Department of **Agriculture, Fisheries and Forestry**
Fisheries Queensland

2010 Statewide Recreational Fishing Survey

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Queensland Government

Content

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List of tables

List of figures

Glossary

Attitudinal/Wash up survey	The final part of the survey where the attitudes and awareness of recreational fishers to a variety of fisheries issues were measured.
Census	A 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.
Comparative group	Used to compare the catch of species or species groups from the National Recreational and Indigenous Fishing Survey with the 2010 Statewide Recreational Fishing Survey.
Crustaceans	A group of invertebrates including lobsters, crayfish, crabs, prawns and yabbies.
CW/NW/SW	Central West/North West/South West.
Diary survey	The 12 months between October 2010 and September 2011 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	A household that indicated during the screening survey 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 which are of interest to fisheries managers.
Fishing household	A household that includes a recreational fisher.
Fisher day	A measure of fishing effort. For example, if three people went fishing in the morning and then again in the afternoon this would represent three fisher days.
FRDC	Fisheries Research and Development Corporation.
Frame	A list of households with a phone number included in the Telstra White Pages from which the sample was selected.
Harvest	The part of the catch that is kept.
Index of abundance	Used in this report to refer to a standardised measure (e.g. catch per unit effort) which can be used to investigate changes in the abundance of fish.
Indigenous fishing	An 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 of the Aboriginal or Torres Strait Islander.
Listed fisher	A 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 from a stock due to predation, death from disease, and removals by fishing.
National Recreational and Indigenous Fishing Survey	The comprehensive survey on recreational and indigenous fishing conducted nationally in 2000–2001. The only survey to date to estimate the total recreational catch by Australians.
Non-fishing household	A household which 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.
Other taxa	All pippis, shellfish and worms collected by fishers.
Participation rate	The number of recreational fishers aged 5 years or more expressed as a percentage of all people aged 5 years or more living in Queensland.
Performance Measurement System	Measures the performance of Queensland's fisheries with respect to sustainable use of fish stocks and fishery related impacts on the broader ecosystem.
Power boats	Boats 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.
Recreational fisher	Someone 5 years old or more who went recreational fishing at least once in a 12 month period.
Recreational fishing	The attempted capture of fish, crustaceans or other taxa for non-commercial purposes.
Relative standard error (RSE)	The standard error of an estimate divided by the estimate and expressed as a percentage.
Reporting groups	Categories used in the report which refer to species or groups of species that were included in the species identification guide given to all households prior to the start of the 2010 Statewide Recreational Fishing Survey.
Representative	A sample that accurately reflects the characteristics of the population as a whole.
Queenslanders	People having their usual place of residence in Queensland.
Response rate	The proportion of households who answered all questions in the survey expressed as a percentage of all households in the sample.
Sample loss	Households randomly selected from the Telstra White Pages which could not be contacted after 15 attempts.
Screening survey	The first part of the survey where approximately 11,000 households were contacted by telephone and their fishing characteristics were examined.
Standard error (SE)	An estimate of how variable sample means are at estimating the true population mean.
Stock status assessment process	The 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	A situation where the fish population does not decline over time because of potential threats, such as fishing practices.
Uptake rate	The number of households that agreed to start the diary survey expressed as a percentage of all households eligible to start the survey.

Executive summary

This report summarises the key results from the 2010 Statewide Recreational Fishing Survey. It includes detailed information on how many Queenslanders fished recreationally, where they fished and what they caught. Information on boat ownership and fishing and diving club membership was also collected. These results will benefit stock assessments, sustainability assessments and the recreational fishing industry, helping to ensure that fisheries in Queensland are managed on an ecologically, economically and socially sustainable basis.

A telephone-diary method was used to estimate the fishing activities of Queenslanders. This technique was used successfully in Queensland in 2000–2001 as part of the National Recreational and Indigenous Fishing Survey (NRIFS) and subsequently elsewhere in Australia. From July–September 2010, approximately 11 000 households across all of Queensland were contacted by telephone interviewers and asked whether they had fished recreationally in the previous 12 months. Households that fished were then invited to take part in a 12 month diary survey which ran from 1 October 2010 to 30 September 2011. Approximately 90% of all fishing households agreed to take part in the diary survey. All fishing information was collected by trained telephone interviewers who made regular calls to fishers and ensured that all information was recorded accurately. Approximately 94% of all households that started the diary survey participated throughout the entire 12 months.

In the 12 months prior to June 2010, an estimated 703 000 Queenslanders went recreational fishing in Queensland, representing 17% of the Queensland population aged five years or more. This makes recreational fishing one of the most popular leisure activities in Queensland with more Queenslanders going recreational fishing than playing golf or cycling.

Over a third of all recreational fishers lived in the Brisbane region but the participation rate among local residents was highest in the Mackay and Wide Bay-Burnett regions, where 28% and 26% of the population were recreational fishers, respectively. Almost 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 45% of fishing households owned a boat and most of these were 4–5 m long power boats. Echo sounders and global positioning systems were less common in smaller boats compared to larger boats.

During the 12 months between October 2010 and September 2011, Queensland residents accounted for approximately 2.6 million fisher days of effort in Queensland. Fishing with a line was the most popular method and around half of all effort was shore based. Residents living in the Brisbane, Moreton and Wide Bay-Burnett regions were responsible for nearly 70% 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 captured approximately 13.3 million individual fish, including a diverse range of teleosts (bony fishes) and elasmobranchs (sharks, skates and rays). The three most commonly caught fish species were yellowfin bream, the sand whiting complex and trumpeter whiting, which collectively formed 30% of all fish caught. Dusky flathead, snapper, pikey bream and tailor were other commonly caught species. In fishing regions adjacent to the Great Barrier Reef, coral trout, redthroat emperor, tropical snapper, and morwong and sweetlip were commonly caught. Large numbers of freshwater fish were caught including golden perch and Australian bass which were the two most commonly caught freshwater species. Recreational fishers caught a further 8.3 million crustaceans, cephalopods and other taxa which included 1.4 million mud crabs, 3 million prawns and 3.5 million other crustaceans such as yabbies.

Nearly half of all fish caught were released back into the water, with high release rates reported for snapper, barramundi, stripey snapper, Australian bass, sharks, and cod and groper. 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, freshwater cod and golden perch.

Participation, effort and catch estimates from this survey can be compared to the NRIFS completed in 2000–2001. While 10 years is a large gap, being able to see any changes in the characteristics of fishers is more useful than seeing an individual snap shot in time. This valuable information allows managers, stakeholders and businesses to adjust and plan for the future.

Despite the rapid growth in the population in Queensland over the last decade, there were fewer fishers in 2010 than in 2000. Similar declines in the participation rate of recreational fishing have recently been reported in South Australia, the Northern Territory and (to a lesser extent) Tasmania. 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, loss of interest and a perception of poor fishing quality.

Compared to 2000, the proportion of fishers aged 45 years or more has increased while the popularity of recreational fishing among the younger population has decreased. In part this may be linked to the gradually ageing population in Queensland. The reasons for the fall in participation among younger people are not well understood; however, management, recreational fishing stakeholder groups and the tackle and boating industry would benefit from future research that aims to understand why fewer young people choose to fish.

Overall, both recreational catch and effort were less between October 2010 and September 2011 in comparison with the May 2000 to April 2001 period. Given the decline in the number of recreational fishers, lower catch and effort in 2010 is not surprising; however, the results demonstrate that people caught fewer fish for similar effort compared to a decade ago. Many factors can influence the size of the recreational catch including variability in recruitment, weather and fishing pressure. Compared to the preceding dry years there was considerable rainfall and flooding between October 2010 and September 2011. Cyclones and floods, although infrequent, have always been a natural part of Queensland's variable climate. These weather events may be the cause of a low year in terms of effort and catch for 2010 compared to 2000.

In total, 43% of the fishers who took part in the 2010 survey felt they fished less than in the previous 12 months. Around a third of these fishers cited weather as the main reason. However, the most common reasons for fishing less in 2010 were work or business commitments and family commitments. Therefore social reasons have also been responsible for the lower fishing effort in 2010. It is possible that the introduction of stricter fishing regulations and green zones could have acted as a deterrent to fishing activity. However, previous research conducted in Queensland identified strong support for conservation of fish and regulations such as size and possession limits among recreational fishers.

The collection of reliable recreational fishing data represents collaboration between fishers and scientists. The exceptionally high participation and completion rates in this survey demonstrate that the vast majority of recreational fishers support these surveys, consider them to be a worthwhile investment of their time, and are committed to playing a role in the sustainable management of fisheries in Queensland. To ensure that future decision making is based on the best possible information on recreational fishing, statewide recreational fishing surveys of this kind are required every two to three years. This will ensure that results are current and match the dynamic and rapidly changing Queensland population.

Introduction

Recreational fishing: benefits and impacts

Recreational fishing provides an important source of enjoyment for a large number of Australians. In 2000–2001 it was estimated that over 3 million Australian residents went recreational fishing (Henry and Lyle, 2003). Recreational fishing is particularly popular in Queensland where a wide range of marine and freshwater fishing opportunities are available.

Fishing also provides an important economic benefit to Queenslanders and helps support the tackle and boating industry. An earlier survey estimated that approximately 730 000 Queenslanders aged five years or more went recreational fishing in Queensland in the 12 months prior to November 2004 (McInnes, 2006). Based on their catch, the gross value of production of recreational fishing in Queensland was estimated at $73 million in 2009–2010 (DEEDI, 2009). In addition, recreational fishing provides an economic stimulus to local businesses ranging from camp sites to bakeries to fuel suppliers which all benefit when recreational fishers visit their local area. The development of freshwater fisheries in stocked impoundments has also brought economic benefits to regional areas of Queensland (Rolfe and Prayaga, 2007).

Fishing for recreation also provides social benefits that cannot be measured in dollars. These include the chance to relax and unwind, share time with family and friends and engage with nature (Sutton, 2009).

Recreational fishing has an impact on fish stocks. While an individual fisher may have only a small impact on the status of fish stocks, collectively the recreational catch is substantial for numerous species, especially coastal species including mud crabs, tailor and snapper. On a global scale, the recreational harvest (kept fish) may represent approximately 12% of the global fish harvest (Cooke and Cowx, 2004). In Australia, recreational fishers were estimated to harvest over 130 million aquatic animals in 2000–2001, including 60 million finfish (Henry and Lyle, 2003). In Queensland, for some species such as tailor, the annual recreational harvest exceeds the commercial harvest (Leigh and O'Neill, 2004; DPIF, 2008).

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, changes in the community structure due to the selective harvest of certain species, and disturbances resulting from physical trampling, boat traffic and noise (Lewin *et al.*, 2006).

Need for recreational fishing information

Fisheries Queensland is responsible for ensuring that fishing in Queensland is sustainable and profitable. Fish stocks can be over exploited and care is needed to ensure that the total harvest from recreational, commercial and charter fisheries does not exceed levels that would cause fish stocks to decline detrimentally. Therefore high quality recreational fishing information is required to properly assess Queensland's fisheries. This information is necessary for thorough stock assessments, management plans and knowledge-based industry development.

Over 4.3 million people live in Queensland (ABS, 2011), many in close proximity to water and fishing opportunities. The most recent estimates of recreational fishing participation and catches are over five years old (McInnes, 2006; 2008). Since 2006, the population in Queensland has risen by 11% (ABS, 2011), new fishing regulations have been introduced in the East Coast Inshore Fin Fish Fishery and the Moreton Bay Marine Park has been rezoned. All of these changes will have affected recreational fishing participation and catches, so there was a clear need to update knowledge about recreational fishing in Queensland.

Aims and objectives

The broad aims of this study were to provide reliable estimates of the following:

- The number of Queenslanders who fish recreationally and the participation rate of recreational fishing among Queenslanders by residential region, age and gender.
- Boat ownership and fishing and diving club membership among recreational fishers.
- Recreational fishing effort by Queenslanders in Queensland (statewide and regional).
- Recreational catch by Queenslanders in Queensland (statewide and regional).
- Recreational fishers' motives for fishing and attitudes to and awareness of various fishing and environmental topics.

The first four aims are reported on in this study. A subsequent report focusing on the social behaviour of recreational fishers will be released later in 2012.

Comparison with previous surveys

The design of this survey is closely modelled on the Queensland component of the 2000–2001 National Recreational and Indigenous Fishing Survey (NRIFS). The NRIFS was the first and only study to examine recreational and indigenous fishing across all of Australia. It achieved this by completing statewide surveys simultaneously in all the Australian states and territories (Henry and Lyle, 2003). Using a consistent survey design is important as it allows robust comparisons to be made through time and between states. For example, the current survey can be compared with the NRIFS survey to reveal changes in recreational fishing activity over the last 10 year period. Furthermore, the same survey design has recently been used in South Australia (Jones, 2009), Tasmania (Lyle *et al.*, 2009a) and the Northern Territory (West *et al.*, 2012). As a result, the estimates in this report can be directly compared with these 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.*, 2009b). This analysis package is specifically designed to analyse recreational fishing survey data collected using methods similar to the NRIFS. This enabled the completion of the detailed statistical analysis presented in this report. The Queensland results from the NRIFS have also been re-analysed using RecSurvey, allowing a direct comparison between recreational fishing in 2000 and 2010.

The statewide telephone-diary surveys conducted by Fisheries Queensland from 1996–2005 (McInnes, 2008) used a different survey design to the current survey. The catch data obtained from these surveys provided indicative catch information for each survey year but could not estimate with confidence the detailed catch and effort statistics such as those presented in this report. The results from the 2010 survey are considered to be more accurate as the design of the survey gives far greater consideration to known sources of bias (Harthill *et al.*, 2012). More information on how this survey differs from previous telephone-diary surveys is provided in the Diary survey section of this report.

Relevance to assessment of fish stocks and sustainability assessments

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, trends through time in an index of abundance, 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 an index of abundance for numerous recreationally-caught species. Information on the size and age of fish harvested by recreational fishers is collected as part of other Fisheries Queensland recreational species monitoring activities.

Information on recreational fishing helps Fisheries Queensland to assess the sustainability and impact of fishing activities on fish stocks. A Stock Status Assessment Framework collates the best available catch information on key species (DEEDI, 2011).

Recreational fishing information is also used in Performance Measurement Systems, which measure the performance of Queensland's fisheries management practices with respect to maintaining fish stocks at sustainable levels (DPIF, 2006).

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 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 (ABARES, 2011). 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 thousands of local business owners who benefit from recreational fishers.

Report structure

The structure of this report is similar to that used in recreational fishing surveys conducted in the Northern Territory (West *et al*., 2012), South Australia (Jones, 2009) and Tasmania (Lyle *et a*l., 2009a). This similarity enables the reader to easily compare results between Queensland, the Northern Territory and South Australia.

Due to the large amount of data collected as part of this survey, it is impractical to present all of the results. This report summarises the key findings of the survey, most of which are displayed in tables or graphs. A list of all the data fields collected is included in Appendix 3 and more detailed information can be obtained from Fisheries Queensland upon request. Development of a web-based information system is also underway which will make this detailed information available to the public.

Materials and methods

Statewide recreational fishing survey

Survey overview

A telephone-diary method was used, involving a multi-phase survey design. Refer to Henry and Lyle (2003), Jones *et al.* (2009a) and Lyle *et al.* (2009a) for a detailed explanation of the design and Figure 1 for a diagram showing the stages of the survey.

The Telstra White Pages have previously been used in Queensland as a frame for recreational fishing surveys (Tobin *et al.*, 2010; McInnes, 2008). 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 (Harthill *et al.*, 2012).

The primary sampling unit (PSU) for the survey was private dwelling households (Australian Bureau of Statistics definition) in Queensland, with recreational fishers within the household representing the secondary unit. A sample of households was taken from the latest Telstra White Pages listings across all areas of Queensland. Information taken from this sample was used to estimate the fishing activity of the Queensland population aged five years or more. Refer to Appendix 1 and 2 for more information on how estimates from the sample were converted to total estimates for the Queensland population aged five years or more.

The design consisted of four main stages:

1. An initial screening survey to gather fishing and boating information from a sample of the Queensland population.
2. A 12-month diary survey where all recreational fishing activities were recorded from a sample of recreational fishers
3. An attitudinal/wash up survey where 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 (Henry and Lyle, 2003). 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.

Figure 1: Various stages of the 2010 Statewide Recreational Fishing Survey
Source: Adapted from West *et al.,* 2012.

Survey stages

Screening survey

The screening survey ran from 15 June to 30 September 2010. The aims of the screening survey were to estimate the number of Queenslanders who fished recreationally in the previous 12 months, the participation rate of recreational fishing among Queenslanders, and information relating to 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 the 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, for example the maximum water depth they fished in.

All households were contacted by phone and given a final overview of how the survey would work and what they specifically had to report. During this last discussion before the diary survey started, respondents were 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 October 2010 to the 30 September 2011. During this time, all recreational fishing activities were recorded by the telephone interviewers who, in most cases, contacted the fishers within a few days of the fishing trip. Very little burden was placed on the fishers. This approach differed to previous recreational fishing surveys conducted by Fisheries Queensland (McInnes, 2008) where it was the fishers' responsibility to write down specific details of their fishing trips and send the information to Fisheries Queensland. 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 respondent. Whenever possible, attempts were made to contact respondents 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.

Attitudinal/wash-up survey

In October and November 2011, the main fisher from every household who completed the diary survey was given an attitudinal interview. A wide range of information, including the fishers' attitudes and awareness towards fisheries and environmental issues was recorded. The results from the attitudinal/wash-up survey will be presented in a subsequent report.

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. 'drop in' to the fishery) from 1 October 2010 to the 30 September 2011 by these households. The non-intending fisher households follow-up survey was performed during October and November 2011 by recontacting a random sample of these households and completing a brief interview 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.

Survey scope

Only Queensland residents could participate in the survey, i.e. those with a usual place of residence in Queensland. Three age criteria applied to various stages of the survey, including:

1. All ages for population/benchmarking purposes.
2. Those aged five years or more for assessment of recreational fishing activity during the diary survey.
3. Those aged 15 years or more for the awareness/attitudinal questions asked in the wash up survey.

Fishing activities from interstate and overseas fishers were not recorded as the Telstra White Pages only contained contact information for occupants of private dwelling households in Queensland. As such, the estimates in this report will underestimate the total number of people fishing recreationally in Queensland and the total recreational catch in Queensland.

Geographical scope

The sample of households was taken from nine residential regions across Queensland. These regions mostly conformed to Australian Bureau of Statistics Census boundaries (e.g. Statistical Divisions, Statistical Subdivisions and Local Government Authorities). Throughout this report these regions are referred to as 'residential regions'. The nine residential regions (Figure 2) were:

- Brisbane
- Moreton
- Wide Bay-Burnett
- Darling Downs
- Central West/ North West/ South West
- Fitzroy
- Mackay
- Northern
- Far Northern.

The survey reported on all fishing activity in Queensland, including the various offshore islands (e.g. in Torres Strait) and extending seaward to the offshore boundary of the exclusive economic zone. All recreational fishing activities in the survey were reported to one of 19 regions which are referred to as 'fishing regions' throughout the report.

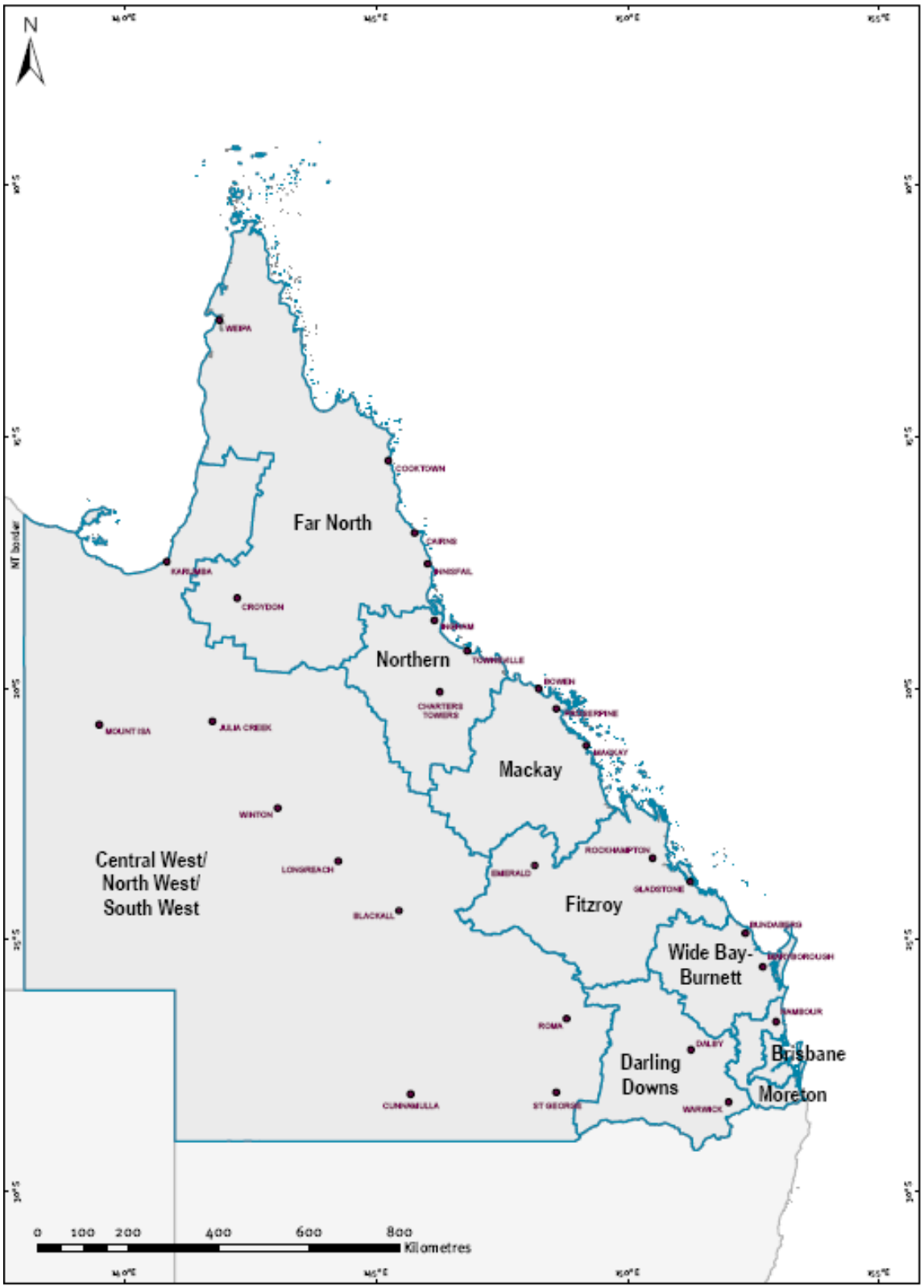


Figure 2: Nine residential regions of Queensland used in this survey

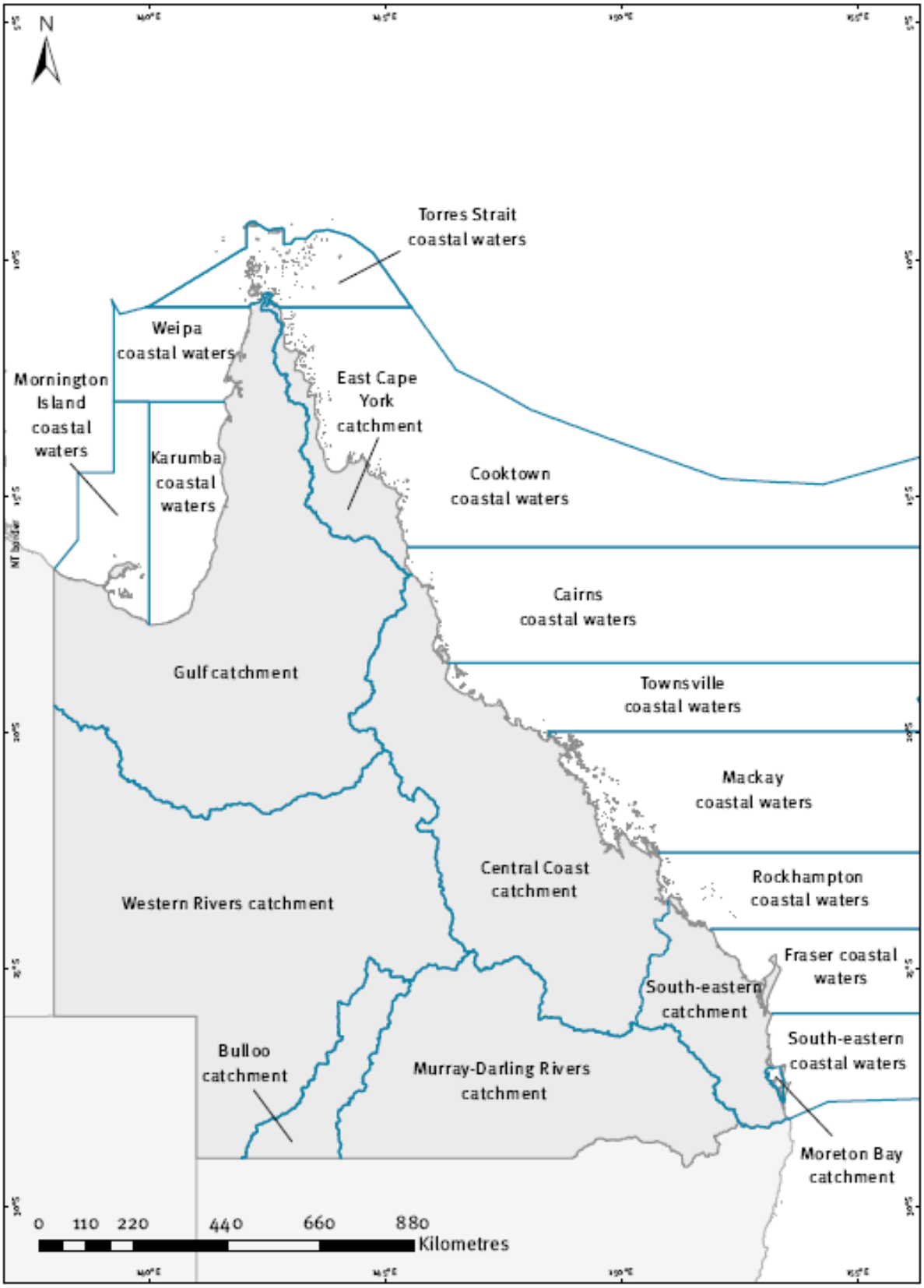


Figure 3: The 19 fishing regions of Queensland used in this survey

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—the kept component of the catch.
3. Released—those animals released back into the water.

All catch information, including small animals such as prawns, bait fish and worms, is presented as the number of fish 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. 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. 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 Appendix 3).

Reporting the catch

For the purposes of reporting and analysis, many of the species caught were grouped into ‘reporting groups’ based on the species identification guide given to all diarists prior to the start of the diary survey. The telephone interviewers ensured that fishers consulted the identification guide when reporting their catch. This ensured that whenever possible, all fishers provided their catch information for these reporting groups. On many occasions, fishers provided more detailed information on the species composition of the catch, which was recorded by the interviewers and is shown in Appendix 6.

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 for a variety of fish species caught at many locations in Queensland. 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. The only raw data presented relate to the listed versus non-listed fishers avidity survey and for the sample and response profiles (Table 2 and Table 3).

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. Throughout the report, sampling error is presented as the standard error (SE) for each estimate. 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 to the estimate, the more precise or better that estimate is, thereby providing greater confidence in that estimate. The SE is presented alongside each survey estimate in the tables and graphs.

The relative standard error (RSE) is also indicated in each of the tables that display survey estimates. The RSE is simply the SE divided by the estimate and is expressed as a percentage. 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. Throughout this report, we have used the same RSE categories as the Australian Bureau of Statistics. These are:

- An RSE less than 25% indicates that the survey estimate is good.
- An RSE between 25–50% indicates that the survey estimate should be interpreted with caution (annotated with a hash symbol (#) throughout this report).
- An RSE of greater than 50% indicates that the estimate is considered too unreliable for general use (annotated with two hash symbols (##)).

All survey estimates with an RSE of 50% or less are shown in this report. Estimates are not shown on those occasions where the RSE is 50% or more. Where a zero estimate 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 detected in the survey.

Comparison with the NRIFS 2000–2001

In the results section, participation, effort and catch data from this survey are presented together with estimates from the NRIFS data collected in 2000–2001 (refer to the section—Comparing 2000 with 2010). To make these two data sets directly comparable, the NRIFS data were restricted to only those fishing events that occurred in Queensland by people who live in Queensland—the same situation as the 2010 data. The NRIFS data set was thoroughly checked and analysed using the RecSurvey package.

The NRIFS estimates presented may differ to those presented in the original NRIFS report (Henry and Lyle, 2003) due to the removal of interstate fisher activity and the use of the more advanced RecSurvey package analytical tools.

Stakeholder consultation

Prior to the start of the survey, recreational fishing stakeholder groups were emailed a fact sheet explaining how the survey would work and were invited to provide comments on the survey. Groups contacted included:

- Sunfish Queensland
- RecFish Australia
- Ecofishers
- Queensland Amateur Fishing Club Association

- Queensland Game Fishing Association
- Australian National Sportsfishing Association (ANSA)
- Freshwater Fish Stocking Association of Queensland
- CapReef.

Researchers at James Cook University, the Great Barrier Reef Marine Park Authority, the University of Queensland and the Commonwealth Scientific and Industrial Research Organisation were also contacted. Presentations and preliminary results were provided to Sunfish Queensland, ANSA, James Cook University, and the Great Barrier Reef Marine Park Authority, and at the 2012 National Recreational Fishing Conference. Updates on the progress of the survey were also posted on the survey webpage.

Testing the representativeness of the sample

Due to the large number of recreational fishers in Queensland it was not feasible to record the fishing behaviour of every Queenslander. Instead the recreational fishing activity of Queenslanders was estimated from a representative sample of the Queensland population. Many well-respected surveys produce estimates based on a sample and not a census of the population. For example, the Australian Bureau of Statistics Employment Survey (ABS, 2012) provides estimates of employed and unemployed persons based on a sample of Australian households and not a census of all Australians.

The survey outlined above used the Telstra White Pages as a frame from which to select a sample of the Queensland population. In recognition that not every household in Queensland has a phone number listed in the Telstra White Pages, fishers were interviewed at marine boat ramps in Queensland as part of ongoing recreational fishing monitoring activities conducted by Fisheries Queensland.

The following questions were added to an established sampling protocol and were asked from one randomly selected fisher within each fishing party interviewed:

- Are you a Queensland resident?
- Do you have a home phone or mobile listed in the White Pages?
- In the last 12 months, how many days did you go recreational fishing, prawning or crabbing? (A measure of avidity, which can be used to compare fishing behaviour).

The primary aims of this on-site validation survey were to:

1. Determine if Queensland fishers with a listed phone fished differently to all Queensland fishers.
2. To establish the proportion of fishers who do not have a listed phone.

