Northern Territory Government

Survey of Recreational Fishing in the Northern Territory

2009–10

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Survey of Recreational Fishing in the Northern Territory, 2009-10

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SUMMARY

Background

This study represents the third comprehensive assessment of recreational fishing in the Northern Territory (NT). The previous two surveys were conducted in 1994-95 (*Fishcount*) and in 2000-01 (The National Recreational Fishing Survey (NRFS)). In each of these studies, the main survey instrument has been the same: an off-site telephone/diary survey with stratified random sampling from telephone listings in the White Pages and expansion of all survey results to Australian Bureau of Statistics (ABS) estimates of the non-indigenous resident population. Fishing activity by interstate and overseas visitors has also been assessed in these surveys. A comprehensive assessment of interstate fishing activity was a major feature of the NRFS telephone/diary survey. However, in both *Fishcount* and the latest survey only limited information was obtained on visitor fishing activity through on-site surveys (e.g. at boat ramps and accommodation establishments) for selected key catchments.

Survey Methods

In the present survey, participation rates and demographic profiles of resident recreational fishers were assessed through a regionally stratified random telephone survey of almost 2600 NT households, comprising close to 6000 non-indigenous residents aged five years and older. This Screening Survey was followed by a Diary Survey, in which the fishing activities of over 700 households, with an intention to do some recreational fishing in the NT, were monitored in detail between April 2009 and March 2010. Fishing activities and related expenditure were recorded through regular telephone contact with diarists and close to 10 400 person-based fishing events were reported by over 1000 recreational fishers. A Wash-up/Attitudinal Survey was conducted at the final contact with diarists to collect additional expenditure information, details of boat ownership and fishers' opinions and attitudes to various fishing-related matters. Also, a sample of households from the Screening Survey that reported no intention to fish in the coming year was re-contacted at the end of the diary period in a Non-intending Fisher Follow-up Survey to identify and account for any unexpected fishing. Response rates across all survey components were exceptionally high (generally in excess of 90%), confirming both the high levels of interest and cooperation by recreational fishers and the performance standards of the survey instrument. By calibrating against ABS population benchmarks and applying non-response adjustments, all survey results (including participation, effort, catch and expenditure) have been expanded to represent the non-indigenous resident population of the NT, aged five years and older.

In the absence of a repeat of NRFS, a limited assessment was undertaken of fishing activity by interstate and overseas visitors through on-site surveys conducted in the peak period of April to November, 2009. For selected areas in and around Darwin, boat ramp surveys were conducted during daylight hours to assess the proportions of fishing effort and catch attributable to NT residents compared with visitors. In the more remote areas, surveys of accommodation establishments were conducted to collect this information for three of the key catchments.

Key Results – NT Residents

Participation

In the 12 months prior to April 2009, an estimated 31 790 non-indigenous NT residents aged five years and older fished at least once in the NT, representing a participation rate of 22%, or more than one in five residents. Whilst the majority (79%) of fishers resided in the 'Darwin and Rural' stratum, residents of the 'Other coastal' stratum had the highest participation rate (38%), with the lowest rate in the 'Hinterland' stratum (3%). Males accounted for two thirds of recreational fishers with a participation rate of 29%, compared with 15% for females. Although the highest number of recreational fishers was in the 30 to 44 years age group (almost 10 000 persons), children (5 to 14 years) had the highest participation rate (28%). Persons in the 60 plus age group had the lowest rate of participation (11%).

Effort

During the 12 months between April 2009 and March 2010, an estimated 30 538 non-indigenous NT residents fished in the NT, slightly but not significantly less than in the previous 12 months. These fishers accounted for over 150 000 fisher days of effort, or an annual average of close to 5 days per fisher. However, as with most recreational fisheries, the distribution of fishing effort was highly skewed, with a relatively small number of fishers (20%) accounting for a high proportion (almost 60%) of the total effort.

Over 80% of recreational fishing activity occurred in marine waters – primarily estuaries, followed by inshore and offshore waters. Freshwater fishing was almost exclusively restricted to rivers, with negligible activity in lakes and dams. Boat-based fishing dominated over shore-based activities in all water body types, with line-fishing by far the most common fishing method (95% of fisher days). The use of pots or traps and cast nets was comparatively minor. Regionally, Darwin Harbour attracted over a quarter (27%) of NT-wide fishing effort, with zones immediately adjacent to Darwin (Darwin Surrounds and Bynoe/Finniss Area) attracting a further 28%. The Mary/Alligator Rivers accounted for a further 17% of the effort, while the more remote zones accounted for less than 10% of resident effort in each case.

Catch

Resident recreational fishers captured a diverse range of scalefish, elasmobranchs (sharks and rays), crustaceans, molluscs and other taxa, with over 770 000 organisms caught during the 12-month survey period. Of the total catch, more than 350 000 (46%) were retained and almost 420 000 (54%) were released or discarded. Fish (scalefish and elasmobranchs) dominated the catch (almost 90% of the total), followed by crustaceans (7%) and cephalopods (2%). Barramundi was the most commonly caught fish species (147 393) and represented 21% of the total fish catch, followed by golden snapper (80 530), small bait fish (55 854), catfish (40 186), saddletail/crimson snapper combined (36 730), and mullet (36 260). Mud crabs (44 634) dominated the crustacean catch, followed by cherabin (8196).

Overall, 58% of all fish caught were released or discarded. There was a low rate of release (<25%) for species such as mullet; an intermediate release rate (25-50%) for black jewfish, blue threadfin, king threadfin and mangrove jack; a moderate release rate (51-75%) for barramundi, golden snapper, saddletail/crimson snapper, pikey bream, rock cods and groupers, grass emperor, queenfish, Spanish mackerel, javelin fish and tarpon; a high release rate (>75%) for catfish, sharks and rays, stripey snapper and giant trevally. 'Too small' was reported as the main reason for releasing many species, including barramundi, pikey bream, javelin fish, black jewfish, mullet, various tropical snappers, blue threadfin and king threadfin. Catch and release fishing was also cited as an important reason for releasing barramundi, pikey bream, queenfish, saratoga and tarpon. Catfish, moonfish, sharks and rays were most often released or discarded as unwanted or undesirable species. Around one third of all mud crabs caught were released, mainly due to being too small.

A high level of fishery specialisation emerged for such species as barramundi, mullet and mud crabs, which were taken mostly as targeted, rather than non-targeted or incidental catch. By contrast, such species as catfish, rock cods and groupers, grass emperor, sharks and rays, trevally and javelin fish were rarely reported as target species.

Tropical snappers (golden, saddletail/crimson and stripey) and grass emperor were the most frequently captured species in offshore waters, with tropical snappers and barramundi being key components of the inshore catch. Barramundi dominated catches in estuarine waters, with golden snapper, mullet and catfish of lesser significance. Barramundi was also the predominant species caught in freshwater, followed by catfish, sooty grunter, tarpon and saratoga.

The vast majority (81%) of the recreational catch was taken by line fishing, with cast nets contributing a further 11% and pots and traps 7%. Barramundi and golden snapper were the most common species taken by line fishing, with mullet and small baitfish dominating the cast net catch, while mud crabs and, to a lesser extent, cherabin were the main components of the pot or trap catch.

Catch and effort data for the key species were examined in detail (based on region, method, fishing platform, water body and seasonality) and the regional fisheries were characterised (effort by where fishers resided, fishing platform, water body and catch composition). The West Coast and Mary/Alligator River zones were particularly significant regions for barramundi, whereas the Bynoe/Finniss Area and Darwin Surrounds zones were significant for such species as golden snapper, saddletail/crimson snapper, rock cod and groupers, black jewfish and Spanish mackerel. Darwin Harbour represented an important region for catches of golden snapper, rock cod and groupers, and mud crabs, with the Darwin Surrounds zone also representing an important region for the latter species. Catches of blue threadfin and king threadfin were concentrated in the Darwin Surrounds and Mary/Alligator River zones, while the North Coast was a significant region for saddletail/crimson snapper. Grass emperor catches were significant in many of the coastal zones and especially in the East Coast/Gulf Area. The West Coast and Darwin Surrounds zones, followed by Central/Inland and the East Coast/Gulf Area, were important regions for cherabin.

In general, catches for most of the key species were highest during the April-September period (dry season) and then fell between October and March. Exceptions to this pattern included barramundi, where catches peaked between April and June but were relatively stable during the remainder of the 12-month survey period; for tropical snappers (golden and saddletail/crimson) catches remained quite stable between April and December and then declined during January-March. The observed seasonality in the fisheries reflected a combination of seasonality in the intensity of fishing effort and presumably the availability of the key species.

Regionally, residents of the 'Darwin and Rural' stratum accounted for the majority of the fishing effort in zones within relatively close proximity, namely Darwin Harbour, Darwin Surrounds, Bynoe/Finniss Area, West Coast and Mary/Alligator Rivers zones. However, residents of the 'Other coastal' stratum were the main contributing group to the fisheries in the North Coast, East Coast/Gulf Area and Central/Inland zones.

The West Coast and Mary/Alligator River fisheries were concentrated in estuarine waters and freshwater rivers, with barramundi the most common catch. In each of the other zones, apart from the Central/Inland zone (freshwater rivers), fishing was mainly focussed in estuarine and inshore waters, with golden snapper and/or barramundi being the main species caught.

Expenditure

NT residents spent an estimated $51 million on goods and services related to recreational fishing during the 12-month survey period, of which $47 million (92%) was directly attributable to recreational fishing – an average of over $1500 per fisher. Annual attributable expenditure on boats and trailers represented the largest expenditure category ($33 million), followed by travel expenses ($7 million) and fishing/diving gear ($3 million). The vast majority of all fishing-related expenditure (93%) occurred within the NT.

Boat Ownership

Over half (58%) of all resident fishing households reported boat ownership during 2009-10, representing almost 10 800 vessels, the majority of which (92%) were used for recreational fishing. Most of the fishing vessels were powered/trailer boats, between 4-6 m in length, with echo sounders and GPS units. The estimated total market value of the recreational fishing fleet in 2009-10 was $194 million – an average of around $18 000 per boat.

Comparisons with Previous Results – NT Residents

Although information collected in this survey is highly comparable with the NRFS data, a re-analysis of the latter is required to enable a direct comparison of the results for two reasons. Firstly, since NRFS, a customised analysis system was developed for surveys of this kind and this *RecSurvey* package has been employed in the current analysis. Secondly, the NRFS data included a number of indigenous NT residents, not covered by the separate NRFS survey component, which assessed indigenous fishing activity in coastal communities across northern Australia. The NRFS data and population benchmarks will therefore need to be amended to exclude indigenous residents before re-analysis using the *RecSurvey* package. However, as discussed in Section 1.2 of this report, the amended NRFS data are likely to result in an overall reduction of around 5% in published estimates of the numbers of resident fishers, fishing effort, catch and expenditure.

Based on this assumption, the estimated 31 790 non-indigenous NT residents aged five years and older who fished in the NT in the 12 months prior to April 2009 represent a decrease of around 17% over the likely/ultimate NRFS estimate. In terms of participation rates, a greater decrease of around 23% can be expected due to population growth between the surveys, i.e. 29% of NT residents fished during NRFS compared with 22% in the current survey. Residents of the 'Darwin and Rural' stratum have been identified as accounting for the majority of this decrease, which is consistent with declining participation rates in other capital cities around Australia.

Very similar estimates of average days fished annually (close to 5 days per fisher) were recorded in both NRFS and the current survey. Therefore, the estimate of total resident fishing effort in 2009-10 (over 150 000 fisher days) is likely to represent a similar proportional decrease to the numbers of fishers (around 17% less).

However, overall catch estimates from the current survey are likely to represent a greater proportional decrease compared with revised NRFS estimates – more than a third less for all species, both in terms of the numbers kept and the numbers released/discarded. However, as discussed in Section 1.2, a range of information (including commercial fisheries data) has suggested that the 12-month period of NRFS was one of the 'best' years, due to the magnitude and extent of previous wet seasons. Also, varying levels of decreased catch have emerged from preliminary comparisons for key species. For example, current harvest estimates for barramundi and golden snapper are likely to be around one third less than revised NRFS estimates, whereas greater decreases are likely for black jewfish and mud crabs, with both at around 50% less.

By contrast, estimated total expenditure on fishing-related goods and services by NT residents in 2009-10 represents a substantial increase (around double) compared with revised NRFS estimates. Increased expenditure in relation to boats and trailers has been identified as a major factor here, both in absolute and proportional terms, where the current estimate of such expenditure ($33 million) well exceeds the total for all goods and services from NRFS. Also, when average annual expenditure per fisher is considered, an increase of well over double is likely, i.e. over $1500 for 2009-10 compared with around $600 for NRFS.

