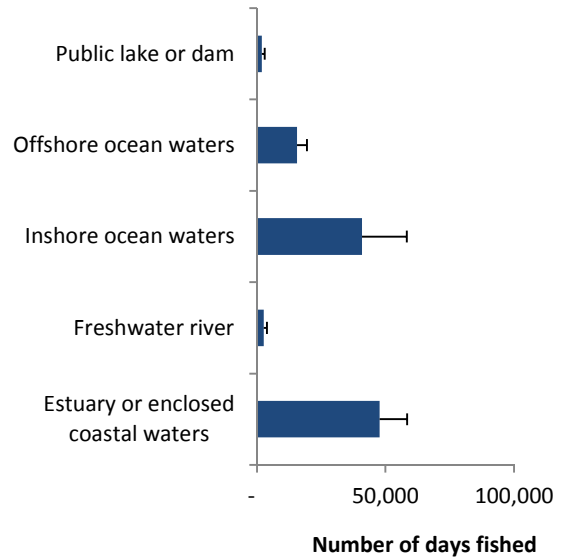
Figure 127: Number of days fished by water body by Cairns residents

December was the most popular time of year for Cairns residents to go fishing, although their fishing effort was fairly consistent throughout the year (Figure 128). The most commonly targeted species were mud crab, barramundi, blue threadfin, mangrove jack and queenfish. Red claw was the most commonly harvested species in term of numbers (Figure 129). Blue threadfin was the most commonly harvested fish, followed closely by coral trout. Species that were commonly released included barred javelin and other cod and groper species.
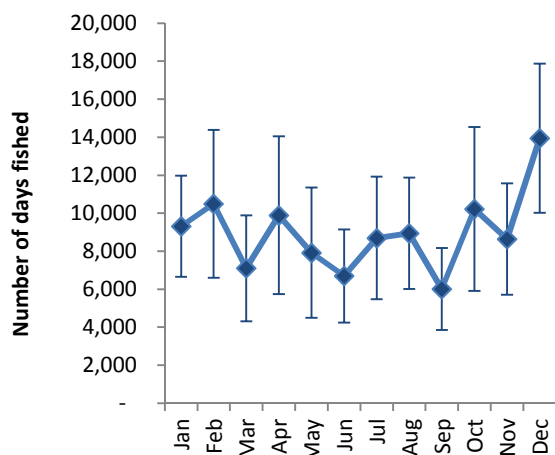
Figure 128: Number of days fished by month by Cairns residents
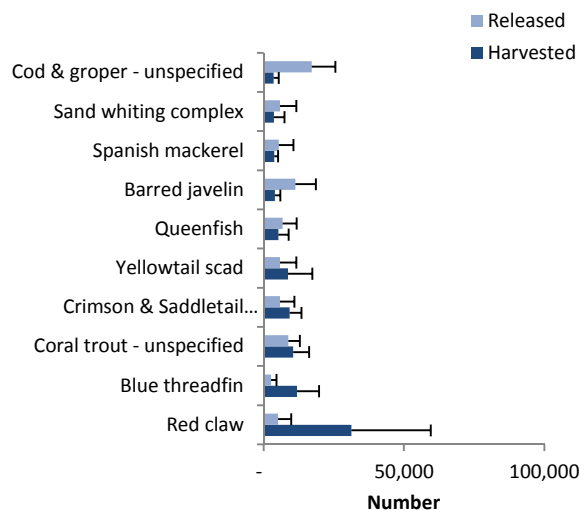
Figure 129: Top 10 species caught by Cairns residents

Far North Hinterland

The Far North Hinterland is a geographically large area in the Cape York Peninsula, but it has a small human population and is remote. It includes the towns of Weipa and Cooktown. The 2013 survey was the first to exclude the Cairns metropolis from the Far North region. The tropical waters accessible from the region include the Gulf of Carpentaria and Carpentaria and the Great Barrier Reef. It also includes many mangrove-lined estuaries, freshwater rivers, lakes and billabongs. The variety of fishing environments provides Far North Hinterland residents with many tropical fish species.

Approximately 30 000 people, or 27.5% of the Far North Hinterland population, were recreational fishers. This was far greater than the state average of 15.1%. Fishing was popular across all age groups, although the 30-44 year olds and 45-59 year olds accounted for most recreational fishers in the region (Figure 130). There were more male fishers than female fishers.

Far North Hinterland residents spent more days fishing from boats than from the shore (Figure 131).
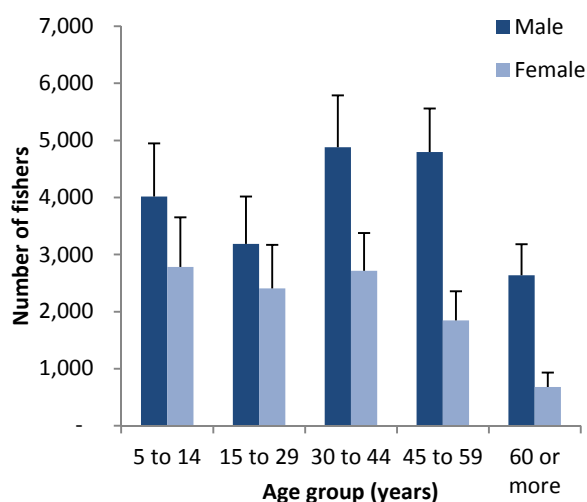
Figure 130: Number of Far North Hinterland residents by age group and gender
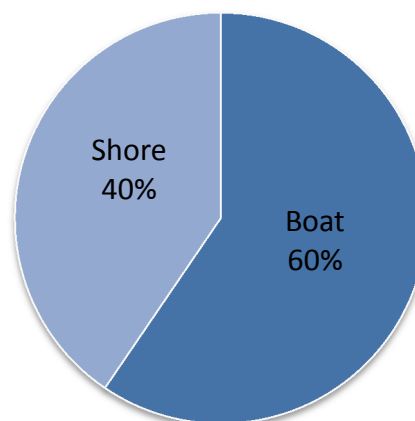
Figure 131: Percentage of days fished by platform by Far North Hinterland residents

Far North Hinterland residents spent most of their time fishing in the Cairns coastal waters (Figure 133). The coastal waters around Weipa were also popular. The catchments of the Gulf, East Cape York and Central Coast were also important fishing regions for Far North Hinterland residents. Estuaries and enclosed coastal waters were the most popular water body overall (Figure 132). More time was spent fishing in the inshore coastal waters than the offshore waters.
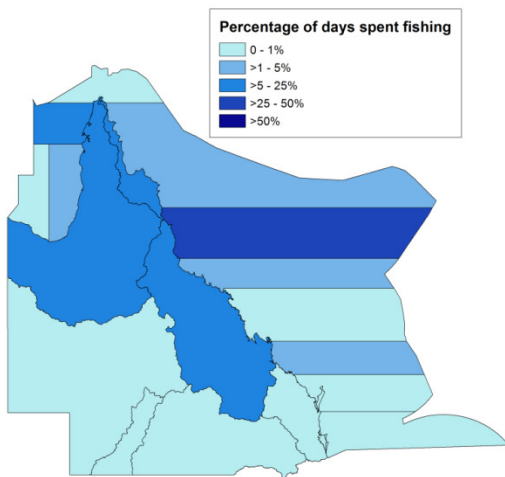
Figure 133: Percentage of days fished by fishing region by Far North Hinterland residents
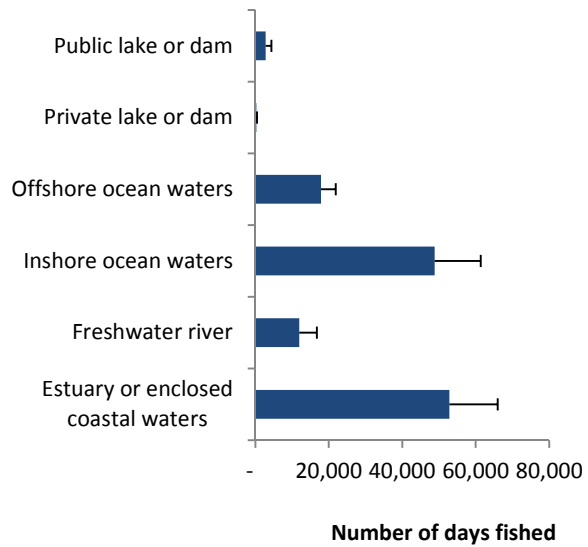

Figure 132: Number of days fished by water body by Far North Hinterland residents

September was the most popular time of year for Far North Hinterland residents to go fishing (Figure 134). There were also peaks during April, July and December, coinciding with school holidays. The most commonly targeted species by Far North Hinterland residents were barramundi, mud crab, mackerel, barred javelin and coral trout. Coral trout was the most commonly harvested fish overall, followed by crimson and saddletail snapper (Figure 135). Barramundi and barred javelin were also commonly caught. Likewise, mud crabs were often caught but more than half were released. Many of the estimates for this region have large standard errors and are indicative only, this is due to the relatively small number of people in this region.
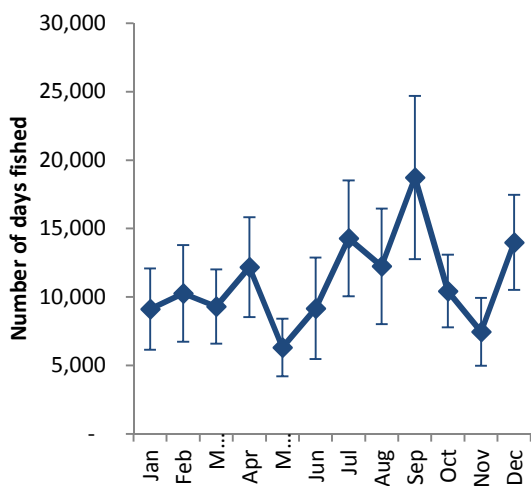
Figure 134: Number of days fished by month by Far North Hinterland residents
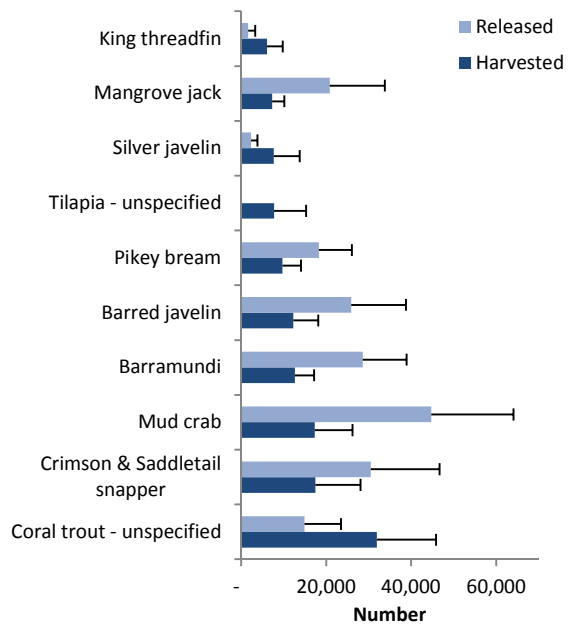
Figure 135: Top 10 species caught by Far North Hinterland residents

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Comparisons with previous surveys

Participation rates and numbers

The recreational fishing participation rate in Queensland has been decreasing since 2000. Since the 2010–11 survey, the participation rate has fallen from 17% to 15% (Table 16)—a decrease of almost 12%.