Fishers were asked to report their avidity as one of five categories (less than 10 days, 10–19 days, 20–29 days, 30–39 days, 40 days or more). This question allowed the avidity profile of Queenslanders with a listed phone to be compared to the avidity profile of all Queenslanders interviewed, thereby determining if the two groups were likely to fish differently.

An examination of the raw data and an ordinal regression analysis were used to test whether fishers with listed phone numbers were likely to fish differently to all fishers.

Results

Sample and response profiles

Screening survey

A total of 11 176 households were phoned during the screening survey. Contact was made with 84% of these households which represented the net sample for the survey. The response rates were high in all residential regions, ranging from 79% in the Far North to 86% in Wide Bay-Burnett (Table 1).

Table 1: 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	764 523	2 941	549	2 392	477	1 915	80
Moreton	373 954	1 989	438	1 551	317	1 234	80
Wide Bay-Burnett	114 906	880	101	779	111	668	86
Darling Downs	89 934	976	125	851	130	721	85
CW/NW/SW	25 970	800	118	682	118	564	83
Fitzroy	81 088	920	107	813	132	681	84
Mackay	63 356	661	77	584	113	471	81
Northern	84 529	1 055	128	927	155	772	83
Far North	102 697	954	130	824	173	651	79
Total	1 700 957	11 176	1 773	9 403	1 726	7 677	82

Diary survey

A total of 1790 households, comprising 5119 people started the diary survey. Very few eligible households refused to start the survey and the uptake rate ranged from 86% in the Far North to 94% in the Darling Downs (Table 2). The percentage of households that completed the 12-month diary survey was very high, ranging from 89% in the CW/NW/SW to 97% in the Moreton region.

[1] Refer to Figure 2 to see the location of these residential regions

[2] Number of households modelled from ABS Estimated Residents Population data at time of screening

Table 2: Response rates of households by residential region

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	1915	431	390	370	90	95
Moreton	1234	291	257	249	88	97
Wide Bay-Burnett	668	224	202	189	90	94
Darling Downs	721	141	132	125	94	95
CW/NW/SW	564	169	153	136	91	89
Fitzroy	681	190	172	162	91	94
Mackay	471	166	154	147	93	95
Northern	772	196	170	163	87	96
Far North	651	186	160	147	86	92
Total	7677	1994	1790	1688	90	94

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 99% of the households eligible to take part in the survey agreed to answer all of the questions in the wash up survey.

A total of 1324 households were contacted in the non-intending fisher follow up survey. Approximately 91% of these households completed this survey.

Demographics of fishers

Number of fisher households

In 2010, an estimated 350 000 (SE=87 000) households or 21% of all households in Queensland, contained one or more recreational fishers.

Number of fishers

An estimated 703 000 (SE=19 800) Queenslanders or 17% of the Queensland population aged five years or more went recreational fishing in Queensland in the 12 months prior to June 2010.

Number of fishers by residential regions

Over a third of all recreational fishers in Queensland lived in Brisbane, where an estimated 260 000 residents went recreational fishing (Table 3 and Figure 4). The Moreton region contained approximately 145 000 fishers while all remaining residential regions contained less than 100 000 fishers.

The participation rate of recreational fishing among local residents was highest in the Mackay and Wide Bay-Burnett residential regions where 28% and 26% of the population were recreational fishers, respectively (Figure 4). The participation rate was lowest in the Darling Downs where 12% of local residents were recreational fishers. In comparison to the rest of the state, the participation rate in the Brisbane residential regions was low, where only 14% of residents were recreational fishers.

[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.

Table 3: Estimated number of recreational fishers in 2010 by region

Residential region	Number of recreational fishers[4]	SE
Brisbane	259 831	14 856
Moreton	145 663	9 397
Wide Bay/Burnett	70 423	4 855
Darling Downs	26 912	2 898
CW/NW/SW	15 130	1 256
Fitzroy	42 208	3 378
Mackay	45 322	3 478
Northern	41 277	3 108
Far North	56 253	4 045
Total	703 019	19 801

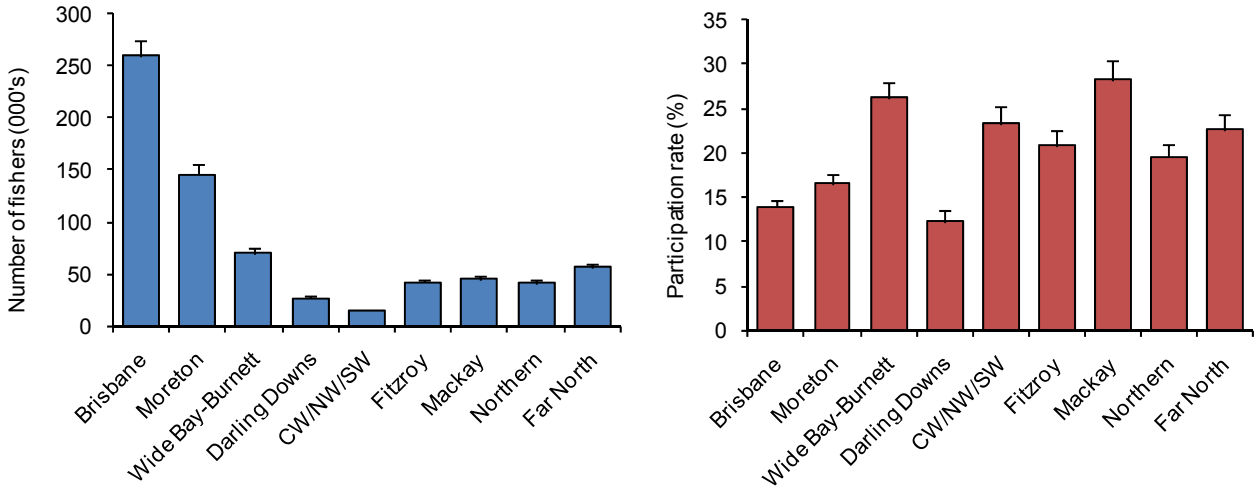


Figure 4: Number (SE) of recreational fishers and participation rate (SE) by residential region

Number of fishers by gender and age

Recreational fishing was more popular with males than females, as there were approximately twice as many male fishers than female fishers. In 2010, approximately 473 000 (SE=13 000) males went recreational fishing, representing 23% of the male resident population. Approximately 230 000 (SE=9300) females went recreational fishing, representing only 11% of the female resident population.

The greatest numbers of recreational fishers were between 30–44 years of age which comprised 27% of all recreational fishers. The least number of recreational fishers were in the 60 or more years of age group which comprised 11% of recreational fishers (Figure 5).

The participation rate of recreational fishing was highest in the 5–14 years of age group (23%) and lowest in the 60 or more years of age group (10%). Refer to Appendix 4 for the number of fishers by gender and age.

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

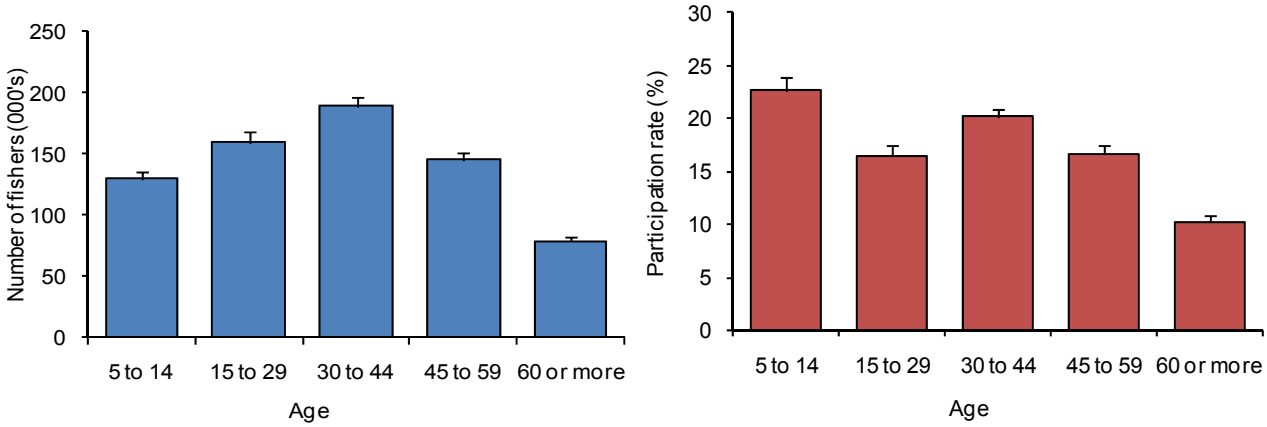


Figure 5: Number of recreational fishers (SE) and participation rate (SE) by age group

Fishing and diving club membership

The majority of recreational fishers in Queensland were not affiliated with a recreational fishing or diving club. Approximately 21 000 (SE=3000) or 3% of all recreational fishers in Queensland, were members of a fishing or diving club. The majority of club members lived in the Brisbane and Moreton residential regions (Figure 6).

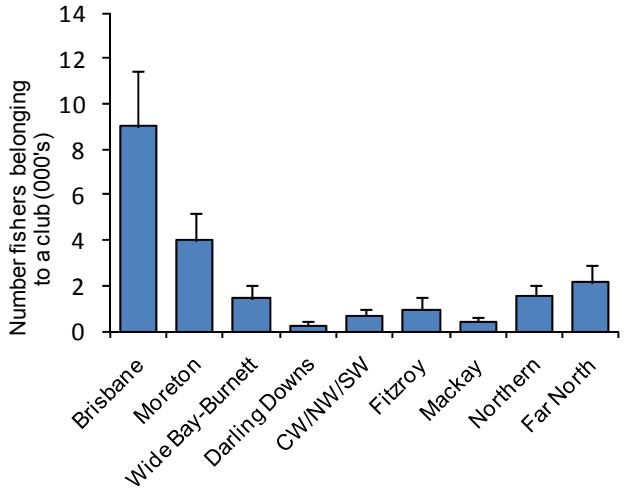


Figure 6: Recreational fishers (SE) belonging to a recreational fishing or diving club

Household boat ownership

Approximately 226 000 (SE=7000) households in Queensland owned a boat as of June 2010, representing 13% of all households. Over half of these households were in the Brisbane and Moreton residential regions (Figure 7). Boat ownership differed considerably between fishing and non-fishing households. Approximately 45% of fishing households owned a boat compared to only 5% of non-fishing households.

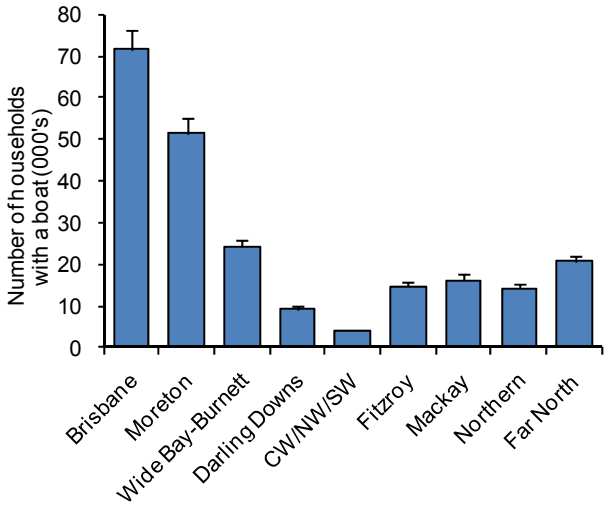


Figure 7: Boat owning households (SE) by residential region

Of the 226 000 boat owning households approximately 145 000 (SE=7000) of them included fishers who fished during the survey. The Brisbane and Moreton residential regions had the lowest percentage of fishing households that owned a boat. Outside these regions boat ownership among fishing households was always greater than 40% with the highest being approximately 60% in the Mackay residential regions (Figure 8). In all regions few households owned two or more boats (Figure 8).

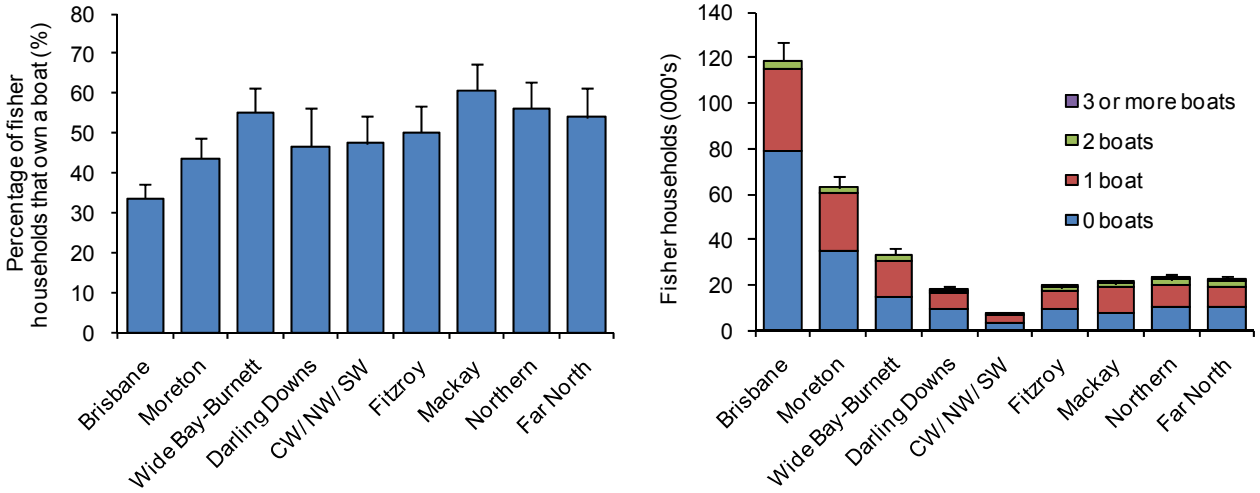


Figure 8: Percentage (SE) of fishing households with a boat and household boat ownership (SE) by residential region

Although the Brisbane and Moreton residential regions had the lowest proportion of boat ownership among fishing households the large population of these regions meant that those regions owned the most boats (Figure 9). The most common length class of boat owned by fishing households across Queensland was 4 m to <5 m with there being almost as many boats less than 4 m as there were boats 5 m to <6 m (Figure 9).

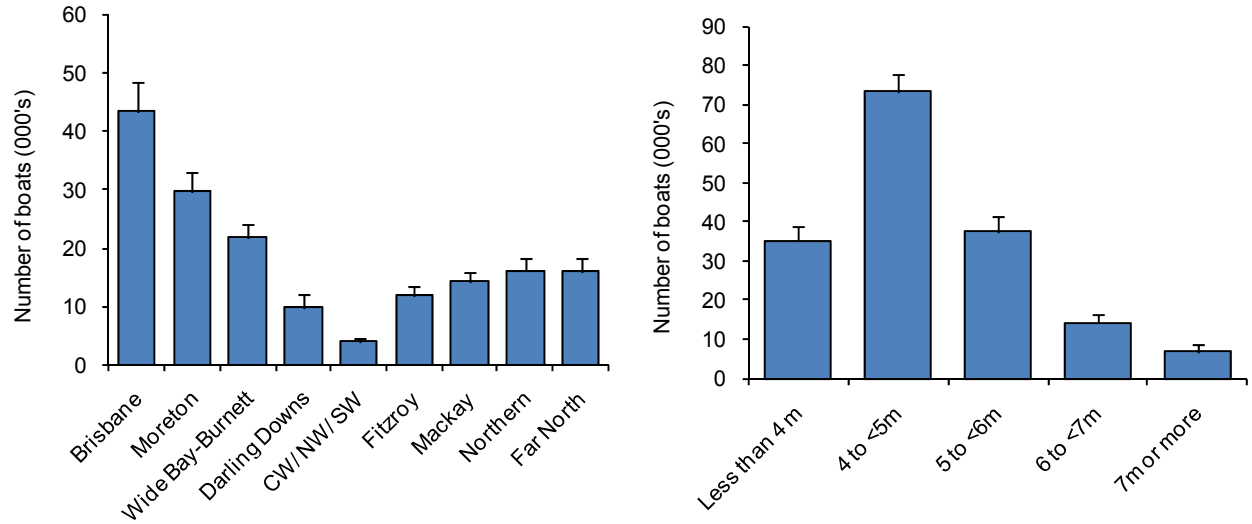


Figure 9: Number of boats (SE) owned by fishing households by residential region and size

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 140 000 (SE=7000) boats (85%) were used for fishing; however, the percentage used for fishing varied by the size of the boat and by residential region. Boats larger than five metres were used for fishing more than 90% of the time (Figure 10). Fishing households that owned a boat in the Wide Bay-Burnett and Northern residential regions used their boats for fishing more than boat owning households in other regions (Figure 10).

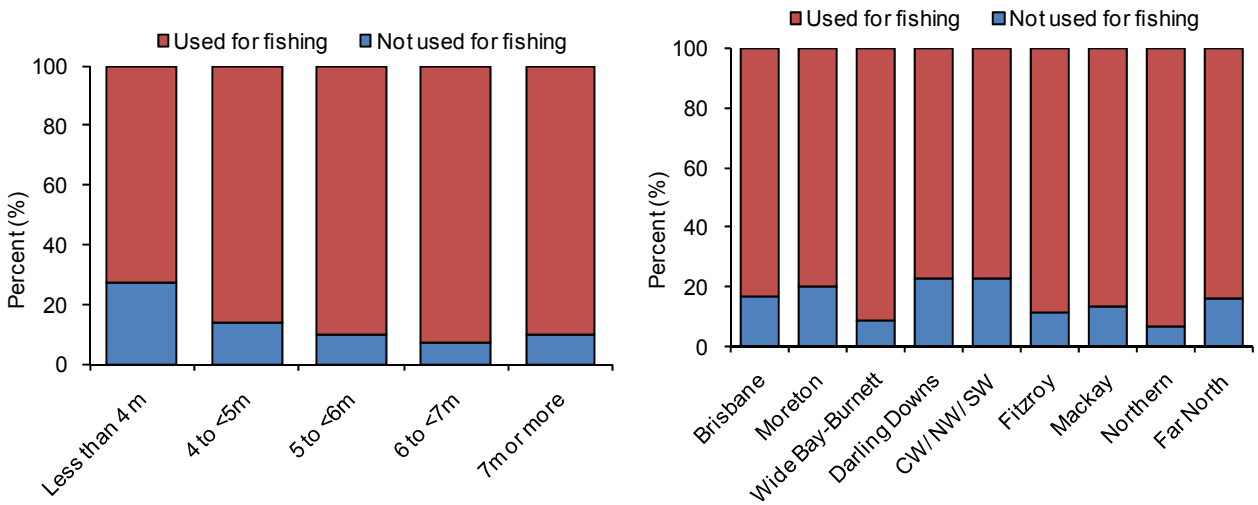


Figure 10: Boat usage by size and residential region

Most of the watercrafts used for fishing were powered by outboard or inboard motors (power boats). Power boats made up approximately 95% of the fishing boats. Paddle boats, including kayaks, made up approximately 4.5%, followed by jet skis (0.3%) and sail boats (0.1%). The residential regional analysis of the number of fishing households owning and using power boats to fish followed the same pattern as fishing household boat ownership (Figure 11). The regional analysis for jet skis, paddle boats and sail boats showed that jet skis were only recorded as being used in the Brisbane and Northern residential regions. Paddle boats were mainly used in the Brisbane and Moreton residential regions but also in the Darling Downs, Central West/ North West/ South West, and Northern residential regions. The standard errors around the paddle boat estimates for the Brisbane and Moreton residential regions were large. Sail boats were only recorded as used in the Mackay residential regions (Figure 11).

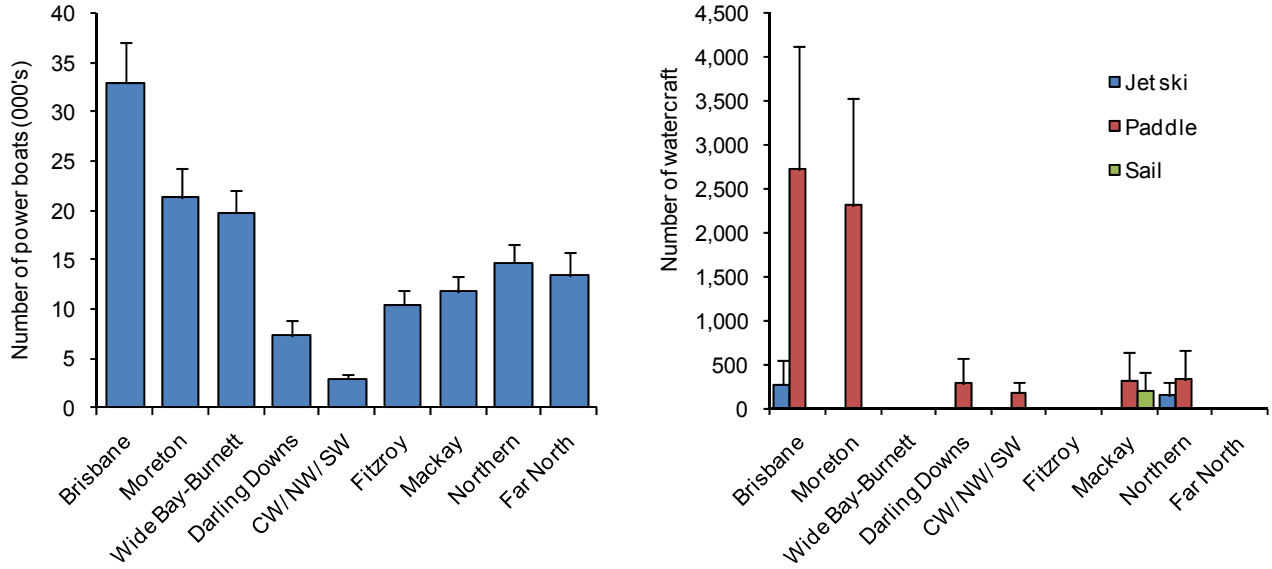


Figure 11: Number of power boats (SE) and watercrafts (SE) used by fishing households

Most of the boats that were used for fishing were used exclusively for fishing, however as the size of boats increased above five metres their relative use for other purposes also increased (Figure 12).

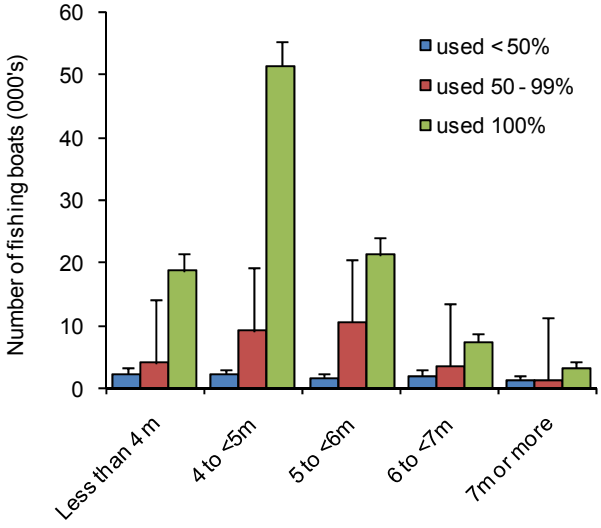


Figure 12: Number (SE) and percent usage of fishing boats by size

Trailer boats were the most popular fishing boat with approximately 127 000 used for fishing. Car-toppers were the next most popular (Figure 13) with approximately 6500 car toppers used for fishing. An estimated 3500 boats were stored on shore, 1500 on moorings and 3000 in public or private marinas.

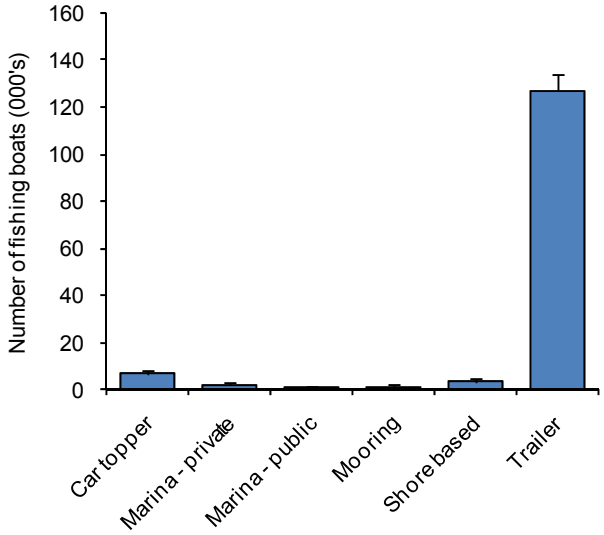


Figure 13: Number of fishing boats (SE) by type or storage method

Approximately 100 000 (SE=6000) fishing boats, the bulk of which were trailer boats, were always launched from public boat ramps. However, approximately 11 000 (SE=2000) were always launched from a public area that was not considered a boat ramp. Only approximately 10 000 were said to have been launched from private property during the survey (Figure 14).

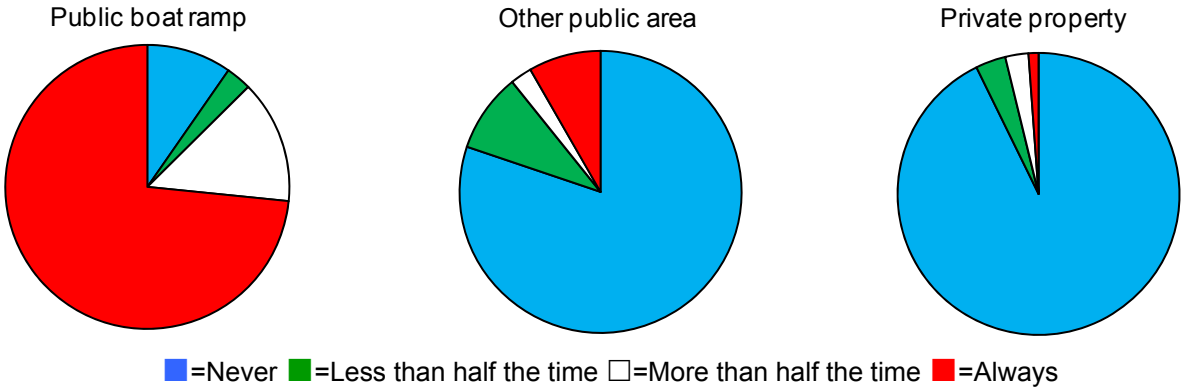


Figure 14: Proportion and frequency of launch of trailer boats at public boat ramps, other public area and private property

Car toppers were commonly launched at public boat ramps and other public areas but rarely from private property (Figure 15). Shore based boats were rarely launched from public boat ramps and were mainly launched from other public areas or private property (Figure 16).

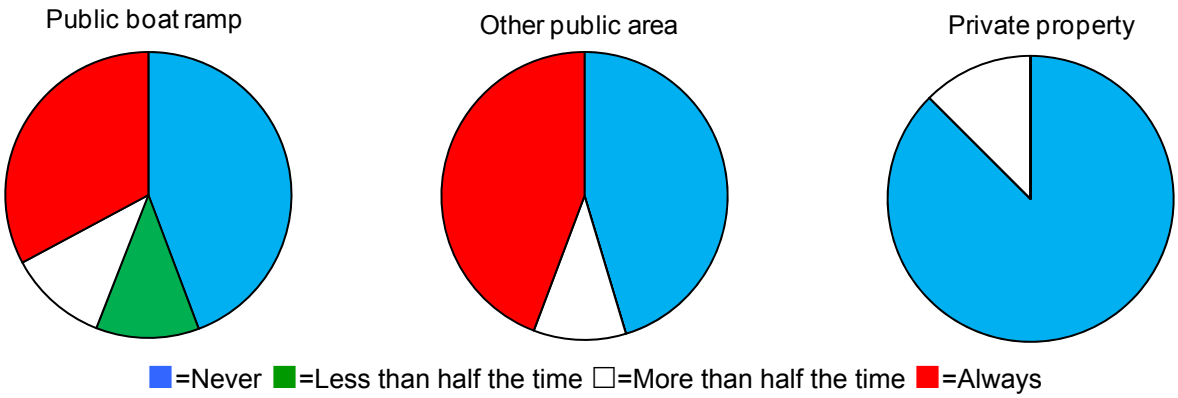


Figure 15: Proportion and frequency of launch of car toppers at public boat ramps, other public area and private property

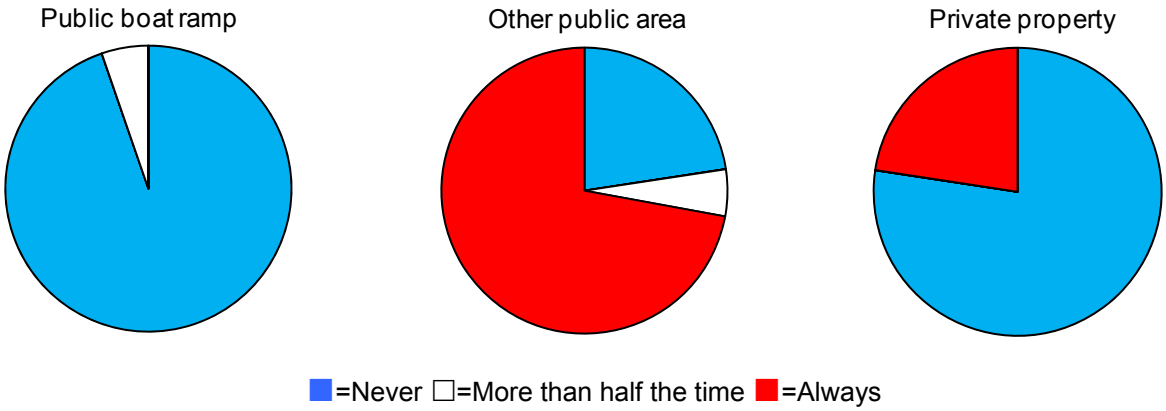


Figure 16: Proportion and frequency of launch of shore based boats at public boat ramps, other public area and private property

The use of echo sounders and global positioning systems (GPS) varied by boat size (Figure 17). These devices were less common on smaller boats compared to larger boats.