NT resident fishing households reported owning close to 10 000 boats that were used for recreational fishing during 2009-10, representing an increase of around 2000 fishing vessels when compared to revised NRFS estimates (around 8000 fishing vessels).

On-site Surveys – Visitor Fishing Activity

Whereas fishing activity by NT residents in 2009-10 represents a decrease compared with NRFS data, results from the recent on-site surveys have revealed an opposite trend for interstate visitors. Surveys conducted at 16 boat ramps in the Darwin and Bynoe Harbour areas in the period April to November 2009 estimated a total of around 17 000 fisher days by visitors from interstate or overseas (the latter being a small minority). Compared with relevant guideline data from NRFS, this represents a substantial increase (over double), although standard error calculations from the NRFS re-analysis will be required to assess the significance of this change (along with comparisons of the associated catch data). Also, surveys conducted at just two boat ramps on the Mary River during this time showed similar estimates of total fisher days by visitors to guideline NRFS estimates, which included all boat ramps/access points on the Mary River.

Surveys of accommodation establishments in more remote areas have shown a significant increase in fishing effort by visitors, very few of whom were from overseas. For the Daly River, a total of close to 15 000 fisher days was estimated for the period April to November 2009 from five of the eight accommodation establishments in the area which were included in the survey. When all facilities are considered, a total approaching 20 000 fisher days have been estimated, representing a four-fold increase over guideline NRFS estimates. A total of 33 000 fisher days by visitors were estimated for the McArthur River during the same period, representing an increase of two and a half times the NRFS estimate. By contrast, a slightly lower estimate (over 5000 fisher days) was recorded for the lower reaches of the Roper River, although this is unlikely to represent a significant difference from the NRFS estimate. In all three of these remote catchments, high catch levels were recorded for various species

and comparisons with re-analysed NRFS data are likely to show a significant increase for the Daly and McArthur Rivers.

Finally, a combined total of over 77 000 fisher days were estimated for visitors from the recent boat ramp and accommodation surveys, compared with around 40 000 from comparable guideline NRFS data – and an overall total of 113 000 fisher days by interstate visitors on an NT-wide annual basis for NRFS (Coleman 2004). Importantly, this estimate for visitors (77 000 fisher days) represents around half of the total annual fishing effort by NT residents for 2009-10 (around 150 000 fisher days), i.e. for all fishing methods, platforms and catchments. Although there is no information available for visitor activity in other catchments, it seems likely that significantly higher proportions of total fishing effort and catch by interstate visitors would have occurred in 2009-10, compared with published estimates from NRFS (38% and 30%, respectively).

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1. INTRODUCTION

1.1 Background

Recreational fishing has long been a highly popular activity in the Northern Territory (NT), among both residents and visitors. Results from the 2000-01 National Recreational Fishing Survey (NRFS) (Henry and Lyle 2003) showed that the Territory had the highest participation rate among residents of all states/territories in Australia and the highest proportions of total catch and effort by interstate visitors.

Catch and effort data is an essential pre-requisite for effective research and management of any fishery. Participation assessments and attitudinal and economic information are also important. Typically, core monitoring data is more easily obtained from the commercial fisheries sector due to the smaller more accessible target audiences involved and the existence of mandatory reporting requirements.

Over the years, the comparatively high cost of recreational fisheries research has resulted in a lack of detailed information for this sector, particularly on a large scale. Recognising this need, the NT Government commissioned the development and implementation of a survey methodology in 1993 to collect this information - *Fishcount* (Coleman 1998). This was the first study of its kind in Australia to provide detailed estimates of recreational fishing on an NT-wide basis, including participation, catch, effort and fishing-related expenditure. The scope of the study was confined to non-indigenous NT residents, with limited assessment of fishing activity by visitors from interstate and overseas.

Around that time, similar concerns in other jurisdictions led to the development of a national policy for recreational fishing in Australia. The policy was released in 1994 and endorsed the principle that "Fisheries management decisions should be based on sound information, including fish biology, fishing activity, catches and economic and social values of recreational fishing" (National Recreational Fishing Working Group (NRFWG) 1994). The policy recommended that a national survey of recreational fishing be undertaken once every five years.

Following extensive consultation and development, the Commonwealth, State and NT fisheries agencies implemented NRFS in 2000. Building on the methodology from the NT *Fishcount* study, the key objectives of NRFS were to determine participation rates in recreational fishing, profile the demographic characteristics of recreational fishers, quantify recreational catch and effort, collect data on expenditure by the recreational fishing sector and assess attitudes and awareness of recreational fishers to issues relevant to the fishery (Henry and Lyle 2003).

NRFS was implemented as a series of state-wide surveys using a common methodology, providing comparable information Australia-wide, including the activity of visiting fishers. In addition to nationally aggregated information, Henry and Lyle (2003) provided summary statistics for each state and territory. A subsequent report (NRFS-NT, Coleman 2004) provided more detailed analysis of NT-specific results. Also, as an integral part of the NRFS project, a separate survey was conducted of indigenous fishing activity in coastal communities across northern Australia (Western Australia, the NT and Queensland) and the results were included in the report by Henry and Lyle (2003).

In the absence of plans to repeat the national survey, other jurisdictions (Tasmania and South Australia) successfully conducted state-wide surveys to provide up-to-date 'big-picture' information on recreational fishing in 2007-08. However, because these states have relatively low levels of fishing activity by interstate and overseas visitors, the scope of their surveys was confined to resident fishers only. By contrast, visiting fishers have been shown to account for a substantial proportion (well over a third) of total

recreational catch and effort in the NT, and in the current study, additional information was sought to provide some assessment of this component through special on-site surveys in selected key catchments.

Essentially the same telephone/diary methodology developed for NRFS was employed for the resident component of the present study, thereby optimising comparability with information collected in 2000-01 and also the previous *Fishcount* study in 1994-95. This information includes NT-wide participation rates and demographic profiles of recreational fishers, catch and effort estimates for key methods, regions and species, fishing-related expenditure, fishing boat profiles, and fisher attitudes and opinions.

Several improvements in statistical analyses have become available since NRFS through the development of a customised analysis package known as *RecSurvey* (Lyle et al. 2009a). This package has been employed in the analysis of the resident component of the current survey. However, re-analysis of the NRFS data on this basis is yet to be conducted (see further discussion in Section 1.2.1). Once completed this will enable future such studies to form a series of comparable surveys to monitor major developments, trends and the general status of recreational fishing in the NT.

1.2 Important Notes to the Reader

1.2.1 Comparisons with Previous Results

By design, NRFS results were expanded to Australian Bureau of Statistics (ABS) benchmarks for the private-dwelling resident population of Australia, aged five years and older – after excluding estimates of indigenous residents covered by the separate survey of coastal communities in northern Australia. For all other jurisdictions (and areas within), inclusion of indigenous residents in NRFS results was considered appropriate and very small proportions of the total population applied (around 2% Australia-wide). However, indigenous residents comprise a significant minority (over a quarter) of the NT population, predominantly in areas outside Darwin. Therefore, NRFS data for the NT included estimates of indigenous residents not covered by the separate coastal survey, most of whom were residents of hinterland areas.

In developing the current survey, it was decided that the scope of the study be confined to non-indigenous residents only, which is consistent with the first such study in the NT (*Fishcount*, Coleman 1998). A major factor in this decision was the very low proportion of Indigenous residents with a White Pages-listed home phone (as shown in NRFS and confirmed through the current survey) and associated uncertainty in terms of behavioural differences between listed and un-listed indigenous residents.

Therefore, to achieve direct comparability with the current survey (and the *Fishcount* study), re-analysis of NRFS is required using the *RecSurvey* package (as discussed in Section 1.1) and after deriving amended population benchmarks for June 2000 to exclude all indigenous residents. In developing the current survey, it was determined that this re-analysis would need to be conducted under separate funding at a later stage.

In the meantime, broad comparisons can be made between surveys. To assist with this, the following guideline estimates have been provided. The ultimate exclusion of all indigenous residents from the NRFS data and benchmarks will likely result in a reduction of around 5% in the total number of resident fishers, the majority of whom will refer to residents of the 'Other coastal' and 'Hinterland' residential strata (see Section 2.4.1). A similar reduction in total fishing effort and catch can also be expected, but is likely to be concentrated in coastal fishing areas away from Darwin, for example fishers residing in hinterland areas tend to fish mainly in their nearest coastal regions.

A further consideration in any comparative work is the fact that inter-annual variations naturally occur within fisheries, such as the availability and abundance of certain species. In the NT, the magnitude and extent of the wet season has long been acknowledged as a critical factor in this regard. In the absence of repeat surveys of this kind, it must be recognised that a typical (or average) year cannot be quantified. However, the 12-month diary period of NRFS has been acknowledged as one of the 'best' years in terms of catches/availability of many key species. Although based on consistent anecdotal information, this assessment is also supported by independent time-series data from the commercial fishing sector.

1.2.2 Report Format

The remainder of this report comprises a detailed discussion of the scope of the study, definitions and other methodological issues (Section 2); sampling and response profiles (Section 3); and substantive survey results from Section 4 onwards. In reviewing these results, the following important aspects should be considered:

- Apart from the discussion in Section 1.2.1 above, comparisons with previous survey results have not been included in the report, other than in general terms in the Summary and for visitor fishing activity in Sections 12 and 13.

- In line with the agreed reporting structure, the survey results have generally been presented without interpretation or commentary, unless such information refers to important definitions or methodological issues.

- The survey findings are often presented in detailed tables of 'expanded' data, i.e. estimates based on relevant ABS benchmark data (households, persons) and related fishing effort, catch and expenditure.

- Where appropriate, some results are presented in graphic form (e.g. histograms/bar charts). In such cases, relevant data tables have been included as appendices.

- In the case of 'non-sample error' (e.g. non-response and reporting biases), optimum data quality has been achieved through a range of measures/outcomes in the study, including excellent response rates in all survey components (see Section 3). Despite this, minor adjustments/calibrations have been applied through the *RecSurvey* package, in accordance with procedures detailed in Lyle et al. (2009a).

- In any sample survey, estimate precision is affected by 'sample error' due to the fact that sampling was employed, as opposed to a total enumeration (or census) of the population concerned. To account for this, standard errors (SEs) have been calculated through the analysis package and included in all substantive figures, data tables and appendices.

- Where high levels of variability occur, or small sub-samples are involved, the SEs can be quite large in relation to the estimates concerned. To highlight these, cases where the relative standard error (RSE) is greater than 40% of the estimate have been routinely shown in bold text. Similarly, estimates derived from less than 30 households (in the raw data) have been italicised. Further details on this issue are discussed in Section 2.3.4.

- For completeness, all survey estimates from the analyses have been included in the data tables, including some very small estimates. Also, 'zero' estimates commonly occur in the tables. This *does not* indicate that there was no such occurrence in the population overall, but rather that none was detected within the limits of the survey sample. Therefore, readers should routinely interpret such results as 'nil or negligible'.

- Extensive data tables and figures have been included in this report, along with a number of additional analyses, which have been provided separately, in anticipation of requests for more detailed data. However, the various survey databases are an output requirement of the project and, subject to error tolerances, considerable further data interrogation can be undertaken.

1.3 Report Structure Acknowledgment

The resident component of the current survey employed an almost identical methodology to state-wide telephone/diary surveys in South Australia and Tasmania, which were conducted in 2007-08. These studies were also analysed using the newly-developed *RecSurvey* package and much of the content and structure of the Tasmanian report (Lyle et al. 2009b) was applied, with permission, to the South Australian report (Jones 2009).

Similarly, the content and structure of this report have been largely adapted from the Tasmanian report, especially in terms of the presentation of results in Sections 4 to 8. The contribution of our co-authors and many others in this respect is sincerely appreciated.

2. SURVEY METHODS AND ANALYSIS

The primary data collection was based on a telephone/diary approach – an off-site methodology developed to provide cost-effective data over large spatial scales, such as for an entire state. A detailed description of the telephone/diary design philosophy and methodology is provided in Lyle et al. (2002a) and Henry and Lyle (2003). Data analysis procedures are described in detail by Lyle et al. (2009a) and have been undertaken using the statistical computing language R (R Development Core Team 2008). An overview of the survey methodology and data analysis is provided below.

A limited assessment was also conducted of fishing activity by interstate and overseas visitors through a program of on-site surveys. Although confined to key catchments and seasons, the results of these surveys provide important information in this regard. Methodological and analysis details for these surveys are discussed in Sections 2.2.6, 2.2.7, 2.3.2 and 2.3.3.