This pattern of decreasing participation has been observed around Australia over the same period (Lyle et al., 2014) and seems to be a phenomenon of industrialised nations (Arlinghaus et al., 2015). This fall has been dampened when we examine the number of recreational fishers, because Queensland's population has grown during the same period.

When comparing the number of fishers across the nine residential regions used in all three surveys, we see that decreases are most prominent in the south-eastern corner of the state (Figure 136).

Away from the urbanised south-eastern corner, the number of recreational fishers appears to be relatively stable.

However, Queensland's population has grown since the 2000–01 survey. When we examine the participation rates across the nine residential regions, we generally see a decrease from the levels seen in the 2000–01 survey, but a recent stabilisation in participation rates in the north of the state while the south continues to decline (Figure 137).

Table 16: Statewide number of recreational fishers and participation rates from the 2000–01, 2010–11 and 2013–14 surveys

Survey	Number of fishers	SE	Participation rate	SE
2000–01	747 000	20 000	23%	0.6
2010–11	703 000	20 000	17%	0.5
2013–14	642 000	18 000	15%	0.4
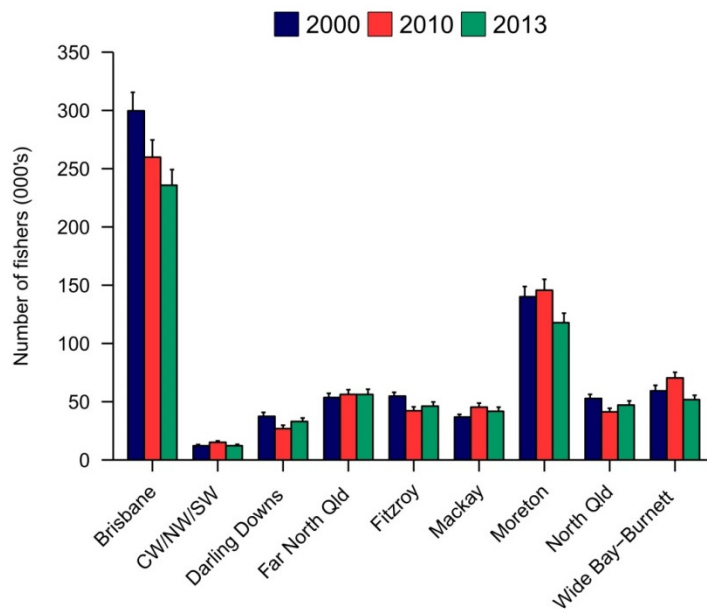
Figure 136: Number of recreational fishers (plus SE) across the nine residential regions for the 2000–01, 2010–11 and 2013–14 surveys
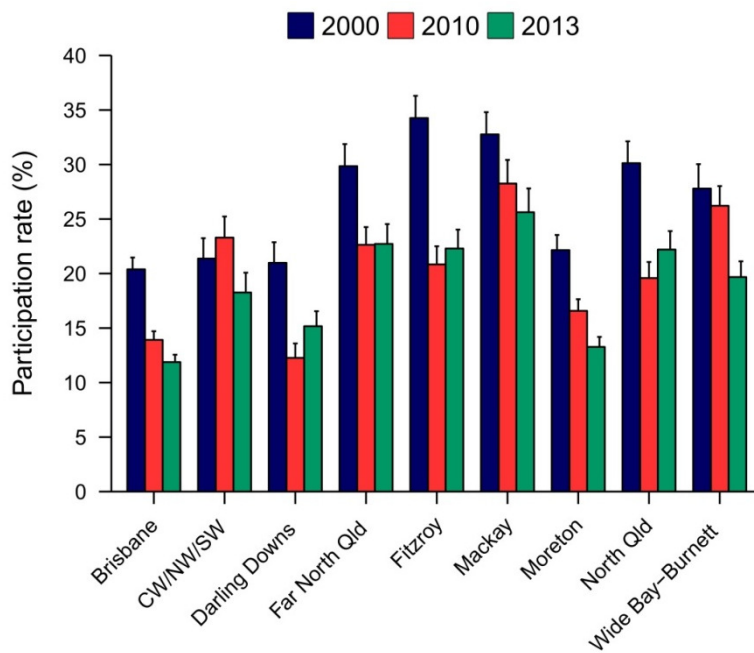
Figure 137: Recreational fishing participation rate (%) across the nine residential regions for the 2000–01, 2010–11 and 2013–14 surveys (plus SE)

Queensland's population is ageing, so we expect to see a shift in the age of recreational fishers through time. Looking at the number of recreational fishers by age group, we see a shift to the older age groups compared to the 2000–01 survey (Figure 134). Comparing the 2013–14 survey to the 2010–11 survey, we see a small decrease in all age groups except for the 5–14 year olds (Figure 138) and a similar pattern in participation rates (Figure 139).
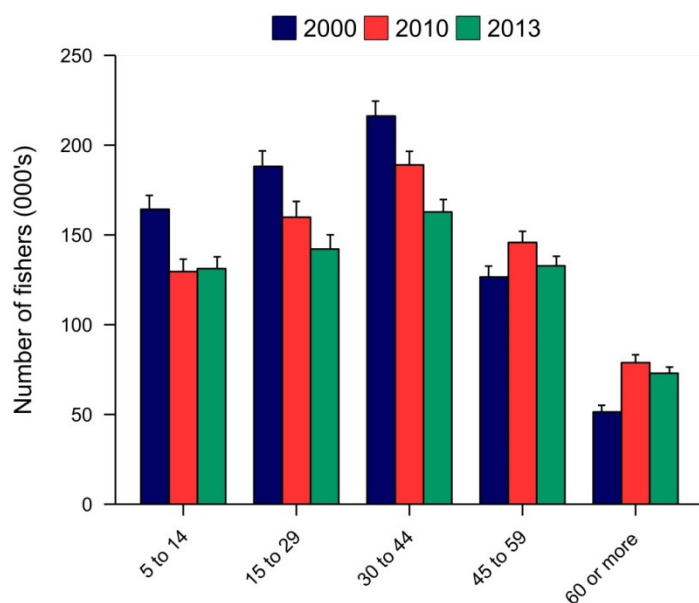
Figure 138: Number of recreational fishers by age group for 2000–01, 2010–11 and 2013–14 (plus SE)
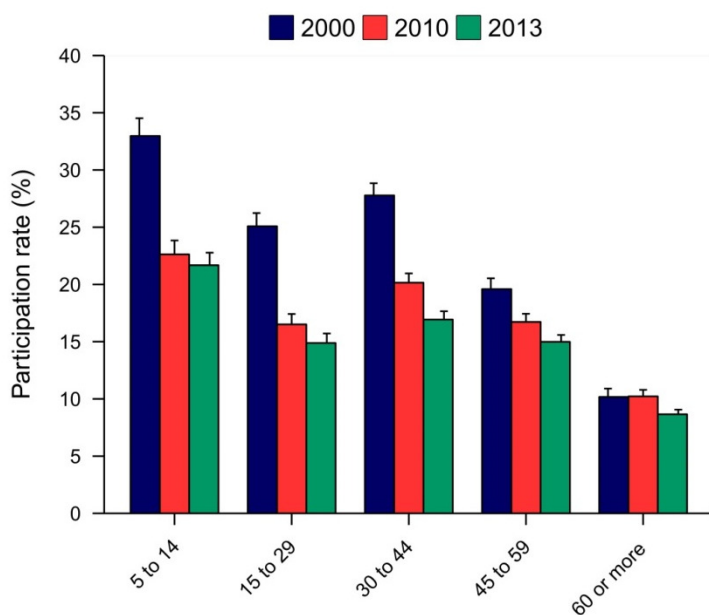
Figure 139: Proportion (%) of recreational fishers by age group for 2000–01, 2010–11 and 2013–14 (plus SE)

Fishing and diving club membership

The 2013–14 survey estimated that 11 000 recreational fishers consider themselves to be members of a fishing or diving club. This figure compares to 21 000 in 2010–11 and 28 000 in 2000–01 (Table 17).

What's driving the decline is uncertain; however, it's thought that online social channels (e.g. Facebook) and the informal groups that can be created through social media are at least partially responsible.