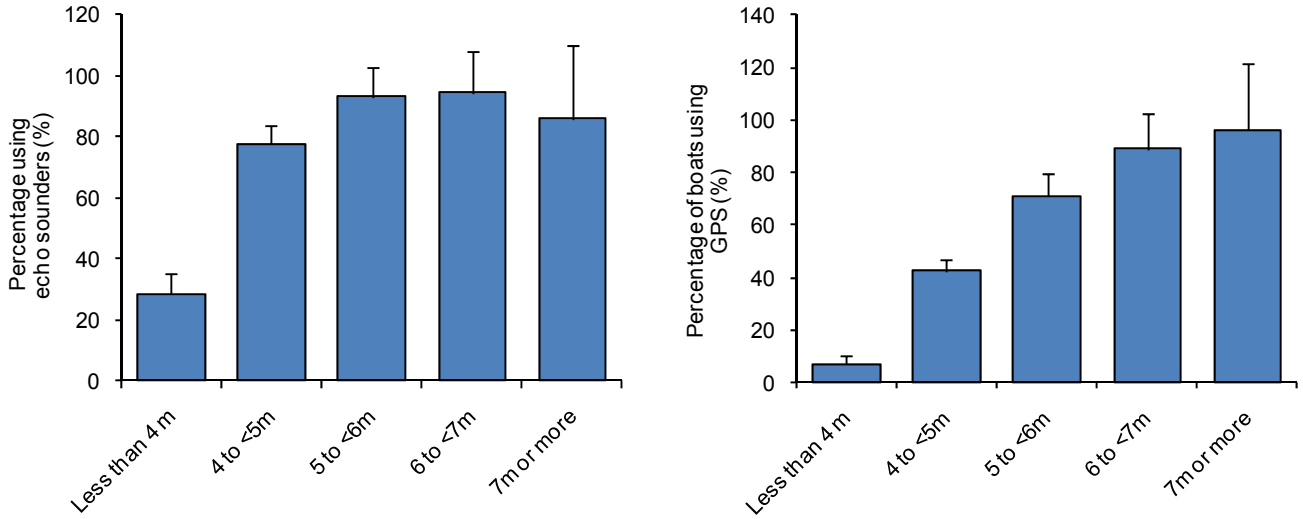
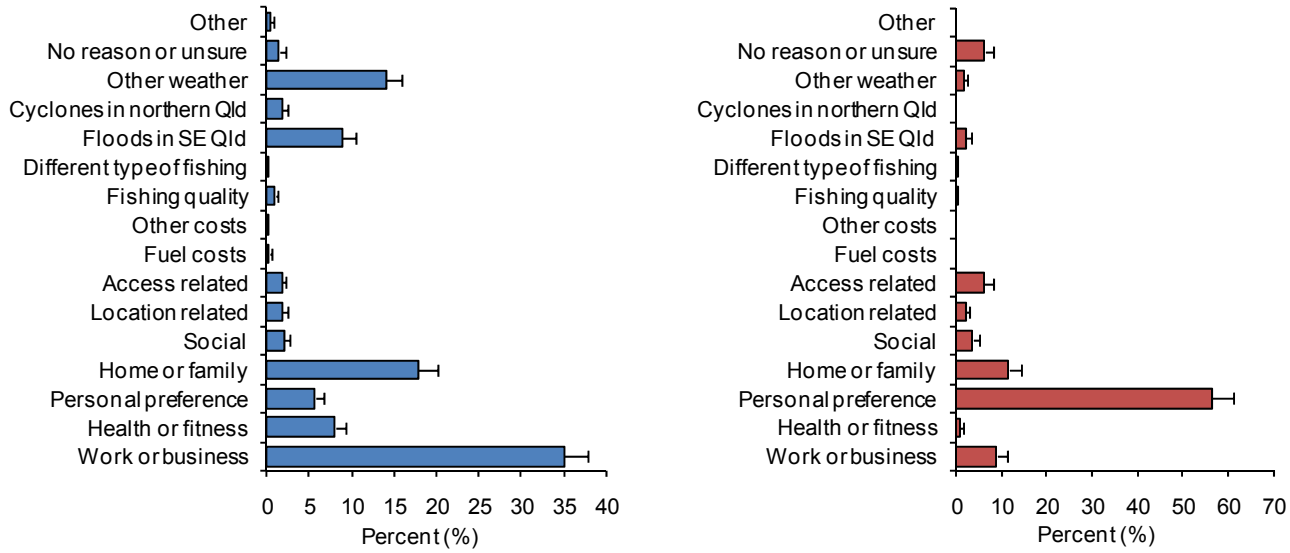


Figure 17: Percentage (SE) of fishing boats using echo sounders and GPS, by size class

Inter-annual fishing frequency

Approximately 43% of fishers said that they fished less during the survey than in the 12 months prior to the survey, but 31% said they fished more often during the survey. Approximately 26% 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 the weather other than cyclones in northern Queensland or flooding in south-eastern Queensland (Figure 18A). The most popular reasons to explain an increase in fishing effort was a change in personal preference followed by home or family reasons then work or business commitments (Figure 18B).



A B

Figure 18: Percentage (SE) of reasons for reductions (A) and increases (B) in fishing effort

Some diarists thought that they would go fishing during the survey period, but actually never went. Approximately 43% of this group cited work or business commitments as the reason preventing them from fishing. Home and family (13%), health and fitness (12%), and personal preference (9%) were the next most common reasons (Figure 19).

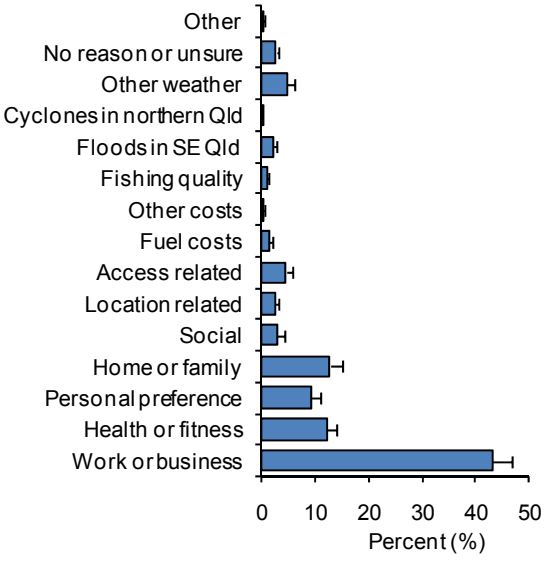


Figure 19: Percentage (SE) of reasons for not fishing by diarists who intended to fish

Recreational fishing effort

During the 12 months between October 2010 and September 2011, Queensland residents fished for approximately 2.6 million fisher days (SE=144 000) in Queensland.

Average number of days fished

Of those people who fished during the 12 month diary survey, the average number of days fished was four days. In all residential regions, people who fished for 11 or more days represented a minor percentage of all fishers. The percentage of fishers who went fishing 11 or more days was highest in the Wide Bay-Burnett residential region at 11% (Figure 20).

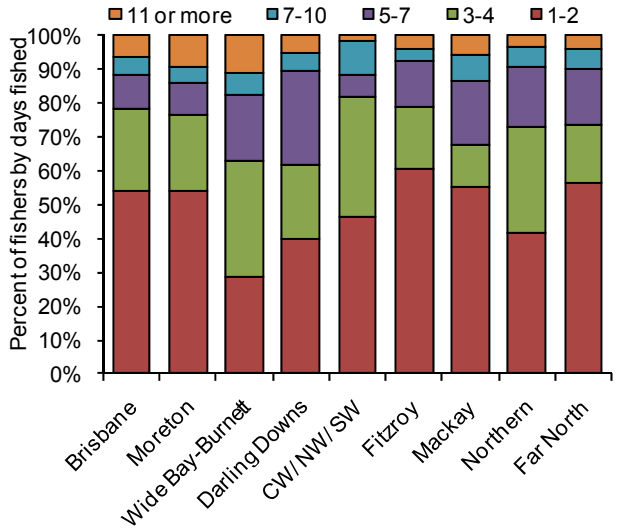


Figure 20: Percentage of fishers by days fished and residential region

Effort by water body

The majority of fishing effort occurred in estuaries (45%) and the ocean (41%) (Figure 21). The remaining 14% of fishing effort occurred in freshwater, of which fishing in public lakes or dams was the most popular.

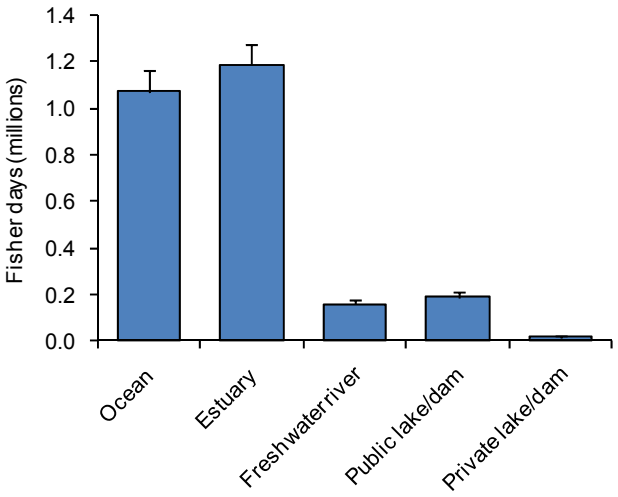


Figure 21: Recreational fisher effort (SE) by water body type

Effort by fishing method

Approximately 2.4 million fisher days or 80% of all fishing effort was spent line fishing (including the use of hooks and lures), making it by far the most common method of fishing (Figure 22). Fishing with pots was the next most popular method, representing 0.3 million fisher days or 13% of fishing effort. Fishing with cast nets, other (hand collection, pumps and spades) and diving (using spears and hand collection) together comprised only 7% of all fishing effort.

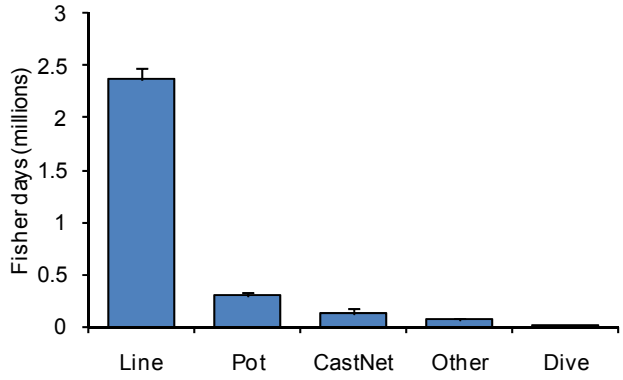


Figure 22: Recreational fisher effort (SE) by fishing method

Effort by fishing platform

Around half of all fisher days were spent fishing from the shore; however, the importance of shore based and boat based fishing varied across the state by fishing region (Figure 23). Shore based fishing dominated in the Bulloo catchment, while in the Moreton Bay catchment shore based and boat based fishing were equally as popular. In the north, boat based fishing tended to be more popular and in the Karumba coastal waters fishing region, 98% of all fishing was from boats.

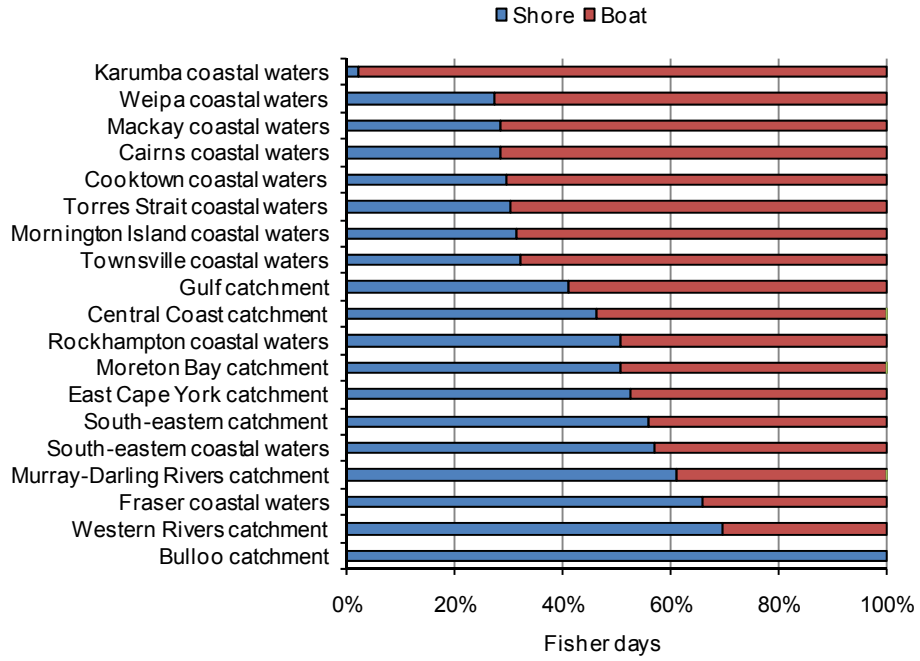


Figure 23: Percentage of fisher effort from the shore or a boat by fishing region

Effort by residential region

The majority of fishing effort by Queenslanders was from residents living in the south-eastern corner of the state. Collectively, fishers living in the Brisbane, Moreton and Wide Bay-Burnett and residential regions were responsible for nearly 70% of the 2.6 million fisher days in Queensland. Residents living adjacent to the Great Barrier Reef (Fitzroy, Mackay, Northern, Far North) fished for approximately 0.6 million fisher days while fishing effort was lowest by residents living in the CW/NW/SW region (Table 4).

Table 4: Fishing effort (SE) within residential regions

Residential region	Number of fisher days[5]	SE
Brisbane	927 177	114 910
Moreton	507 582	61 670
Wide Bay-Burnett	328 007	34 877
Darling Downs	162 285	28 924
CW/NW/SW	48 599	6 744
Fitzroy	132 756	16 123
Mackay	164 794	19 906
Northern	188 807	22 279
Far North	150 188	19 040

Effort by fishing region

Most fishing activities occurred in the south-eastern corner of the state. Nearly 1.5 million fisher days occurred in the south-eastern catchment, south-eastern coastal waters and Moreton Bay catchment fishing regions (Table 5). Fishing in freshwater only regions was also popular. For example, approximately 90 000 fisher days occurred in the Murray-Darling Rivers catchment. Of those areas in close proximity to the Great Barrier Reef, fishing effort was largest in the Mackay coastal waters fishing region where effort was approximately 100 000 fisher days a year. Reliable estimates of the fishing effort within the Cooktown, Weipa and Mornington Island coastal waters fishing regions could not be obtained in this survey.

[5] All relative standard errors for estimates of the number of fishers in this table are less than 15% indicating good estimates.

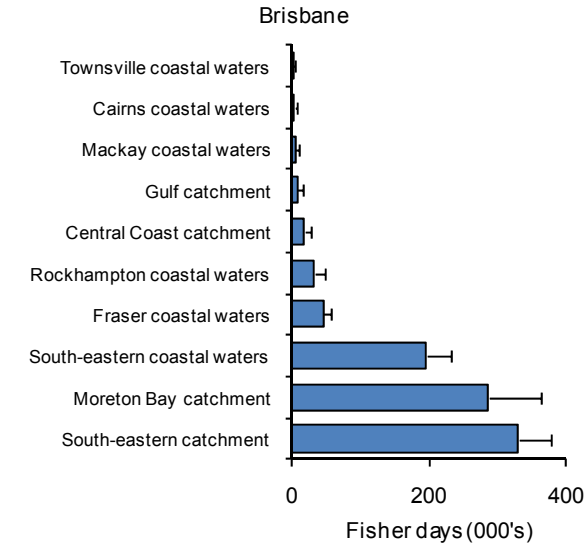
Table 5: Fishing effort (SE) within fishing regions

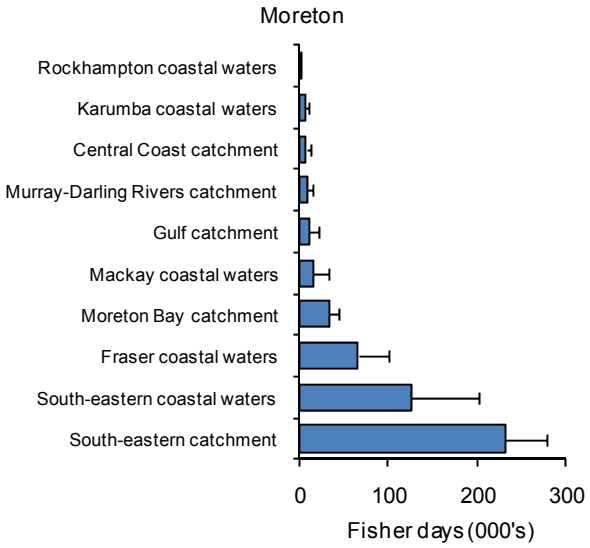
Fishing Region	Number of fisher days	SE
South-eastern catchment	773 676	66 996
South-eastern coastal waters	354 861	39 610
Moreton Bay catchment	337 111	77 634
Fraser coastal waters	292 846	31 098
Central Coast catchment	287 957	25 256
Mackay coastal waters	104 729	14 309
Rockhampton coastal waters	102 788	19 373
Cairns coastal waters	95 246	13 612
Murray-Darling Rivers catchment	91 855	16 769
Townsville coastal waters	69 472	10 588
Gulf catchment	62 474	15 277
Karumba coastal waters	#11 606	5 042
Western Rivers catchment	11 178	2 652
East Cape York catchment	#10 307	3 267
Cooktown coastal waters	##	##
Weipa coastal waters	##	##
Torres Strait coastal waters	#5 776	2 515
Mornington Island coastal waters	##	##
Bulloo catchment	#1 013	479

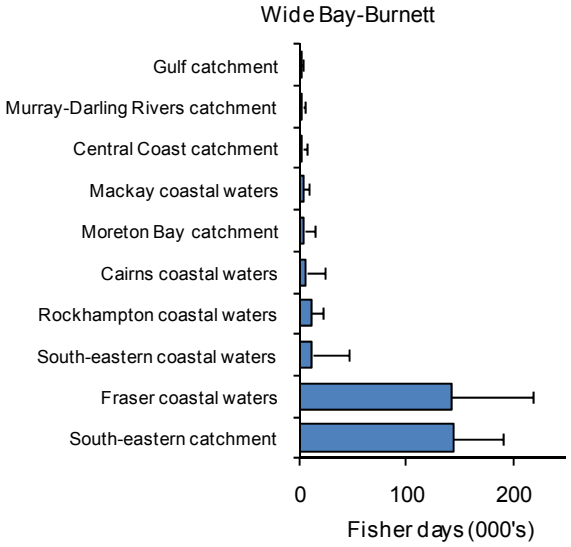
Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25 and 50% and the estimate should be used cautiously; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

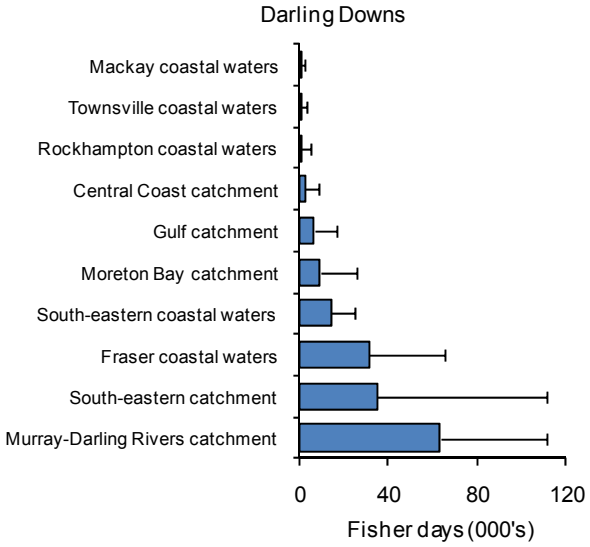
Effort by residential region and fishing region

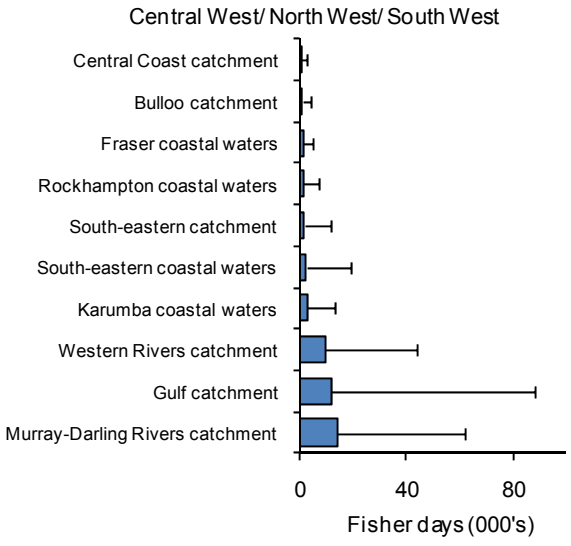
The majority of anglers fished in their local region (Figure 24); however, some fishers did travel away from their local area to fish. For example, some residents of the Brisbane and residential region fished in Fraser coastal waters fishing region while some residents of the Darling Downs residential region fished in the rivers of the Gulf catchment fishing region.

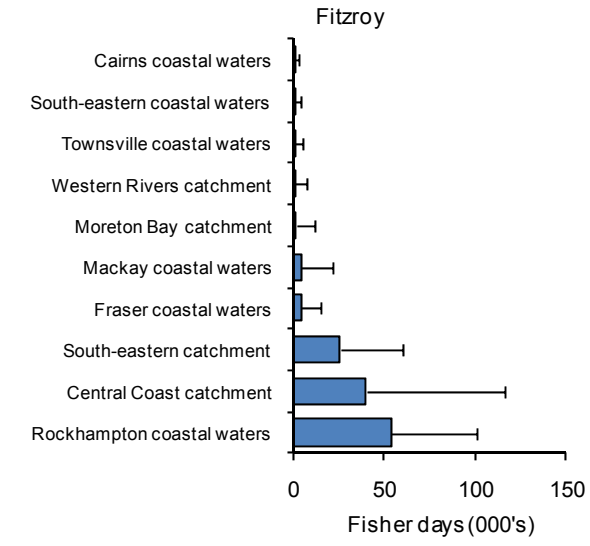

Brisbane
Townsville coastal waters
Cairns coastal waters
Mackay coastal waters
Gulf catchment
Central Coast catchment
Rockhampton coastal waters
Fraser coastal waters
South-eastern coastal waters
Moreton Bay catchment
South-eastern catchment
0
200
400
Fisher days (000's)


Moreton
Rockhampton coastal waters
Karumba coastal waters
Central Coast catchment
Murray-Darling Rivers catchment
Gulf catchment
Mackay coastal waters
Moreton Bay catchment
Fraser coastal waters
South-eastern coastal waters
South-eastern catchment
0
100
200
300
Fisher days (000's)


Wide Bay-Burnett
Gulf catchment
Murray-Darling Rivers catchment
Central Coast catchment
Mackay coastal waters
Moreton Bay catchment
Cairns coastal waters
Rockhampton coastal waters
South-eastern coastal waters
Fraser coastal waters
South-eastern catchment
0
100
200
Fisher days (000's)


Darling Downs
Mackay coastal waters
Townsville coastal waters
Rockhampton coastal waters
Central Coast catchment
Gulf catchment
Moreton Bay catchment
South-eastern coastal waters
Fraser coastal waters
South-eastern catchment
Murray-Darling Rivers catchment
0
40
80
120
Fisher days (000's)


Central West/ North West/ South West
Central Coast catchment
Bulloo catchment
Fraser coastal waters
Rockhampton coastal waters
South-eastern catchment
South-eastern coastal waters
Karumba coastal waters
Western Rivers catchment
Gulf catchment
Murray-Darling Rivers catchment
0
40
80
Fisher days (000's)


Fitzroy
Cairns coastal waters
South-eastern coastal waters
Townsville coastal waters
Western Rivers catchment
Moreton Bay catchment
Mackay coastal waters
Fraser coastal waters
South-eastern catchment
Central Coast catchment
Rockhampton coastal waters
0
50
100
150
Fisher days (000's)

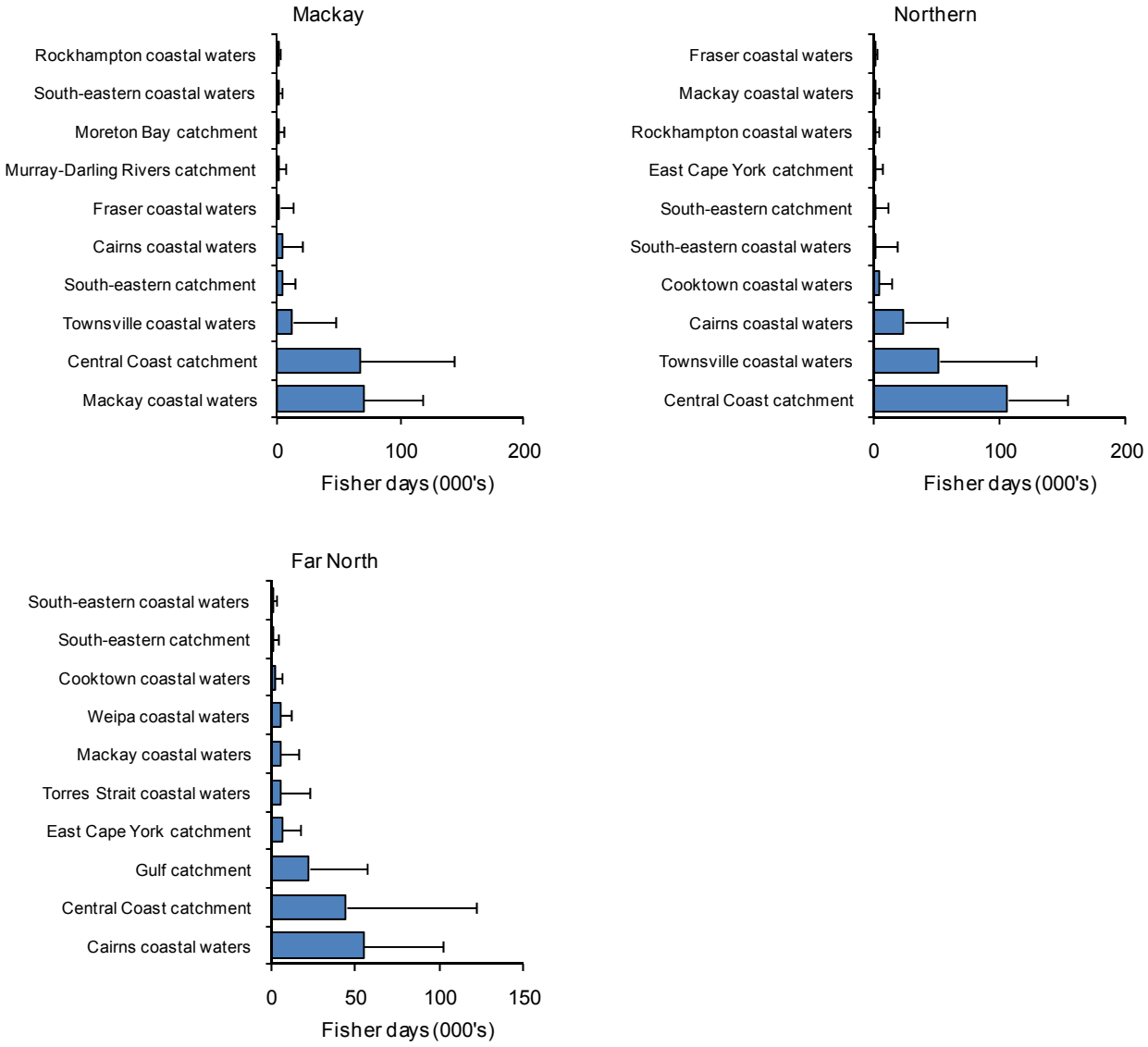


Figure 24: Fishing effort (SE) by residential region and fishing region

Effort by seasons

Across the state, effort was fairly even between the seasons with approximately 0.8 million fisher days in spring (September–November), 0.7 million fisher days in autumn (March–May), and 0.6 million fisher days in both summer (December–February) and winter (June–August), respectively (Figure 25).

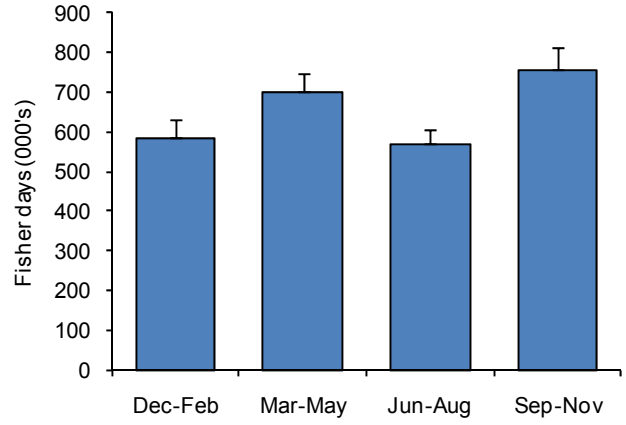


Figure 25: Seasonal effort (SE) by recreational fishers

Effort by depth fished for boat fishing

The majority of boats that were bottom fishing in coastal waters provided details of their maximum depth. Statewide, most of these boats fished in waters shallower than 40 m, with over a third of boats fishing in water shallower than 20 m (Figure 26); however not all fishing regions were the same. Different places provide access to different depths of water, for example, the Torres Strait, Weipa, Karumba and Mornington Island coastal waters are relatively shallow and there was no fishing activity reported in waters deeper than 40 m. In Fraser and south-eastern coastal waters more than 30% of boat based fishing in ocean waters occurred in waters deeper than 40 m.

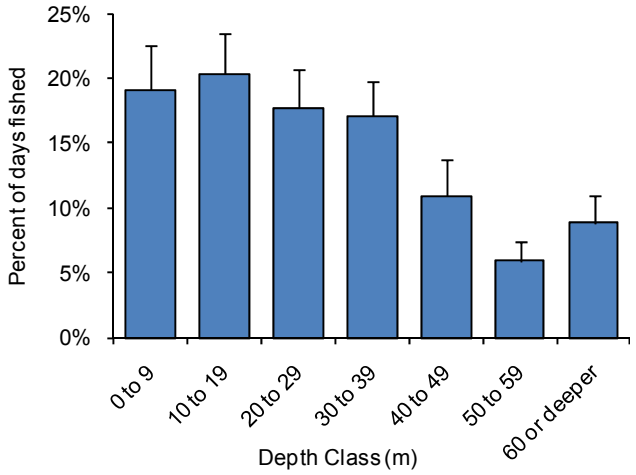


Figure 26: Fishing effort (SE) by maximum depth class for boats fishing in ocean waters

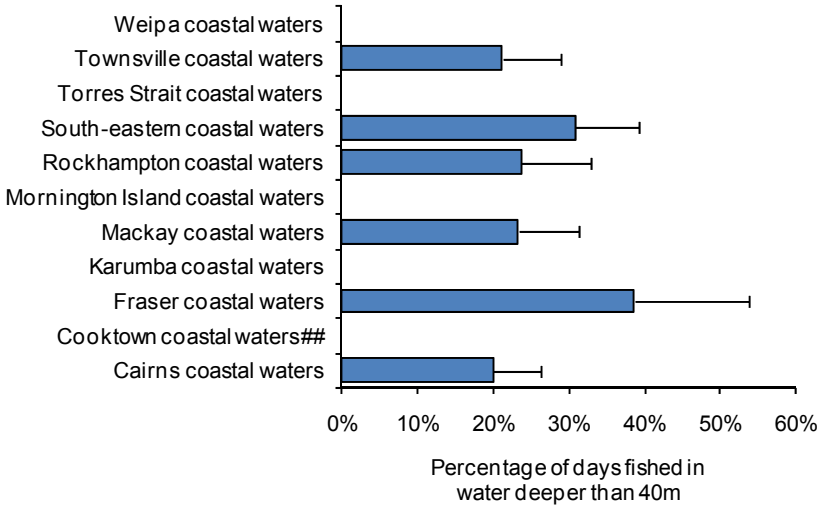


Figure 27: Fishing effort (SE) in coastal waters deeper than 40 m by fishing region
indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Recreational catch

Total catch summary

All estimates that follow represent the total catch (numbers of fish) by Queenslanders aged five years or more, fishing in Queensland during the diary survey between 1 October 2010 and 30 September 2011.