2.1 Survey Scope

The telephone/diary component of the survey encompassed the private dwelling, non-indigenous resident population of the NT aged five years and older and their recreational fishing activity. In this context, recreational fishing was defined broadly as the capture or attempted capture of aquatic animals in NT waters (freshwater, estuarine and marine) other than for commercial purposes. All recreational fishing techniques and harvesting activities were considered in-scope, including dive and hand collection, the use of pots, nets and spears, in addition to various forms of line fishing.

In contrast to the 2000-01 survey, the fishing activities of NT residents in other states of Australia were considered out-of-scope (other than for broad participation assessment). Likewise, any fishing activities in the NT by non-NT residents were excluded, other than for data collected through the separate on-site surveys.

2.2 Survey Methods

2.2.1 Survey Overview

The telephone/diary methodology involved a two-phase survey design, the principal components being an initial screening phase to gather profiling information from a sample of the resident population and a subsequent, intensive phase, in which respondents provided detailed catch and effort information over a 12-month period. Details of fishing-related expenditure were also collected. In this second phase, respondents were encouraged to use a simple diary to record key fishing data and were contacted regularly by survey interviewers who were responsible for collecting this information. The underlying design philosophy is focused on minimising respondent burden and maximising response and data quality.

Additional survey components included a non-intending fisher follow-up survey, a wash-up/attitudinal survey, and on-site surveys at boat ramps and accommodation establishments. The non-intending fisher call-backs involved a sample of households that indicated at screening that none of the residents were likely to do any recreational fishing in the NT during the diary period. This component was designed to identify and account for ‘unexpected fishing’ that may have occurred during the period. The opinions and attitudes of diarists to fishing-related matters were assessed at the end of the diary period in a wash-up survey, along with boat-profiling information and collection of additional fishing-related expenditure.

In the absence of any repeat of NRFS, on-site surveys were also conducted primarily to provide an assessment of visitor fishing activity in selected catchments, but also size/frequency information for key species. A depiction of the various survey components (and their relationships) is provided in Figure 1.

Consultant staff of Kewagama Research had primary responsibility for the design and analysis of all survey components, together with interviewing and data processing for the telephone/diary survey components. For the on-site surveys, Fisheries Division of the NT Department of Primary Industry and Fisheries (NT Fisheries) staff were responsible for the recruitment, training and management of interviewers and initial data processing.

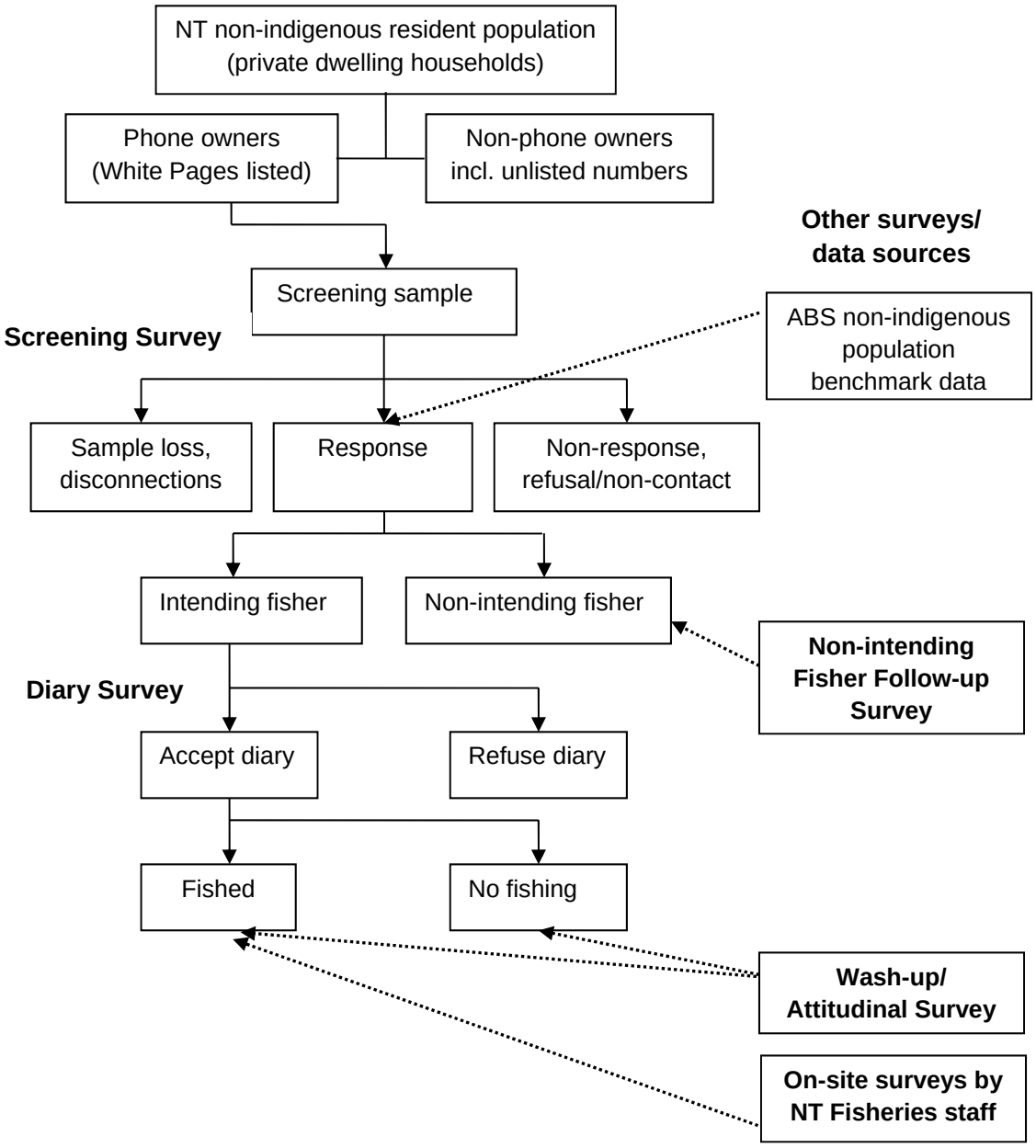

Figure 1. A diagram of components of the Survey of Recreational Fishing in the NT, 2009-10.

2.2.2 Screening Survey

The primary role of the screening interview was to collect profiling information for all household members (e.g. sex and age group) as well as establishing eligibility to participate in the following diary phase. Profiling information was important not only to characterise the sample population, but also to examine issues related to representation and response.

The Screening Survey consisted of structured interviews with a random sample of NT households by telephone. The White Pages telephone directory provided the sample frame, from which obvious business numbers, non-private dwellings and multiple listings were excluded. For each selected listing/telephone number, the suburb was also noted enabling the selection to be assigned to a Statistical Sub-Division (SSD) – an ABS classification used to define residential strata for the survey (see Section 2.5.1). Stratified random sampling was undertaken with a higher sampling rate for the SSDs comprising the 'Other coastal' stratum than for the 'Hinterland' stratum, with the lowest sampling rate in the 'Darwin and Rural' stratum. Within each stratum, care was taken to ensure that the proportional breakdown of the sample at the SSD level did not differ significantly from the known proportion of private dwellings based on ABS data. In addition to landline numbers, 5% of selected listings were represented by mobile-only numbers.

In order to minimise non-contacts, at least 15 calls were made to each 'live' telephone number. Disconnected numbers, business and facsimile numbers were treated as sample loss and not replaced. The Screening Survey was conducted during February and March 2009.

Within each responding household, the demographic profiles (age group, gender and indigenous status) of all usual residents were obtained. For residents aged five years and older, involvement in recreational fishing over the previous 12 months and likelihood (expectation) of doing any recreational fishing in the following 12 months was established. All respondents who had fished during the 12 months prior to interview were asked whether they had fished interstate and were asked to estimate how many days they had fished in the previous 12 months, by category (less than five days, five to nine days, 10 to 14 days, 15 to 19 days and 20 days or more). This last detail was used as an index of avidity, rather than a direct or accurate measure of prior fishing activity, which allowed fishers to be broadly classified as, for example, infrequent, occasional and frequent, based on these categories. Boat ownership was also established for all households, regardless of whether they were fishers or not.

All households in which at least one member (regardless of prior fishing history) expressed a likelihood of going fishing in the NT during the following 12 months were considered eligible for the second (diary) phase of the study.

2.2.3 Diary Survey

All households identified as eligible for the Diary Survey were invited to participate in this phase of the study. Fishing activity of household members aged five years and older was monitored between 1 April 2009 and 31 March 2010.

The approach taken in this survey differed from conventional angler diary surveys in two important ways: first, the diary was employed more as a 'memory jogger' than a logbook; and second, responsibility for data collection rested with the survey interviewers and not the diarists. Typically, other diary survey response rates are low and data quality can suffer in terms of completeness, generality and consistency. Also, since the burden of maintaining the diary rests with the respondent, instructions may be misinterpreted and data may be incomplete or ambiguous. The need to periodically remind respondents

to submit documentation creates a further problem, whereby information that has not been written in a diary must be collected on the basis of recall, if at all.

By contrast, the telephone/diary approach employed in the current study (a form of panel survey), effectively transferred the burden of data collection from the respondent to the survey interviewer. Data collection was undertaken by brief telephone interviews in which trained interviewers recorded details of any fishing that had occurred since the last contact. The level of fishing activity determined the frequency of such contact but, as a general rule, respondents were called at least once a month, even if no fishing was planned.

After receiving the diary kit, which included the diary, a colour species identification guide for the common species and an official covering letter for the survey, data requirements were explained to the respondents in a brief interview and then the next contact was arranged. The respondents were encouraged to record basic information in their diaries, such as date, location, and start and finish times, and catch and release numbers. More detailed data, such as target species, fishing method, platform (boat or shore), water body type (river, lake, estuary, coastal, offshore) and reason(s) for release, for each individual fishing event were collected and recorded during the telephone interview. Details of any fishing-related expenditure were also obtained for various items/categories, including the proportion directly attributable to recreational fishing and whether the expenditure occurred within the NT or elsewhere. By maintaining regular contact, usually within a couple of weeks of any fishing activity, details of any non-diarised fishing or expenditure were obtained with minimal concern in relation to recall bias. Furthermore, interviewers were able to immediately clarify ambiguities and ensure completeness of information. This in turn, provided for greater data utility, for example fishing effort could be apportioned between target fisheries, methods, fishing platform and so on. It should be noted that although covered by ongoing Fishing Tour Operator (FTO) data collection processes, any charter fishing trips by residents were also included in the Diary Survey and classified accordingly for separate analysis as required. However, these comprised a small proportion of all fishing activity (see Section 5.3).

2.2.4 Non-intending Fisher Follow-up Survey

The objective of this ‘call-back’ survey was to account for those persons who may have unexpectedly ‘dropped-in’ to the fishery, providing symmetry for those persons who unexpectedly ‘dropped-out’ of the fishery – namely, those diarists who did no fishing during the diary period, despite intending to do so.

A random sample of households, which at screening had indicated no intention to go fishing during the diary period (i.e. not eligible for the Diary Survey), was re-contacted shortly after the diary period in April 2010. Whether any fishing had occurred during the diary period was established in a brief telephone interview, with particular care to identify whether there had been a change in the household (e.g. telephone number re-allocated) and that household members were the same as those at screening. Further details were collected from those households in which fishing was reported, including demographic profile (age group and gender), whether individual members had fished in the NT and/or interstate, the number of days fished during the 12 months of the diary period (by ‘avidity category’) and whether any key species were caught and kept. Respondents who were identified as not being residents of the household at the time of screening were excluded from the analysis.

2.2.5 Wash-up/Attitudinal Survey

This survey was conducted with diarists at the end of the diary period and was designed to assess a range of information, including confirmation of the completeness of the diary data for each household member (whether they had reported fishing or not) and collection of additional fishing-related expenditure, which may not have been reported in diary interviews, including annual expenses (such as boat insurance) and other less obvious items (such as camping equipment). After comparing this information with data collected during the diary period, any valid additional expenditure was subsequently included.

Although boat ownership was generally assessed for all households in the Screening Survey, detailed boat profiling information (such as length, main propulsion method, usage for fishing) was collected in the Wash-up Survey for vessels owned by households reporting any fishing activity during the period, as an assessment of the recreational fishing fleet.

The opinions and attitudes of diarists were also obtained in terms of various fishing-related matters, from the main/key fisher in each household, aged 15 years and older. Summary results of this questioning have been included in this report (see Section 11); however, more detailed analysis and classification of 'verbatim' responses will be undertaken by NT Fisheries.