Table 17: Number of recreational fishers belonging to a fishing or diving club by region from the 2000–01, 2010–11 and 2013–14 surveys[11]

Residential region	2000–01	SE	2010–11	SE	2013–14	SE
Brisbane	#13 000	3 400	#9 000	2 500	#3 200	1 200
Moreton	#4 000	1 200	#4 000	1 200	##	
Wide Bay-Burnett	#1 700	800	#1 400	600	#1 000	500
Darling Downs	#2 300	900	##	##	#1 100	500
CW/NW/SW	<#500	200	<#700	250	<#500	200
Fitzroy	#1 600	500	##	##	#1 900	700
Mackay	#1 600	700	##	##	##	##
Northern	#2 700	800	#1 600	500	>#1 000	500
Far North	##	##	#2 200	700	>#1 000	500
Total	28 000	4 000	21 000	3 000	11 000	2 000

Boat ownership

Within Queensland, kayak fishing is growing in popularity. We see this by comparing our 2010–11 and 2013–14 survey estimates. The proportion of paddle-powered watercraft under 4 m used for fishing has increased from 4800 to 12 000 watercraft, representing 19% and 36% of watercraft under 4 m in 2010-11 and 2013-14 respectively (Table 18).

The majority of these paddle-powered fishing vessels are probably kayaks of some form, which reflects the growing popularity of 'yak fishing'. While still small, the number of jet skis used for fishing has also increased and now represents almost 9% of watercraft under 4 m used for fishing.

Table 18: Number of watercraft used for fishing by propulsion method during the 2010–11 and 2013–14 surveys[11]

	2010–11			2013–14		
	Jet ski	Outboard	Paddle	Jet ski	Outboard	Paddle
Under 4 m	##	#20 000	#4 800	#3 000	18 000	12 000
4 m to <5 m		62 000	##		70 000	8 100

[11]Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes; columns may not add to totals because of rounding

Fishing effort

Statewide

In 2013–14, an estimated 2.5 million (SE = 114 000) fisher days occurred in Queensland, compared to 2.6 million in 2010–11 (SE = 144 000) and 3.6 million (SE = 169 000) in 2000–01.

While there has been a decline of the levels seen in the 2000–01 survey, the 2013–14 estimate is not significantly different from the 2010–11 estimate, indicating that statewide recreational fishing effort has been stable.

Lures vs bait

Another development in recreational fishing that appears to have happened in recent years is an increase in the proportion of fishing using lures as opposed to bait. The proportion of line fishing in Queensland using lures increased from 11% in the 2000–01 survey to 18% in this 2013–14 survey (Figure 140).

This trend towards lure-based fishing and the increasing use of kayaks in our survey estimates suggested that the survey is providing information that reflects the underlying changes in recreational fishing activity.
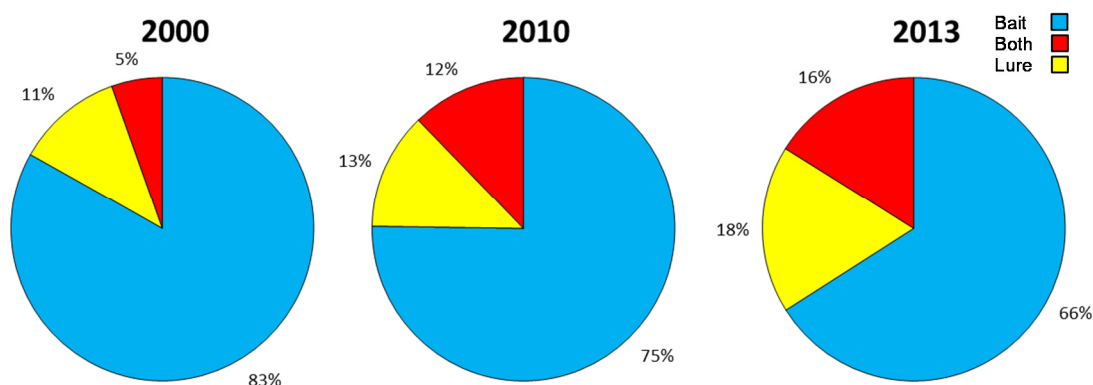
Figure 140: Proportion of line-based effort spent fishing with bait (blue), lures (yellow) or both (red)

Proportion of boat-based effort over time

In the 2013–14 survey, fishing from a boat amounted to 1.3 million days. This was the same as the 2010–11 survey estimate of 1.3 million days, but less than the 2000–01 survey estimate of 1.7 million days. Comparing the relative proportion of boat-based to shore-based fishing, we see a slight trend towards boat-based fishing across the surveys (Table 19).

Table 19: Relative effort of days fished by boat and shore from the 2000–01, 2010–11 and 2013–14 surveys

Boat or shore	2000–01	SE	2010–11	SE	2013–14	SE
Boat	45%	3%	48%	3%	50%	3%
Shore	55%	3%	52%	4%	50%	3%

Depth fished

With larger, more powerful boats, better technology and more knowledge, recreational fishers may look for new places to fish and these places maybe further offshore or in deeper water. The 2010–11 survey started to collect information on depth fished for boat-based bottom fishing. This represents the start of a time series that will show changes in the depth fished by recreational fishers.

In 2013–14, fewer days were spent fishing in water with a depth of 30 m or more where depth was recorded— in 2010–11, 89 000 (SE = 9800) days, and in 2013–14, 61 000 (SE = 7600) days. However, the relative proportion of days spent fishing in water deeper than 60 m increased, indicating that perhaps those who do decide to fish in waters deeper than 40 m prefer to explore waters in excess of 60 m deep (Figure 141).
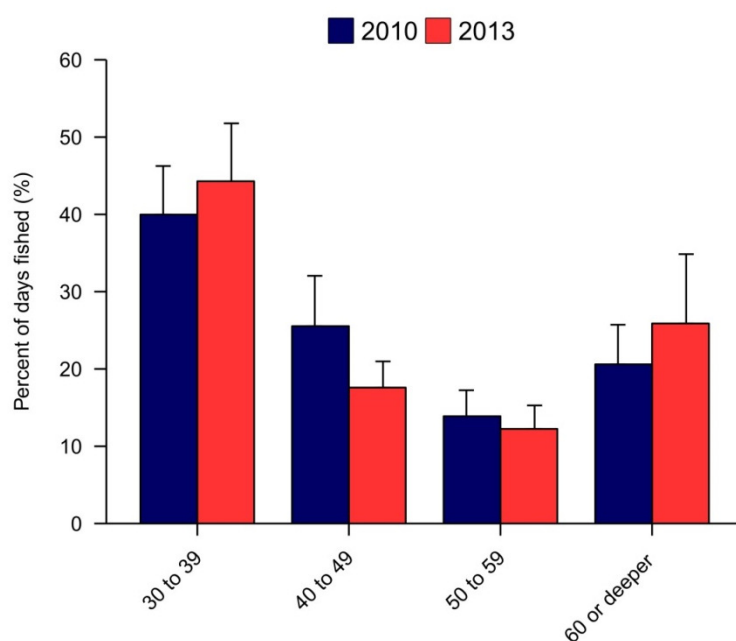
Figure 141: The proportion of days spent fishing in waters 30 m+ in 2010–11 and 2013–14 (plus SE)

Catch

The recreational catch and harvest varies from year to year by species, following natural fluctuations in the underlying populations. Generally though, fewer animals were caught or harvested in 2013–14 than 2000–01 (Table 20 and Table 21).

In 2013–14, the most abundantly caught fish were whiting, bream and flathead, together with a substantial number of mud crabs. These species are found in estuaries, are generalist feeders and accessible from the shore or by boat. They are also relatively abundant in our waterways.

Catch, harvest and release estimates for other species groups are presented in Table 20 and Table 21, and more species-specific information for 2013–14 is available in the Appendix. As applies to all these estimates, additional specific comparisons can be obtained on the QFish data portal or by request to DAF (Appendix).

Table 20: Recreational catch estimates for the 2000–01, 2010–11 and 2013–14 surveys[12]

Comparative group	2000–01 catch	2010–11 catch	2013–14 catch
Australian bass	#259 000	#104 000	#171 000
Barramundi	#252 000	278 000	#174 000
Blue swimmer crab	#395 000	##	268 000
Blue threadfin		39 000	#51 000
Bream	4 143 000	2 043 000	1 417 000
Cod and groper	480 000	310 000	242 000
Coral trout	350 000	179 000	170 000
Dart	595 000	289 000	#352 000
Emperor	#635 000	#222 000	201 000
Flathead	762 000	481 000	412 000
Golden perch	370 000	170 000	146 000
Golden snapper	66 000	#39 000	21 000
Hussar	73 000	#158 000	69 000
Javelin	589 000	177 000	383 000
Jewfish/mulloway	#131 000	#121 000	#172 000
King threadfin		#17 000	#41 000
Mackerel	#282 000	#165 000	#155 000
Mangrove jack	96 000	123 000	91 000
Morwong and sweetlip	#34 000	262 000	73 000
Moses snapper	155 000	163 000	136 000
Mud crab	2 578 000	1 372 000	1 696 000
Parrotfish and tuskfish	#270 000	179 000	98 000
Pearl perch	#100 000	#89 000	#25 000
Perch (other freshwater)	#186 000	#67 000	#68 000
Prawns (marine)	6 796 000	2 971 000	#2 142 000

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[12] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

Comparative group	2000–01 catch	2010–11 catch	2013–14 catch
Queenfish	#55 000	#25 000	#52 000
Red emperor	#394 000	89 000	74 000
Shark and ray	#325 000	#137 000	#193 000
Snapper	623 000	352 000	203 000
Sooty grunter	160 000	79 000	#82 000
Stripey snapper	134 000	#119 000	73 000
Tailor	#1 214 000	345 000	170 000
Trevally	244 000	170 000	118 000
Whiting	6 772 000	2 252 000	1 783 000

Table 21: Recreational harvest and release estimates for the 2000–01, 2010–11 and 2013–14 surveys[13]