Approximately 13.3 million (SE=2.2 million) fish were caught, including teleosts (bony fishes) and elasmobranchs (sharks and rays) (Table 6). A total of 140 different species/groups were reported by fishers during the survey. Catch estimates for each of these species, along with the SE are listed in Appendix 6. For the purposes of reporting and analysis, however, many of these species were grouped in recognition that there are considerable difficulties for fishers (and scientists) in accurately identifying some of these species (refer to Reporting the catch). As such, the tables and figures that follow provide information on the major species/groups which are referred to as reporting groups. These reporting groups were included in the species guide to help fishers classify their catches.

Yellowfin bream was the most commonly caught fish with an estimated 1.7 million caught. Sand whiting complex was the second most commonly caught fish with approximately 1.3 million caught during the diary period. Trumpeter whiting was the next most caught fish, with an estimated catch of 1 million. Collectively, these three species comprised 30% of the total catch of all fish by numbers.

Flathead also formed a considerable part of the total catch with nearly 500 000 caught, 83% of which comprised dusky flathead. Approximately 350 000 snapper, 350 000 pikey bream, and 340 000 tailor were caught making them the next most commonly caught recreational species.

Collectively, nearly 500 000 tropical snappers from the genus *Lutjanus* (stripey snapper, Moses snapper, other tropical snapper) were caught and these species formed a key part of the catch of reef fishes. Large numbers of freshwater fish were also caught, with golden perch and Australian bass being the most common.

The recreational catch was not restricted to fish. A further 8.3 million crustaceans, cephalopods and other taxa were caught (Table 7). This number included 1.4 million mud crabs, 3 million prawns and a further 3.5 million other crustaceans, such as yabbies.

Nearly half of all fish caught were released back to the water (Table 8). In comparison, only 21% of non-fish species were released (Table 9). The fate of the catch for each reporting group was split into four categories ranging from low release (0–25% of catch released) through to high release (76–100% released) (Table 10). Low release rates were reported for other taxa, prawns, other crustaceans and threadfin. High release rates were reported for snapper, barramundi, stripey snapper, Australian bass, sharks and cod and groper. An estimated 94% of sharks caught were released, a higher percentage than any other reporting group.

Table 6: Estimated recreational catch (SE) of fish during the diary survey

	Total catch	
Reporting group	**Number**	**SE**
Australian bass	#104 023	28 383
Barramundi	278 055	57 084
Yellowfin bream	1 667 011	217 726
Pikey bream	348 067	45 966
Cod, freshwater	#29 035	7 469
Cod & groper	309 371	37 872
Coral trout	179 150	26 963
Dart	288 613	50 897
Red emperor	89 381	14 735
Redthroat emperor	119 139	26 063
Emperor, other	103 247	17 976
Northern sand flathead	74 530	11 042
Dusky flathead	399 059	68 978
Flathead, other	##	##
Sooty grunter	79 249	17 805
Hussar	#157 845	50 011
Barred javelin	134 889	28 900
Silver javelin	42 495	8 726
School mackerel	60 453	14 322
Spanish mackerel	50 260	9 846
Spotted mackerel	#45 681	16 003
Mackerel, other	##	##
Mangrove jack	123 294	21 902
Jewfish/mulloway	73 710	16 278
Parrotfish	110 849	18 509
Pearl perch	#89 386	28 982
Golden perch	169 849	29 507
Perch, other freshwater	66 969	13 331
Sharks	88 531	18 895
Snapper	352 115	76 522
Stripey snapper	#118 887	31 312
Moses snapper	162 794	38 156
Snapper, other tropical	205 320	35 014
Morwong & sweetlip	261 895	45 419
Tailor	344 711	67 219
Threadfin	56 171	9 864
Trevally	170 387	29 591
Sand whiting complex	1 282 561	157 257
Trumpeter whiting	#969 477	245 831
Finfish, other	#4 104 319	1 815 741
Total	13 324 069	2 218 023

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Table 7: Estimated recreational catch (SE) of non-fish during the diary survey

	Total catch	
Reporting group	**Number**	**SE**
Blue swimmer crab	##	##
Mud crab	1 371 998	175 125
Prawns	2 970 854	621 380
Crustaceans, other	3 461 163	700 622
Cephalopods	#13 283	5 842
Other taxa	#88 113	42 754
Total	8 265 975	1 121 565

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Table 8: Estimated recreational harvest and release (SE) of fish during the diary survey

	Harvest		Release	
Reporting group	**Number**	**SE**	**Number**	**SE**
Australian bass	#19 472	7 431	#84 552	23 776
Barramundi	59 769	10 800	218 286	52 437
Yellowfin bream	546 817	107 386	1 120 194	134 937
Pikey bream	134 125	19 430	213 942	32 339
Cod & groper	74 432	9 185	234 939	34 231
Cod, freshwater	#7 917	2 480	#21 117	6 821
Coral trout	104 572	14 778	74 578	15 560
Dart	#104 135	26 152	184 478	32 545
Red emperor	34 608	6 707	54 773	11 178
Redthroat emperor	65 445	15 311	#53 694	13 297
Emperor, other	59 043	13 413	44 205	8 949
Northern sand flathead	30 192	4 985	44 337	8 382
Dusky flathead	174 367	28 913	224 692	43 193
Flathead other	#3 875	1 652	##	##
Sooty grunter	#31 379	9 595	47 870	10 528
Hussar	#65 334	16 800	#92 511	39 457
Barred javelin	51 268	11 878	83 620	19 285
Silver javelin	#20 572	5 747	#21 923	5 506
School mackerel	38 081	8 244	#22 372	10 573
Spanish mackerel	36 208	6 582	#14 053	4 266
Spotted mackerel	#30 380	12 545	#15 301	6 611
Mackerel, other	##	##	##	##
Mangrove jack	55 708	8 422	67 586	15 811
Jewfish/mulloway	40 979	9 982	#32 731	11 453
Parrotfish	54 413	10 366	56 435	10 574
Pearl perch	#26 978	10 841	#62 409	21 597
Golden perch	87 356	15 268	82 494	18 041
Perch, other freshwater	#16 952	5 166	50 017	10 808
Sharks	##	##	83 094	18 021
Snapper	83 898	19 514	268 217	63 214
Stripey snapper	24 706	4 651	#94 181	29 603
Moses snapper	41 222	8 909	#121 572	32 116
Snapper, other tropical	91 180	16 710	114 140	25 224
Morwong & sweetlip	120 335	22 561	141 560	26 513
Tailor	197 612	44 576	147 099	31 314
Threadfin	42 972	7 599	#13 199	3 859
Trevally	74 278	12 937	96 109	21 353
Sand whiting complex	656 866	90 185	625 695	87 218
Trumpeter whiting	#645 839	178 553	323 639	77 140
Finfish, other	##	##	1 209 797	255 384
Total	6 857 663	1 780 022	6 466 408	542 175

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Table 9: Estimated recreational harvest and release (SE) of non-fish during the diary survey

	Harvest		Release	
Reporting group	**Number**	**SE**	**Number**	**SE**
Blue swimmer crab	##	100 837	##	##
Mud crab	366 065	42 973	1 005 933	137 073
Prawns	2 900 596	614 543	#70 258	43 360
Crustaceans, other	3 032 912	591 983	#428 252	158 813
Cephalopods	#12 683	5 819	##	##
Other taxa	#88 113	42 754	0	0
Total	6 515 805	912 531	1 750 169	361 977

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Table 10: Percentage of recreational catch of key reporting groups that were released

Percentage of the total catch that was released			
0-25%	**26-50%**	**51-75%**	**76-100%**
Other taxa	Spanish mackerel	Parrotfish	Cod & groper
Prawns	Finfish, other	Silver javelin	Snapper
Crustaceans, other	Trumpeter whiting	Morwong & sweetlip	Barramundi
Threadfin	Spotted mackerel	Mangrove jack	Stripey snapper
	School mackerel	Snapper, other tropical	Australian bass
	Coral trout	Dusky flathead	Sharks
	Tailor	Trevally	
	Emperor, other	Hussar	
	Jewfish/mulloway	Northern sand flathead	
	Redthroat emperor	Sooty grunter	
	Golden perch	Red emperor	
	Sand whiting complex	Pikey bream	
		Barred javelin	
		Dart	
		Yellowfin bream	
		Pearl perch	
		Cod, freshwater	
		Mud crab	
		Perch, other freshwater	
		Moses snapper	

Reasons for release

Recreational fishers released their catch for a variety of reasons which were reported to one of 17 categories (refer to Materials and methods for more information). The five most common responses given by fishers for why they chose to release fish were ‘too small’, ‘under size limit’, ‘too many’, ‘catch and release’ and ‘unwanted’ (Table 11). The too small category related to any occasions when fishers mentioned ‘too small’, without mentioning words like ‘legal limit’ or ‘under size’. This related to a personal preference in contrast to the under size limit category which was used when fishers responded using words such as ‘legal limit’ or ‘undersize’. The too many category related to a personal preference and was used when any mention of ‘too many’ was made except for when words like ‘legal limit’ were used.

The majority of fish were released because they were considered too small by the fishers. The percentage of fish that were released for this reason was particularly high for pearl perch (93%) and jewfish/mulloway (88%). The percentage of fish that were released because they were under the size limit was highest for Spanish mackerel (46%) and silver javelin (45%) while for the too many category the percentage released was high for barramundi (19%).

Catch and release fishing was popular for freshwater species. Approximately 67% of freshwater cod were released for catch and release reasons while 39% of Australian bass and 32% of golden perch were released for catch and release reasons. Sharks were not the desired catch for many fishers and 72% of sharks were released because they were unwanted species.

Table 11: Number and top five reasons for release (%) of fish during the diary survey

		Five most common reasons for release (% of total released)[6]				
Species/group	**Number released**	**Too small**	**Under size limit**	**Too many**	**Catch and release**	**Unwanted**
Australian bass	84 552	35	9	14	39	4
Barramundi	218 286	26	14	19	27	0
Yellowfin bream	1 120 194	69	14	1	14	2
Pikey bream	213 942	59	24	5	12	1
Cod & groper	234 939	60	12	3	14	11
Cod, freshwater	21 117	25	4	4	67	0
Coral trout	74 578	74	18	7	1	0
Dart	184 478	63	4	9	9	14
Red emperor	54 773	77	18	2	3	0
Redthroat emperor	53 694	68	32	0	0	0
Emperor, other	44 205	61	15	6	12	5
Northern sand flathead	44 337	66	4	2	27	1
Dusky flathead	224 692	57	6	6	29	1
Flathead, other	##	##	##	##	##	##
Sooty grunter	47 870	65	8	7	19	1
Hussar	92 511	77	13	5	4	0
Barred javelin	83 620	72	18	0	9	1
Silver javelin	21 923	49	45	1	4	0
School mackerel	22 372	71	19	4	1	6
Spanish mackerel	14 053	47	46	4	0	0
Spotted mackerel	15 301	71	11	0	0	18
Mackerel, other	##	##	##	##	##	##
Mangrove Jack	67 586	48	26	18	8	0
Jewfish/mulloway	32 731	88	5	1	5	0
Parrotfish	56 435	74	17	3	6	0
Pearl perch	62 409	93	3	4	0	0
Golden perch	82 494	44	11	8	32	4
Perch, other freshwater	50 017	50	6	7	25	13
Sharks	83 094	5	0	1	22	72
Snapper	268 217	58	17	17	3	0
Snapper, stripey	94 181	49	32	0	4	15
Snapper, Moses	121 572	76	10	0	14	0
Snapper, other tropical	114 140	78	15	3	4	0
Morwong & sweetlip	141 560	55	36	4	3	2
Tailor	147 099	56	19	9	15	1
Threadfin	13 199	51	31	2	16	0
Trevally	96 109	40	11	4	33	11
Whiting, sand complex	625 695	69	20	3	7	0
Whiting, trumpeter	323 639	71	18	10	0	0
Finfish, other	1 209 797	26	7	16	10	40

[6] Percentages in each row may not add up to 100% because this is a list of 5 out of 16 recorded release reasons

Targeted catch versus actual catch

On many occasions, fishers did not catch what they were targeting prior to the fishing event. For example, less than 25% of the total catch of sharks, redthroat emperor and freshwater cod occurred when fishers indicated that they were targeting each of these fish (Table 12). However, a high percentage of the barramundi catch occurred when fishers were targeting barramundi and the majority of mud crabs were also caught when fishers were targeting these animals.

Table 12: Percentage of targeted catch

Percentage of catch when fishers caught what they were targeting			
0-25%	**26-50%**	**51-75%**	**76-100%**
Sharks	Coral trout	Golden perch	Barramundi
Hussar	Northern sand flathead	Australian bass	Prawns
Silver javelin	Sooty grunter	Finfish, other	Mud crab
Parrotfish	Pikey bream	Tailor	Crustaceans, other
Cod & groper	School mackerel	Trumpeter whiting	Other taxa
Cod, freshwater	Spotted mackerel		
Emperor, other	Dusky flathead		
Moses snapper	Snapper		
Pearl perch	Yellowfin bream		
Trevally	Sand whiting complex		
Red emperor	Spanish mackerel		
Redthroat emperor			
Snapper, other tropical			
Jewfish/mulloway			
Barred javelin			
Dart			
Stripey snapper			
Morwong & sweetlip			
Perch, other freshwater			
Threadfin			
Mangrove jack			

Harvest weights and comparison with the commercial sector

Table 13 shows the number of fish harvested, their average weight, the estimated weight of the recreational harvest with associated standard error and the commercial harvested weight. For barramundi, whiting and Spanish mackerel the commercial harvest was greater than the recreational harvest. For cobia, pearl perch, snapper, spotted mackerel and tailor the recreational harvest was greater (Figure 28).

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

	Recreational harvest				Commercial harvest
Species	**Number of fish**	**Average individual fish weight (kg)[7]**	**Harvest weight (kg)**	**SE of harvest weight**	**Weight (kg)**
Barramundi	59 769	3.02	180 502	31 290	1 556 920
Cobia	5 360	7.36	39 450	14 487	32 540
Pearl perch	26 978	1.33	35 881	14 032	26 294
Whiting	1 302 705	0.13	169 352	22 177	273 479
Snapper	83 898	1.54	129 203	28 063	66 608
Spanish mackerel	36 208	7.68	278 077	49 398	517 879
Spotted mackerel	30 380	2.67	81 115	31 506	61 707
Tailor	197 612	0.65	128 448	30 031	64 578

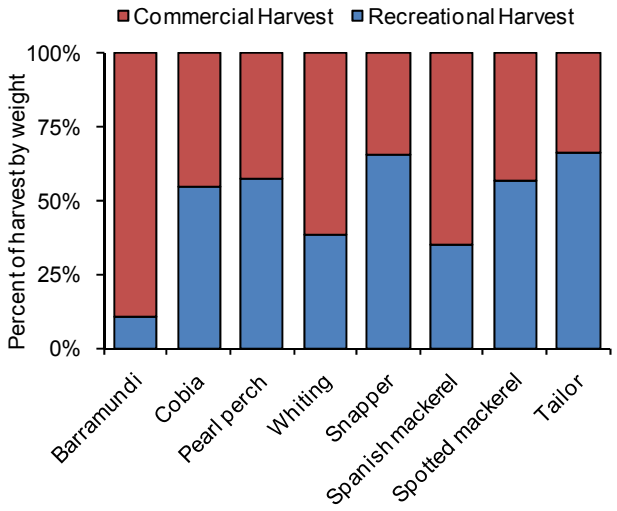


Figure 28: Percentage of harvest by recreational and commercial fishers

Catch by water body

In total, 44% of the catch occurred in the ocean while 43% was taken in estuaries. The remainder occurred in freshwater rivers, public lakes/dams, and private lakes/dams. Approximately 66% of the freshwater catch occurred in public lakes or dams.

Within the ocean and estuarine water bodies, yellowfin bream, the sand whiting complex and trumpeter whiting were the three most commonly caught species (Table 14). Approximately twice as many yellowfin bream were caught in estuaries than in the ocean. The catch of the sand whiting complex was fairly similar in both the ocean and estuaries while the catch of trumpeter whiting was higher in the ocean. Other reporting groups that were caught in large numbers within estuaries were dusky flathead, pikey bream and barramundi.

[7] Average weights are calculated at smaller spatial regions before being weighted and scaled up to a statewide estimate

Reporting groups that were caught in large numbers in the ocean included snapper, tailor, dart, morwong and sweetlip, and cod and groper. Reef-associated species such as coral trout, red emperor, redthroat emperor and hussar were almost exclusively caught in the ocean.

Catch by fishing method

Nearly half of the total catch of fish and other animals occurred while line fishing; however, fishers used a variety of other methods including cast nets, crab pots and traps, spearfishing, seine nets, and equipment used for gathering bait such as rakes, forks/spades and pumps. The majority of the catch while line fishing was taken using bait (77%) as opposed to using a lure, jig or fly (9%) or using bait and a lure, jig or fly (15%). However, the catch using a lure, jig or fly formed a substantial part of the total catch for some species such as Australian bass (37%) and barramundi (46%).

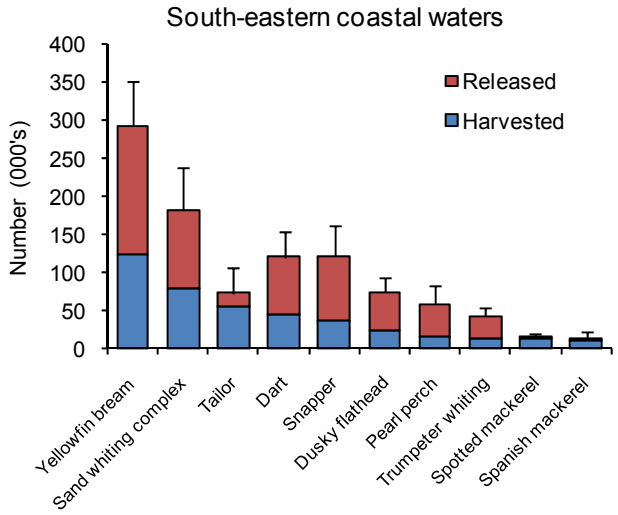
Table 14: Estimated total catch (SE) in the ocean and estuaries for fish during the diary survey

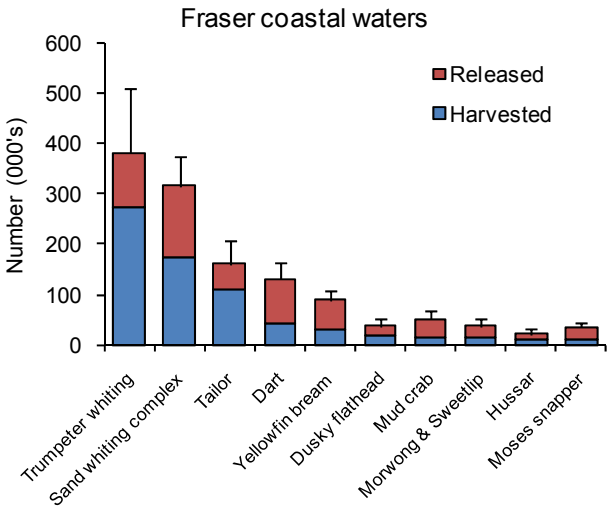
	Ocean		Estuary	
Species/group	**Total catch**	**SE**	**Total catch**	**SE**
Australian bass			##4 633	3 467
Barramundi	#38 012	9 588	#175 664	49 898
Yellowfin bream	501 885	94 043	1 165 126	192 294
Pikey bream	139 355	31 240	194 618	27 984
Cod & groper	214 893	33 974	94 478	14 979
Coral trout	177 688	26 938	##1 462	1 207
Dart	250 915	46 332	#37 699	18 135
Red emperor	88 486	14 730	##895	544
Redthroat emperor	119 031	26 063	##108	108
Emperor, other	96 375	17 663	##6 872	3 472
Northern sand flathead	36 032	7 339	38 498	7 793
Dusky flathead	113 984	18 909	285 075	63 026
Flathead, other	##6 189	3 841	##1 383	977
Sooty grunter			#14 731	6 810
Hussar	#157 335	50 009	##510	507
Barred javelin	#55 405	13 704	#79 361	24 748
Silver javelin	#17 557	6 015	#24 938	6 294
School mackerel	#56 047	14 182	#4 406	2 025
Spanish mackerel	48 756	9 732	##1 504	859
Spotted mackerel	#42 468	15 814	##3 213	2 454
Mackerel, other	##5 719	2 960		
Mangrove jack	#65 599	19 482	57 695	9 296
Jewfish/mulloway	#50 610	14 238	#23 100	7 594
Parrotfish	105 576	18 223	##5 273	2 892
Pearl perch	#83 946	28 865	#5 440	2 682
Perch, other freshwater			##564	554
Sharks	76 282	18 493	#12 249	3 343
Snapper	303 683	67 601	#48 432	22 127
Stripey snapper	#88 862	21 897	##30 026	22 376
Moses snapper	79 768	17 165	#83 026	34 193
Snapper, other tropical	198 802	34 702	#6 519	2 227
Morwong & sweetlip	244 096	44 898	#17 798	5 887
Tailor	280 283	63 522	#64 428	20 580
Threadfin	32 907	7 512	#23 264	6 287
Trevally	107 139	21 080	#63 248	20 417
Sand whiting complex	674 499	114 319	608 062	95 174
Trumpeter whiting	#649 621	192 856	#319 856	106 282
Fish, other	#2 522 889	1 787 197	1 059 151	177 424

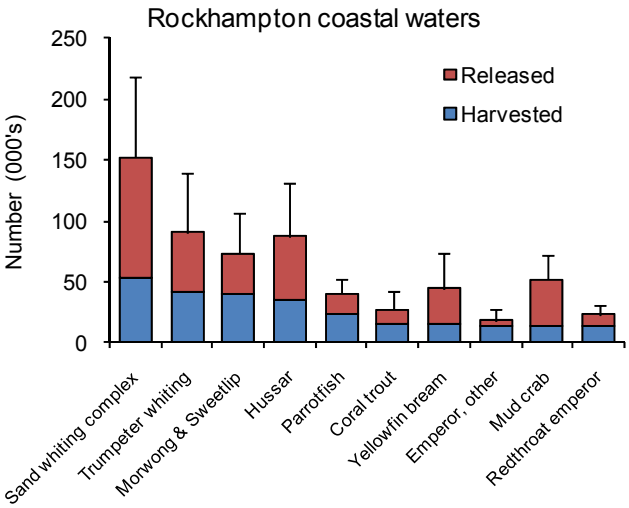
Estimates without a # have RSEs less than 25% and are considered good; # indicates the RSE is between 25 and 50% and the estimate should be used cautiously; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

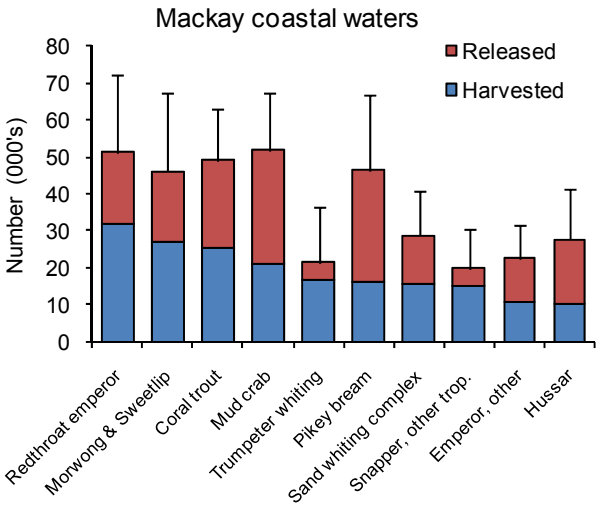
Catch by fishing region

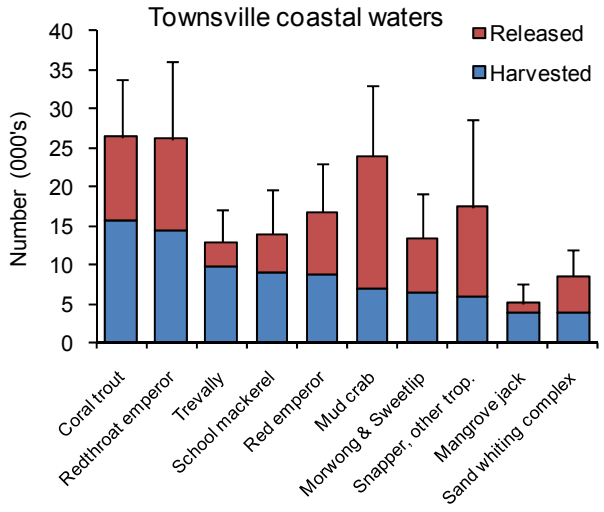
Fishing activity in regions which had marine waters caught a more diverse range of species compared to fishing in regions which only had access to fresh water (Figure 29). Yellowfin bream, the sand whiting complex and trumpeter whiting were frequently harvested in south-eastern coastal waters, Moreton Bay and Fraser coastal waters. In fishing regions adjacent to the Great Barrier Reef, coral trout, redthroat emperor, morwong and sweetlip formed a key part of the harvest.

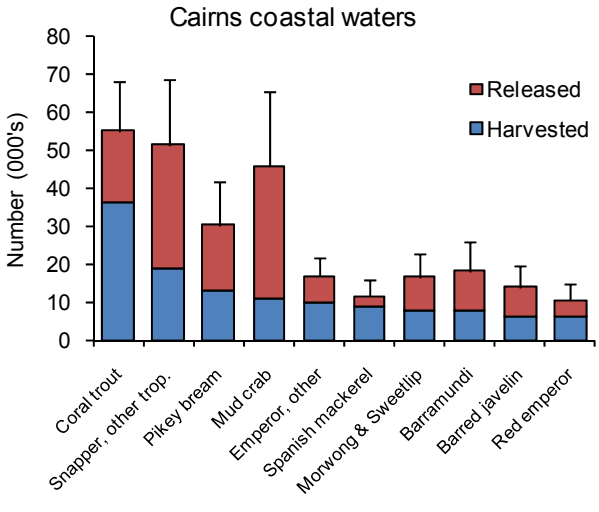


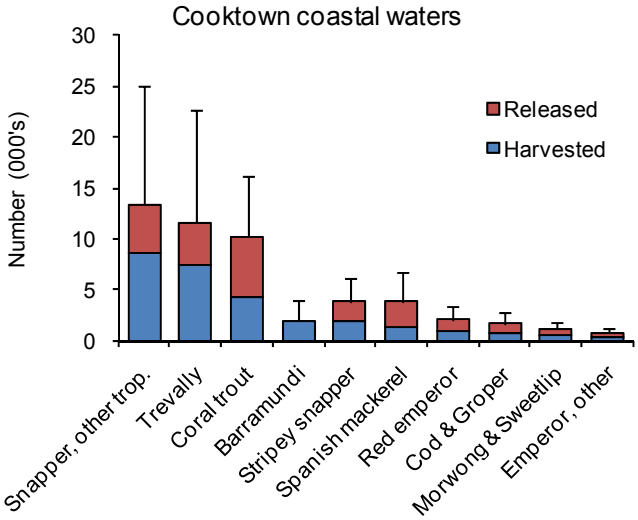


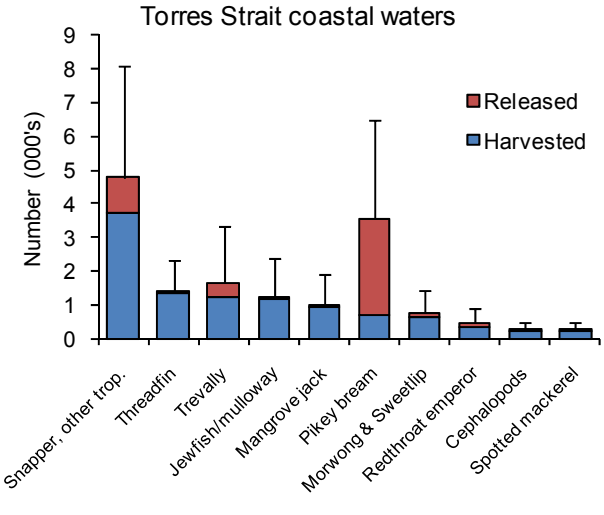


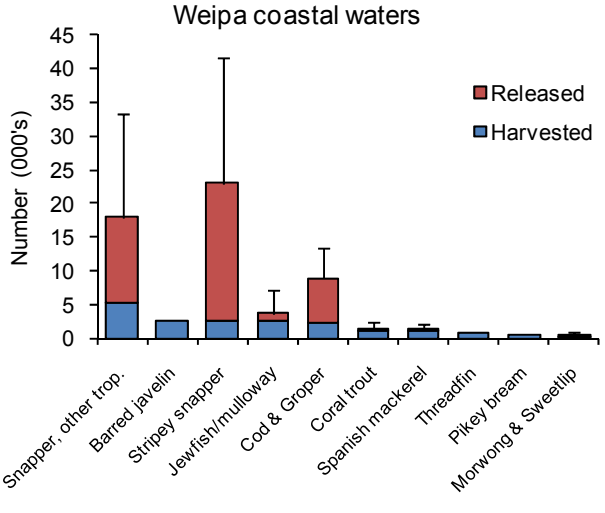


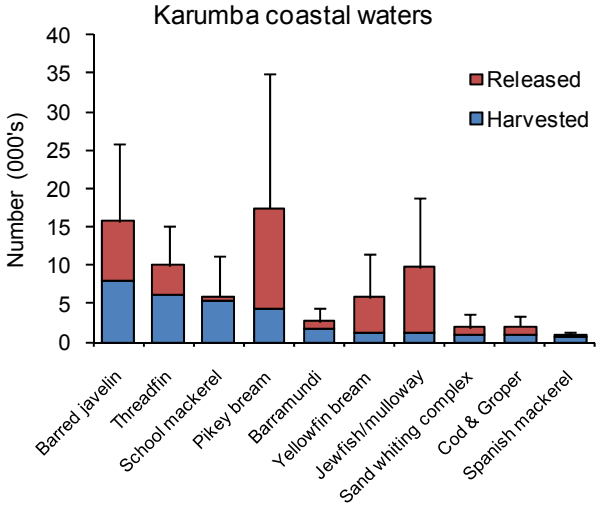

Townsville coastal waters
Released
Harvested
Number (000's)
40
35
30
25
20
15
10
5
0
Coral trout
Redthroat emperor
Trevally
School mackerel
Red emperor
Mud crab
Morwong & Sweetlip
Snapper, other trop.
Mangrove jack
Sand whiting complex