2.2.6 On-site Survey – Boat Ramps

In the absence of a repeat of NRFS, on-site surveys were required to provide some assessment of visitor fishing activity. However, all forms of on-site survey are inherently expensive and, due to budgetary constraints, a key objective in the survey development was the identification of a cost-effective strategy to assess visitor fishing activity for selected key catchments (as determined by NRFS data and fisheries management needs).

For catchments in the more densely populated areas (such as Darwin), a conventional access-point survey methodology was identified. Although necessarily confined to boat-based fishing in daylight hours when a majority of all fishing activity occurs, this approach was also applied to key catchments that were regarded as accessible by day trips from other areas – unlike the more remote catchments where visitor populations could be 'isolated', as in the Accommodation Survey (see Section 2.2.7).

Five catchments/areas were included in the boat ramp surveys:

- Darwin Harbour: Eleven public boat ramps were included: Buffalo Creek, Dinah Beach, Ski Club/Conacher, Nightcliff, Channel Island, East Arm/Berrimah, Palmerston, Trailer Boat Club, Mandorah, Middle Arm and Southport. Three other boat access points were excluded: Vestey's Beach ramp (a rarely used beach launching), Larrakeyah ramp (military base, access prohibited) and Cullen Bay Marina (a major private facility for residents and charter operators).

- Bynoe Harbour: Three of the six public boat ramps in the harbour were included: Crab Claw Island, Keswick Point and McKenzie 2/Six Pack Creek. The three excluded ramps were assessed as minor in terms of fishing activity: Milne Inlet, Raft Point and the McKenzie 1 ramp on Dundee Road.

- Leaders Creek: A privately-owned facility to the north-east of Darwin that provides launch/retrieval and storage of boats and trailers.

- Mary River: The two major public boat ramps in the area were included: Corroboree and Shady Camp. The two minor upstream/freshwater ramps were excluded: Mary River Bridge and The Rock Hole.

- Dundee Beach: A privately-owned beach launching facility (tractor) to the south-west of Bynoe Harbour was a late inclusion in the survey due to the exclusion of two ramps in the Nhulunbuy area through illness/unavailability of interviewing staff.

By design, the survey was confined to the eight-month period from 1 April to 30 November 2009 when, based on NRFS data, 98% of annual visitor catch and effort occurred in the NT. The late inclusion of Dundee Beach allowed only for a six-month survey period, from 1 June to 30 November 2009.

In the following overview, we have employed the terminology of Pollock et al. (1994) to describe the survey design and estimation methods used. The survey was an access-(effort)-access-(catch) design using stratified random sampling. The primary sampling unit (PSU) was the calendar day. Stratification of 'day types' (weekend and public holidays versus weekdays) was employed, as well as 'shifts' within days (early versus late), resulting in a four-cell stratification matrix. Each ramp was assigned to a 'size category' on the basis of available usage (effort) information; different levels of replication were applied to each category. Similarly, shift strata were assigned different levels of replication on the basis of effort intensity. All estimation procedures were applied separately to each stratum for each ramp, prior to calculation of ramp estimates and then catchment totals. A more detailed description of sampling procedures is provided below.

As noted above, the PSU for the survey was the calendar day; however, coverage was restricted to boats returning to ramps between 9 am and 7 pm. From NRFS data, this 10-hour period accounted for around 85% of boat-based fishing effort in these areas. Stratification of the 244 days in the sampling universe (183 days for Dundee beach) was undertaken according to day type, translating to 168 weekdays (WD) and 76 weekend/public holidays (WE_PH) in the period (with 128 and 55, respectively, for Dundee Beach). Again based on NRFS data, disproportionate sampling of the WE_PH stratum was applied to improve precision due to substantially higher levels of resident fishing activity on such days. Not surprisingly, the levels of visitor fishing activity did not vary by day type. For each ramp, the total sampling days were allocated on 50:50 basis by day type.

Disproportionate sampling was also applied in terms of the early versus late periods in the day, with 'shift type' defined as 9 am to 2 pm ('early shift') and 2 pm to 7 pm ('late shift'). Again, based on NRFS data, a disproportionate number of boat-based NT fishing trips concluded in the defined late shift; accordingly, these were sampled at twice the rate of early shifts for each ramp within each day type.

Selection of sampling days was conducted randomly and independently for all ramps within each catchment. Depending on ramp size (see below), temporal sub-strata were employed to ensure proportional distribution by day type (WD vs. WE_PH) across the survey period by, for example, sampling from monthly/two-monthly 'blocks' by day type. However, for operational efficiency and to further avoid temporal 'clustering', systematic random sampling was employed in allocating early/late shifts for each ramp by day type (see discussion in Section 2.3.2).

In each catchment, boat ramps were classified by size on the basis of usage levels, both generally and by visitors. For Darwin Harbour, the following ramp sizes and sampling intensities were applied:

- 'Large' ramps: Buffalo Creek, Dinah Beach, Ski Club/Conacher and Nightcliff – 18 sampling days/shifts each, comprising 9 x WD shifts (3 x early and 6 x late) and 9 x WE_PH shifts (3 x early and 6 x late).

- 'Medium' ramps: Channel Island, East Arm/Berrimah, Palmerston and Trailer Boat Club – 12 sampling days/shifts each, comprising 6 x WD shifts (2 x early and 4 x late) and 9 x WE_PH shifts (2 x early and 4 x late).

- 'Small' ramps: Mandorah, Middle Arm and Southport – 6 sampling days/shifts each, comprising 3 x WD shifts (1 x early and 2 x late) and 3 x WE_PH shifts (1 x early and 2 x late).

A higher sampling intensity was applied to the three Bynoe Harbour ramps as follows:

- 'Large' ramp: Crab Claw Island – 24 sampling days/shifts each, comprising 12 x WD shifts (4 x early and 8 x late) and 12 x WE_PH shifts (4 x early and 8 x late).

- 'Medium' ramps: Keswick Point and McKenzie 2/Six Pack Creek – 12 sampling days/shifts each, comprising 6 x WD shifts (2 x early and 4 x late) and 9 x WE_PH shifts (2 x early and 4 x late).

For the remaining catchments/areas, Leaders Creek was allocated 18 sampling days/shifts (as for large Darwin Harbour ramps) and the Mary River and Dundee Beach were allocated 24 sampling days/shifts to each ramp, as for Crab Claw Island (above).

On each selected sample day/shift, the interviewer recorded a range of information, including the numbers of vehicles and trailers present at the start and end of the shift, the period of any tidal 'blackout' (no accessibility due to low tide), the numbers of private boats departing from and returning to the ramp during the period and among the latter, the number of interviews attempted and completed (and if not, the reason). Note that unlike in the telephone/diary survey, charter boats were excluded from this survey, primarily to avoid inconveniencing operators at ramps, yet coverage of their activity is provided by the ongoing FTO survey program. On the other hand, any fishing activity by indigenous residents (and visitors) was included in the on-site surveys due to various difficulties/sensitivities in related questioning (unlike for telephone interviews). Although likely to comprise a minority of all fishing activity, direct comparability with the telephone/diary survey results has not been achieved in this regard.

By design, interviews were routinely attempted for all private boats returning during the shift, with vessels classified as recreational fishing or not (e.g. sightseeing, boat-testing). For those reporting any fishing activity, detailed information was obtained in terms of the number of fishers (aged five years and older) including the number of NT residents vs. visitors (classified by state of residence or overseas) and details of each 'fishing event' (consistent with the telephone/diary survey): date and start/finish times, location (region code and water body type), fishing method, platform, and catch and release numbers by species. However, for all fishing parties comprising both NT residents and visitors, this information was recorded separately for each 'group', or apportioned where accurate dissection was impractical (e.g. catches from shared crab pots).

Where time permitted, size/frequency data for three key species (barramundi, black jewfish and golden snapper) was also obtained by interviewers measuring any retained catch of these species. By design,

this information has not been used for any estimation of harvest weights in this report, but was collected for other NT Fisheries assessment purposes.

Finally, additional information was collected for NT residents in terms of whether they had a White Pages listed home phone or not, together with their 'avidity' profiles (days fished in the last 12 months by broad groupings, such as less than 5 days, 5 to 9 days etc.). This information will be used in the assessment of any behavioural differences between listed and un-listed fishers, as part of an ongoing study of the coverage and representation provided by telephone/diary surveys of recreational fishing in various states of Australia.

2.2.7 On-site Survey – Accommodation Establishments

An assessment of visitor fishing activity was obtained through these surveys of key catchments in the more remote areas (primarily based on NRFS data), where the visitor population could be 'isolated'. That is, cost-effective sampling could be achieved where high proportions of visiting fishers for the catchment/area were known to stay in a small number of accommodation establishments. Initially, five potential catchments/areas were identified, but difficulties with field staff recruitment and access resulted in three catchments ultimately being included in the survey:

- Daly River: Due to its distance from Darwin (or nearby accommodation facilities), the potential for any 'day trips' by visitors was assessed as negligible. Eight separate accommodation establishments were identified in the area, ranging from quite small to large facilities. Initially, permission to conduct the survey was provided by seven of these; however, difficulties in recruitment and retention of interviewing staff (Brown's Creek and Mango Farm) resulted in only five establishments being fully enumerated for the survey: Banyan Farm, Daly River Caravan Park, Daly River Resort, Sinclair's and Woolianna (see further discussion in Sections 2.3.3 and 13).

- McArthur River: King Ash Bay Caravan Park is a very large facility and apart from local houseboat hire, provides the only accommodation for visiting fishers in the area (including for some nearby rivers).

- Roper River: Two establishments were initially identified as the only accommodation facilities providing 'day trip' access to the lower reaches of the river. However, difficulties with staff recruitment (Roper Bar) resulted in only one establishment being fully enumerated for the survey, namely Tomato Island (see further discussion in Sections 2.3.3 and 13).

By design, the study was confined to the 8-month period, from 1 April to 30 November 2009, due to inaccessibility in the wet season and effective closure of these establishments at that time. NRFS data showed that 98% of visitor catches and effort in the NT occurred in this 8-month period and virtually all for these remote areas.

Interviews were conducted for each establishment on selected days/nights from the 244 days in the sampling universe (April to November). Systematic random sampling was employed for operational efficiency and to avoid any temporal clustering. For the Daly River, a total of 12 sample days was randomly selected for each establishment on the basis of 3 sample days per two-month 'block' in the period – a total of 60 sample days for the catchment. For Tomato Island and King Ash Bay, 24 sample days were randomly selected for each on the basis of 3 sample days per month.

No stratification was undertaken for day type (WD vs. WE_PH) for any catchment on the assumption that no behavioural differences would occur in this respect for visitors, who were assessed (and ultimately confirmed) as dominating the occupancy of these establishments. However, because NT residents were also included, appropriate sampling was conducted to ensure proportional selections for each day type (WD vs. WE_PH) across the 244 days of the survey period.

On each selected sample day, the interviewer visited the establishment in the late afternoon/early evening to firstly determine the number of occupied 'sites' (cabins, tents, caravans etc.) at the time – either from office records or by physically counting the sites. In this way, the inclusion of any late arrivals to the facility was optimised. Sites were then selected for interview through systematic random sampling using a prescribed random start/skip interval approach. Due to limited interviewing time, a total of 20 selections per sample day (or all, if fewer sites were occupied) was applied to all establishments, except for King Ash Bay where 25 interviews were required due to the size of the facility.

Interviews were then conducted at each selected site (with no replacement) to establish the number of occupants aged five years and older, their usual place of residence (NT, other states or overseas), whether any recreational fishing, crabbing etc. occurred on the day (i.e. 24 hours prior to interview) and, if so, details of fishing effort and catch were collected for the site (see below). The intention to fish on the following day (the next 24 hours) was also assessed and on the following night, all selected sites were interviewed to collect details of any such activity. However, the main objective of the second night's interviewing was to ensure complete data for any selected sites that were not contacted on the first night, such as occupants who had not returned from fishing by the end of interviewing on the first night. Importantly, no data was collected for any sites occupied after initial sample selection and the PSU for the survey was the first calendar day, i.e. fishing events that concluded in the period 0001 hours to 2400 hours on that day.

Catch and effort information was collected for each site/day on the same basis as for the boat ramp surveys, including size/frequency data for the three key species. However, information for any charter fishing trips by respondents was routinely collected and classified. Charter trips were only reported for the Daly River, comprising a very small proportion (2%) of all fishing activity there and have been included in the survey results. Also, as for the boat ramp surveys, fishing activity by indigenous residents and visitors was necessarily included.