Comparative group	Harvest 2000–01	Release 2000–01	Harvest 2010–11	Release 2010–11	Harvest 2013–14	Release 2013–14
Australian bass	#62 000	#196 000	#19 000	#85 000	#14 000	#157 000
Barramundi	88 000	#165 000	60 000	218 000	42 000	#132 000
Blue swimmer crab	#118 000	#277 000	##	##	109 000	#158 000
Blue threadfin			30 000	#9 000	#29 000	#22 000
Bream	1 477 000	2 666 000	688 000	1 355 000	397 000	1 020 000
Cod	149 000	331 000	75 000	235 000	36 000	206 000
Coral trout	217 000	134 000	105 000	75 000	103 000	66 000
Dart	#202 000	393 000	#104 000	184 000	#114 000	#237 000
Emperor	307 000	#328 000	#124 000	#98 000	97 000	#104 000
Flathead	380 000	#383 000	208 000	273 000	139 000	#273 000
Golden perch	217 000	154 000	87 000	82 000	74 000	#73 000
Golden snapper	26 000	40 000	#22 000	#17 000	8 000	#13 000
Hussar	#28 000	#45 000	#65 000	93 000	33 000	36 000
Javelin	173 000	416 000	72 000	106 000	107 000	276 000
Jewfish	#78 000	#50 000	#46 000	##	#37 000	##
King threadfin			#13 000	##	#21 000	##
Mackerel	#209 000	##	#111 000	#55 000	#100 000	#55 000
Mangrove jack	49 000	#48 000	56 000	68 000	36 000	#55 000
Morwong and sweetlip	#24 000	##	120 000	142 000	30 000	#43 000
Moses snapper	#42 000	113 000	41 000	#122 000	24 000	112 000
Mud crab	662 000	1 917 000	366 000	1 006 000	338 000	1 358 000
Parrotfish and tuskfish	#147 000	#123 000	89 000	90 000	53 000	#45 000
Pearl perch	#54 000	#46 000	#27 000	#62 000	#11 000	#14 000
Perch (other freshwater)	##	#146 000	#17 000	#50 000	##	#50 000

[13] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

Comparative group	Harvest	Release	Harvest	Release	Harvest	Release
Prawns (marine)	6 534 000	#262 000	2 901 000	##	#2 101 000	##
Queenfish	#26 000	#30 000	#9 700	##	#12 000	#40 000
Red emperor	#47 000	#348 000	35 000	55 000	16 000	#58 000
Shark and ray	##	#288 000	##	#130 000	##	#186 000
Snapper	#252 000	#371 000	84 000	268 000	#56 000	148 000
Sooty grunter	#40 000	#121 000	#31 000	48 000	#23 000	#58 000
Stripey snapper	53 000	82 000	25 000	#94 000	#16 000	57 000
Tailor	578 000	##	198 000	147 000	#111 000	59 000
Trevally	119 000	125 000	#74 000	#96 000	#176 000	#292 000
Whiting	#4 144 000	2 628 000	1 303 000	949 000	997 000	785 000

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Reasons for release

The number of fish and crabs released during the 2013–14 survey was estimated at 7.2 million animals, compared to 8.1million in 2010–11. Overall, the top three reasons for releasing animals in 2013–14 were:

1. too small or less than the minimum legal size
2. unwanted
3. catch and release.

In 2010–11, the top three reasons were:

1. too small or less than the minimum legal size
2. too many
3. catch and release.

Releasing animals because the fisher had caught too many was the fifth most common reason in 2013–14, down from second place in 2010–11. Releasing female mud crabs was in fourth position in 2013–14.

As expected, the main reason for release varied by species. For example, some species are considered a sports fish and the main reason for release may be catch and release. Examining the number one reason for release, which was 'either considered too small or smaller than minimum legal size' for individual species, we can see how the importance of this reason changed from 2010–11 to 2013–14.

The change between the years is different for different species. For Australian bass and mulloway, this reason has become markedly less important because of a corresponding rise in catch-and-release fishing for these species (Table 23).

Commonly caught species for which catch and release was the biggest reason for release were Australian bass and golden perch—both being freshwater species. Several commonly caught marine species also benefited from catch-and-release fishing, including dusky flathead and barred javelin (Table 23).

A smaller proportion of barramundi were released for catch-and-release reasons in 2013–14 (14%) compared to 2010–11 (27%). This was mainly driven by fishers releasing a bigger proportion of

barramundi because they considered them to be too small or less than legal size in 2013–14 compared to 2010–11.

Table 22: Proportion (%) of fish released because fishers considered them to be either too small or less than the minimum legal size

Species	2010–11	2013–14
Australian bass	44%	25%
Barramundi	40%	45%
Barred javelin	90%	80%
Coral trout	92%	95%
Dusky flathead	63%	62%
Golden perch	56%	46%
Mangrove jack	74%	77%
Mud crab	63%	62%
Mulloway	93%	37%
Pearl perch	96%	100%
Red emperor	95%	100%
Sand whiting complex	90%	91%
Silver javelin	94%	92%
Snapper	75%	98%
Tailor	75%	88%
Trumpeter whiting	89%	83%
Yellowfin bream	82%	82%

Table 23: Proportion (%) of fish released because fishers were catch-and-release fishing

Species	2010–11	2013–14
Australian bass	39%	72%
Barramundi	27%	14%
Barred javelin	9%	16%
Dusky flathead	29%	26%
Golden perch	32%	33%
Mangrove jack	8%	8%
Mulloway	5%	38%
Sand whiting complex	7%	8%
Yellowfin bream	14%	12%

All of these reasons for release should be taken as a guide because of the subjective nature of choosing a reason. For example, fishers may be practising catch-and-release fishing, catch an under size fish and report that they released it because it was too small.

Species targeted

The numbers of fish caught can also be influenced by whether or not fishers target them. Catching some fish required specialised skills, tackle and techniques. In addition, the popularity of certain species may change over time. Examining the most targeted species by effort across the surveys

reveals, however, that the top three are relatively consistent being whiting, bream and mud crabs (Table 24). Flathead, tailor, barramundi, golden perch and red claw are also common across all surveys.

Table 24: The top 10 species/groups by effort targeted from the 2013–14 survey compared to previous surveys (marine yabbies and small baitfish not included)

	2000–01 (days)	2010–11 (days)	2013–14 (days)
1	Whiting (361 000)	Mud crab (205 000)	Mud crab (202 000)
2	Bream (324 000)	Whiting (194 000)	Whiting (126 000)
3	Mud crab (270 000)	Bream (222 000)	Bream (96 000)
4	Barramundi (128 000)	Flathead (112 000)	Barramundi (92 000)
5	Golden perch (95 000)	Barramundi (101 000)	Flathead (86 000)
6	Tailor (90 000)	Tailor (62 000)	Tailor (43 000)
7	Flathead (84 000)	Golden perch (57 000)	Australian bass (41 000)
8	Australian bass (68 000)	Mullet (52 000)	Snapper (38 000)
9	Blue swimmer crab (44 000)	Red claw (51 000)	Golden perch (36 000)
10	Red claw (42 000)	Mangrove jack (33 000)	Red claw (36 000)

Testing the representativeness of the survey

A total of 6314 people were intercepted during the tackle stores survey, of which 3062 (48.5%) people had fished recreationally in Queensland within the previous 12 months. Of these fishers, 1378 (45%) lived in a household that had a telephone number listed in the Telstra White Pages.

Overall, no significant differences in fishing activity (platform use or target species) were detected between listed and unlisted fishers within each demographic group. These results support the assumption that the fishing activity of the sample of fishers from the Telstra White Pages is representative of the fishing activity of all fishers within the state. A full description of this survey is provided in the paper by Teixeira et al. (in prep.).

Discussion

This survey method has been applied to three Queensland 12-month statewide surveys and allows valid comparisons of recreational catch and effort to be made between the 2000–01, 2010–11 and 2013–14 periods.

All three surveys show that recreational fishing is a significant recreational activity undertaken by Queenslanders all over the state. The method was first used in Australia in the National Recreational and Indigenous Fishing Survey 2000–01 (Lyle et al., 2002; Henry and Lyle, 2003).

Since then it has been used by other states and territories, with methodological improvements being made while continuing to maintain the ability to compare prior surveys (Jones, 2009; Lyle et al., 2009; Taylor et al., 2012; West et al., 2012a; Lyle et al., 2014).

More recently in New Zealand, the method was directly tested by comparing it to other on-site methods to estimate fishing activities (Hartill and Edwards, 2015). That research showed that the methods compared all gave similar estimates.

The survey is, however, designed to provide estimates at a regional scale and for species and methods that are caught or used frequently. It is designed this way so that the information is useful for sustainable management activities such as stock assessments. It is not designed to provide estimates at the scale of individual rivers, reefs or relatively infrequently caught species (e.g. marlin or longtail tuna).

By analysing catch and effort information from the three comparable surveys, we can see how the fishing activity of Queenslanders changes through time.

Importantly this report presents only some of the information collected. If readers wish to access all the data from the 2000–01, 2010–11 and 2013–14 surveys DAF has developed a web-based information system (qfish.fisheries.qld.gov.au). This website allows users to create their own data queries online by filtering various fields and data, which provides access to many more estimates than can be presented in this report.

Participation in recreational fishing in Queensland

Comparison with other activities

In the 12 months prior to October 2013, approximately 642 000 Queenslanders went recreational fishing in Queensland, representing 15% of the Queensland population aged 5 years or more.

This makes recreational fishing one of the most popular leisure activities in Queensland, with more Queenslanders going recreational fishing than playing popular sports such as golf or tennis (Australian Bureau of Statistics, 2012). This popularity shows that recreational fishers contribute to the state and regional economies through their expenditure of fishing-related products and services.

While the majority of recreational fishers lived in south-eastern Queensland, particularly the Brisbane region, the highest recreational fishing participation rate was in the Mackay Hinterland and Far North Hinterland regions (Table 5; Figure 4). By examining regional participation in the 2013–14 survey, we can see that urbanised areas tend to have lower participation rates compared to adjacent rural areas.

For example, the participation rate in Townsville was 21.3% while the adjacent rural area, the Northern Hinterland, had a participation rate of 25.7%. The Gold Coast had the lowest participation rate of 8.9%.