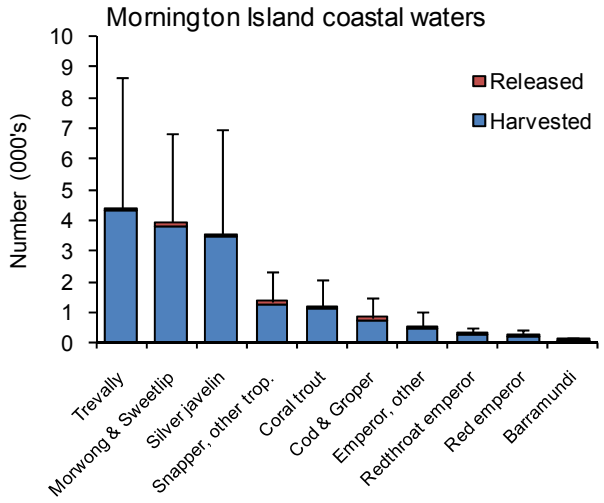

Cairns coastal waters
Released
Harvested
Number (000's)
80
70
60
50
40
30
20
10
0
Coral trout
Snapper, other trop.
Pikey bream
Mud crab
Emperor, other
Spanish mackerel
Morwong & Sweetlip
Barramundi
Barred javelin
Red emperor

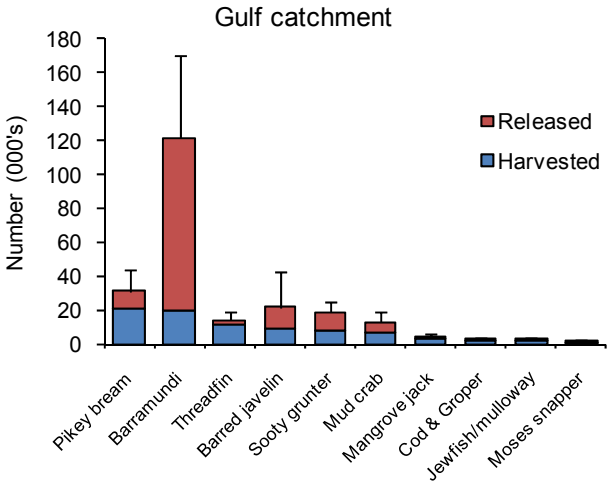

Cooktown coastal waters
Released
Harvested
Number (000's)
30
25
20
15
10
5
0
Snapper, other trop.
Trevally
Coral trout
Barramundi
Stripey snapper
Spanish mackerel
Red emperor
Cod & Groper
Morwong & Sweetlip
Emperor, other

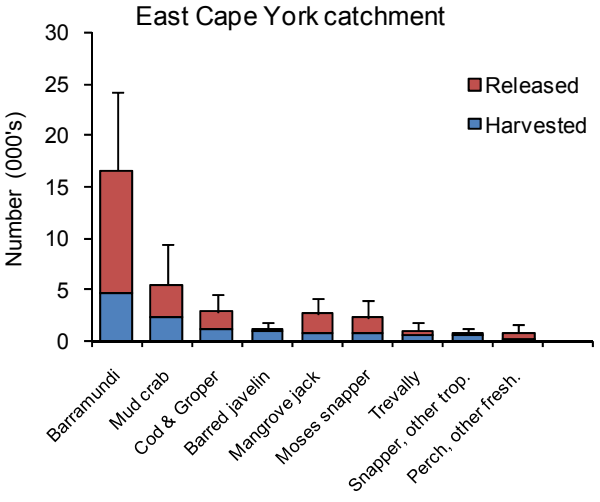

Torres Strait coastal waters
Released
Harvested
Number (000's)
9
8
7
6
5
4
3
2
1
0
Snapper, other trop.
Threadfin
Trevally
Jewfish/mulloway
Mangrove jack
Pikey bream
Morwong & Sweetlip
Redthroat emperor
Cephalopods
Spotted mackerel

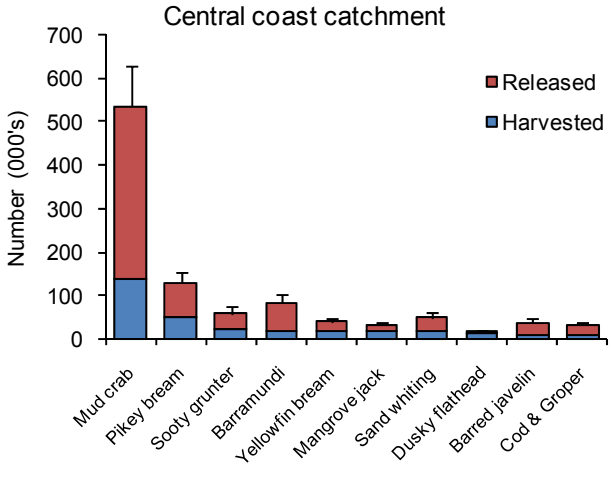

Weipa coastal waters
Released
Harvested
Number (000's)
45
40
35
30
25
20
15
10
5
0
Snapper, other trop.
Barred javelin
Stripey snapper
Jewfish/mulloway
Cod & Groper
Coral trout
Spanish mackerel
Threadfin
Pikey bream
Morwong & Sweetlip

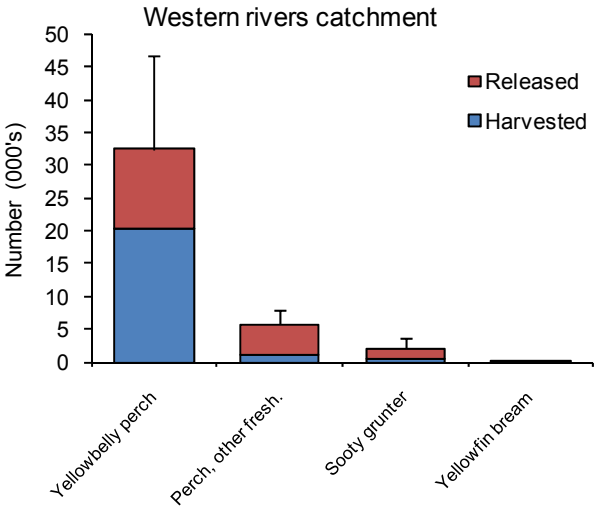

Karumba coastal waters
Released
Harvested
Number (000's)
40
35
30
25
20
15
10
5
0
Barred javelin
Threadfin
School mackerel
Pikey bream
Barramundi
Yellowfin bream
Jewfish/mulloway
Sand whiting complex
Cod & Groper
Spanish mackerel

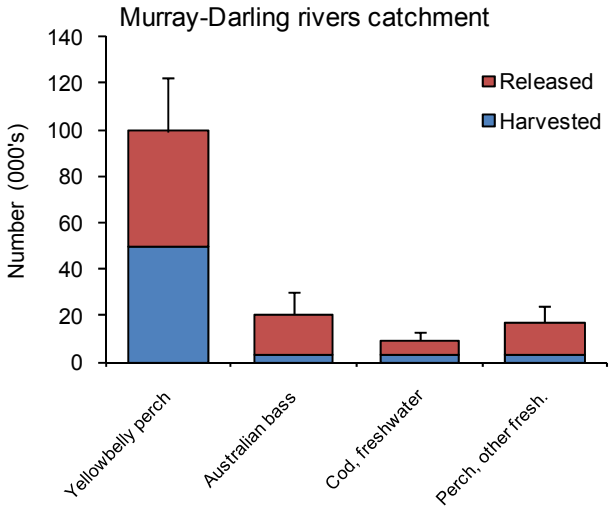

Mornington Island coastal waters
Number (000's)
Released
Harvested
Trevally
Morwong & Sweetlip
Silver javelin
Snapper, other trop.
Coral trout
Cod & Groper
Emperor, other
Redthroat emperor
Red emperor
Barramundi


Gulf catchment
Number (000's)
Released
Harvested
Pikey bream
Barramundi
Threadfin
Barred javelin
Sooty grunter
Mud crab
Mangrove jack
Cod & Groper
Jewfish/mulloway
Moses snapper


East Cape York catchment
Number (000's)
Released
Harvested
Barramundi
Mud crab
Cod & Groper
Barred javelin
Mangrove jack
Moses snapper
Trevally
Snapper, other trop.
Perch, other fresh.


Central coast catchment
Number (000's)
Released
Harvested
Mud crab
Pikey bream
Sooty grunter
Barramundi
Yellowfin bream
Mangrove jack
Sand whiting
Dusky flathead
Barred javelin
Cod & Groper


Western rivers catchment
Number (000's)
Released
Harvested
Yellowbelly perch
Perch, other fresh.
Sooty grunter
Yellowfin bream


Murray-Darling rivers catchment
Number (000's)
Released
Harvested
Yellowbelly perch
Australian bass
Cod, freshwater
Perch, other fresh.

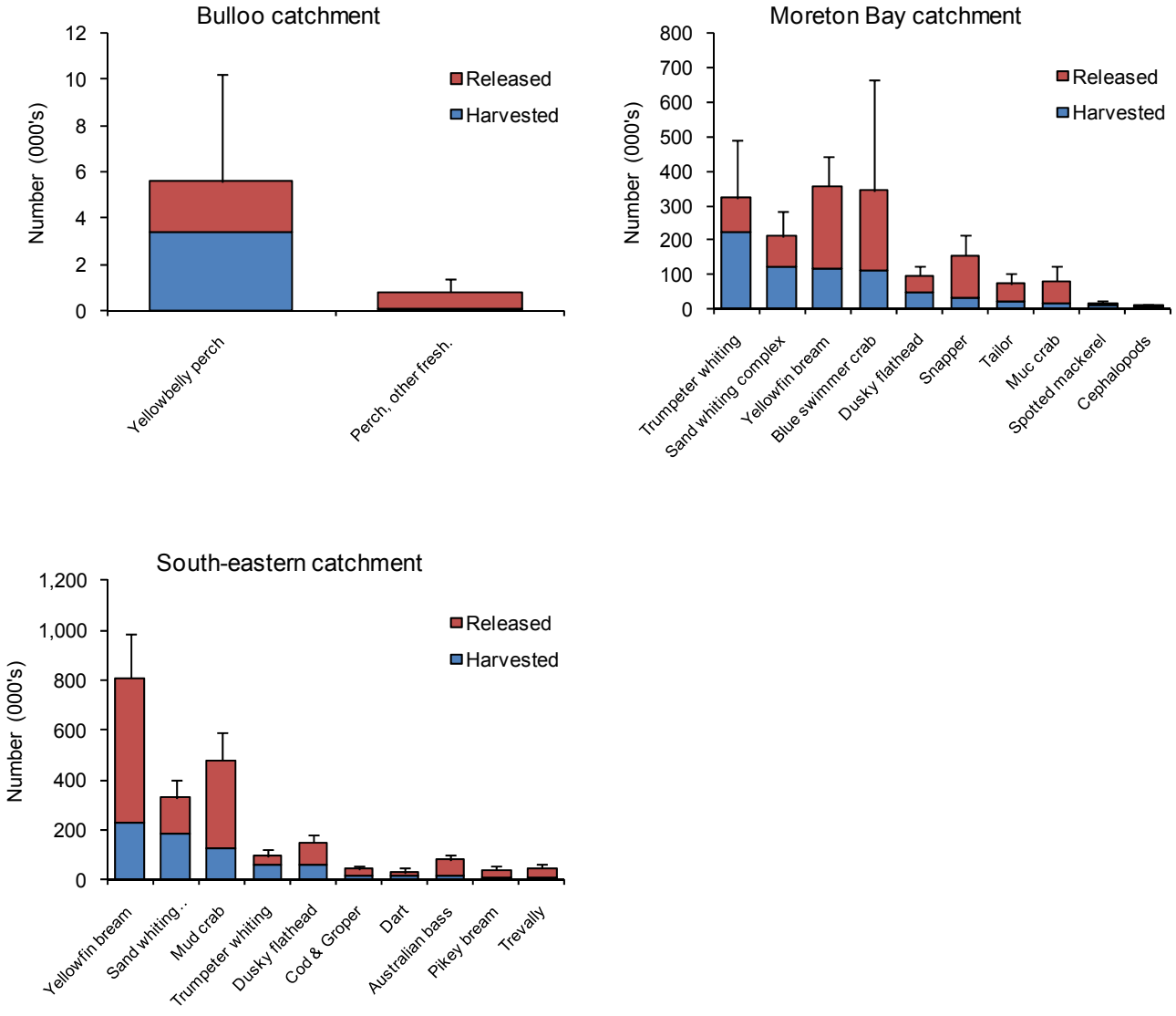
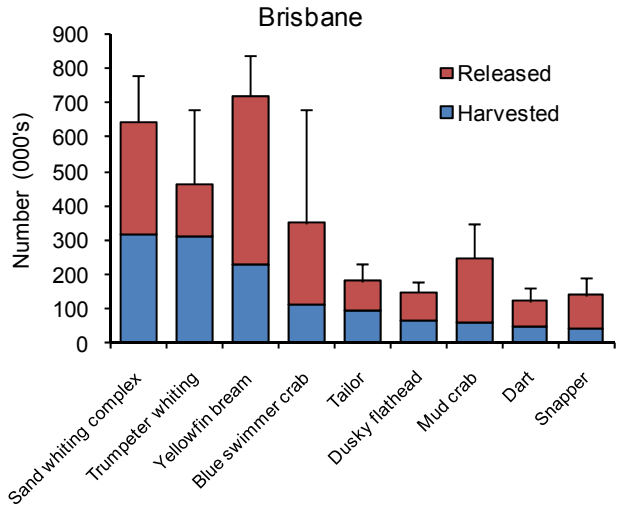
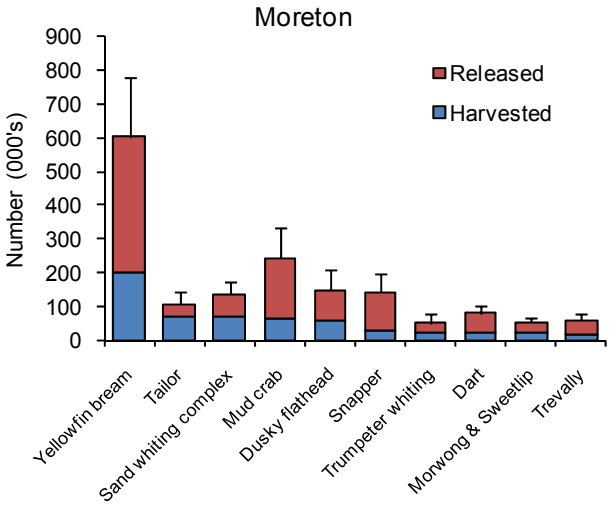


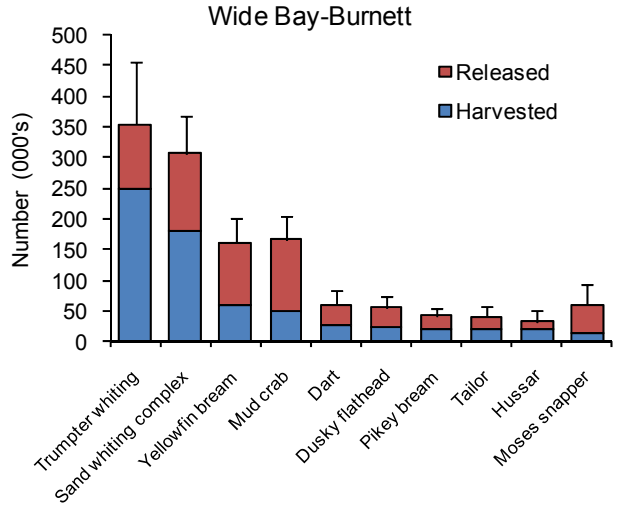
Figure 29: Top 10 species caught (harvested and released) by fishing region
Note: Lines above bars represent the standard error for the catch.

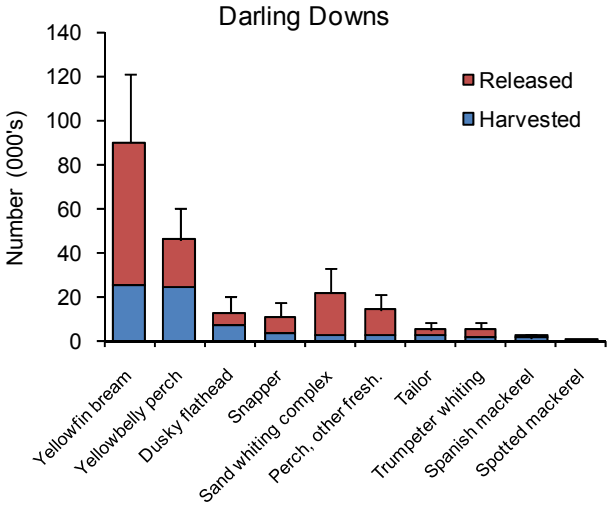
Catch by residential region

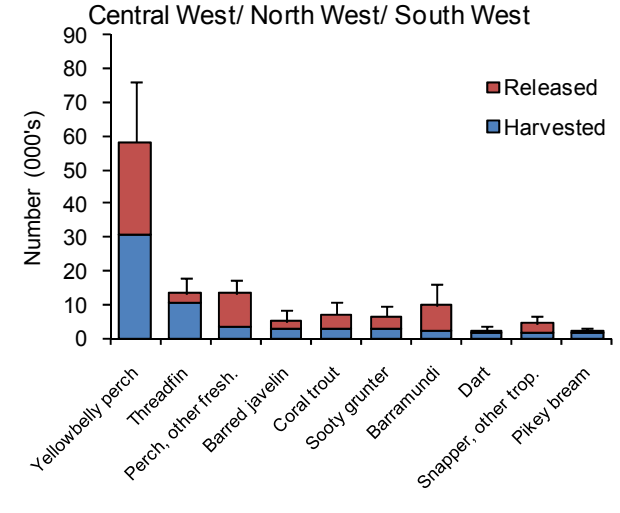
People don't just catch fish that occur in their local region. For example, people living on the Darling Downs caught more yellowfin bream (a marine species) than any freshwater fish, and coral trout from the Great Barrier Reef was the fifth most abundantly caught fish by people from the central west/ north west /south west residential region (Figure 30).

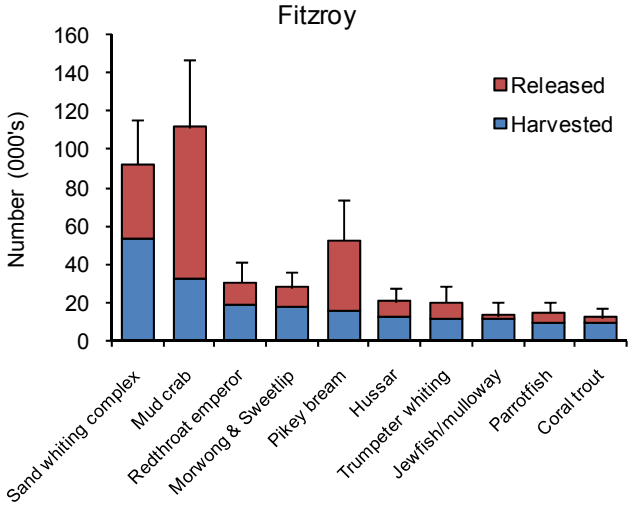

Brisbane
Number (000's)
900
800
700
600
500
400
300
200
100
0
Released
Harvested
Sand whiting complex
Trumpeter whiting
Yellowfin bream
Blue swimmer crab
Tailor
Dusky flathead
Mud crab
Dart
Snapper


Moreton
Number (000's)
900
800
700
600
500
400
300
200
100
0
Released
Harvested
Yellowfin bream
Tailor
Sand whiting complex
Mud crab
Dusky flathead
Snapper
Trumpeter whiting
Dart
Morwong & Sweetlip
Trevally


Wide Bay-Burnett
Number (000's)
500
450
400
350
300
250
200
150
100
50
0
Released
Harvested
Trumpter whiting
Sand whiting complex
Yellowfin bream
Mud crab
Dart
Dusky flathead
Pikey bream
Tailor
Hussar
Moses snapper


Darling Downs
Number (000's)
140
120
100
80
60
40
20
0
Released
Harvested
Yellowfin bream
Yellowbelly perch
Dusky flathead
Snapper
Sand whiting complex
Perch, other fresh.
Tailor
Trumpeter whiting
Spanish mackerel
Spotted mackerel


Central West/ North West/ South West
Number (000's)
90
80
70
60
50
40
30
20
10
0
Released
Harvested
Yellowbelly perch
Threadfin
Perch, other fresh.
Barred javelin
Coral trout
Sooty grunter
Barramundi
Dart
Snapper, other trop.
Pikey bream


Fitzroy
Number (000's)
160
140
120
100
80
60
40
20
0
Released
Harvested
Sand whiting complex
Mud crab
Redthroat emperor
Morwong & Sweetlip
Pikey bream
Hussar
Trumpeter whiting
Jewfish/mulloway
Parrotfish
Coral trout

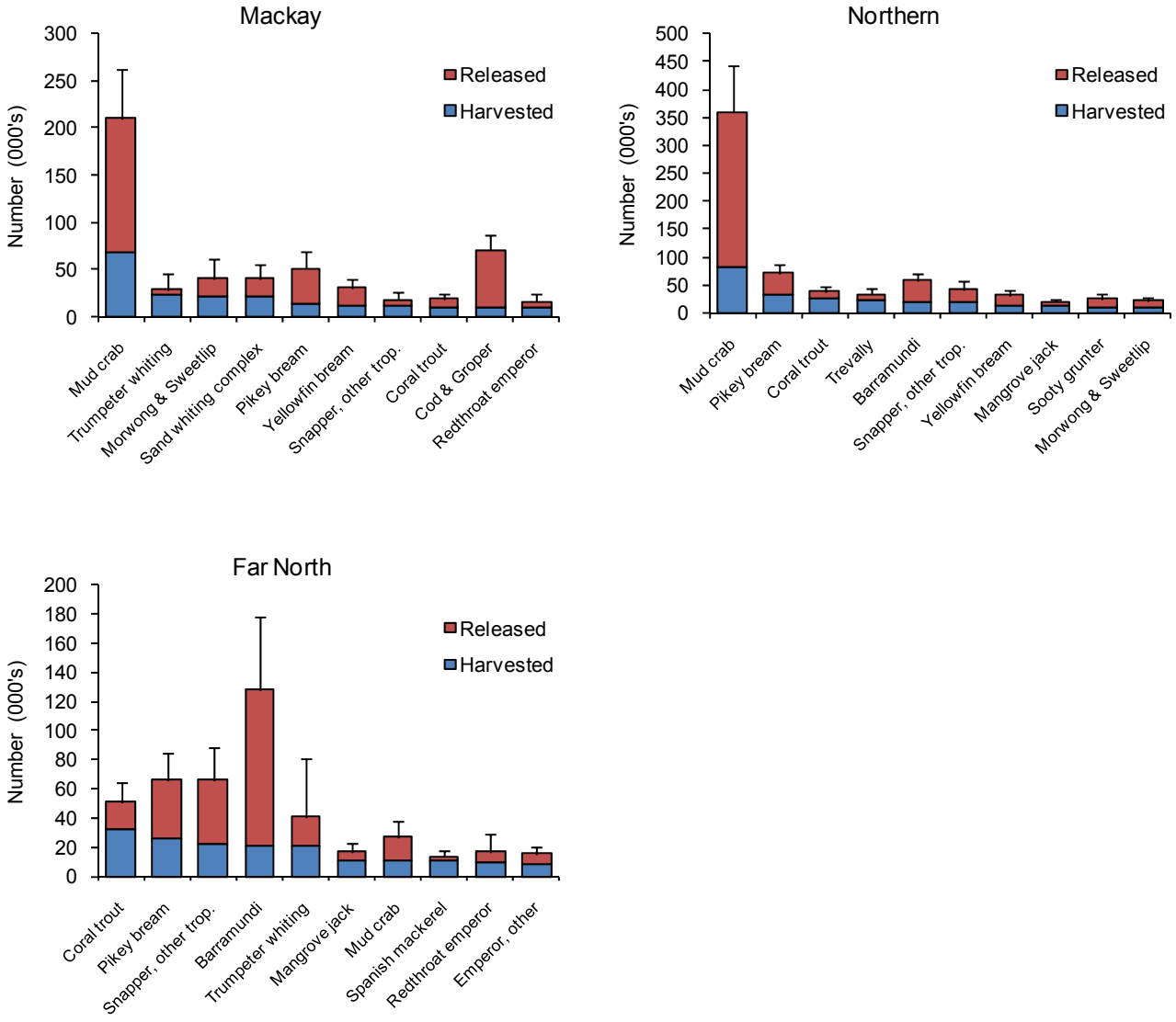


Figure 30: Top 10 species caught (harvested and released) by residential region
Note: Lines above bars represent the standard error for the catch.

Catch by platform

Overall, 54% of the catch was taken while fishing from a boat compared to 46% taken while fishing from the shore. The contribution of the catch taken by boat and shore varied for the different reporting groups (Table 15). Shore based fishing resulted in a high proportion of the catch for tailor and the sand whiting complex while fishing from a boat comprised a high proportion of the catch for red emperor, redthroat emperor, snapper and members of the genus *Lutjanus* (stripey snapper, Moses snapper, other tropical snapper).

Table 15: Estimated total catch (SE) of fish from a boat or the shore during the diary survey

	Boat		Shore		Both	
Reporting group	**Total catch**	**SE**	**Total catch**	**SE**	**Total catch**	**SE**
Australian bass	#75 425	22 714	#28 599	13 248		
Barramundi	#206 913	54 728	71 143	13 997		
Yellowfin bream	742 785	112 891	924 226	174 057		
Pikey bream	228 122	39 339	119 008	20 330	##	##
Cod, freshwater	#6 434	3 036	#22 601	6 747		
Cod & groper	262 400	36 279	46 971	8 740		
Coral trout	178 906	26 963	##	##		
Dart	##	##	269 528	48 581		
Red emperor	89 095	14 733	##	##		
Redthroat emperor	119 023	26 059	##	##		
Emperor, other	98 544	17 865	#4 703	1 959		
Northern sand flathead	40 862	8 053	33 668	7 379		
Dusky flathead	281 037	62 935	118 022	18 327		
Flathead, other	##	##	##	##		
Sooty grunter	#33 029	13 383	#46 220	11 558		
Hussar	#157 845	50 011				
Barred javelin	118 931	28 434	15 957	3 855		
Silver javelin	31 489	6 835	#11 007	##		
School mackerel	58 825	14 252	##	##		
Spanish mackerel	49 658	9 837	##	##		
Spotted mackerel	#43 125	14 712	##	##		
Mackerel, other	##	##				
Mangrove Jack	101 664	20 945	21 630	4 874		
Jewfish/mulloway	#61 916	15 409	#11 794	5 315		
Parrotfish	108 574	18 474	##2 275	1 276		
Pearl perch	#83 130	28 848	#6 256	2 890		
Golden perch	#79 472	21 166	90 179	17 439	##	##
Perch, other freshwater	#17 227	5 502	49 742	11 928		
Sharks	74 301	17 343	##	##		
Snapper	330 582	75 196	##	##		
Stripey snapper	90 368	21 908	##	##		
Moses snappper	90 937	18 056	#71 857	33 782		
Snapper, other tropical	202 858	34 982	##	##		
Morwong & sweetlip	255 232	45 326	#6 663	2 536		
Tailor	#126 255	35 233	#218 456	54 278		
Threadfin	43 454	8 848	#12 717	4 290		
Trevally	130 465	25 142	#39 922	15 095		
Sand whiting complex	563 690	88 490	718 871	116 503		
Trumpeter whiting	#794 409	239 072	#175 068	54 300		
Finfish, other	1 069 301	145 224	##	##	##	##

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

Species profiles

Australian bass (Macquaria novemaculeata)

Overall, 19% of Australian bass caught were harvested and 81% were released. Catches were restricted to three fishing regions in Southeast Queensland (Figure 31A). The majority (87%) were caught in public lakes or dams (Figure 31B). Most were caught from boats (72%) with the remainder caught from the shore (28%) (Figure 31C). Examining harvest through the year (Figure 31D—blue bars) reveals a reduction during the winter months (June–August). Australian bass were only caught while line fishing so if other methods were used they were rarely successful (Figure 31E).

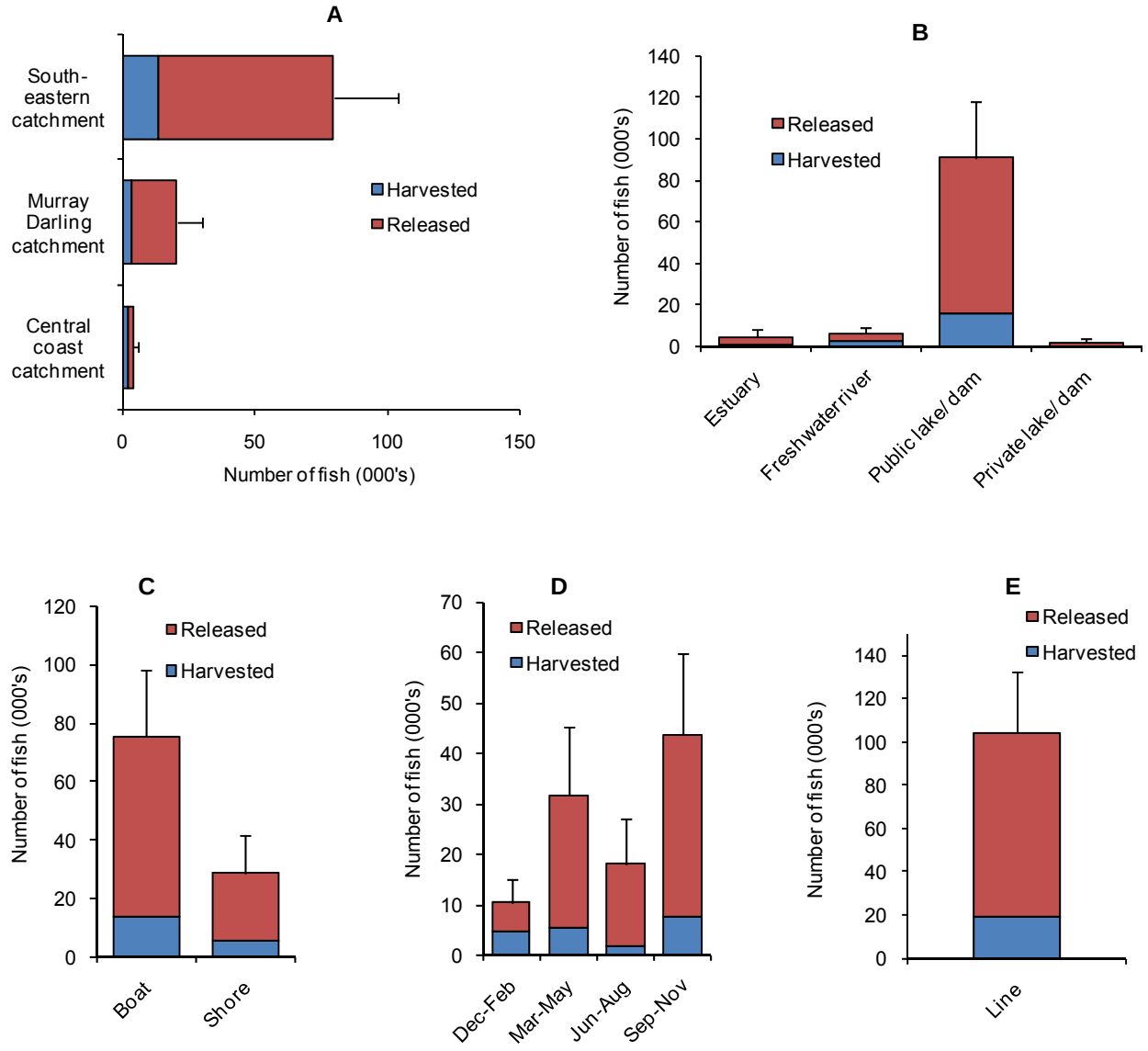


Figure 31: Australian bass catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Barramundi (Lates calcarifer)

Overall, 21% of barramundi caught were harvested and 79% were released. Generally, catches were restricted to northern Queensland, however some were caught in the south-eastern catchment (Figure 32A). The majority (63%) were caught in estuaries (Figure 32B). Most were caught from boats (74%) with the remainder caught from the shore (26%) (Figure 32C). Examining catch through the year (Figure 32D) reveals a reduction during the summer (December–February) and winter months (June–August). Almost all barramundi were caught using fishing lines (Figure 32E).