2.3 Data Expansion and Analysis

2.3.1 Telephone/Diary Survey Components

Data analysis was based on a stratified random survey design using single stage cluster sampling, with the household representing the PSU and residents within the household representing the secondary sampling unit (SSU). In determining household and individual expansion factors, an integrated approach was applied that adjusted for non-response and calibrated against population benchmarks (Lyle et al. 2009a).

Adjustment for non-response at screening was based on fishing propensity determined amongst households that refused to complete the screening interview, but at least answered the question about whether or not household members had fished in the previous 12 months. However, no such adjustment was required for the non-contact group, for which no significant differences have been assessed in terms of fishing propensity, through analysis of the response group and the number of calls required to complete the interview, i.e. participation rates did not change as the number of required calls increased

(up to 15). Non-response follow-up surveys have also confirmed this, both in the NRFS and current surveys; where (up to) a further 10 calls were made to households in the ultimate non-contact group.

Calibration against ABS estimated resident population (ERP) data for non-indigenous residents in each stratum in June 2009 was implemented, taking account of household and person-based demographics. Using diary phase uptake and completion rates for eligible households, a further non-response adjustment was applied to expansion factors in calculating catch and effort information. This adjustment was made sensitive to the avidity classification for the household (the maximum avidity index for a member of the household determined at screening) and region of residence (stratum).

Not all eligible fishers actually fished during the diary period and in effect, these represented the unexpected 'drop-outs' from the fishery. In order to take into account unexpected 'drop-ins' to the fishery, an additional adjustment was necessary and was based on the Non-intending Fisher Follow-up Survey. This adjustment was made sensitive to the avidity index reported for 'drop-ins' and region of residence (stratum). A full account of the analytical process is provided by Lyle et al. (2009a).

However, unlike in the recent South Australian and Tasmanian surveys, fishing-related expenditure was assessed in the current survey and this information was collected throughout the diary phase and also in the final Wash-up/Attitudinal Survey (for annual, less obvious, expenditure items). Despite high response rates for the latter, an additional adjustment/calibration (by stratum and avidity) was employed to account for non-response among fisher households completing the diary phase. In the database and related outputs, this procedure has been referred to as the Phase 3 calibration, with the screening and diary survey calibrations being Phases 1 and 2, respectively.

Unless otherwise indicated, parameter estimates provided in this report are based on expanded data, scaled-up to represent the population rather than the sample from which they were derived.

2.3.2 On-site Survey – Boat Ramps

Estimation of fishing effort, harvest and the released component of the catch was done through direct expansion of survey data to account for the un-sampled fraction of the population. This expansion was completed separately for each shift type (early vs. late) by day type stratum (WD vs. WE_PH) combination for each boat ramp within the survey period.

By design, the direct expansion of survey data initially ignored the residential origin of fishers (i.e. NT resident and visitor data were pooled). A finite population correction factor was not used in variance estimation because the entire PSU was not sampled. Variances were additive when combining strata. The final analysis step estimated the fishing effort, and harvested and released catch separately for NT residents and visitors. The total variance calculated for all fishers was then partitioned proportionally for each of the two residential groups. This process was applied separately for fishing effort, harvest and the released component of the catch and for each species group by catchment.

An alternative method of estimation would have been to treat the fishing activities of NT residents and visitors as if they were independent and to estimate their contributions to catch and effort separately. However, the assumption of statistical independence between these two groups of fishers was often invalid, namely whenever visitors accompanied residents on their fishing trips. This type of analysis would have led to a false impression of greater precision for all survey estimates and the approach was therefore rejected.

Unlike for the Diary Survey, estimates of total harvest and the released component of the catch have been reported separately, i.e. total catch results and standard errors have not been provided. This approach was required due to differences in terms of the accuracy and variance structure of the two catch components. Harvest data is routinely verified by interviewers in terms of numbers and species identification, whereas the accuracy of released data can be impacted by rounding and recall bias, along with varying species identification skills of fishers.

It should be noted that the above analysis was applied to 267 of the 276 sampling shifts originally scheduled across the survey catchments. Although correctly enumerated, the data for 9 sampling shifts in the Darwin Harbour catchment was unfortunately lost or destroyed after despatch by the interviewer. These shifts referred to three boat ramps (Buffalo Creek, East Arm/Berrimah and Nightcliff) and the final months of the survey (October and November).

The general equations that were used for the expansion of the survey data and variance calculations were as follows:

Estimation methods – basic notation

j Denotes the stratum being considered $\left(j = 1,..., J\right)$;

J Denotes the total number of strata

i Denotes the sample day unit within the stratum $\left(i = 1,...., N_j\right)$

N_j Denotes the total population size (all possible sampling days) in stratum j

n_j Denotes the sample size in stratum j

z_{ij} Denotes the value of the i th unit of stratum j

$\bar{z}_j$ Denotes the sample mean for stratum j

$s_j^2 = \dfrac{\left[\sum_{i=1}^{n_j}\left(z_{ij} - \bar{z}_j\right)^2\right]}{\left(n_j - 1\right)}$ is the sample variance for stratum j.

General equations

$\hat{z}_j$ Denotes the estimated total for stratum j

$$\hat{z}_j = N_j \times \bar{z}_j \qquad (1)$$

$Var\left(\bar{z}_j\right)$ Denotes the estimated variance of the sample mean for stratum j

$$Var\left(\bar{z}_j\right) = \frac{s_j^2}{n_j} \quad (2)$$

$Var\left(\hat{z}_j\right)$ Denotes the estimated variance of the estimated total for stratum j

$$Var\left(\hat{z}_j\right) = N_j^2 \times Var\left(\bar{z}_j\right) \quad (3)$$

$SE\left(\hat{z}_j\right)$ Denotes the estimated standard error of the estimated total for stratum j

$$SE\left(\hat{z}_j\right) = \sqrt{Var\left(\hat{z}_j\right)} \quad (4)$$

2.3.3 On-site Survey – Accommodation Establishments

The same direct expansion and variance calculations for the Boat Ramp Survey were employed (as detailed in Section 2.3.2 above) to estimate fishing effort, harvest and the released component of the catch in the Accommodation Survey. However, no stratification for day type (WD vs. WE_PH) or shift type (early vs. late) was employed in the Accommodation Survey. As discussed in Sections 2.2.7 and 3.6, the primary data for this survey referred to fishing activity on the first sampling day for each selected site and establishment.

2.3.4 Statistical Uncertainty

As discussed in Section 1.2.2, all parameter estimates have some statistical uncertainty and this can be expressed in terms of standard error (SE), which indicates the extent to which the estimate might have varied from the true population value due to chance and sampling of the population. There are about two chances in three (67%) that sample estimates will vary by less than one SE and about 19 chances in 20 (95%) that the difference from the true population value will be less than two SEs. It should be noted that as survey data is disaggregated, for example by region or method, SEs expressed as a percentage of the estimate, known as relative standard error (RSE) will increase and there may become a point where the disaggregated estimates become unreliable.

In interpreting survey estimates, consideration needs to be given to a) the magnitude of the RSE and b) the actual number of households that contributed records to the estimate. Estimates with RSEs of 40% or greater (implying a 95% confidence range of around ± 80% or higher) have been highlighted in the various tables and are regarded as imprecise. Estimates derived from records involving fewer than 30 households have also been highlighted since they may be particularly influenced by the activities of very few fishers and hence may not be representative.

2.4 Regions

2.4.1 Sampling Strata

Initial household selection (i.e. telephone listing/number) was based on a stratified random sample design using the three residential strata, aligning to ABS Statistical Sub-Divisions (SSD) in the Australian Standard Geographic Classification, 2009 (ASGC, ABS 2009), as follows:

- 'Darwin and Rural' – comprising all three SSDs (0505, 0510 and 0520) in the Darwin Statistical Division (SD 05), plus the surrounding Finniss SSD (1005).

- 'Other coastal' – comprising all other SSDs which border the coastline, including Bathurst and Melville Islands (1010, 1015, 1025 and 1030).

- 'Hinterland' – comprising the remaining, wholly inland SSDs (1035 and 1040).

A map of these strata is shown in Figure 2. When describing household and population characteristics, data have been analysed at stratum and total NT levels.

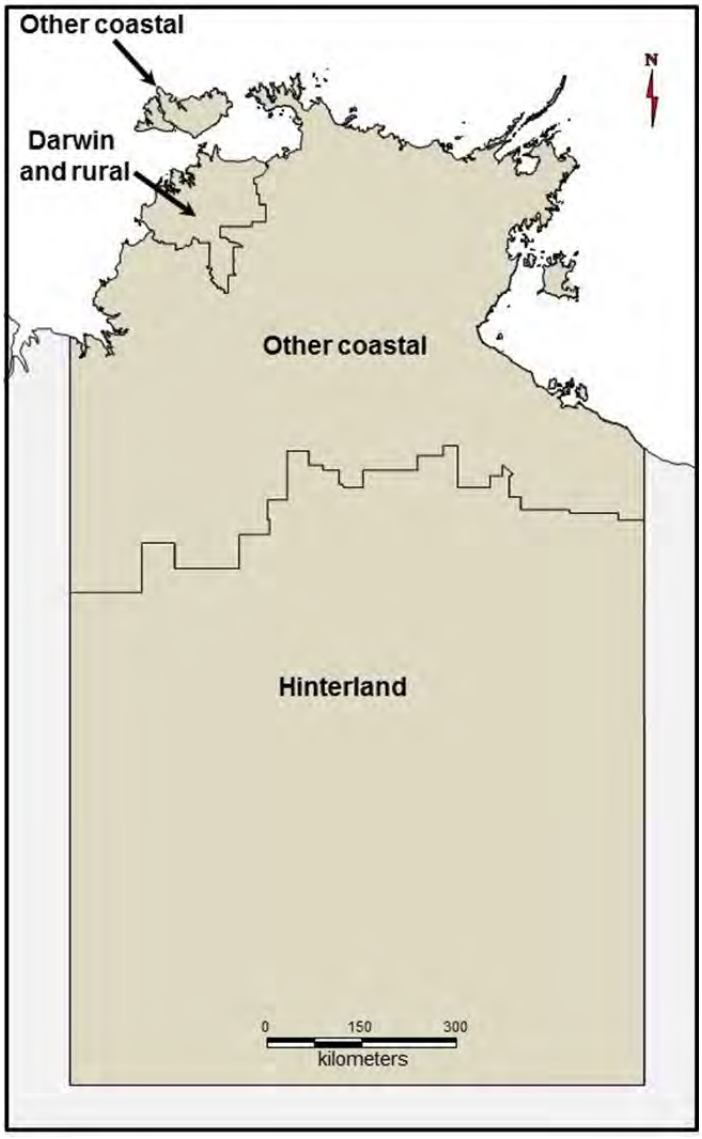

Figure 2. A map of the NT showing ABS-based, residential strata used for sample stratification.

2.4.2 Fishing Regions and Zones

During the Diary Survey, interviewers classified the location of each fishing activity (event) into one of 64 fishing regions (Figure 3), which largely conform to the classification employed in NRFS (61 fishing regions). An additional three fishing regions were created for the current survey to provide greater resolution of areas within Darwin Harbour, i.e. to separate the main body of the harbour from the three arms (east, middle and west – Figure 4). Also, unlike in NRFS, the reported fishing location (text) was routinely recorded on the database, both as a validation tool and to provide added flexibility in ongoing analysis work.

Although detailed catch and effort information has been separately provided for all 64 fishing regions, for practical reporting purposes, these have been collapsed into eight fishing zones (Figure 5), as follows:

1. West Coast: region codes 1, 2, 3, 4, 40, 41 and 42
2. Bynoe/Finniss Area: region codes 6, 7 and 43
3. Darwin Harbour: region codes 10, 10a, 10b, 10c and 12
4. Darwin Surrounds: region codes 8, 9, 11, 13, 44, 45, 46, 60 and 61
5. Mary/Alligator Rivers: region codes 14, 15, 16, 17, 18 and 47
6. North Coast: region codes 19, 20, 21, 22, 23, 24, 25, 26, 48, 49, 50, 51, 52, 53 and 54
7. East Coast/Gulf Area: region codes 27, 28, 29, 30, 32, 33, 34, 35, 36, 37, 38, 55, 56, 57, 58 and 59
8. Central/Inland: region codes 5, 31 and 39.

Other fishing location information was also collected in the Diary Survey in terms of water body type: marine waters more or less than 5 km from the coastline; estuarine waters; freshwater rivers and freshwater lakes/dams, public or private.