Urbanisation is unlikely to be the direct driver, but rather, urbanisation may be related to a greater variety or type of recreational activities accessible in urbanised environments compared to rural areas, increasing the competition for recreational time. Compared to 2000-01, today there is a greater variety of recreational pursuits which are easily accessible. This competition for recreational time may be contributing to the slow decline we have seen in recreational fishing participation in Queensland and Australia.

Changes through time

Fishers and participation

There was a relatively small decrease in the number of fishers in 2013–14 compared to 2010–11; however, the decrease in participation is more significant—in 2010–11, 17.1% (SE = 0.5%), and in 2013–14, 15.1% (SE = 0.4%).

Estimates of the number of fishers derived from the other telephone–diary surveys conducted by the department from 1996 to 2004 (McInnes, 2006) suggest that this decline in the number of fishers has been gradual over the last decade. Similar declines in the participation rate of recreational fishing have recently been reported in South Australia (Jones, 2009) the Northern Territory (West et al., 2012b) and, to a lesser extent, Tasmania (Lyle et al., 2014).

Lyle at al. (2014) examined the declines observed in Tasmania and considered broader demographic trends, particularly the ageing 'baby boomer' generation and the sharp decline in participation rates among the 60 plus age group. They predicted that the decline in the number of recreational fishers is set to continue in Tasmania.

While changing demographics may explain some of the decline seen in Queensland, the role of other factors such as fishing satisfaction or increased competition for recreational time by other activities should also be considered.

Effort

Total statewide recreational fishing effort estimated from this survey was similar to that from the 2010–11 survey (2.5 million fisher days vs 2.6 million fisher days respectively), but it was less than in the 2000–01 survey (3.6 million fisher days). Given the small decline in the number of recreational fishers, a similar effort to 2010–11 is not surprising.

On average, Queensland recreational fishers fished 3.6 days a year, with more than three-quarters of them fishing between 1 and 4 days during the survey. As was the case with participation, the average number of days fished by recreational fishers tended to be lower in urbanised areas compared to adjacent rural regions.

For example, Brisbane's average days fished in the 2013–14 survey was lower than the estimates for the Far North, Mackay, Fitzroy and Wide Bay-Burnett residential regions. There are of course many fishers who fish more frequently; however, the majority of recreational fishers in Queensland go fishing for less than 5 days a year.

Queensland recreational fishers fished a variety of aquatic habitats, ranging from private freshwater dams to the outer barrier reef. Almost half of the recreational fishing effort occurred in estuarine or enclosed coastal waters and almost one-third in inshore oceanic waters (<5 km from shore), which includes shore-based ocean beach fishing. Fishing more than 5 km offshore represented 7% of fishing effort, whereas freshwater recreational fishing effort represented approximately 13% of total recreational effort.

As was the case with previous surveys, line-based fishing was the dominant method. In this survey, line-based fishing represented approximately 81% of effort. Potting was the next most popular method. The survey also recorded other methods of fishing, including the use of cast nets, spears, and pumps, and collecting by hand.

Catch

As expected, the difference in catch between the years varied by species or groups. For example, compared to 2010–11, the 2013–14 catch estimate increased for javelin, king threadfin, queenfish, Australian bass, jewfish/mulloway and mud crabs, while catch estimates decreased for trevally, hussar, mangrove jack, pearl perch, and bream (Table 20).

The reasons for these species-specific increases and decreases are likely to be complex. For example, species differ in their biology and factors like recruitment success, predation and responses to weather events such as flooding can affect populations, which in turn can affect catch rates. People may also change the species they target from year to year, which may also affect the catch estimates we see in the surveys. Changes to regulations affecting fishing may also affect the catch rates for different species.

It's likely that a number of reasons are acting together to alter catch rates from year to year. Scientists are more able to identify the key drivers of change where they have more data. Therefore, this survey will make important contributions to understanding changes in catch rates and improve the management of Queensland's fish stocks.

Release

Many of the fish caught by recreational fishers are released and there are many reasons why people release fish. A person's reason for releasing fish is somewhat subjective. For example, a fisher may say a fish was released because they considered it to be 'too small'. They may realise that it was smaller than the minimum legal size or they may just consider the fish too small to keep.

Interviewers did not query the fishers beyond the initial reason given, so as not to alter the behaviour of the fisher. This survey recorded the major reasons for release as being too small, less than minimum legal size, unwanted, catch and release, and a number of other less common but important reasons such as conservation, damaged, dangerous, sick and tag and release.

Between the 2010–11 and 2013–14 surveys, the first and third most common reasons for release remained the same when looking at the state as a whole. The most common reason was that the fisher considered the fish to be either too small or under the legal size, and the third most popular was that the fisher was practising catch-and-release fishing.

The second most popular reason for release in 2010–11 was that the fishers decided they had caught too many, whereas in 2013–14 it was that the fish were unwanted. In 2013–14, catching too many had slipped to fifth position, one below being released because the animal is a female crab.

The reasons for release were more variable when looking at individual species across the years. For example, the proportion of Australian bass released because the fish were considered to be too small decreased from 44% in 2010–11 to 25% in 2013–14. For several other species, including mud crabs and dusky flathead, the proportion released because they were considered too small remained similar in 2010–11 and 2013–14 (Table 22). Most of the Australian bass released in 2013–14 were released because the fishers were practising catch-and-release fishing and the proportion of mulloway released for this reason increased substantially.

Understanding how reasons for release change for specific species through time contributes to understanding potential mortality of released fish, and may provide an insight into prior recruitment

events. This information can assist educational programs about good fish handling methods and catch-and-release tips as shown on YouTube (www.youtube.com/fisheriesqld).

Changes in fishing frequency

There are many reasons that can affect the frequency a person goes fishing in any particular year. For example, these reasons can include the amount of recreational time available, physical access to fishing locations and weather.

In this survey, approximately one-third of fishers said they fished less often during the survey than in the previous 12 months, one-third said they fished more often and one-third said they fished about the same number of times. In the 2010–11 survey, approximately 43% of fishers said they fished less often.

In both the 2010–11 and 2013–14 surveys, work or business commitments and home and family life were the main reasons for a perceived reduction in fishing frequency. However, in the 2010–11 survey, weather and flooding were significant reasons—they were relatively minor in the 2013–14 survey.

During the 2010–11 survey, which covered the Christmas/New Year period of 2010–11, there was significant flooding and rainfall across all of Queensland. Such wide-scale, extreme weather events were absent from the 2013–14 survey.

It's likely that the rainfall and weather events experienced during the 2010–11 survey affected more than just the frequency of fishing—they may well have affected the catch for various species as well.

Quality of the results

The collection and analysis of recreational fishing information forms an important part of sustainability assessments and assists in the sustainable management of fisheries. As with other recreational fishing surveys, the collection of good recreational fishing data represents a mutual collaboration between fishers and scientists.

Throughout all stages of this survey, the response rate was very high. Approximately 91% of all households contacted and identified as eligible to take part in the diary survey agreed to provide details of their fishing activities, and 92% of all these households fully participated throughout the 12-month diary survey (Table 4).

The high participation and completion rates mean that the estimates from this survey are highly likely to be representative of all Queenslanders who fish—ranging from those who only go fishing once or twice a year, through to those who fish weekly or more often. Furthermore, recent research in New Zealand, as part of their national recreational fishing survey, has further supported the validity of this style of telephone–diary survey to provide results similar to other on-site methods (Wynne-Jones et al., 2014; Hartill and Edwards, 2015).

As with the 2010–11 survey, fishers who live in a household without a listed telephone are out of the scope of this survey. In itself this is not a concern, provided that the participation rate and the fishing activities of the residents of listed households are similar to their unlisted counterparts.

During the 2010–11 survey, fishers of listed and unlisted households interviewed at boat ramps were found to have similar avidity profiles (Taylor et al., 2012).

During this survey, more than 3000 fishers from listed and unlisted households were interviewed at tackle stores around Queensland and asked about their fishing activity (Teixeira et al., in prep.). Again, fishers from listed households were found to fish in a similar manner to their unlisted counterparts.

For this survey, therefore, there is little evidence to suggest that the estimates are biased because some households are not listed in the Telstra White Pages. However, as the proportion of unlisted households increases, more robust methods of validating the Telstra White Pages as a suitable sampling frame will be required. Alternatively a new sampling frame could be sought.

Conclusion and recommendations

This survey has built on the time series of recreational fishing information collected during the 2000–01 and 2010–11 surveys. This survey collected data on the largest number of fishing events. In many cases, this additional information has improved the precision and reliability of the estimates.

Estimates from this survey will be incorporated into stock assessment models and stock status determinations, and will help fisheries management into the future.

If readers wish to query the data sets from the 2000–01, 2010–11 and 2013–14 surveys DAF has developed a web-based information system (qfish.fisheries.qld.gov.au). This website allows users to create their own data queries online by filtering various fields and data, which provides access to many more estimates than can be presented in this report.

Appendix

Sampling the Telstra White Pages

Access to the electronic Telstra White Pages is restricted, so phone numbers were randomly selected from the printed telephone directories. In the months just preceding the screening survey, selections were drawn from the latest print versions in Queensland.

These selections were stratified by the residential regions and sampling fractions, with the sampling fraction varying across the different regions. No substitution of selected phone numbers occurred and if a household was not contactable after at least 15 phone calls it was coded as 'non-response'.

Sampling was conducted in waves to achieve predetermined targets of households participating in the diary survey (minimum target of 100 households in each of the nine residential regions)

Expansion of survey data

Survey results were expanded to the Queensland population using the RecSurvey package (Lyle et al., 2010), which was successfully used in the 2010–11 survey in Queensland and in similar surveys conducted in South Australia, Tasmania and the Northern Territory (Jones, 2009; Taylor et al., 2012; West et al., 2012b; Lyle et al., 2014).

The RecSurvey package is implemented in the statistical computing language R, and builds upon the survey package developed by Thomas Lumley (Lumley, 2004, 2010).