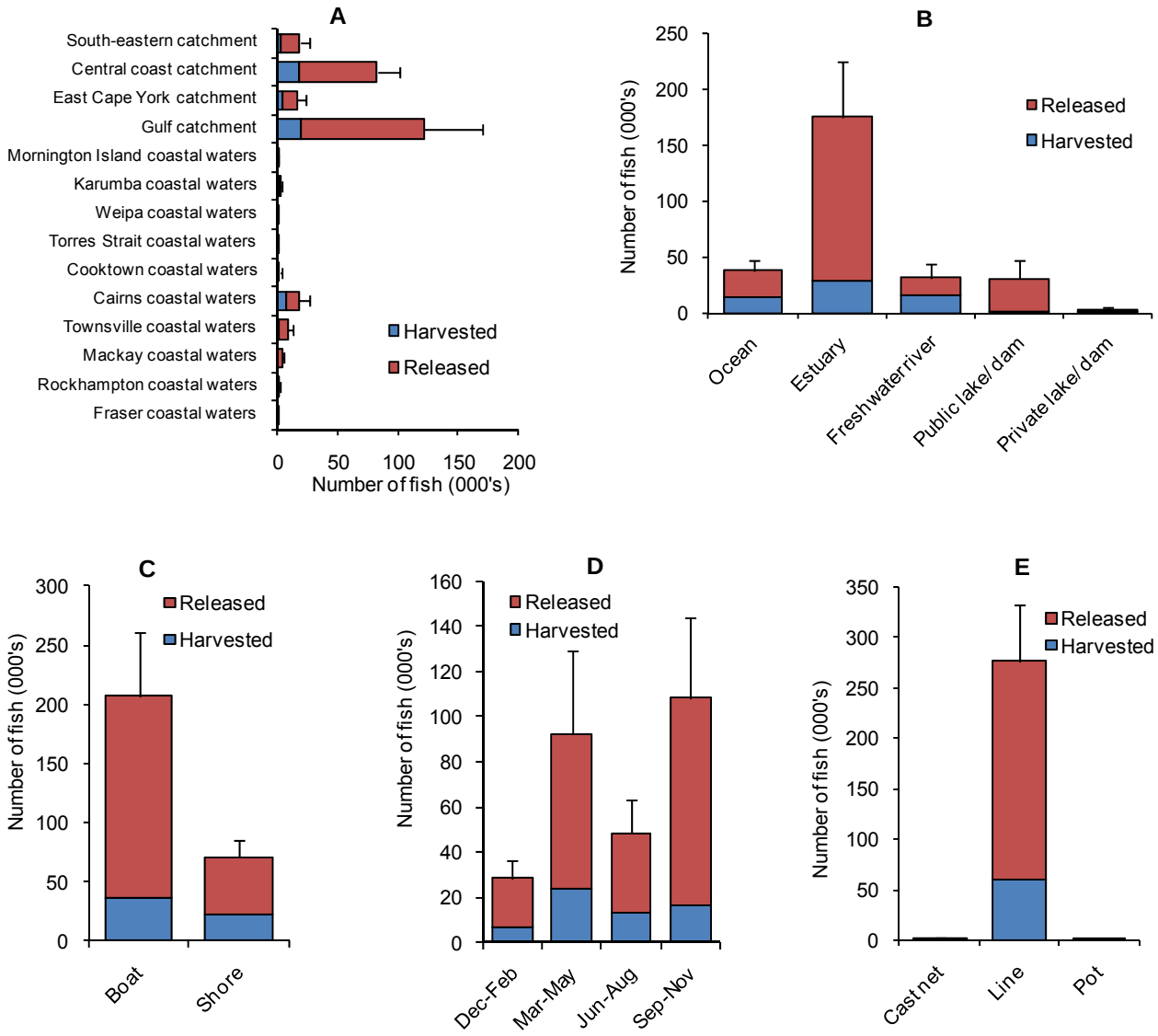


Figure 32: Barramundi catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Coral trout (Plectropomus spp and Variola spp)

Overall, 58% of coral trout caught were harvested and 42% were released. Generally, catches were restricted to the northern half of Queensland's coastal waters (Figure 33A). Almost all coral trout were caught in ocean waters (Figure 33B) and from boats (Figure 33C). Examining harvest through the year (Figure 33D—blue bars) reveals a peak in autumn (March–May) and spring (September–November) however total catch (red bars) shows a steady increase until spring. Nearly all coral trout were caught using fishing lines (Figure 33E).

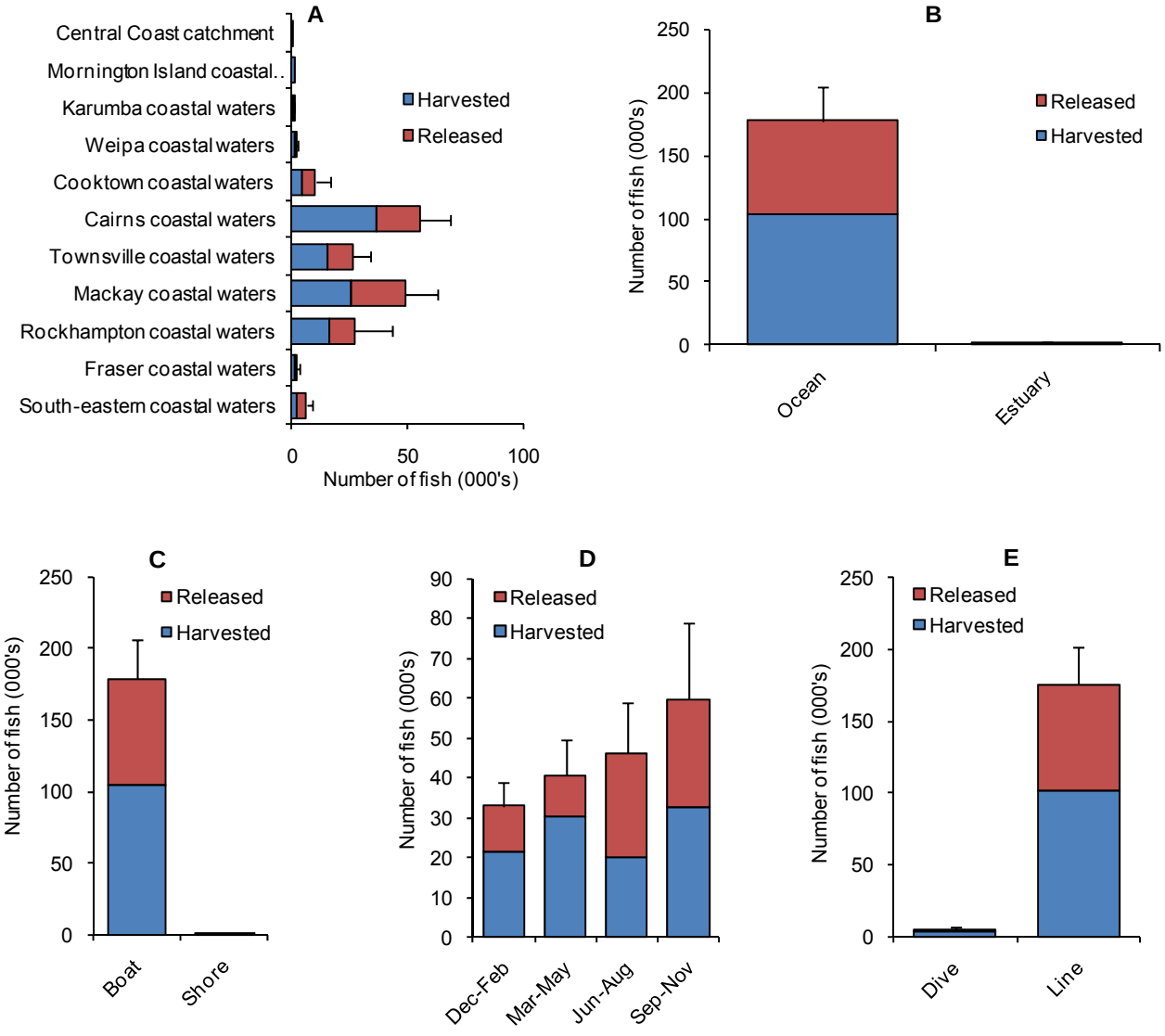


Figure 33: Coral trout catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Dusky flathead (Platycephalus fuscus)

Overall, 44% of dusky flathead caught were harvested and 56% were released. Catches were greatest in Queensland's southern marine waters (Figure 34A). The majority (71%) were caught in estuarine waters (Figure 34B) and from boats (70%) (Figure 34C). The catch in December–February was lower than the rest of the year (Figure 34D). Nearly all the dusky flathead caught were caught using fishing lines (Figure 34E).

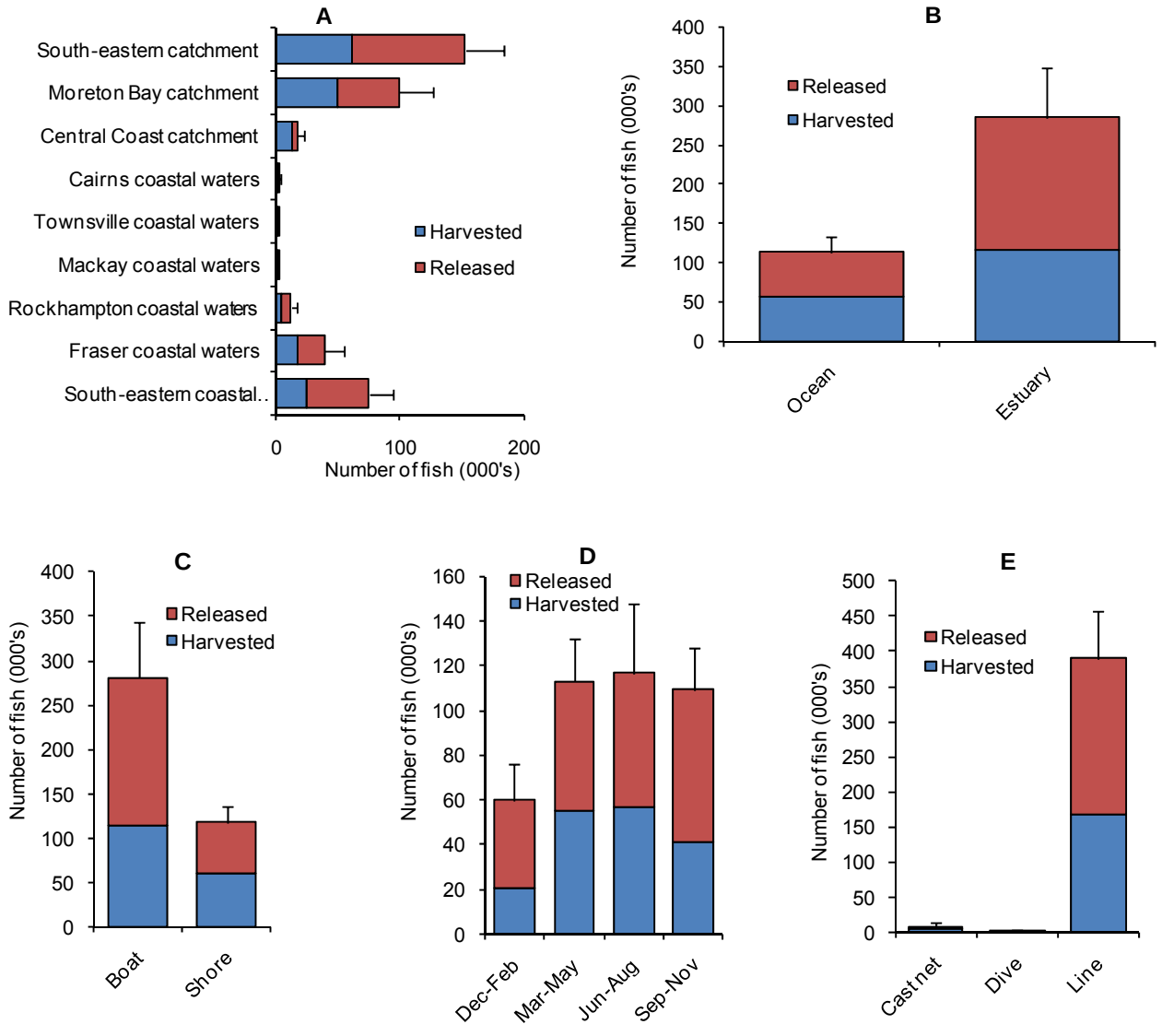


Figure 34: Dusky flathead catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

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

Overall, 27% of mud crabs caught were harvested and 73% were released. Catches were greatest in the Central Coast and south-eastern catchments (Figure 39A). The majority of the catch came from estuarine waters (83%) (Figure 39B). Fishing from a boat accounted for 87% of the catch with the remainder being caught from the shore (23%) (Figure 39C). Approximately 36% of mud crabs were caught during autumn (March–May) (Figure 39D) and almost all were caught by pot (99%) (Figure 39E).

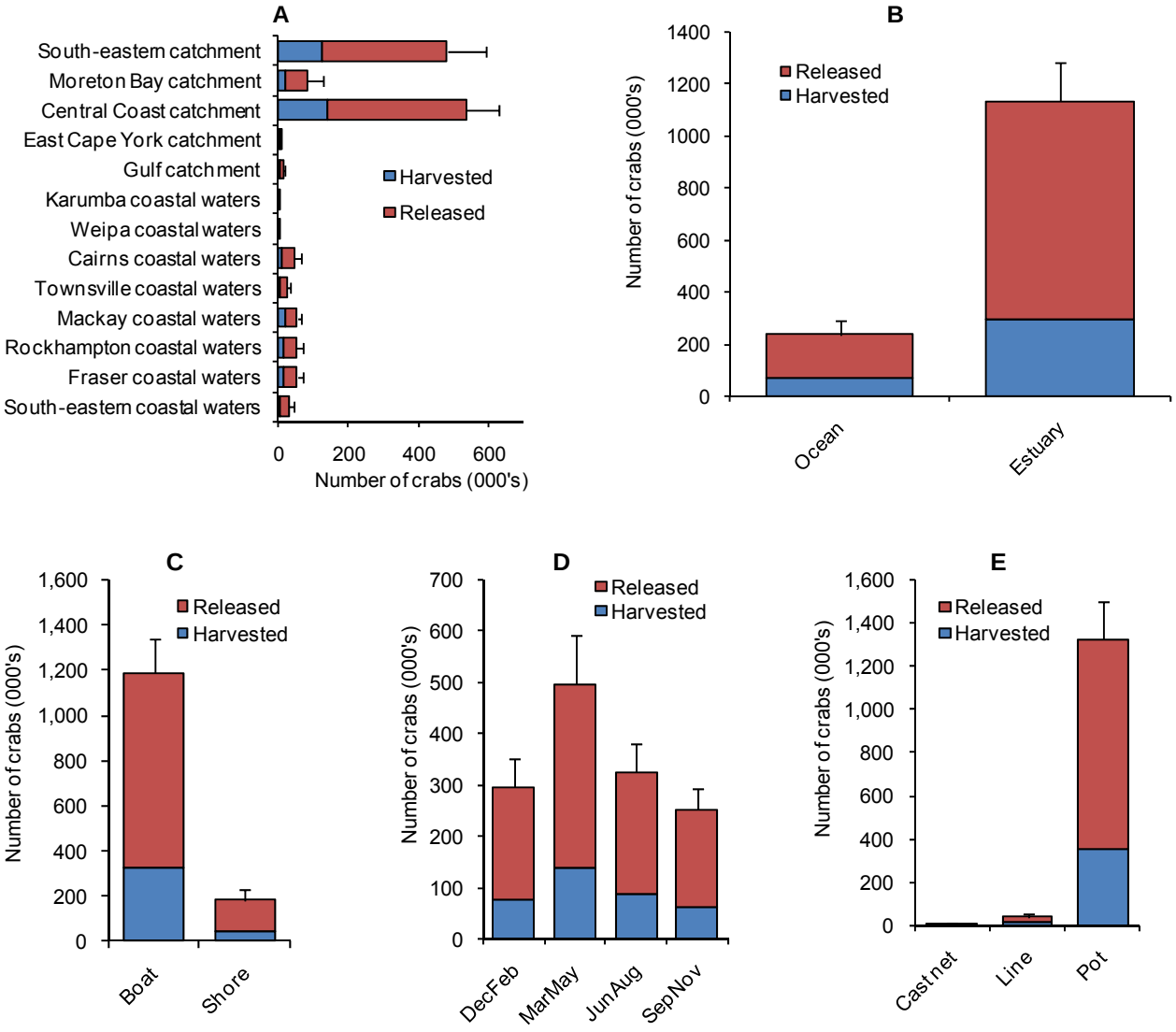


Figure 35: Mud crab catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

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

Overall, 51% of sand whiting complex caught were harvested and 49% were released. Catches were greatest in Queensland's southern marine waters (Figure 36A). Fifty-two percent were caught in ocean waters (Figure 36B) but mainly from the shore or beach (56%) rather than boats (44%) (Figure 36C). The catch and harvest of sand whiting complex varied through the year with the biggest harvest (36%) being during spring (September–November) (Figure 36D). Sand whiting complex were mainly caught by line (94%), although a substantial number (approximately 75 000 fish) were caught with cast nets and in pots (Figure 36E).

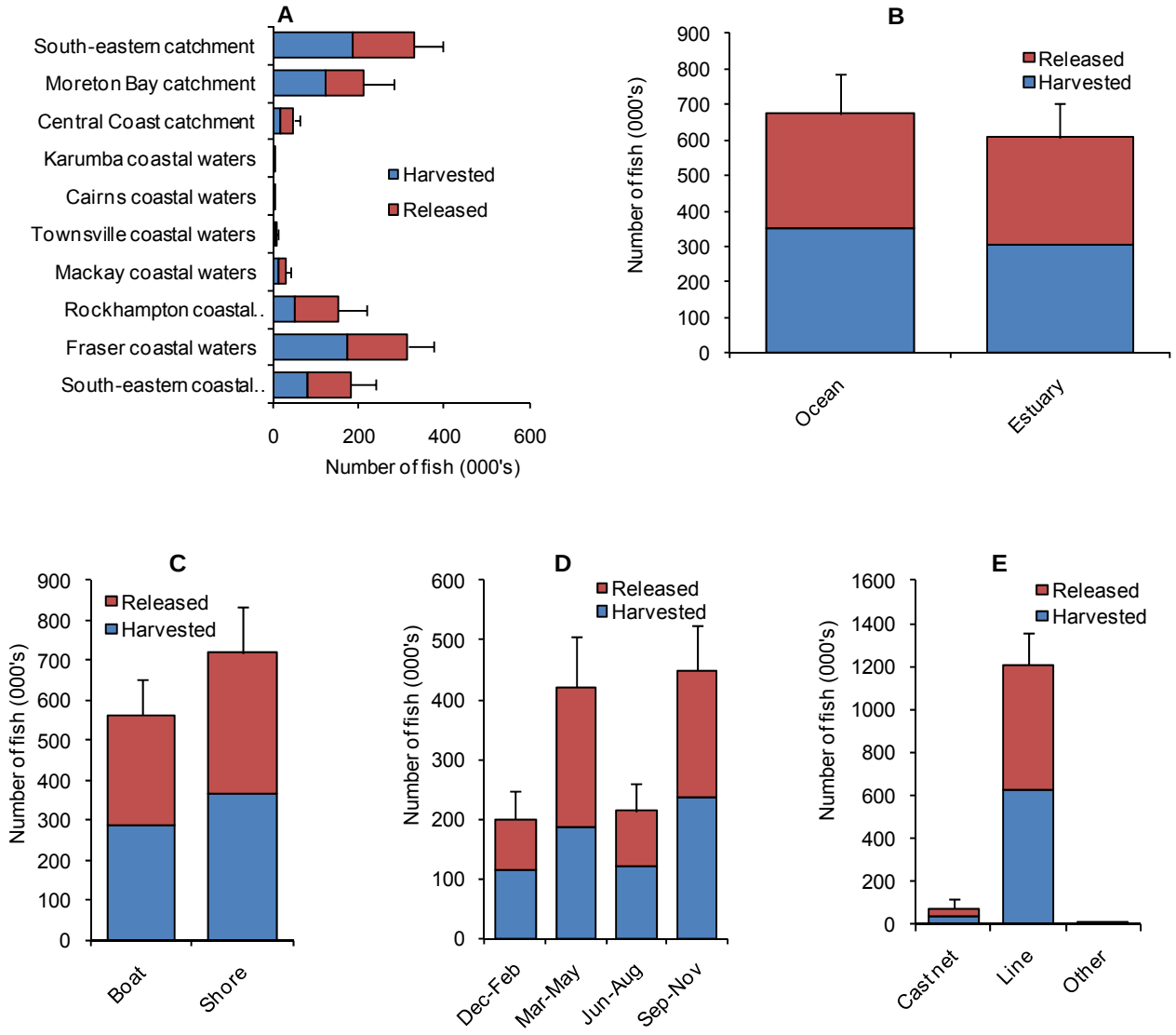


Figure 36: Sand whiting complex catch information by fishing region, water body, platform, season and method

Note: Lines above bars represent the standard error for the catch

Snapper (Pagrus auratus)

Overall, 24% of snapper caught were harvested and 76% were released. Catches were greatest in Queensland's southern marine waters (Figure 37A). The majority of the catch came from ocean waters (86%) (Figure 37B) and by fishing from a boat (94%) (Figure 37C). Just over half (51%) of the snapper catch occurred during winter (June–August) (Figure 37D). Almost all the snapper were caught using fishing lines (Figure 37E).

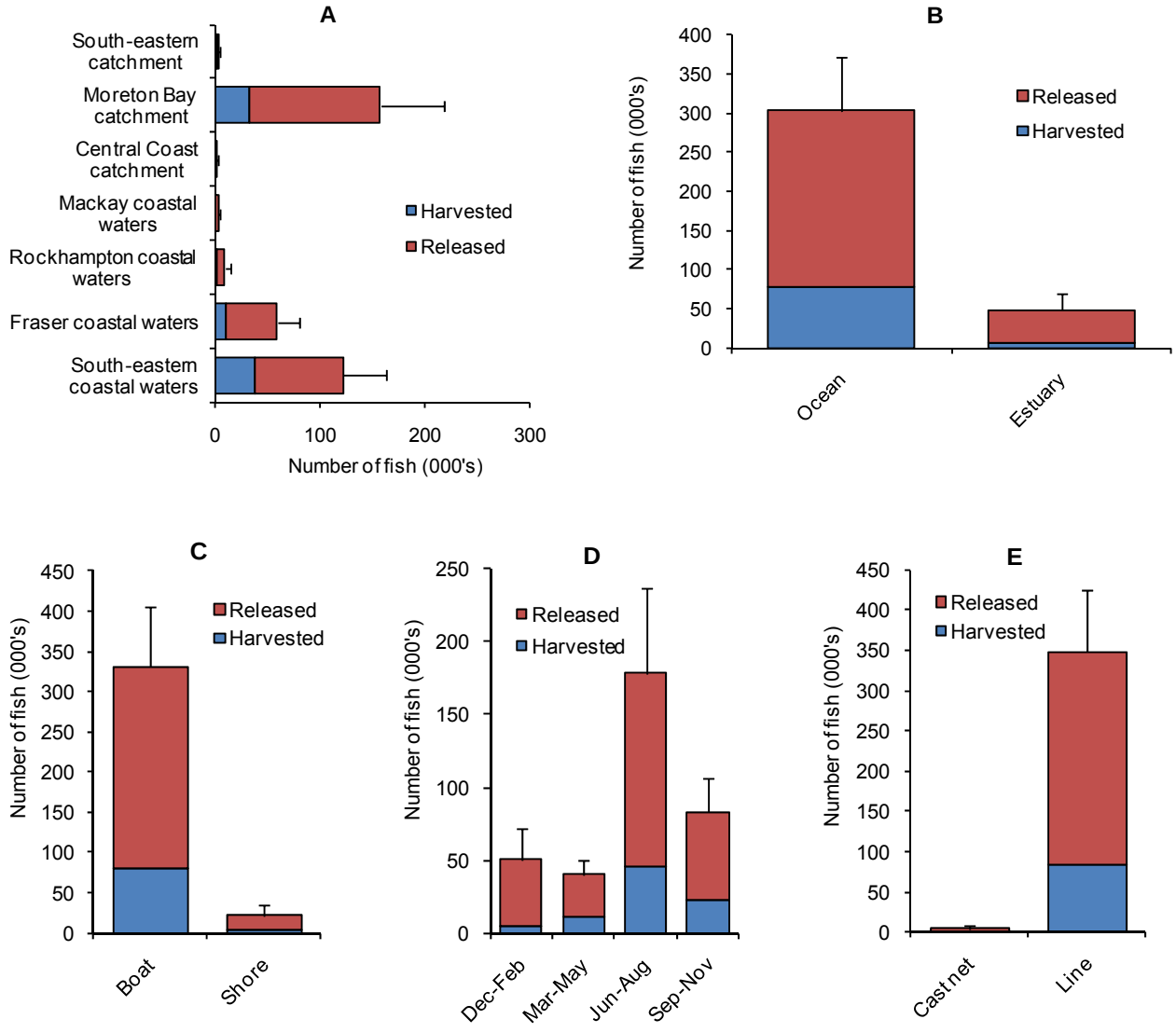


Figure 37: Snapper catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Spanish mackerel (Scomberomorus commerson)

Overall, 72% of Spanish mackerel caught were harvested and 28% were released. Catches were greatest in the Cairns and south-eastern coastal waters (Figure 38A). Nearly all Spanish mackerel were caught in ocean waters (Figure 38B) and from a boat (Figure 38C). Approximately 40% of the Spanish mackerel catch occurred during summer (December–February) (Figure 38D) and they were almost exclusively caught by line (99%) (Figure 38E).

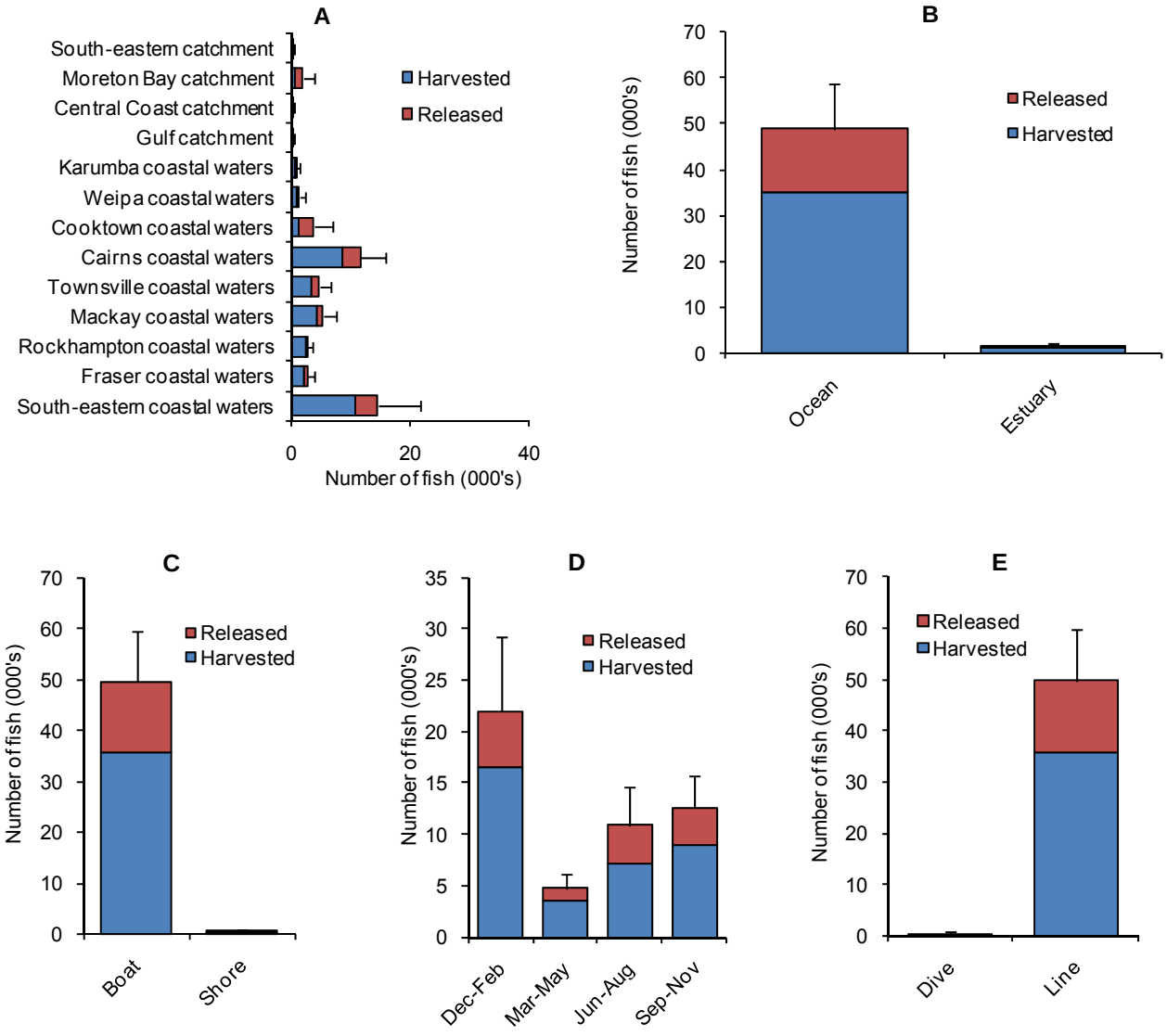


Figure 38: Spanish mackerel catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Tailor (Pomatomus saltatrix)

Overall, 57% of tailor caught were harvested and 43% were released. Catches were greatest in the Queensland's south-eastern marine waters (Figure 39A). The majority of the catch came from ocean waters (81%) (Figure 39B). Fishing from the shore accounted for 63% of the catch with the remainder being caught from boats (37%) (Figure 39C). Approximately 95% of tailor were caught during winter and spring (June–August and September–November) (Figure 39D) and almost all were caught by line (99%) (Figure 39E).