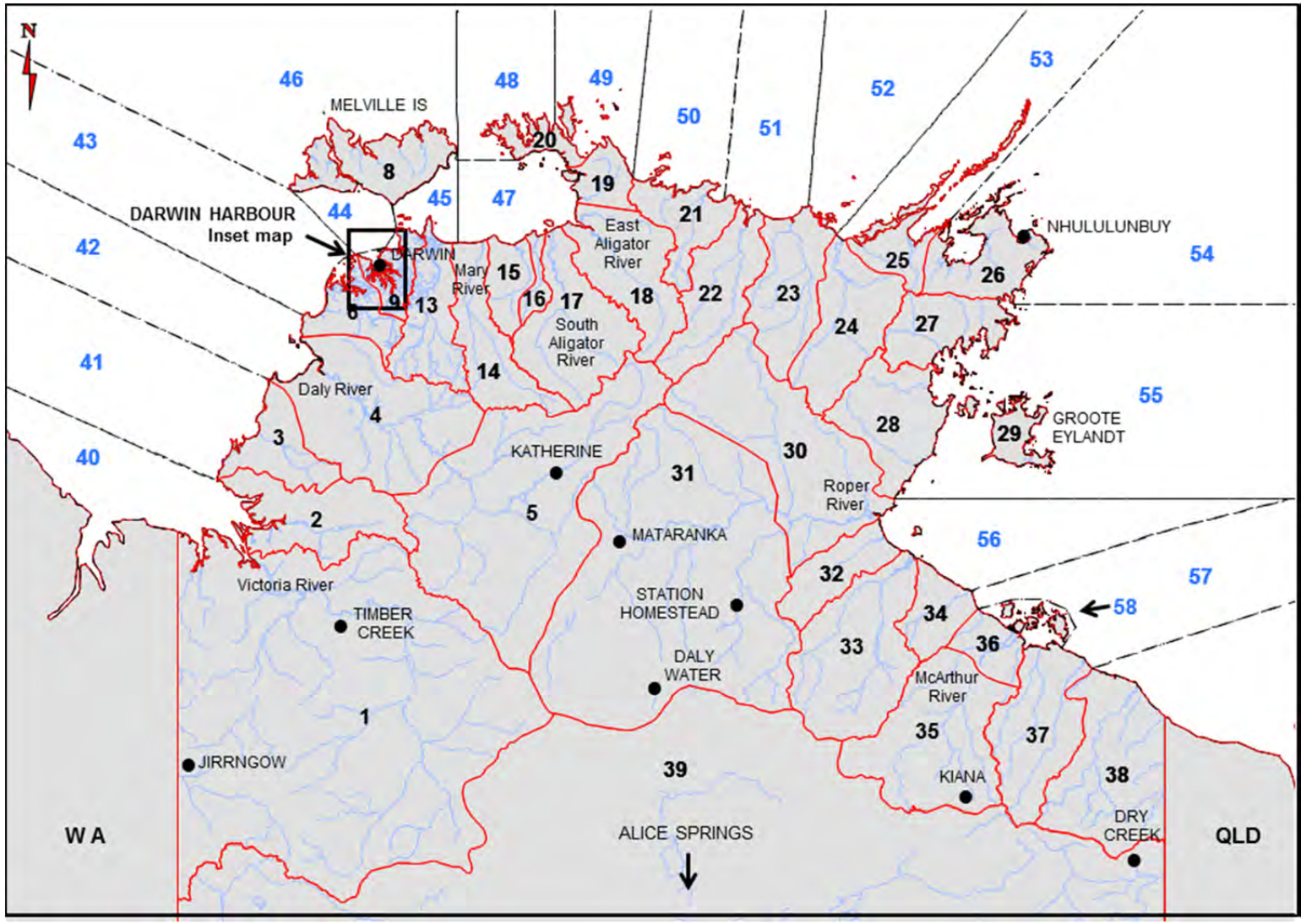

Figure 3. Map of the Northern Territory showing Fishing Regions used for reporting fishing activities.

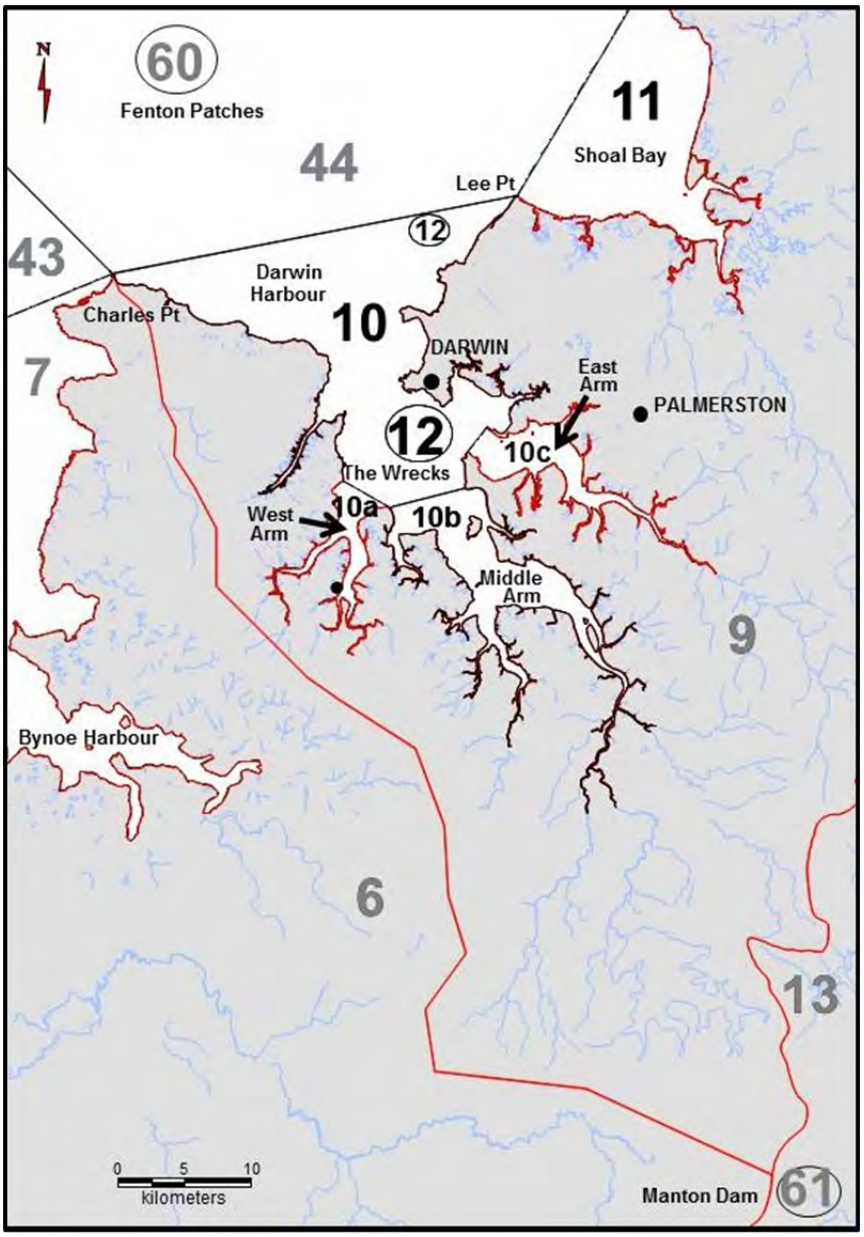

Figure 4. Map of the Darwin Harbour area showing Fishing Regions used for reporting fishing activities.

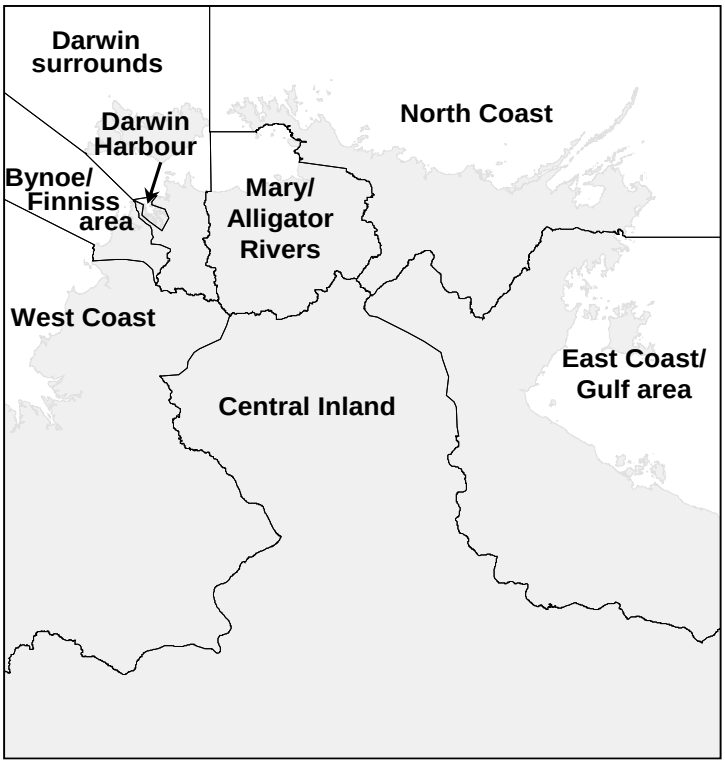

Figure 5. Map of the Northern Territory showing Fishing Zones used for reporting fishing activities.

2.5 Fishing Effort

Fishing information was collected on an 'event' basis, where an event was defined as a discrete fishing episode, and the actual household member(s) involved in the event recorded. Separate fishing events were defined where there was a change in fishing region or water body type, target species and/or fishing method. As a result, a day's fishing trip could comprise more than one event; for instance, fishers may gather bait prior to line fishing for barramundi. Both the gathering of bait and the subsequent fishing were considered to be separate events since the effort expended in the capture of bait cannot be attributed to the capture of barramundi and vice versa. Similarly, the use of passive fishing gear, such as crab pots at the same time as line fishing, were recorded as separate fishing events. The delineation of fishing activity in this manner provided an ability to analyse effort (and catch) on the basis of fishing method and target species/fishery. Furthermore, three measures of effort have been applied, namely fisher days (i.e. separate days on which some form of fishing was undertaken by a fisher), fishing events and hours fished.

It should be noted that person-based effort has been calculated for this report. For active fishing methods such as line fishing and dive harvesting this is clearly appropriate, but where shared or joint activities occurred, such as fishing with crab pots, these can over-estimate effort. In such instances, effort was calculated as the number of pots/nets used divided by the number of persons who participated in the fishing activity on a given day, providing an effort measure of the number of person pot/net days of effort.

2.6 Fishing Methods

A variety of fishing/harvesting methods were reported by diarists, but for most analysis purposes, the following reporting categories have been defined: line fishing (bait and/or lure/jig/fly lines), pot/trap (baited, passive use), cast net, dive collection (including underwater spearfishing and hand collection by snorkel, scuba or hookah) and other methods (including surface/hand spearing, beach seine and scoop/dip nets, hand collection, and the use of hooks, pumps and spades).

2.7 Catch

A Species Identification Guide, including clear colour images, was provided to all diarists to optimise the accuracy of species identification during the survey. A key factor here is that the resolution required for individual species must recognise the identification capabilities of fishers on a lowest-common-denominator basis. Although excellent reporting accuracy can be achieved at the species level in some instances confirmed through on-site surveys (Lyle and Campbell 1999; Lyle et al. 2002b), species groupings were required where fishers could not reasonably be expected to delineate particular species, even with the aid of the Species Identification Guide. For example, iconic species, such as barramundi and golden snapper, were readily recognisable, whereas identification to the species level for all tropical snappers was not always achievable, such as saddletail versus crimson snapper (hence their grouping in the analysis).

For the purpose of reporting catches, individual species, such as barramundi and pikey bream, have been used in most instances, with broad taxonomic groupings required in some cases, such as cods/groupers, and sharks and rays. However, many species or species groups were represented by very few records, making it necessary to pool these into broader taxonomic categories for analysis, principally as ‘Other scalefish’. Details of taxa reported in catches and the catch analysis groupings are provided in Appendix 2, including Standard Fish Names and scientific names for each species (SSA 2009).

Catches were reported as numbers of individuals kept or harvested and numbers released or discarded by species. Although length/frequency data was collected in the on-site surveys for barramundi, black jewfish and golden snapper, any tonnage estimation for these species is the subject of separate analysis by NT Fisheries.

3. SAMPLE AND RESPONSE PROFILES

3.1 Screening Survey

Table 1 provides a summary of the numbers of non-indigenous, private-dwelling households in the NT in June 2009 (based on customised ABS Census and ERP data), along with sampling details and response profiles relating to the Screening Survey. Since sampling was undertaken without replacement for sample loss (such as disconnected numbers and non-private dwellings), the net sample was reduced from a gross sample of 4033 to 3086, of which 2596 households (84.1%) fully responded to the Screening Survey. Response rates were relatively consistent across all sampling strata. Overall, information on recreational fishing and demographic profiling was collected for 5955 non-indigenous residents aged five years and older.