Prior to expansion, estimated resident population data released by the Australian Bureau of Statistics on the population size in Queensland (number of people and number of households) were used to estimate the population size by residential region in June 2013—the time when the screening survey commenced.

As part of the expansion process, survey data on participation, catch and effort were converted to statewide population estimates, with adjustments being made for various types of non-response using calibration and response propensity modelling. These adjustments were made to provide estimates that were representative of the Queensland population.

For a detailed explanation of how the RecSurvey process works, refer to Lyle et al. (2010).

Customise your analyses

A substantial amount of valuable information was collected during the survey and is stored in a relational database. The number of analyses that could be done with this information greatly exceeds what is presented in this report.

If readers wish to query the data sets from the 2000–01, 2010–11 and 2013–14 surveys DAF has developed a web-based information system (qfish.fisheries.qld.gov.au). This website allows users to create their own data queries online by filtering various fields and data, which provides access to many more estimates than can be presented in this report.

Type of data collected

Table 25: Household data fields

Description of field	Data recorded
Location—residential region	See Figure 2
Did someone in the household fish in the 12 months prior to the survey?	Y/N
The maximum avidity of fishers in the household in the 12 months prior to the survey	5 categories
The average avidity of fishers in the household prior to the survey	Average of categories
Likelihood that someone in the household will go fishing in the next 12 months	5 categories
Does the household own a boat?	Y/N
Is there a member of a fishing or diving club in the household?	Y/N
Number of persons in the household	Number

Table 26: Person data fields

Description of field	Data recorded
Gender	M/F
Age group	5 categories
Did the person fish in Queensland in the 12 months prior to the survey?	Y/N
Did the person fish outside Queensland in the 12 months prior to the survey?	Y/N
Recalled estimate of the number of days fished in the previous 12 months	5 categories
Is the person a member of a fishing or diving club?	Y/N
Likelihood that the person will go fishing in the next 12 months	5 categories

Table 27: Fishing event data fields

Description of field	Data recorded
Fishing start date and time	Time
Fishing end date and time	Time
Length of breaks from fishing	Minutes
Location—fishing region	See **Figure 3**
Water body	See water body types (see Table 29 overleaf)
Location	Name (e.g. state, river, beach, reef, nearest town)
Primary target	Species name
Secondary target	Species name
Depth	Water depth for offshore fishing (metres)
Fishing method	Method types (see Table 30 overleaf)
Number of pieces of gear (e.g. number of pots)	Number
Number of fishers	Number
Platform	Boat, shore, both
Boat type	Private, hire, charter
Shore type	Beach, rocks, man-made (public/private), other natural

Table 28: Catch data fields

Description of field	Data recorded
Species	Species
Number harvested	Number
Number released	Number
Number released by reason for release	See reasons for release

Table 29: Water body types

Description
Inshore waters (<5 km offshore)
Offshore waters (>5 km offshore)
River/estuary (marine)
River/stream (freshwater)
Public lake or dam
Private lake or dam

Table 30: Method types

Method	Description
Lines—bait	Line fishing with bait
Lines—lure/jig/fly	Line fishing with lures
Lines—both	Line fishing with both bait and lures
Lines—set	Lines set but not actively fished
Pot/trap passive	Pots and traps
Net—cast	Hand-thrown cast net
Net—drag/seine	Net dragged through water
Net—scoop/push	Net pushed through water
Diving spearfishing	Spearing underwater free diving (e.g. snorkel)
Other spearfishing	Spearing in shallow water (e.g. walking in shallows or from the bank)
Hook/pump/rake/spade	Using a pump, rake or spade
Other hand collecting	Other hand collecting (e.g. hand net, picking up animals)

Table 31: Reasons for release for which data were collected

Reason for release	Description
Too small	Fisher considered them to be too small, but they may have been greater than the minimum size limit
Smaller than legal size	Fishers abiding to a minimum legal size rule
Too many	Fisher considered he/she had harvested enough, but they may not have reached the possession limit
Possession limit	Fisher had reached possession limit
Catch and release	Fisher was practising catch-and-release fishing
Unwanted	The species was not wanted
Female crab	The crab was female
Too few	The fisher considered that he/she had caught too few to be worth keeping
Exceeded legal size limit	The fish was larger than the upper legal size limit
Too big	The fisher considered that the fish was too big to keep, but it may have been within the legal size limits
Tag and release	The fisher was doing tag-and-release fishing
Conservation	The fisher thought the fish should be released for conservation reasons
Sick	The fisher thought the fish was sick and should be released
Damaged	The fisher thought the fish was damaged and should be released
Deformed	The fisher thought the fish was deformed and should be released
Dangerous	The fisher thought it was a dangerous species
Other	Any other reason for releasing the fish

Data tables

Table 32: Number of recreational fishers in 2013–14 by age and gender

	Males		Females		Total	
Age group	Fishers	SE	Fishers	SE	Fishers	SE
5–14	80 000	4 500	51 000	3 700	131 000	6 600
15–29	95 000	5 600	47 000	4 100	142 000	7 900
30–44	109 000	4 800	53 000	3 400	162 000	6 900
45–59	94 000	3 900	38 000	2 500	132 000	5 300
60 or more	57 000	2 800	16 000	1 300	73 000	3 400

Table 33: Number of recreational fishers in 2013–14 by residential region, age and gender[14]

	Females		Males		Total	
	Fishers	SE	Fishers	SE	Fishers	SE
Brisbane	**68 000**	**6 000**	**167 000**	**9 300**	**236 000**	**13 000**
05–14	19 000	2 700	32 000	3 400	51 000	4 900
15–29	16 000	2 800	39 000	4 300	55 000	5 900
30–44	18 000	2 400	41 000	3 700	59 000	5 200
45–59	11 000	1 600	36 000	2 900	47 000	3 700
60+	4 700	800	19 000	2 000	24 000	2 400
Gold Coast	**13 000**	**2 200**	**29 000**	**3 300**	**42 000**	**4 700**
05–14	#2 800	900	#4 400	1 200	7 200	1 700
15–29	#2 400	1 000	#6 400	1 600	8 900	2 000
30–44	#3 700	1 000	8 400	1 500	12 000	2 200
45–59	#2 400	700	4 500	1 000	6 900	1 400
60+	#1 300	400	5 200	900	6 500	1 100
Sunshine Coast	**#19 000**	**3 100**	**40 000**	**4 100**	**59 000**	**6 400**
05–14	#4 800	1 300	8 700	1 500	14 000	2 300
15–29	#4 300	1 600	#7 000	1 800	11 000	2 600
30–44	5 300	1 200	10 000	1 600	15 000	2 400
45–59	#3 300	900	8 400	1 400	12 000	2 000
60+	#1 600	400	5 800	1 000	7 400	1 200
West Moreton	**#5 500**	**1 600**	**#11 000**	**2 400**	**17 000**	**3 600**
05–14	##	##	#2 600	1 000	#3 000	1 100
15–29	##	##	#2 600	1 100	#4 800	2 100
30–44	#1 300	600	#2 700	900	# 4 000	1 300
45–59	#800	400	#2 000	700	#2 800	900
60+	#900	400	#1 200	400	#2 100	600
Wide Bay-Burnett	**18 000**	**1 800**	**34 000**	**2 400**	**52 000**	**3 800**
05–14	#3 200	800	6 400	1 000	9 600	1 800
15–29	4 100	800	5 600	900	9 700	1 700
30–44	4 400	700	7 500	800	12 000	1 500
45–59	4 100	600	7 000	800	11 000	1 500
60+	2 200	400	7 200	800	9 500	1 200
Darling Downs	**12 000**	**1 446**	**21 000**	**2 000**	**33 000**	**3 000**
05–14	3 500	600	3 800	800	7 200	1 200
15–29	#2 700	700	4 200	900	6 900	1 300
30–44	2 500	500	4 900	700	7 400	1 000
45–59	2 100	400	5 200	700	7 300	1 000
60+	1 000	200	3 200	500	4 200	600

[14] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

	Females		Males		Total	
	Fishers	**SE**	**Fishers**	**SE**	**Fishers**	**SE**
CW/NW/SW	**4 300**	**600**	**7 900**	**800**	**12 000**	**1 200**
05–14	1 100	200	1 500	300	2 500	400
15–29	900	200	1 900	400	2 800	500
30–44	1 200	200	2 100	300	3 300	500
45–59	#700	200	1 600	300	2 400	400
60+	#300	100	900	200	1 200	200
Gladstone	**3 700**	**800**	**8 400**	**1 500**	**12 000**	**2 000**
05–14	#900	300	#2 100	600	#3 000	800
15–29	##	##	#1 800	800	#2 300	900
30–44	#1 100	400	#2 000	500	#3 100	800
45–59	#1 000	300	1 900	400	2 800	700
60+	##	##	#600	300	#900	400
Rockhampton	**6 800**	**1 200**	**16 000**	**1 900**	**22 000**	**2 800**
05–14	#2 100	600	#2 200	600	4 300	1 000
15–29	#800	400	3 800	900	4 700	1 100
30–44	2 200	500	4 300	800	6 500	1 100
45–59	#1 300	400	3 400	600	4 800	800
60+	##	##	1 900	400	2 300	500
Fitzroy Hinterland	**4 900**	**1 100**	**6 700**	**1 200**	**12 000**	**2 100**
05–14	#1 300	400	#1 100	400	#2 400	700
15–29	#1 100	500	#1 300	600	#2 400	800
30–44	#1 200	400	#2 400	600	#3 600	900
45–59	#1 000	300	#1 100	400	#2 000	600
60+	#200	100	#900	300	#1 200	400
Mackay-Whitsunday	**12 000**	**1 600**	**23 000**	**2 100**	**34 000**	**3 400**
05–14	#1 600	500	#2 400	600	3 900	900
15–29	3 800	900	6 600	1 000	10 000	1 700
30–44	2 200	500	4 300	700	6 600	1 100
45–59	3 200	600	7 100	800	10 000	1 300
60+	#800	300	2 100	400	2 900	600
Mackay Hinterland	**#2 400**	**700**	**5 200**	**1 000**	**7 600**	**1 500**
05–14	#1 100	400	#700	300	#1 800	600
15–29	##	##	#1 100	500	#1 600	800
30–44	#500	200	#1 600	500	#2 000	600
45–59	##	##	#1 000	300	#1 100	400
60+	#200	100	#900	300	#1 100	400
Townsville	**13 000**	**1 700**	**24 000**	**2 000**	**36 000**	**3 400**
05–14	3 300	700	3 700	700	7 000	1 200
15–29	3 300	800	6 500	1 100	9 700	1 700
30–44	3 200	600	6 100	800	9 300	1 200