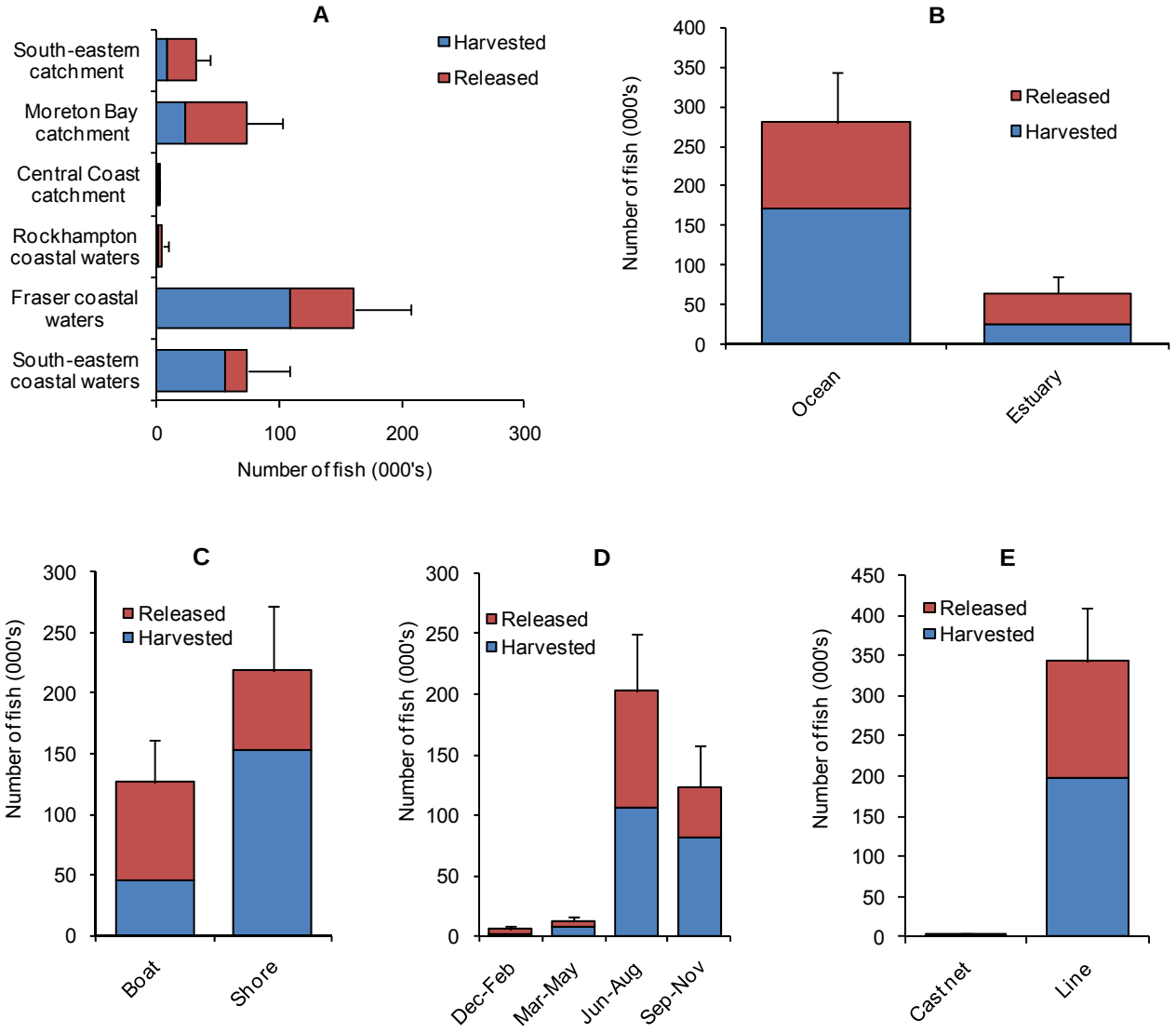


Figure 39: Tailor catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Yellowfin bream (Acanthopagrus australis)

Overall, 33% of yellowfin bream caught were harvested and 67% were released. Catches were greatest in Queensland's southern marine waters (Figure 40A). The majority (70%) were caught in estuarine waters (Figure 40B). More yellowfin bream were caught from the shore (55%) than from boats (45%) (Figure 40C). More yellowfin bream were caught and harvested during autumn (March–May) and winter (June–August) than during spring (September–November) and summer (December–February) (Figure 40D). Nearly all yellowfin bream were caught by line (96%), although a substantial number (approximately 65 000 fish) were caught with cast nets and in pots (Figure 40E).

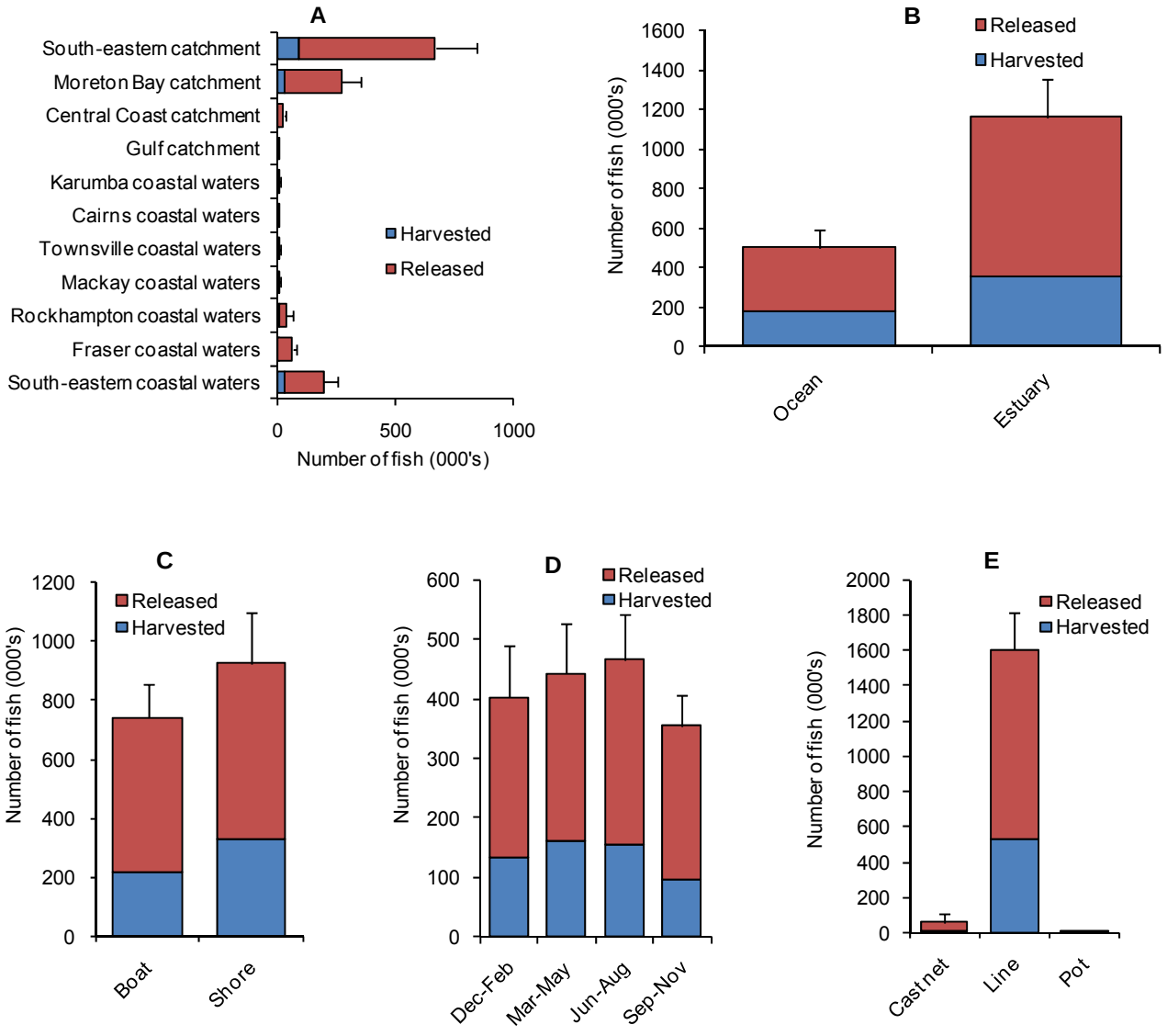


Figure 40: Yellowfin bream catch information by fishing region, water body, platform, season and method
Note: Lines above bars represent the standard error for the catch

Comparing 2000 with 2010

Number of fishers

Comparing the reanalysis of NRIFS with the current survey reveals that there were more recreational fishers in 2000 than in 2010. In 2000, an estimated 747 000 (SE=20 000) Queenslanders went recreational fishing in Queensland, representing 23% of the population aged five years or more. In 2010, 703 000 (SE=20 000) Queenslanders went recreational fishing in Queensland, representing 17% of the Queensland population aged five years or more.

Number of fishers by residential region

Although there were fewer recreational fishers in 2010 compared to 2000 across the state, within some residential regions, the number of recreational fishers increased slightly (Figure 41). In the 2010 survey, there were more recreational fishers living in the Moreton, Wide Bay-Burnett, Mackay and Far North regions than during 2000. The statewide decline in the number of recreational fishers over the last decade was largely driven by a loss of approximately 40 000 fishers in the Brisbane residential region.

The recreational fishing participation rate was substantially lower in 2010 compared to 2000 reflecting the decline in the number of the fishers combined with the large increase in the Queensland's population. The decline in participation rate was particularly apparent in the Fitzroy residential region where the participation rate dropped from 34% to 21% between 2000 and 2010 (Figure 41).

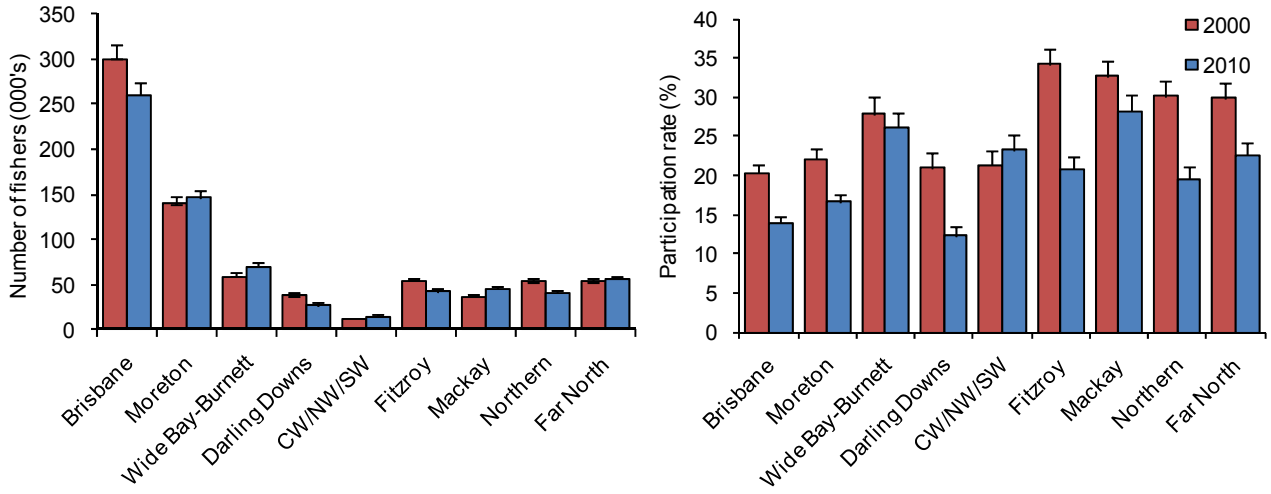


Figure 41: Number of recreational fishers (SE) and participation rates (SE) by residential region in 2000 and 2010[8]

Number of fishers by age

A shift in the age of recreational fishers occurred between 2000 and 2010 (Figure 42). In 2010, the number of fishers younger than 45 years was lower while the number aged 45 years or more was higher. The decline in the recreational fishing participation rate was more apparent in the Queensland population aged less than 45 years while the participation rate among fishers aged 60 years or more was almost identical in both surveys.

[8] Error bars represent one standard error. A recreational fisher was defined as anyone who fished once or more in the 12 months prior to April 2000 or June 2010.

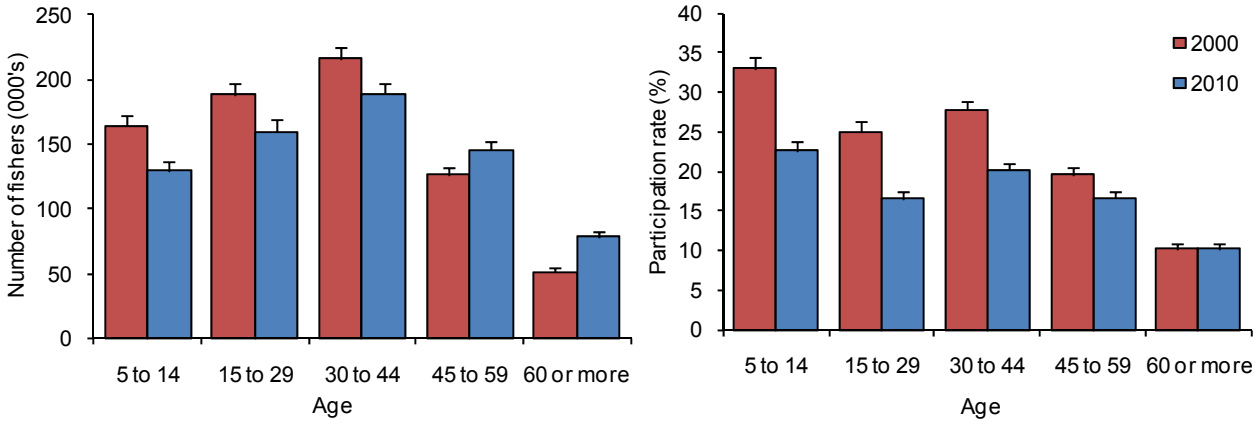


Figure 42: Number (SE) and participation rates (SE) of recreational fishers by age in 2000 and 2010[9]

Fishing and diving club membership

In 2010, an estimated 21 000 recreational fishers were members of a fishing or diving club in comparison to 28 000 fishers in 2000. The largest decline in club members occurred in the Brisbane and the Far North residential regions, although the SE was high for the Brisbane region indicating uncertainty in this estimate (Figure 43).

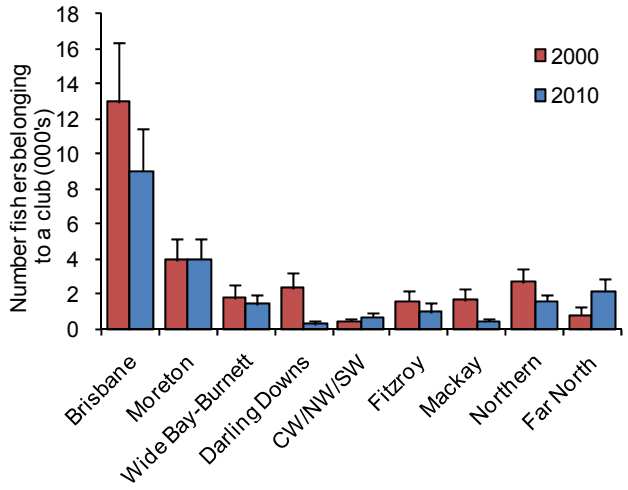


Figure 43: Number (SE) of recreational fishers belonging to a fishing or diving club in 2000 and 2010[10]

Boat ownership

The number of households that owned a boat increased from approximately 176 000 households in 2000 to an estimated 226 000 households in 2010, although the percentage of all households that owned a boat was 13% in both survey years. While boat ownership was particularly high in the Brisbane and Moreton residential regions, the rise in household boat ownership between 2000 and 2010 was most apparent in the Mackay residential region (Figure 44).

[9] Error bars represent one standard error. A recreational fisher was defined as anyone who fished once or more in the 12 months prior to April 2000 or June 2010.

[10] Club membership was assessed as of April 2000 and June 2010. Error bars represent one standard error.

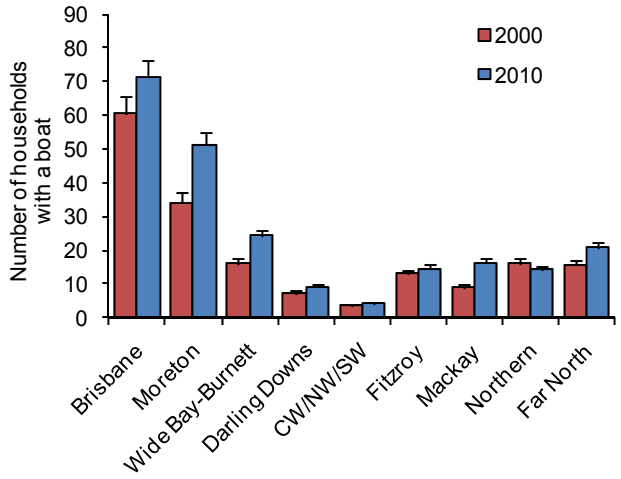


Figure 44: Number (SE) of households with a boat in 2000 and 2010[11]

Fishing effort

Statewide comparison

In 2010, an estimated 2.6 million (SE=144 000) fisher days occurred in Queensland while in 2000 recreational fishing effort was approximately 3.6 million (SE=169 000) fisher days. This represents a 28% reduction in recreational fishing effort between the two survey years and it occurred across all water bodies (ocean, estuaries, rivers, public lake/dams, private lake/dams).

Fishing method

Fishing with a line was the most popular method of fishing in 2010 and 2000, although line fishing effort was substantially less in 2010 (Figure 45). There was slightly less fishing activity with crab pots in 2010 than 2000 but fishing activity by collecting animals by hand, and by using pumps and spades (other category) was much less in 2010.

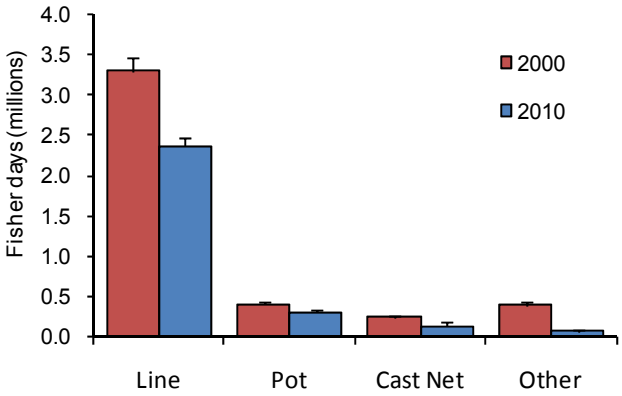


Figure 45: Fishing effort (SE) by method in 2000 and 2010[12]

[11] Boat ownership was assessed as of April 2000 and June 2010. Error bars represent one standard error

[12] Fishing effort was estimated between May 2000 to April 2001 and October 2010 to September 2011. Error bars represent one standard error.

Boat versus shore

The reduction in fishing effort between 2000 and 2010 occurred for boat-based and shore-based fishing. This decline was greater for shore-based fishing, which dropped from approximately 2.1 million fisher days in 2000 to 1.4 million fisher days in 2010 (Figure 46).

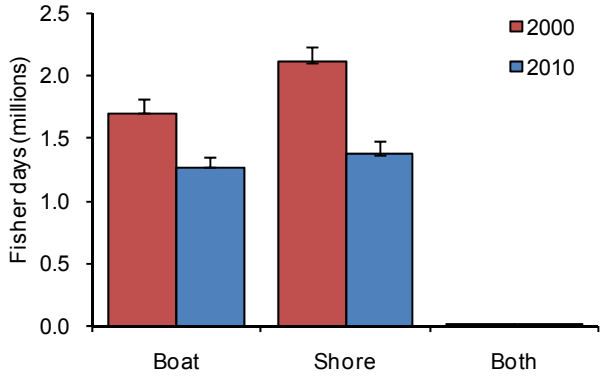


Figure 46: Fishing effort (SE) from boats or the shore in 2000 and 2010[13]

Effort by residential region

In both 2000 and 2010, over half of all recreational fishing effort resulted from fishers living in the Brisbane and Moreton regions (Figure 47). When expressed as a percentage of annual fishing effort, residents of Wide Bay-Burnett and the Mackay residential regions contributed more in 2010. In 2000, Fitzroy and Northern residents comprised a larger percentage of annual fishing effort.

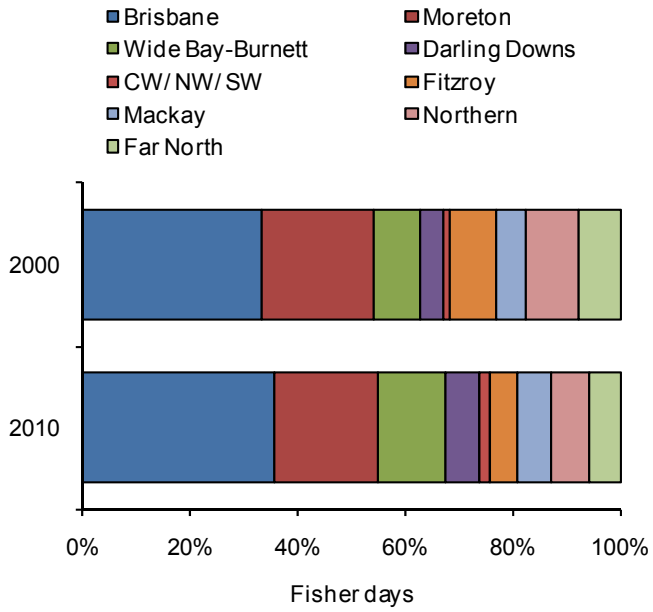


Figure 47: Fishing effort by residential region in 2000 and 2010[14]

Catch

The recreational catch was much higher in 2000 than 2010. Approximately 26.4 million fish were caught in 2000 while 13.3 million fish were caught in 2000. In both years, the catch of fish was dominated by whiting and bream (Table 16). Whiting comprised 28% of fish caught in 2000 and 25% in 2010 while bream comprised 17% of fish caught in 2000 and 22% in 2010. The catch for

[13] Fishing effort was estimated between May 2000 to April 2001 and October 2010 to September 2011. Error bars represent one standard error.

[14] Fishing effort was estimated between May 2000 to April 2001 and October 2010 to September 2011

barramundi, mangrove jack and tropical snapper was higher in 2010 while for many other fish the catch in 2000 was higher (Table 16, Figure 48).

The catch of mud crab was nearly twice as large in 2000. In 2000, approximately 2 million (SE=727 000) pippis, oysters, other shells and worms were caught (refer to the 'Other' category in Figure 46) while the catch of pippis, oysters, other shells and worms in 2010 was far less at an estimated 88 000 (SE=43 000).

Table 16: Recreational catch (SE) in 2000 and 2010[15]

	2000 catch		2010 catch	
Comparative group	**Number**	**SE**	**Number**	**SE**
Australian bass	#258 653	79 112	#104 024	28 383
Barramundi	#252 333	66 617	278 055	57 084
Bream	4 121 692	382 076	2 015 078	224 544
Cod	535 295	64 432	338 406	38 656
Coral trout	350 498	57 401	179 150	26 963
Dart	595 155	141 185	288 613	50 897
Emperor	1 029 337	221 376	311 767	44 104
Flathead	762 368	97 977	481 161	73 015
Sooty grunter	160 111	38 755	79 249	17 805
Javelin	588 924	111 661	177 384	30 945
Mackerel	273 903	61 774	162 114	25 306
Mangrove jack	96 332	21 432	123 294	21 902
Jewfish/mulloway	102 879	18 699	73 710	16 278
Parrotfish & tuskfish	#270 358	67 752	179 032	29 182
Pearl perch	#99 529	25 180	#89 386	28 982
Golden perch	370 414	60 515	169 849	29 507
Perch, other freshwater	185 644	41 426	66 969	13 336
Sharks	177 532	31 382	88 531	18 895
Snapper	623 082	147 531	352 115	76 522
Snapper, tropical	643 237	76 760	644 847	86 519
Morwong & sweetlip	#34 437	8 809	261 895	45 419
Tailor	#1 213 595	472 950	344 711	67 219
Threadfin	#187 757	61 368	56 171	9 864
Trevally	241 346	36 388	170 387	29 591
Whiting	6 771 699	1 027 245	2 252 038	336 191
Finfish, other	6 456 889	582 295	#4 036 136	1 815 558
Blue swimmer crab	#394 770	110 068	##	##
Mud crab	2 578 156	284 466	1 371 998	175 125
Prawns	6 795 739	1 303 617	2 970 854	621 380
Crustaceans, other	28 580 286	4 756 345	3 461 163	700 622
Cephalopods	##	##	#13 283	5 842
Other taxa	#2 079 386	727 186	#88 113	42 754

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

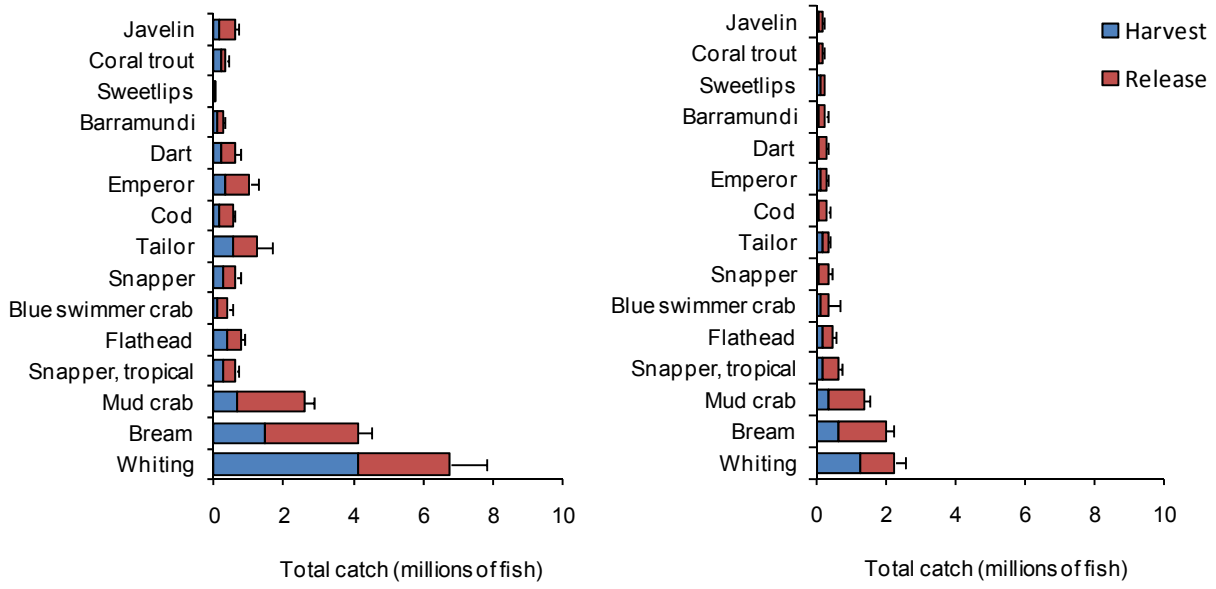
[15] Catch was estimated between May 2000 and April 2001 and between October 2010 and September 2011

Table 17: Recreational harvest and release (SE) in 2000 and 2010[16]

	2000 catch				2010 catch			
	Harvest		**Release**		**Harvest**		**Release**	
Comparative group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Australian bass	#62 322	18 235	#196 331	71 193	#19 472	7 431	#84 552	23 776
Barramundi	#87 805	21 831	#164 528	45 993	59 769	10 800	218 286	52 437
Bream	1 465 331	169 072	2 656 360	247 554	680 942	109 470	1 334 136	140 782
Cod	172 665	25 457	362 630	52 734	82 349	9 499	256 056	34 949
Coral trout	216 530	34 279	133 968	27 411	104 572	14 778	74 578	15 560
Dart	#201 856	55 883	#393 299	96 429	#104 135	26 152	184 478	32 545
Emperor	353 763	51 172	#675 574	188 466	159 096	25 540	152 671	23 336
Flathead	379 529	49 791	382 839	67 107	208 434	30 451	272 727	46 080
Sooty grunter	39 596	13 110	#120 515	33 322	#31 379	9 595	47 870	10 528
Javelin	172 586	22 769	416 338	101 480	71 841	13 449	105 543	20 678
Mackerel	200 549	47 971	#73 354	29 172	109 089	18 080	#53 025	13 589
Mangrove jack	48 608	10 772	#47 725	13 709	55 708	8 422	67 586	15 811
Jewfish/mulloway	#52 845	13 118	50 034	9 864	40 979	9 982	#32 371	11 453
Parrotfish & tuskfish	#147 436	38 678	#122 922	32 265	88 690	14 954	90 342	17 025
Pearl perch	#53 555	16 714	#45 973	14 359	#26 978	10 841	#62 409	21 597
Golden perch	216 673	40 334	153 741	29 271	87 356	15 268	82 494	18 041
Perch, other freshwater	#39 645	17 182	145 999	35 142	#16 952	5 166	50 017	10 808
Sharks	#25 603	7 030	151 929	29 329	##	##	83 094	18 021
Snapper	#252 229	76 743	#370 853	93 898	83 898	19 514	268 217	63 214
Snapper, tropical	276 036	51 746	367 201	44 828	222 442	29 213	422 404	68 556
Morwong & sweetlip	24 173	6 334	#10 263	3 676	120 335	22 561	141 560	26 513
Tailor	577 653	117 131	#635 942	447 712	197 612	44 576	147 099	31 314
Threadfin	87 266	20 090	#100 491	55 692	42 972	7 599	#13 199	3 859
Trevally	117 092	20 001	124 255	25 346	74 278	12 937	96 109	21 353
Whiting	4 144 057	864 460	2 627 643	305 529	1 302 705	226 063	949 333	129 990
Finfish, other	3 843 873	435 763	2 613 016	250 722	##	##	1 175 890	254 882
Blue swimmer crab	#117 660	32 919	#277 110	80 900	##	##	##	##
Mud crab	661 648	73 814	1 916 507	223 874	366 065	42 973	1 005 933	137 073
Prawns	6 534 031	1 285 752	#261 708	81 867	2 900 596	614 543	##	##
Crustaceans, other	25 223 252	4 509 857	3 357 034	549 702	3 032 912	591 983	#428 252	158 813
Cephalopods	#69 069	31 571	##	##	#12 683	5 819	##	##
Other taxa	#1 935 775	689 052	##	##	#88 113	42 754		

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

[16] Catch was estimated between May 2000 and April 2001 and between October 2010 and September 2011



A. B.

Figure 48: Recreational catch (SE) in 2000 (A) and 2010 (B)[17]

Testing the representativeness of the sample

A total of 5893 Queensland residents provided complete answers to the avidity and phone status questions asked at public boat ramps. Of these, 74% came from a household with a listed phone number. In terms of the estimated number of days fished over the previous 12 months (avidity), there was very little difference between fishers from listed households and all fishers interviewed (Table 18). Ordinal regression revealed a statistical difference in avidity profiles between listed and all fishers interviewed at boat ramps; however, this difference was very small, as shown in Figure 49.