Among the 947 cases of sample loss (Table 1), the vast majority (838) referred to disconnected telephone numbers (numbers that remained disconnected for the two-month period of the Screening Survey). Other forms of sample loss were: 37 business-only numbers, 47 permanent fax/email lines and 26 others (non-private private dwellings, holiday homes and non-functioning/'dead' phone lines).

The 490 non-responding households (Table 1) accounted for 15.9% of the net sample and are dissected as follows: 96 full refusals (3.1%), 151 part refusals (4.9%), 219 full non-contacts (7.1%) and 24 language/communication difficulties (0.8%). As noted in Section 2.3.1, any uncertainty in terms of fishing propensities is limited to a minority of the non-response group and predominantly, the full refusals where participation rates by stratum for the part refusals were applied in the analysis.

Table 1. Northern Territory non-indigenous private dwelling population (number of households), sample size and sample loss/response profiles for the screening survey, by stratum.

Residential stratum[1]	Total households[2]	Initial sample	Sample loss	Net sample	Non-response	Full response	Response rate (%)
'Darwin and Rural'	42 143	2282	484	1798	306	1492	83.0
'Other coastal'	6476	972	284	688	93	595	86.5
'Hinterland'	10 235	779	179	600	91	509	84.8
Total	58 854	4033	947	3086	490	2596	84.1

Notes: [1] Defined according to ABS Statistical Divisions and Sub-divisions - see Section 2.4.1 and Figure 2
[2] Households containing one or more non-Indigenous residents - see Section 2.1

3.2 Diary Survey

Table 2 summarises response profiles for the Diary Survey, with 798 households (30.7% of the full response group at screening) identified as having at least one non-indigenous resident (aged five years and older) with an intention to do some recreational fishing in the NT during the diary period (April 2009 to March 2010). Of these eligible households, 763 (95.6%) agreed to take part in the Diary Survey and among these, 719 (94.2% or 90.1% among eligible households) fully responded. Importantly, of the 44 households failing to complete the Diary Survey, only 5 declined to continue, 10 were ongoing non-contacts and the remaining 29 were 'untraceable' cases of re-locations or disconnected numbers.

In total, 719 NT households, representing 1799 non-indigenous residents aged five years and older, completed the Diary Survey, with consistent response rates across all strata. Some 568 of these households (79%) reported fishing activity during the diary period, comprising 1009 fishers. The Diary Survey yielded a total of 10 368 person-based fishing events. The remaining (21%) non-fishing households comprise the 'drop-outs' from the fishery (see Section 2.3.1); this proportion is consistent with previous diary surveys in the NT and other states.

Overall, by comparison with other general population surveys and traditional mail-back diary studies, the response rates achieved in all components of this study are exceptional and represent an important performance indicator in terms of the survey instrument.

Table 2. Household response profiles for the Diary Survey, by stratum.

Residential stratum	Full response at screening	Eligible for the Diary Survey	Diary uptake	Diary Survey completed	Uptake rate among eligibles (%)	Completion rate among uptake (%)	Completion rate among eligibles (%)
Darwin and Rural'	1492	488	464	439	95.1	94.6	90.0
'Other coastal'	595	275	264	247	96.0	93.6	89.8
'Hinterland'	509	35	35	33	100.0	94.3	94.3
Total	2596	798	763	719	95.6	94.2	90.1

3.3 Non-intending Fisher Follow-up Survey

Response rates for this 'call-back' survey are presented in Table 3. Close to half of the 1798 households that indicated no intention to go fishing during the diary period were selected at random to be followed-up at the end of the diary period to ascertain whether any unexpected fishing had occurred. When sample loss (disconnected numbers, different household) is taken into account, an overall response rate of 88% was achieved for this component of the study, again with consistently high response rates between strata.

There were 89 non-responding households (Table 3) which accounted for 11.9% of the net sample and are dissected as follows: 21 full refusals (2.8%), 19 part refusals (2.5%), 44 full non-contacts (5.9%) and 5 language/communication difficulties (0.7%).

Table 3. Sample size (households) and sample loss/response profiles for the non-intending fisher follow-up survey by stratum.

Residential stratum	Initial sample	Sample loss	Net sample	Non-response	Full response	Response rate (%)
'Darwin and Rural'	492	68	424	47	377	88.9
'Other coastal'	155	30	125	12	113	90.4
'Hinterland'	233	31	202	30	172	85.1
Total	880	129	751	89	662	88.1

3.4 Wash-up/Attitudinal Survey

By design, all 719 households completing the Diary Survey were included in the sample. No sample loss was encountered and 652 households fully responded to the survey (90.7%). Consistent response rates were achieved by stratum, but with higher response rates for fisher households (92.1%) than for non-fisher households (80.1%). However, whereas all 67 cases of non-response were classified as non-contacts, 29 referred to households that moved permanently interstate or overseas during the diary period. Although these latter households were correctly classified as fully responding for the diary period (in terms of NT fishing activity), it was decided to exclude them from the Wash-up Survey, due to contact/tracking difficulties and many of these did not fish at all in the diary period. Among the remaining 38 non-contacts, virtually all involved contact difficulties for the main/key fisher (often the only fisher) in the household, but again diary survey response was complete.

3.5 On-site Survey – Boat Ramps

Response profiles for this survey are presented in Table 4 and are based on 267 sampling shifts across the five catchments where complete data was obtained. As discussed in Section 2.3.2, the nine shifts in Darwin Harbour where the data was lost or destroyed have not been included. By design, all private boats that returned to ramps during the shift period were eligible for interview. However, at particularly busy times (including brief tidal 'windows'), this was not always achievable and interviewers applied systematic random sampling procedures as boats returned (for example, the second, fourth etc.). In total, 144 boats were classified in Table 4 as 'interview not attempted (sub-sampling)' and of the 136 cases in the Darwin Harbour catchment, the majority (98 or 72%) referred to Dinah Beach boat ramp.

Of the 1907 total interviews attempted (Table 4), 1852 boats (97.1%) fully responded to the survey with consistently high response rates across the catchments. All 55 cases of non-response (2.9%) were full refusals. Among the 1852 fully responding interviews in the five catchments, 1702 boats (91.9%) reported some recreational fishing activity on the day – comprising a total of 4402 individual fishers aged five years and older. The majority of fishers (3375 or 76.7%) were NT residents and a total of 6809 person-based fishing events were recorded.

Table 4. Boat-based response profiles for the Boat Ramp Survey by catchment.

Catchment	No. of sampling shifts	No. of private boats (returned)	Interview not attempted (sub-sampling)	Interview attempted	Non-response	Full response	Response rate (%)
Bynoe Harbour	48	238	0	238	1	237	99.6
Darwin Harbour	129	1089	136	953	38	915	96.0
Dundee Beach	24	215	5	210	12	198	94.3
Leaders Creek	18	83	0	83	0	83	100.0
Mary River	48	426	3	423	4	419	99.1
Grand Total	267	2051	144	1907	55	1852	97.1

3.6 On-site Survey – Accommodation Establishments

Response profiles for this survey are presented in Table 5 and are based on all selected accommodation sites (tents and caravans) and the completeness of interviews for core assessment purposes, i.e. demographic data for all occupants of the site and details of any fishing activity on the first day. As discussed in Section 2.2.7, the primary purpose of interviews on the subsequent day was to optimise this core information. Consistently high response rates were achieved across the three catchments (Table 5) and the 52 cases of non-response (3.9%) are dissected as follows: 8 full refusals (0.6%), 6 part refusals (0.4%), 31 full non-contacts (2.3%) and 7 part non-contacts (0.4%).

Among the 1287 fully responding sites in the three catchments (Table 5), 863 sites (67.1%) reported some recreational fishing activity on the first sample day – comprising a total of 1809 individual fishers aged five years and older. The vast majority of fishers (1590 or 87.9%) were visitors from interstate or overseas and a total of 2659 person-based fishing events were recorded for the first day.

For a combined response assessment of the first and second sampling days, 'sample loss' has been excluded, i.e. cases where occupants of the selected site vacated the establishment on the second day and no fishing was expected – 94 sites (7%) of the 1339 total selected sites (Table 5). Of the remaining 1245 sites, 1119 (89.9%) were fully responding, with varying response rates by catchment: Daly River (88.3%), Roper River (98%) and McArthur River (87.7%). However, of the 10.1% non-responses, the majority (6.1%) were the result of increased partial non-contacts, i.e. those who fully responded on the first day, but were unable to be contacted on the second day. To reduce these partial non-contacts, a third day would have been required.

Table 5. Response profiles (first sample day basis) for sites selected in the 'accommodation establishments' survey by catchment.

Catchment	No. of sampling days	No. of selected sites	Non-response	Full response	Response rate (%)
Daly River	60	483	21	462	95.7
McArthur River	24	602	28	574	95.3
Roper River	24	254	3	251	98.8
Grand total	108	1339	52	1287	96.1

4. FISHER CHARACTERISTICS – NT RESIDENTS

Information presented in this section is based on the Screening Survey and is reported as expanded estimates (adjusted for non-response, after Lyle et al. 2009a) to represent the non-indigenous resident population of the NT aged five years and older. Detailed information about participation by age, gender and residence is provided in Appendix 1.

4.1 Fishing Participation

An estimated 31 790 (SE 1211) non-indigenous residents of the NT aged five years and older fished at least once in the NT in the 12 months prior to April 2009, representing a participation rate of 22.3% (SE 0.8%) (Appendix 1). While the majority (79%) of recreational fishers resided in the 'Darwin and Rural' stratum, residents of the 'Other coastal' stratum had the highest participation rate (38.2%) (Figure 6). The lowest number of fishers (less than 1000) and lowest participation rate (3%) emerged for residents of the 'Hinterland' stratum.

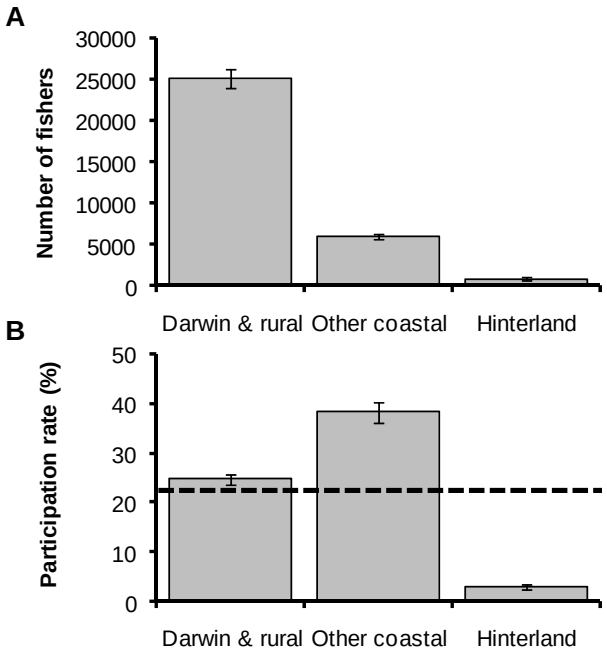

Figure 6 Estimated number (A) and proportion (B) of the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT in the 12 months prior to April 2009 by stratum. Error bars represent one standard error and the dotted line represents the participation rate for the NT as a whole.

4.2 Age and Gender

Two thirds of recreational fishers were male, representing a participation rate of 28.5%, compared with 15.4% for females (Appendix 1). The greater popularity of recreational fishing amongst males was evident across all age groups (Figure 7) and in each of the residential strata (Appendix 1).

Overall, the number of recreational fishers increased with age to a peak in the 30-44 years age group of 9893 persons, before declining, with an especially sharp fall to 1843 persons in the 60 years and older

age group. This pattern was generally consistent for males and females, with the exception that the number of female fishers in the youngest age group (5-14 years) did not differ significantly from that for the 15 to 29 years age group (Figure 7A).

When considering participation rate rather than numbers, participation was highest (27.8%) in the youngest age group (5 to 14 years), closely followed by persons in the 30-44 year age bracket (25.6%, Appendix 1). The lowest participation, about one in ten persons (11.2%), occurred amongst the 60 plus age group.

Male participation rates for the age groups up to 59 years were relatively consistent, in the range 28.6 to 32.8% depending on age group, falling to about half this level (15.4%) in the oldest age group (Figure 7B). The trend for females was more variable, with one in four females (25.2%) aged 5 to 14 years fishing, followed by 18.0% of 30 to 44 year-olds, 14.1% of 15 to 29 year-olds and 12.4% of 45 to 59 year-olds (Figure 7B). Only 5.6% of females 60 years and older participated in recreational fishing.