	Females		Males		Total	
	Fishers	SE	Fishers	SE	Fishers	SE
45–59	2 500	500	5 300	700	7 700	1 100
60+	#300	100	2 000	400	2 300	500
Northern Hinterland	**3 800**	**900**	**7 200**	**1 200**	**11 000**	**1 800**
05–14	##	##	#1 100	400	#1 800	600
15–29	#600	300	#1 200	500	#1 900	600
30–44	#900	300	1 800	400	#2 800	700
45–59	#1 100	400	#1 300	400	#2 300	700
60+	#400	200	1 800	400	2 200	500
Cairns	**9 700**	**1 900**	**17 000**	**2 100**	**26 000**	**3 500**
05–14	#3 100	1 000	#3 100	900	6 200	1 500
15–29	#1 400	600	#2 800	700	#4 200	1 100
30–44	2 900	700	5 500	1 000	8 400	1 400
45–59	#1 700	500	4 200	800	5 900	1 100
60+	#700	200	#900	300	#1 600	500
Far North Hinterland	**10 000**	**1 800**	**20 000**	**2 200**	**30 000**	**3 500**
05–14	#2 800	900	4 000	900	6 800	1 600
15–29	#2 400	800	#3 200	800	5 600	1 400
30–44	#2 700	700	4 900	900	7 600	1 300
45–59	#1 800	500	4 800	800	6 600	1 000
60+	#700	300	2 600	500	3 300	600
Total	**206 000**	**8 500**	**436 000**	**12 000**	**642 000**	**18 000**

Table 34: Catch for all species[15]

Group name	Common name	Scientific name	Catch Number	Catch SE	Harvested Number	Harvested SE	Released Number	Released SE
Barramundi	Barramundi	*Lates calcarifer*	#174 000	49 000	42 000	7 700	#132 000	44 000
Bream	Bream—unspecified	Sparidae	##	##	##	##	##	##
	Pikey bream	*Acanthopagrus berda*	234 000	49 000	65 000	12 000	169 000	41 000
	Tarwhine	*Rhabdosargus sarba*	24 000	4 800	#7 700	2 300	16 000	3 700
	Yellowfin bream	*Acanthopagrus australis*	1 156 000	132 000	323 000	41 000	833 000	98 000
Catfish	Eeltail catfish— unspecified	Plotosidae	80 000	15 000	#11 000	3 700	69 000	14 000
	Forktail catfish—unspecified	Ariidae	373 000	62 000	#26 000	9 000	346 000	61 000
Cephalopod	Cuttlefish	Sepiidae—undifferentiated	##	##	##	##		
	Octopus	Order Octopoda—undifferentiated	##	##	##	##	##	##
	Pencil squid	*Uroteuthis* (Photololigo) spp.	#13 000	6 100	#11 000	4 700	##	##
	Squid—unspecified	Order Teuthoidea—undifferentiated	##	##	##	##	##	##
	Tiger squid	*Sepioteuthis lessoniana*	##	##	##	##	##	##
Cobia	Cobia	*Rachycentron canadum*	#7 600	2 000	#5 400	1 600	#2 200	900
Cod and groper	Cod and groper—unspecified	Several Families (Moridae, Serranidae)	239 000	30 000	36 000	5 100	203 000	28 000
	Goldspotted rockcod	*Epinephelus coioides*	##	##	##	##	##	##
	Maori cod	*Epinephelus undulatostriatus*	##	##			##	##
Coral trout	Coral trout—unspecified	Serranidae	169 000	28 000	103 000	18 000	66 000	14 000
	Coronation trout	*Variola louti*	##	##	##	##	##	##
Crab	Blue swimmer crab	*Portunus armatus*	268 000	67 000	109 000	26 000	#158 000	45 000

[15] Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25% and 50%, and the estimate should be used cautiously; and ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes. Blank cells indicate no data were reported.

Group name	Common name	Scientific name	Catch		Harvested		Released	
			Number	SE	Number	SE	Number	SE
	Crab—unspecified	Brachyura	##	##	##	##	##	##
	Mud crab	*Scylla* spp.	1 696 000	204 000	338 000	42 000	1 358 000	169 000
Eel	Eel—unspecified	Anguillidae	#27 000	8 600	##	##	#25 000	8 400
Emperor	Emperor—unspecified	Lethrinidae	#24 000	11 000	##	##	##	##
	Grass emperor	*Lethrinus laticaudis*	73 000	13 000	35 000	8 000	38 000	8 400
	Redthroat emperor	*Lethrinus miniatus*	78 000	13 000	37 000	6 300	41 000	8 400
	Seabream and coral bream—unspecified	Lethrinidae	##	##	##	##	##	##
	Spangled emperor	*Lethrinus nebulosus*	24 000	5 400	14 000	3 300	#9 600	3 100
Finfish (other)	Archerfish	Toxotidae	##	##			##	##
	Black marlin	*Makaira indica*	##	##			##	##
	Bonefish	Albulidae—undifferentiated	##	##			##	##
	Bony bream	*Nematalosa* spp.	##	##			##	##
	Diamond fish	*Monodactylus argenteus*	#48 000	16 000	##	##	#41 000	16 000
	Fish—unspecified	Several families	#88 000	28 000	##	##	#45 000	14 000
	Flounder and flatfish—unspecifed	Bothidae and Pleuronectidae	#22 000	6 600	#12 000	5 600	10 000	2 200
	Grinners and lizardfish—unspecified	Synodontidae	#44 000	16 000	##	##	#42 000	16 000
	Leatherjackets—unspecified	Monacanthidae	#6 000	2 400	##	##	#4 400	2 100
	Long Tom	Belonidae—undifferentiated	##	##	##		####	##
	Luderick	*Girella tricuspidata*	##	##			##	##
	Mahi mahi	*Coryphaena hippurus*	##	##	##	##	##	##
	Marlin—unspecified	*Makaira* spp.	##	##			##	##
	Milkfish	*Chanos chanos*	##	##	##	##	##	##

Group name	Common name	Scientific name	Catch		Harvested		Released	
			Number	SE	Number	SE	Number	SE
	Moonfish and batfish—unspecified	Ephippidae and Drepaneidae spp.	##	##	##	##	##	##
	Northern saratoga	*Scleropages jardinii*	##	##			##	##
	Oxeye herring	*Megalops cyprinoides*	#33 000	10 000	#18 000	7 700	#15 000	5 100
	Rabbitfish	*Siganus* spp.	##	##	##	##	##	##
	Remora	*Remora remora*	#6 800	2 500			#6 800	2 500
	Sailfish	*Istiophorus platypterus*	##	##			##	##
	Samson fish	*Seriola hippos*	##	##	##	##		
	Scat	Scatophagidae	##	##	##	##		
	Scorpian fish—unspecified	Scorpaenidae	#4 100	1 500			#4 100	1 500
	Sergeant baker	*Aulopus purpurissatus*	9 300	6 500	##	##	##	##
	Small baitfish	Several families	575 000	135 000	#532 000	133 000	#42 000	11 000
	Spotty seaperch	*Ellerkeldia* spp.	##	##	##	##		
	Stargazer—unspecified	Uranoscopidae	##	##			##	##
	Sweep—unspecified	Scorpidinae	##	##	##	##	##	##
	Toadfish and pufferfish—unspecified	Several families	116 000	19 000	##	##	108 000	17 000
	Tripletail	*Lobotes surinamensis*	##	##	##	##		
Flathead	Bartail flathead	*Platycephalus indicus*	##	##	##	##	##	##
	Dusky flathead	*Platycephalus fuscus*	352 000	80 000	117 000	16 000	#234 000	69 000
	Flathead—unspecified	Platycephalidae	##	##	##	##	##	##
	Northern sand flathead	*Platycephalus endrachtensis*	54 000	9 100	19 000	4 200	34 000	6 500
	Yellowtail flathead	*Platycephalus westraliae*	##	##	##	##	##	##
Freshwater bass, cod and perch	Australian bass	*Macquaria novemaculeata*	#171 000	52 000	#14 000	4 200	#157 000	51 000
	Estuary perch	*Macquaria colonorum*	##	##	##	##	##	##

Group name	Common name	Scientific name	Catch		Harvested		Released	
			Number	SE	Number	SE	Number	SE
	Freshwater cod—unspecified	Percichthyidae	##	##	##	##	##	##
	Freshwater perch—unspecified	Percichthyidae or Percidae	##	##	##	##	##	##
	Golden perch	*Macquaria ambigua*	146 000	31 000	74 000	17 000	#73 000	18 000
	Murray cod	*Maccullochella peeli*	#4 100	1 500	##	##	#3 300	1 300
Garfish	Garfish—unspecified	Hemiramphidae	#104 000	33 000	#94 000	32 000	#9 800	4 100
Grunter and trumpeter	Silver perch	*Bidyanus bidyanus*	##	##	##	##	#22 000	9 300
	Sooty grunter	*Hephaestus fuliginosus*	#82 000	23 000	#23 000	10 000	#58 000	18 000
	Spangled perch	*Leiopotherapon unicolor*	#23 000	6 900	##	##	#20 000	6 700
	Trumpeter, grunters and javelin fish—unspecified	Various	##	##	##	##	##	##
Herring and pilchard	Herring—unspecified	Clupeidae	#436 000	172 000	#334 000	131 000	#102 000	48 000
	Pilchard	Clupeidae	##	##	##	##	##	##
Javelin	Barred javelin	*Pomadasys kaakan*	329 000	75 000	85 000	19 000	244 000	61 000
	Silver javelin	*Pomadasys argenteus*	55 000	13 000	#22 000	7 200	#33 000	8 400
Jewfish	Black jewfish	*Protonibea diacanthus*	##	##	#5 600	2 400	##	##
	Jewfish—unspecified	Scianidae	##	##	##	##	##	##
	Mulloway	*Argyrosomus japonicus*	#51 000	20 000	#17 000	6 100	#35 000	17 000
	Teraglin	*Atractoscion aequidens*	##	##	##	##	##	##
Lobster	Lobster—unspecified	*Astacidea* and *Palinura*—undifferentiated	##	##	##	##		
	Ornate rocklobster	*Panulirus ornatus*	##	##	##	##		
Mackerel	Blue mackerel	*Scomber australasicus*	##	##	##	##	##	##
	Grey mackerel	*Scomberomorus semifasciatus*	##	##	##	##	##	##