Table 18: Fisher avidity profiles by listed households and all fishers interviewed

	Group	
Avidity category	**Listed households (%)**	**All interviewed (%)**
Less than 10 days	20.1	21.5
10 to 19 days	26.0	25.7
20 to 29 days	19.1	19.2
30 to 39 days	9.6	9.7
40 days or more	25.2	23.9
Total	100.0	100.0

[17] Catch was estimated between May 2000 and April 2001 and between October 2010 and September 2011

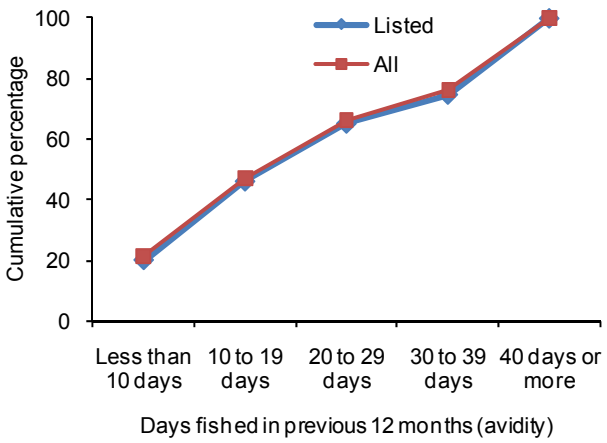


Figure 49: Cumulative avidity profile of fishers by listed households and all fishers interviewed

Discussion

Participation in recreational fishing in Queensland

Comparison with other activities

In the 12 months prior to June 2010, approximately 703 000 Queenslanders went recreational fishing in Queensland, representing 17% of the Queensland population aged five 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 cycling (ABS, 2010). Although the ABS participation in sport and physical activities survey reported a lower participation rate for recreational fishing, this may be due to fishers interviewed as part of this survey not classing recreational fishing as a sport or physical activity.

While the majority of recreational fishers lived in Southeast Queensland, particularly the Brisbane region, the highest participation rate of recreational fishing was in the Mackay and Wide Bay-Burnett regions. This demonstrates the popularity of recreational fishing across the state and shows that fishers likely contribute to the state and regional economies through their expenditure of fishing-related products and services.

Changes through time

Despite the rapid growth in the population in Queensland over the last decade, there were fewer fishers in 2010 than 2000. 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.*, 2012) and to a lesser extent Tasmania (Lyle *et a*l., 2009a). Previous research suggested that primary reasons for ceasing fishing in Queensland were due to a lack of time, loss of interest and a perception of poor fishing quality (Sutton *et al.*, 2009).

Changes in the demographics of recreational fishers have occurred in Queensland over the last decade. Compared to 2000, the proportion of fishers aged 45 years or over has increased, while the popularity of recreational fishing among the younger population has decreased. These observations are consistent with South Australia (Jones, 2009). The increase in the proportion of older fishers may be explained by the gradually ageing population in Queensland (ABS, 2011), however, reasons for the fall in participation observed among younger people are not well understood. Management, recreational fishing stakeholder groups and the tackle and boating industry would benefit from future research that aims to understand the reasons why fewer younger people choose to fish.

Recreational catch and effort

Changes through time

By analysing catch and effort information from two comparable surveys, we have seen how the fishing activity of Queenslanders has changed over a decade. While ten years is a large gap, being able to see this movement is far more useful than seeing an individual snap shot in time. Being able to compare representative surveys that use a similar methodology both through time and between states, reveals changing patterns in fishing activity and the characteristics of the fishers. This valuable information will allow managers, stakeholders and businesses to adjust and plan for the future.

Overall, both recreational catch and effort was less in 2010 than in 2000. Given the decline in the number of recreational fishers, lower catch and effort in 2010 is not surprising; however, the recreational catch in 2010 declined much more than the effort compared to 2000, indicating that people caught fewer fish for similar effort compared to a decade ago.

There are many factors that can influence the magnitude of the recreational catch including, variability in recruitment, weather, fishing pressure and changes in fisher behaviour. Compared to preceding dry years there was considerable rainfall and flooding during the 2010 diary survey, including Cyclone Yazi. Cyclones and floods, although infrequent, have always been a natural a part of Queensland's variable climate. These weather events may have made 2010 a low year in terms of effort and catch in comparison to 2000. In total, 43% of the fishers who took part in the 2010 survey felt they fished less during the survey than they did in the 12 months prior to the survey. Around a third of these fishers cited weather related reasons as the main reason for their decline in fishing activity. However, the two most common reasons cited for fishing less in 2010 were work or business commitments and family commitments. Provided these business and social reasons were not driven by weather events, for example rebuilding a flooded business, it demonstrates that business and social reasons may have been a bigger driver of lower fishing effort and catch during 2010.

The introduction of stricter possession and minimum legal size limits for popular species such as snapper, whiting, tailor and bream was intended to change fishers' behaviour and result in more fish being released but unless they served as a deterrent on fishing activity they would not be expected to lower the total catch or effort. Furthermore, previous research conducted on saltwater fishers in Queensland identified strong support for conservation of fish and regulations such as size and possession limits (Tobin *et al.*, 2010). Based on this, it is unlikely that management changes are the main reasons for the reduction in effort in 2010.

The biggest difference in recreational catch between 2000 and 2010 related to the catch of pippis, oysters, other shells and worms. Effort directed towards hand collection methods was far less in 2010. While this could be linked to the wet weather during the 2010 diary survey, it could indicate a shift towards fishers buying their bait rather than collecting it before a fishing trip. Interestingly the harvest of pippis in South Australia was also much lower in 2007 in comparison to 2000 (Jones, 2009). The fact that the South Australian survey used a very similar design to this survey and was not conducted in a year with high rainfall suggests that weather was not responsible for the reduction in pippi harvest and hand collection activity.

Quality of the results

Response rates and representativeness of the sample

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 90% of all households eligible to take part in the diary survey agreed to provide details of their fishing activities and 94% of all these households fully participated throughout the 12 month diary survey. These are exceptionally high participation and completion rates compared to other types of surveys. This clearly demonstrates that the vast majority of recreational fishers support these surveys, consider them to be a worthwhile investment of their time, and are committed to playing a role in the sustainable management of fisheries in Queensland.

The exceptionally high participation and completion rates mean the estimates in this report 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, fishers living in a household with a listed phone were very similar in their avidity to all Queensland fishers interviewed at boat ramps. While there is no current information available on the proportion of Queenslanders who have a listed phone, data collected in 2003 suggested that 81% of Queensland households had one or more phones listed in the Telstra White Pages (ABS, 2004). This percentage is similar to that obtained from fishers interviewed at boat ramps during this survey (74%), suggesting that the participation rate of listed and non-listed may also be similar. In the absence of a registry of all recreational fishers in Queensland, using the Telstra White Pages remains a viable method of obtaining a representative sample of recreational fishers who are willing to contribute data that can be used to derive statewide and regional participation, catch and effort estimates.

Species-specific information

A major improvement of this survey over previous statewide recreational fishing surveys conducted in Queensland was better identification of the different species of fish caught by recreational fishers. This was achieved by providing diarists with a colour identification guide of commonly caught fish and ensuring that interviewers routinely asked fishers to refer to their guide when reporting their fishing information. Using trained interviewers to collect the data also ensured that important information such as fishing times, reasons for release and fishing location were routinely reported by all fishers.

Although this survey provided precise statewide catch estimates for many commonly-caught species, the estimate for blue swimmer crab harvest was unreliable (RSE was greater than 50%). For the blue swimmer crab harvest, the upper and lower range of the 95% confidence limits were 313 078 and one, respectively. This was largely due to high variability in the catches between fishers in the survey, and demonstrates the fact that an individual survey cannot provide precise estimates for every species caught by recreational fishers.

Conclusion and recommendations

This survey has provided the most detailed statewide information on the demographics of fishers, their recreational catch and effort that Queensland has ever had. This valuable information will be incorporated into stock assessment models and will assist Fisheries Queensland in ensuring that fisheries are sustainable. This report only presents an overview of the extensive data set collected. Fisheries Queensland welcomes data requests from the public wishing to make use of this valuable resource.

As highlighted by the comparisons with the earlier NRIFS survey completed in 2000–2001, the really beneficial knowledge comes from revealing the patterns in fishing activity and catches through time rather than one off ‘snap shots’. Matching the frequency of these statewide surveys to the dynamic and rapidly changing Queensland population and environment is the key to ensuring that managers, stakeholders and businesses that rely on recreational fishing in Queensland have access to accurate and current information. Therefore statewide information on recreational fishers and their catch should be collected every two to three years to ensure that these decisions can be made using current knowledge rather than outdated information. Importantly, future monitoring should build upon the approach outlined here and ensure comparability between these and future results.

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Appendix

1. Sampling the Telstra White Pages

Access to the electronic Telstra White Pages is restricted so phone numbers were randomly selected from the actual White Pages phone telephone directories. Between March and June 2010 selections were drawn from the latest versions of the 10 telephone directories in Queensland. No substitution of selected phone numbers occurred and if a household was not contactable after at least 15 phone calls it was coded as 'sample loss'. Sampling was conducted in three waves to achieve pre-determined targets of households participating in the diary survey (minimum of 110 households in each residential region).

2. Expansion of survey data

Survey results were expanded to the Queensland population using the RecSurvey package (Lyle *et al.*, 2009b), which has been successfully used in similar surveys conducted in South Australia, Tasmania and the Northern Territory. 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 (Catalogue number 3101) 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 2010, 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 ensure all final estimates were representative of the Queensland population. For a detailed explanation of how the RecSurvey process works, refer to (Lyle *et al.*, 2009b).

3. Data collected: 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. Therefore an overview of the type (field names and description) of information collected is presented in the following tables to assist people wanting to request additional analyses not presented in this report. These data can be requested by completing a data request form available by contacting Fisheries Queensland's data coordinator.

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	Avidity categories
The average avidity of fishers in the household prior to the survey	Avidity 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

Person data fields

Description of field	Data recorded
Age group	Categories
Age (for those who participated in the diary phase)	Age as a number
Gender	M/F
Did the person fish outside Queensland in the 12 months prior to the survey	Y/N
Did the person fish in Queensland in the 12 months prior to the survey	Y/N
Is the person a member of a fishing or diving club	Y/N
Number of persons in the household	Number

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 below)
Location	Name e.g. name of river, name of beach
Primary target	Species name
Secondary target	Species name
Depth	Water depth for offshore fishing (metres)
Fishing method	See method types (see table below)
Number of pieces of gear e.g. number of pots	Number
Platform	Boat, shore, both
Boat type	Private, hire, charter
Shore type	Beach, rocks, man-made (public/private), other natural

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

Water body types

Ocean waters
River/estuary (marine)
River/stream (freshwater)
Public lake/dam
Private lake/dam

Method types

Method	Description
Lines—bait	Line
Lines—lure/jig/fly	Line
Lines—both	Line
Pot/trap passive	Pot
Net—cast	Cast net
Net—drag/seine	Other
Net—scoop/push	Other
Spear fishing	Dive
Other diving	Dive
Hook/pump/rake/spade	Other
Other hand collecting	Other
Other	Other

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 their possession limit.
Possession limit	Fisher had reached possession limit
Catch and release	Fisher was doing 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 to 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
Other	Any other reason for releasing the fish

4. Number of recreational fishers in 2010 by age and gender

	Males		Females		Total	
Age Group	**Fishers**	**SE**	**Fishers**	**SE**	**Fishers**	**SE**
5–14	80 552	4 839	49 008	3 902	129 560	6 928
15–29	108 106	6 226	51 757	4 280	159 863	8 790
30–44	124 913	5 034	64 058	3 774	188 971	7 585
45–59	101 862	4 283	43 925	2 996	145 787	6 208
60 or more	57 947	3 345	20 891	1 921	78 838	4 393

All relative standard errors for estimates in this table are less than 15%, indicating good estimates.

5. Number of recreational fishers in 2010 by residential region, age and gender

		Male		Female		Total	
Residential region	**Age group**	**Fishers**	**SE**	**Fishers**	**SE**	**Fishers**	**SE**
Brisbane							
	5–14	30 146	3 636	19 932	2 921	50 078	5 223
	15–29	38 995	4 702	15 646	3 064	54 641	6 454
	30–44	49 312	3 769	25 503	2 846	74 814	5 728
	45–59	37 495	3 174	14 743	2 141	52 238	4 542
	60 or more	21 361	2 456	6 699	1 263	28 060	3 064
	Total					259 831	14 856
Moreton							
	5–14	18 256	2 362	9 312	1 784	27 568	3 249
	15–29	22 729	3 090	9 793	2 083	32 522	4 459
	30–44	25 184	2 513	10 723	1 750	35 908	3 601
	45–59	20 962	2 086	9 277	1 492	30 239	3 086
	60 or more	13 492	1 700	5 935	1 111	19 427	2 350
	Total					145 663	9 397
Wide Bay-Burnett							
	5–14	8 894	1 326	5 259	1 042	14 154	1 881
	15–29	7 473	1 168	4 415	963	11 888	1 766
	30–44	10 670	1 045	7 107	980	17 777	1 796
	45–59	11 062	1 103	5 892	917	16 954	1 657
	60 or more	7 154	896	2 496	541	9 650	1 235
	Total					70 423	4 855
Darling Downs							
	5–14	#2 185	562	#2 301	666	4 486	920
	15–29	5 766	1 029	#2 582	687	8 348	1 398
	30–44	4 359	654	#1 724	444	6 083	957
	45–59	4 455	675	#1 311	363	5 766	880
	60 or more	1 850	391	##	##	2 229	485
	Total					26 912	2 898
CW/NW/SW							
	5–14	1 865	294	1238	248	3 102	432
	15–29	2 239	361	1604	299	3 843	543
	30–44	2 672	287	1 327	229	3 999	442
	45–59	1 804	238	1 025	189	2 829	377
	60 or more	941	187	#416	123	1 357	271
	Total					15 130	1 256

		Male		Female		Total	
Residential region	**Age group**	**Fishers**	**SE**	**Fishers**	**SE**	**Fishers**	**SE**
Fitzroy							
	5–14	4 169	735	#3 148	803	7 317	1 233
	15–29	6 894	978	3 856	758	10 750	1 441
	30–44	7 356	808	3 609	619	10 965	1 268
	45–59	5 646	677	2 779	498	8 425	1 037
	60 or more	3 195	549	#1 556	398	4 751	849
	Total					42 208	3 378
Mackay							
	5–14	4 056	652	3 066	696	7 122	1 086
	15–29	6 960	1 057	4 375	886	11 335	1 640
	30–44	9 161	919	5 097	705	14 258	1 406
	45–59	6 202	750	2 103	479	8 304	1 045
	60 or more	3 002	541	1 300	374	4 302	800
	Total					45 322	3 478
Northern							
	5–14	4 561	723	2 372	538	6 933	1 022
	15–29	5 959	937	4 504	867	10 463	1 447
	30–44	6 762	773	3 286	554	10 048	1 116
	45–59	6 428	649	3 194	504	9 622	1 013
	60 or more	3 036	499	#1 175	316	4 210	715
	Total					41 277	3 108
Far North							
	5–14	6 421	983	#2 381	709	8 801	1 363
	15–29	11 091	1 267	4 981	1 000	16 072	1 873
	30–44	9 438	1 059	5 681	828	15 119	1 613
	45–59	7 808	861	3 602	654	11 410	1 238
	60 or more	3 917	661	#934	344	4 850	829
	Total					56 253	4 045

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.

6. Catch for all species

			Catch		Harvested		Released	
Group name	**Common name**	**Scientific name**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Amberjack	Amberjack	*Seriola dumerili*	##	##	##	##	##	##
Australian salmon	Australian salmon	Arripidae	##	##	##	##		
Barramundi	Barramundi	*Lates calcarifer*	278 055	57 084	59 769	10 800	218 286	52 437
Bream	Pikey bream	*Acanthopagrus berda*	348 067	45 966	134 125	19 430	213 942	32 339
	Tarwhine	*Rhabdosargus sarba*	##	##	#7 511	3 188	##	##
	Yellowfin bream	*Acanthopagrus australis*	1 667 011	217 726	546 817	107 386	1 120 194	134 937
Catfish	Forktail catfish—unspecified	Ariidae	169 583	24 032	#14 178	4 855	155 405	22 929
	Eeltail catfish—unspecified	Plotosidae	168 605	26 934	#39 392	11 037	129 213	22 842
Cephalopod	Pencil squid	*Uroteuthis (Photololigo) spp.*	##	##	##	##	##	##
	Tiger squid	*Sepioteuthis lessoniana*	##	##	##	##		
Cobia	Cobia	*Rachycentron canadum*	#7 494	2 191	#5 360	2 010	#2 134	843
Cod & groper	Cod & groper—unspecified	Several families (Moridae, Serranidae)	309 546	37 872	74 607	9 186	234 939	34 231
Coral trout	Coral trout—unspecified	Serranidae	179 150	26 963	104 572	14 778	74 578	15 560
Crab	Blue swimmer crab	*Portunus armatus*	##	##	##	##	##	##
	Crab—unspecified	Brachyura	##	##	##	##	##	##
	Mud crab	*Scylla spp*	1 371 998	175 125	366 065	42 973	1 005 933	137 073
Crayfish	Red claw	*Cherax quadricarinatus*	#1 455 942	475 468	#1 281 404	431 164	#174 538	78 278
	Yabby freshwater	*Cherax spp.*	#127 620	34 157	#93 677	27 322	#33 943	13 599
Dart	Dart—unspecified	*Trachinotus spp.*	288 613	50 897	#104 135	26 152	184 478	32 545
Drummer	Drummers Sweeps—unspecified	*Kyphosus spp.*	##	##	##	##		
Eel	Eel—unspecified	Anguillidae	30 379	6 571	#2 306	1 075	28 073	6 383
Emperor	Emperor—unspecified	Lethrinidae	##	##	##	##	##	##
	Grass emperor	*Lethrinus laticaudis*	59 654	13 072	#27 043	7 328	#32 611	8 393
	Redthroat emperor	*Lethrinus miniatus*	119 139	26 063	65 445	15 311	53 694	13 297
	Seabream Coral bream—unspecified	Lethrinidae	##	##	##	##	##	##
	Spangled emperor	*Lethrinus nebulosus*	30 025	7 400	#20 005	6 273	#10 021	2 692
European carp	European carp	*Cyprinus carpio*	#94 184	27 143	#77 773	26 130	#16 411	7 258
Finfish—other	Archerfish	Toxotidae	#2 215	896	##	##	#1 999	819

			Catch		Harvested		Released	
Group name	**Common name**	**Scientific name**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
	Black marlin	*Makaira indica*	##	##			##	##
	Chinaman fish	*Symphorus nematophorus*	#5 880	2 550	##	##	#5 442	2 512
	Diamond fish	*Monodactylus argenteus*	##	##	##	##	#16 669	8 139
	Dory—unspecified	Zeidae, Cyttidae—undifferentiated	##	##	##	##	##	##
	Fish—unspecified	Several Families	##	##	##	##	##	##
	Frogfish	Batrachoididae	##	##			##	##
	Goatfishes—unspecified	Mullidae	##	##	##	##	##	##
	Grinners and lizardfish—unspecified	Synodontidae	##	##	##	##	##	##
	Gurnard—unspecified	Triglidae and Peristediidae—undifferentiated	##	##			##	##
	Long tom	Belonidae—undifferentiated	#2 367	1 159	##	##	##	##
	Luderick	*Girella tricuspidata*	##	##			##	##
	Mahi mahi	*Coryphaena hippurus*	#3 962	1 858	#2 161	1 079	##	##
	Moonfish batfish—unspecified	Ephippidae and Drepaneidae spp.	#2 871	1 036	##	##	#2 511	1 005
	Northern saratoga	*Scleropages jardinii*	##	##	##	##	##	##
	Rabbitfish	*Siganus spp.*	#10 680	4 627			#10 680	4 627
	Rainbow fish	Pseudomugilidae	##	##	##	##	##	##
	Remora	*Remora remora*	##	##			##	##
	Sailfish	*Istiophorus platypterus*	##	##			##	##
	Scat	Scatophagidae	##	##	##	##	##	##
	Sergeant baker	*Aulopus purpurissatus*	##	##			##	##
	Stargazer—unspecified	Uranoscopidae	##	##			##	##
	Tilapia—unspecified	*Tilapia mariae* and *Oreochromis mossambicus*	#38 110	17 469	#36 718	17 416	##	##
	Toadfish pufferfish—unspecified	Several Families	#119 910	32 585	##	##	#113 959	32 339
Flatfish	Flounder and flatfish—unspecified	Bothidae and Pleuronectidae	#20 229	6 850	#10 977	5 333	#9 251	2 477
Flathead	Bartail flathead	*Platycephalus indicus*	##	##	##	##		
	Dusky flathead	*Platycephalus fuscus*	399 059	68 978	174 367	28 913	224 692	43 193
	Northern sand flathead	*Platycephalus endrachtensis*	74 530	11 042	30 192	4 985	44 337	8 382
	Yellowtail flathead	*Platycephalus westraliae*	##	##	#3 673	1 639	##	##
Freshwater bass, cod & perch	Australian bass	*Macquaria novemaculeata*	#104 024	28 383	#19 472	7 431	#84 552	23 776
	Estuary perch	*Macquaria colonorum*	##	##	##	##	##	##

			Catch		Harvested		Released	
Group name	**Common name**	**Scientific name**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
	Freshwater cod—unspecified	Percichthyidae	#23 500	6 919	#6 987	2 381	#16 513	6 257
	Golden perch	*Macquaria ambigua*	169 849	29 507	87 356	15 268	82 494	18 041
	Murray cod	*Maccullochella peeli*	##	##	##	##	##	##
	Spangled perch[1]	*Leiopotherapon unicolor*	#26 788	8 916	#7 110	3 155	#19 678	7 171
Garfish	Garfish—unspecified	Hemiramphidae	#65 492	24 976	#50 326	23 318	#15 166	5 582
Grunter	Silver perch[1]	*Bidyanus bidyanus*	40 181	9 256	#9 842	3 410	#30 339	7 918
	Sooty grunter	*Hephaestus fuliginosus*	79 249	17 805	#31 379	9 595	47 870	10 528
	Trumpeter and grunters—unspecified	Several families	##	##	##	##		
Herring/pilchard	Herring—unspecified	Clupeidae	##	##	##	##	##	##
	Oxeye herring	*Megalops cyprinoides*	##	##	##	##	#5 498	2 531
Javelin	Barred javelin	*Pomadasys kaakan*	134 889	28 900	51 268	11 878	83 620	19 285
	Silver javelin	*Pomadasys argenteus*	42 495	8 726	#20 572	5 747	#21 923	5 506
Jewfish	Black jewfish	*Protonibea diacanthus*	##	##	##	##		
	Jewfish—unspecified	Scianidae	#34 524	12 030	#17 821	7 125	##	##
	Mulloway	*Argyrosomus japonicus*	#38 163	10 681	#22 134	6 699	#16 028	7 004
	Teraglin	*Atractoscion aequidens*	##	##	##	##	##	##
Kingfish	Yellowtail kingfish	*Seriola lalandi*	##	##	##	##	##	##
Leather jacket	Leatherjackets—unspecified	Monacanthidae	##	##			##	##
Lobster	Ornate rocklobster	*Panulirus ornatus*	##	##	##	##		
Mackerel	Blue mackerel	*Scomber australasicus*	##	##	##	##	##	##
	Grey mackerel	*Scomberomorus semifasciatus*	##	##	##	##	##	##
	School mackerel	*Scomberomorus queenslandicus*	60 453	14 322	38 081	8 244	#22 372	10 573
	Shark mackerel	*Grammatorcynus bicarinatus*	##	##	##	##		
	Spanish mackerel	*Scomberomorus commerson*	50 260	9 846	36 208	6 582	#14 053	4 266
	Spotted mackerel	*Scomberomorus munroi*	#45 681	16 003	#30 380	12 545	#15 301	6 611
	Wahoo	*Acanthocybium solandri*	##	##	##	##	##	##
Morwong & sweetlip	Morwong & sweetlip—unspecified	Cheilodactylidae and Haemulidae	261 895	45 419	120 335	22 561	141 560	26 513
Mullet	Mullet—unspecified	Mugilidae	##	##	#445 155	211 766	##	##
Worm	Beach worms	Onuphidae—undifferentiated	##	##	##	##		

[1] The two species, spangled perch and silver perch, have been grouped together elsewhere in this report as 'Perch—other freshwater'. For example, see Table 6

			Catch		Harvested		Released	
Group name	**Common name**	**Scientific name**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Mollusc	Oysters	Ostreidae and Pteriidae	##	##	##	##		
	Pippi Cockle	Donacidae—undifferentiated	##	##	##	##		
Parrotfish	Parrot fish—unspecified	Scaridae—undifferentiated	110 849	18 509	54 413	10 366	56 435	10 574
Pearl perch	Pearl perch	*Glaucosoma scapulare*	#89 386	28 982	#26 978	10 841	#62 409	21 597
Pike	Barracuda—unspecified	*Sphyraena spp*	#6 906	2 023	##	##	#6 347	1 937
	Pikes	Sphyraenidae and Dinolestidae	#109 023	52 376	##	##	##	##
Prawn	Shrimps—freshwater	*Macrobrachium spp*	#95 557	36 864	#88 632	36 138	##	##
	Prawns—marine	Penaeidea	2 970 854	621 380	2 900 596	614 543	##	##
Scad	Yellowtail scad	*Trachurus novaezelandiae*	##	##	##	##		
Sharks & rays	Blue shark	*Prionace glauca*	##	##			##	##
	Grey carpetshark	*Chiloscyllium spp.*	##	##			##	##
	Hammerhead shark	Sphyrnidae	#1 671	621			#1 671	621
	Rays skates—unspecified	Several Families (e.g.Rhinobatidae, Dasyatidae)	26 110	5 724	##	##	26 039	5 723
	School shark	*Galeorhinus galeus*	##	##	##	##	##	##
	Shark—unspecified	Several Families	24 964	5 009	##	##	24 438	4 898
	Shortfin Mako shark	*Isurus oxyrinchus*	##	##			##	##
	Shovelnose ray and guitar fish—unspecified	Rhinobatidae and Rhinidae	#22 067	6 588	##	##	#21 305	6 534
	Whaler and weasel sharks—unspecified	*Carcharhinus spp.*	#50 468	16 975	##	##	#45 840	16 039
	Wobbegong—unspecified	*Orectolobus spp.*	##	##			##	##
Small baitfish	Small baitfish	Several families	#373 342	94 801	#316 453	83 915	#56 889	27 619
Snapper	Snapper	*Pagrus auratus*	352 115	76 522	83 898	19 514	268 217	63 214
Tailor	Tailor	*Pomatomus saltatrix*	344 711	67 219	197 612	44 576	147 099	31 314
Threadfin	Blue threadfin	*Eleutheronema tetradactylum*	39 417	8 487	30 427	6 221	#8 991	3 207
	King threadfin	*Polydactylus macrochir*	#16 753	4 431	#12 545	3 621	##	##
Trevally	Giant trevally	*Caranx ignobilis*	#84 313	21 187	29 078	7 042	#55 235	17 128
	Golden trevally	*Gnathanodon speciosus*	72 947	14 040	36 818	7 811	#36 130	9 277
	Queenfish	*Scomberoides spp.*	#25 048	11 121	#9 672	3 244	##	##
	Silver trevally	*Pseudocaranx dentex*	##	##	##	##		
	Trevally—unspecified	Carangidae	#12 016	4 482	#7 271	3 093	#4 745	2 343

			Catch		Harvested		Released	
Group name	**Common name**	**Scientific name**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Tropical snapper & sea perch	Crimson and saddletail snapper	*Lutjanus spp.*	165 003	29 473	68 671	13 815	96 332	22 288
	Fusiliers	Caesionidae	#24 689	10 011	##	##	#17 668	8 467
	Golden snapper	*Lutjanus johnii*	#38 693	12 482	#21 928	7 655	#16 765	7 875
	Hussar	*Lutjanus vitta and Lutjanus adetii*	#157 845	50 011	#65 334	16 800	#92 511	39 457
	Jobfish	Lutjanidae	#5 194	2 248	#4 755	2 097	##	##
	Mangrove jack	*Lutjanus argentimaculatus*	123 294	21 902	55 708	8 422	67 586	15 811
	Moses snapper	*Lutjanus russellii*	162 794	38 156	41 222	8 909	#121 572	32 116
	Red emperor	*Lutjanus sebae*	89 381	14 735	34 608	6 707	54 773	11 178
	Stripey snapper	*Lutjanus carponotatus*	#118 887	31 312	24 706	4 651	#94 181	29 603
	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)	##	##			##	##
	Yellowfin tuna	*Thunnus albacares*	##	##	##	##		
Whiting	Sand whiting complex	*Sillago ciliata analis and sihama*	1 282 561	157 257	656 866	90 185	625 695	87 218
	Trumpeter whiting	*Sillago maculata*	#969 477	245 831	#645 839	178 553	323 639	77 140
Wrasse	Maori wrasse	Labridae—*Cheilinus and Oxycheilinus spp*	##	##			##	##
	Pigfish—unspecified	*Bodianus spp.*	##	##	##	##	##	##
	Tuskfish—unspecified	*Choerodon spp*	#68 183	19 031	#34 277	8 864	#33 906	11 438
	Wrasse—unspecified	Labridae	#4 566	2 244	##	##	##	##
Yabbies	Marine yabbies or ghost nippers	*Callianassa australiensis*	#1 775 093	483 677	1 562 475	369 087	##	##

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; ## indicates the RSE is greater than 50% and the estimate is considered unreliable for general purposes.