Group name	Common name	Scientific name	Catch Number	SE	Harvested Number	SE	Released Number	SE
	Mackerel—unspecified	Scombridae spp (tribes *Scomberomorini* and *Scombrini*)	##	##	##	##	##	##
	School mackerel	*Scomberomorus queenslandicus*	37 000	7 600	22 000	4 600	#15 000	5 000
	Shark mackerel	*Grammatorcynus bicarinatus*	##	##	##	##	##	##
	Spanish mackerel	*Scomberomorus commerson*	55 000	9 000	34 000	5 100	#20 000	6 600
	Spotted mackerel	*Scomberomorus munroi*	38 000	8 200	26 000	6 000	#12 000	4 000
	Wahoo	*Acanthocybium solandri*	##	##	##	##	##	##
Mollusc	Mussels—unspecified	Bivalvia	##	##	##	##		
	Oysters	Ostreidae and Pteriidae spp.	##	##	##	##		
	Pippi/cockle	Donacidae—undifferentiated	#541 000	189 000	#535 000	189 000	##	##
Morwongs and sweetlips	Morwong and sweetlip—unspecified	Cheilodactylidae and Haemulidae	73 000	17 000	30 000	6 900	#43 000	13 000
Mullet	Mullet—unspecified	Mugilidae	243 000	54 000	216 000	51 000	#27 000	8 200
Non-fish	Non-fish	Other	##	##			##	##
	Saltwater crocodile	*Crocodylus porosus*	##	##			##	##
	Sea snakes	Hydropiidae	##	##			##	##
	Turtles	Turtles	#11 000	5 000			#11 000	5 000
Parrotfish	Parrot fish—unspecified	Scaridae—undifferentiated	53 000	9 800	30 000	5 900	#23 000	5 800
Pearl perch	Pearl perch	*Glaucosoma scapulare*	#25 000	7 400	#11 000	2 900	#14 000	5 400
Pest fish	European carp	*Cyprinus carpio*	#50 000	18 000	#50 000	18 000	##	##
	Tilapia—unspecified	*Tilapia mariae* and *Oreochromis mossambicus*	##	##	##	##	##	##
Pike	Barracuda—unspecified	*Sphyraena barracuda*	#11 000	3 100	#3 700	1 600	#6 900	2 300
	Pikes	Sphyraenidae and Dinolestidae	#22 000	6 400	#10 000	4 000	12 000	4 700
Prawn	Prawns—marine	Penaeidea	#2 142 000	539 000	#2 101 000	535 000	##	##

Group name	Common name	Scientific name	Catch Number	Catch SE	Harvested Number	Harvested SE	Released Number	Released SE
	Shrimps—freshwater	*Macrobrachium* spp.	##	##	##	##	##	##
Shark and ray	Bronze whaler shark	*Carcharhinus brachyurus*	##	##	##	##	##	##
	Gummy shark	*Mustelus antarcticus*	##	##			##	##
	Hammerhead shark	Sphyrnidae	#3 300	1 000	##	##	#3 000	1 000
	Rays and skates—unspecified	Several families (e.g. Rhinobatidae, Dasyatidae)	#66 000	17 000	##	##	#66 000	17 000
	Shark—unspecified	Several families	#55 000	15 000	##	##	#52 000	14 000
	Shovelnose ray and guitar fish—unspecified	Rhinobatidae and Rhinidae spp.	30 000	5 300	##	##	28 000	4 900
	Tiger shark	*Galeocerdo cuvier*	##	##			##	##
	Whaler and weasel sharks—unspecified	*Carcharhinus* spp.	24 000	5 000	##	##	24 000	5 000
	Wobbegong—unspecified	*Orectolobus* spp.	##	##			##	##
Snapper	Snapper	*Pagrus auratus*	203 000	43 000	#56 000	15 000	148 000	36 000
Tailor	Tailor	*Pomatomus saltatrix*	169 000	40 000	#110 000	28 000	59 000	14 000
Threadfin and Australian salmon	Blue threadfin	*Eleutheronema tetradactylum*	#51 000	15 000	#29 000	9 100	#22 000	7 900
	King threadfin	*Polydactylus macrochir*	#41 000	18 000	#21 000	6 200	##	##
	Threadfin and Australian salmon	*Polydactylus* (threadfins) and *Arripes*	##	##	##	##	##	##
Trevally and amberjack	Amberjack	*Seriola dumerili*	##	##	##	##	##	##
	Dart—unspecified	*Trachinotus* spp.	#352 000	105 000	#114 000	53 000	#237 000	65 000
	Giant trevally	*Caranx ignobilis*	26 000	4 800	11 000	2 500	15 000	3 600
	Gold spotted trevally	*Carangoides fulvoguttatus*	##	##			##	##
	Golden trevally	*Gnathanodon speciosus*	28 000	6 100	#9 000	2 900	#19 000	5 300
	Queenfish	*Scomberoides* spp.	#52 000	17 000	#12 000	4 200	#40 000	15 000
	Rainbow runner	*Elegatis bipunnulata*	##	##	##	##	##	##

Group name	Common name	Scientific name	Catch		Harvested		Released	
			Number	SE	Number	SE	Number	SE
	Silver trevally	*Pseudocaranx dentex*	##	##	##	##	##	##
	Trevally—unspecified	Carangidae	#16 000	5 300	#9 100	3 800	#7 200	2 400
	Yellowtail kingfish	Seriola lalandi	#5 500	2 200	##	##	##	##
	Yellowtail scad	*Trachurus novaezelandiae*	##	##	##	##	##	##
Tropical snapper and sea perch	Chinamanfish	*Symphorus nematophorus*	##	##			##	##
	Crimson and saddletail snapper	Lutjanus spp.	155 000	32 000	74 000	18 000	#81 000	22 000
	Fusiliers	Caesionidae	#8 000	3 100	##	##	#8 000	3 100
	Golden snapper	*Lutjanus johnii*	21 000	4 800	8 000	1 900	#13 000	3 400
	Hussar	*Lutjanus vitta* and *Lutjanus adetii*	69 000	14 000	33 000	7 500	36 000	8 700
	Indonesian snapper	*Lutjanus bitaeniatus*	##	##	##	##	##	##
	Jobfish	Lutjanidae	#2 800	1 100	#2 300	1 000	##	##
	Mangrove jack	*Lutjanus argentimaculatus*	91 000	18 000	36 000	5 900	#55 000	16 000
	Moses snapper	*Lutjanus russelli*	136 000	21 000	24 000	4 300	112 000	19 000
	Red bass	*Lutjanus bohar*	##	##			##	##
	Red emperor	*Lutjanus sebae*	74 000	17 000	16 000	2 700	#58 000	16 000
	Stripey snapper	*Lutjanus carponotatus*	73 000	14 000	#16 000	4 500	57 000	13 000
	Tropical snapper—unspecified	Lutjanidae and Caesonidae	##	##	##	##	##	##
Tuna	Bonito	*Sarda australis* and *Cybiosarda elegans*	##	##	##	##	##	##
	Longtail tuna	*Thunnus tonggol*	##	##	##	##		
	Mackerel tuna	*Euthynnus affinis*	##	##	##	##	##	##
	Skipjack tuna	*Katsuwonis pelamis*	##	##	##	##		##
	Tuna—unspecified	Scombridae spp (tribes *Sardini* and *Thunnini*)	##	##	##	##	##	##

Group name	Common name	Scientific name	Catch Number	Catch SE	Harvested Number	Harvested SE	Released Number	Released SE
	Yellowfin tuna	*Thunnus albacares*	##	##	##	##	##	##
Whiting	Sand whiting complex	*Sillago ciliata, analis* and *sihama*	1 090 000	124 000	482 000	71 000	608 000	76 000
	Trumpeter whiting	*Sillago maculata*	#679 000	171 000	#510 000	146 000	169 000	40 000
	Whiting—unspecified	Sillaginidae	##	##	##	##	##	##
Worm	Beach worms	Onuphidae—undifferentiated	##	##	##	##	##	##
	Worms—unspecified	Phylum Annelida	##	##	##	##		
Wrasse	Maori wrasse	Labridae-Cheilinus and Oxycheilinus spp.	##	##			##	##
	Pigfish—unspecified	Bodianus spp.	##	##			##	##
	Tuskfish—unspecified	Choerodon spp.	46 000	8 600	23 000	4 700	23 000	5 700
	Wrasse—unspecified	Labridae	##	##	##	##	##	##
Yabby (freshwater)	Red claw	*Cherax quadricarinatus*	#401 000	161 000	#376 000	158 000	##	##
	Yabby—freshwater	Cherax spp.	##	##	##	##	##	##
Yabby (marine)	Marine yabbies or ghost nippers	*Callianassa australiensis*	3 629 000	556 000	3 311 000	500 000	#318 000	148 000
Total			**19 261 000**	**4 355 000**	**11 625 000**	**2 922 000**	**7 636 000**	**1 842 000**

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