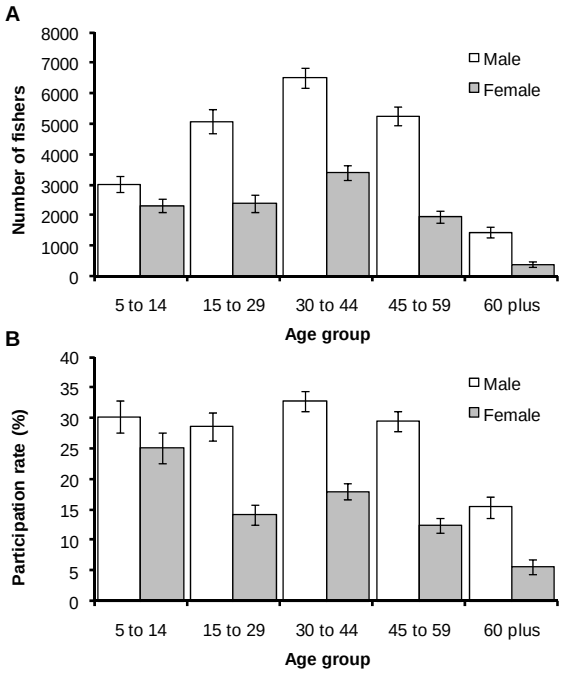

Figure 7. Estimated number (A) and proportion (B) of the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT in the 12 months prior to April 2009 by age group and gender. Error bars represent one standard error.

5. FISHING EFFORT – NT RESIDENTS

In this section the fishing activities of respondents during the Diary Survey are reported as expanded estimates (adjusted for non-response, after Lyle et al. 2009a) to represent the activity of the non-indigenous resident population of the NT aged five years and older for the period April 2009 to March 2010.

Fishing effort can be expressed in various ways, including the number of persons who fished at least once, the total number of person days spent fishing (fisher days), actual time spent fishing (fisher hours) or as fishing events (as defined in Section 2.5). For various analysis purposes, fishing effort has also been considered in relation to the location of the fishing activity (region and water body type), fishing method, fishing platform and species targeted.

5.1 Overview

In total, an estimated 30 538 non-indigenous NT residents aged five years and older fished at least once in the NT between April 2009 and March 2010 - accounting for a total of 150 502 fisher days of effort, at an average of almost 5 days per fisher (Table 6). Although the number of fishers was slightly lower than the estimate for the previous 12 months (Section 4), the difference was not significant.

'Darwin and Rural' residents represented 78% of the fishers and accounted for 74% of the fisher days while 'Other coastal' residents represented 19% of the fishers and contributed 23% of the total fisher days of effort. Although 'Hinterland' residents fished on average more days than those from the other areas (7.3 days compared with 4.7 and 5.7 days for 'Darwin and Rural' and 'Other coastal' strata, respectively), the low number of persons involved (2% of fishers) meant that this group made a very minor contribution (3%) to the NT-wide fishing effort.

Table 6. Estimated number of persons and days fished by non-indigenous residents aged five years and older in the Northern Territory during 2009-10 by stratum.

	Fishers		Fisher days		
Residential stratum	**Number**	***SE**	**Number**	**SE**	**Mean**
'Darwin and Rural'	23 955	1218	111 704	7195	4.7
'Other coastal'	5909	349	33 898	3014	5.7
'Hinterland'	674	225	4901	2769	7.3
Total	30 538	1280	150 502	8278	4.9

*SE = standard error

The majority (75%) of fishers reported fishing on 5 or fewer days in the NT during 2009-10, with a further 14% fishing 6 to 10 days and 5% 11 to 15 days (Figure 8). Less than 3% of fishers reported more than 20 days of fishing. The highly skewed nature of the fishing activity is further emphasised when individual fishers are ranked in order of their annual fishing effort (days fished) and the cumulative effect of adding each fisher's effort to the progressive total is assessed (Figure 9). This analysis revealed that 20% of fishers accounted for almost 60% of the effort. Such a relationship is common in recreational fisheries elsewhere and highlights the fact that a relatively small number of recreational fishers have a disproportionately large impact in terms of effort (and catch). Thus, minor shifts in the dynamics of participation (based on activity levels) at the upper end of the fishery can be expected to have significant implications on effort (and catch) levels on an NT-wide basis.

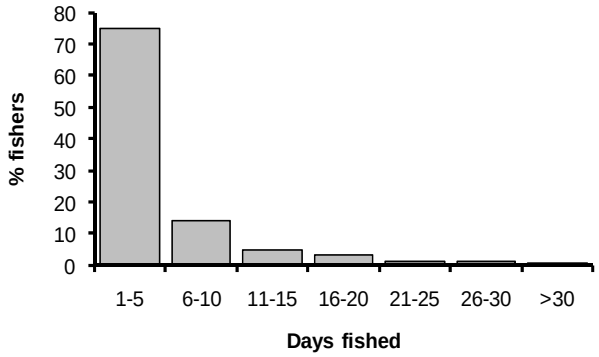

Figure 8. The distribution of fishing effort by annual days fished for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10.

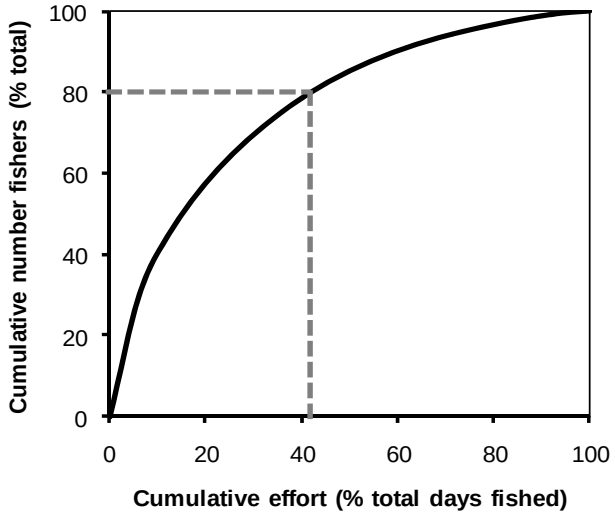

Figure 9. The **r**elationship between the number of fishers and their cumulative fishing effort (days fished) for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10. Dotted lines indicate that 80% of the fishers accounted for just over 40% of the total days fished.

5.2 Water Body

Recreational fishing activity in the NT was concentrated in marine waters, in particular estuarine waters, which attracted just under half (47% or 70 811 fisher days) of the total effort, followed by inshore waters (<5 km from the coastline – 27% or 41 192 fisher days) and offshore waters (>5 km from the coastline – 8% or 11 962 fisher days) (Figure 10 and Appendix 5).

Fishing in freshwater occurred almost exclusively in rivers (19% or 27 978 fisher days), whilst fishing in lakes and dams was a very minor activity (305 fisher days). A similar pattern was evident for effort when based on hours fished (Appendix 5).

In relation to participation and, recognising that individuals may have fished in more than one water body type during the year, it was estimated that almost two-thirds of the NT resident fishers fished at least once in estuarine waters, half fished in inshore waters, one third fished in freshwater rivers and just under one in five fished at least once in offshore waters during 2009-10 (Appendix 5).

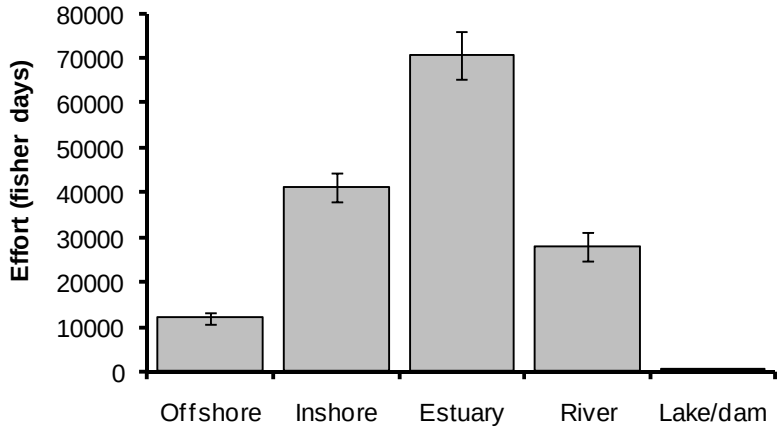

Figure 10. Fishing effort (fisher days) by water body type for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10. Error bars represent one standard error.

5.3 Fishing Platform

Overall, the majority (81%) of recreational fishers fished at least once from a boat, accounting for 79% of the total days fished and 86% of the total fisher hours of effort during 2009-10 (Appendix 9). Privately-owned boats accounted for the vast majority (96%) of all boat-based fishing effort (days fished), with the remainder equally shared between charter and hire boats (2% each). This latter information did not warrant the inclusion of a separate table/appendix.

Shore-based fishing was a relatively minor component of the fishing effort in each of the water body types, with boat-based effort accounting for over five times the effort (fisher days) in estuarine waters and more than double the effort in both inshore waters and freshwater rivers (Figure 11). Shore-based fishing was an insignificant component of the offshore fishery, noting that by definition, offshore waters included many small islands situated farther than 5 km from the main coastline of the NT.

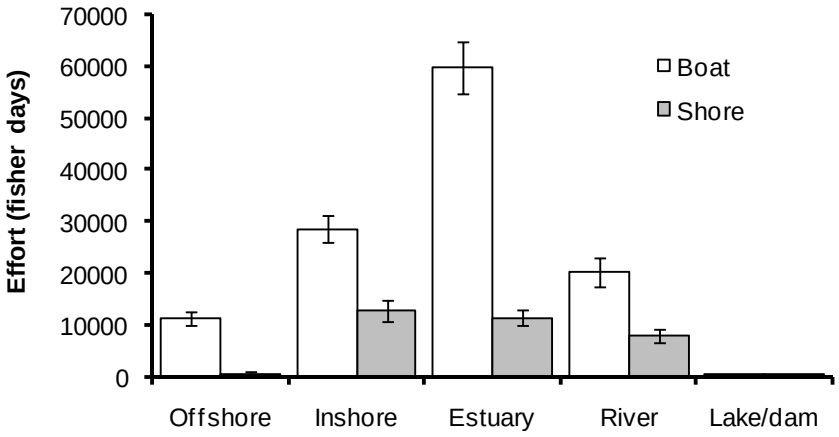

Figure 11. Fishing effort (fisher days) by water body type and fishing platform for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10. Error bars represent one standard error.

5.4 Fishing Method

Line fishing was by far the most common method used by NT recreational fishers, with 99% of all fishers line fishing at least once during 2009-10, representing 95% of the fisher days and 84% of the total hours fished (Appendix 7, Figure. 12). In addition, almost one in four fishers (24%) used a pot or trap at least once, accounting for 11% of all days fished and 15% of the total hours fished. Cast nets were used by 5% of fishers on around 3% of the fisher days, representing less than 1% of the total hours fished. Dive and other methods, including hand collection, were comparatively insignificant activities.

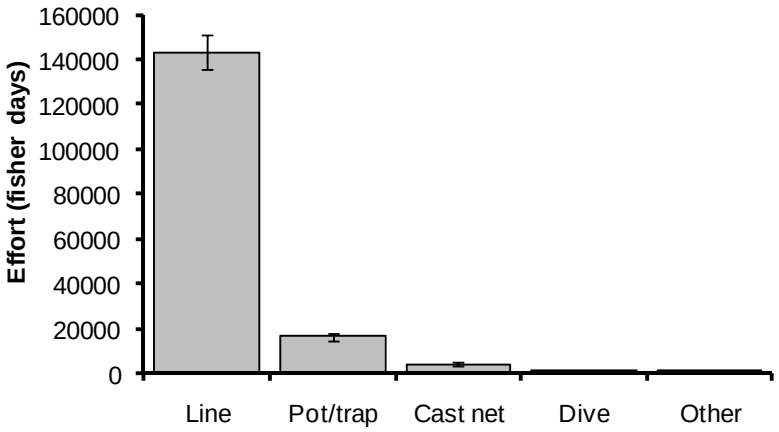

Figure 12. Fishing effort (fisher days) by fishing method for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10. Error bars represent one standard error.

5.5 Fishing Zones

Regionally, Darwin Harbour together with the Darwin Surrounds zone accounted for 45% of the total fishing effort (days fished), followed by the Mary/Alligator Rivers (17%) and West Coast and Bynoe/Finniss Area zones (10% each) (Figure 13, Appendix 12). The remaining zones attracted between 3% and 8% of the total fishing effort, with the lowest activity levels occurring in the Central/Inland zone.

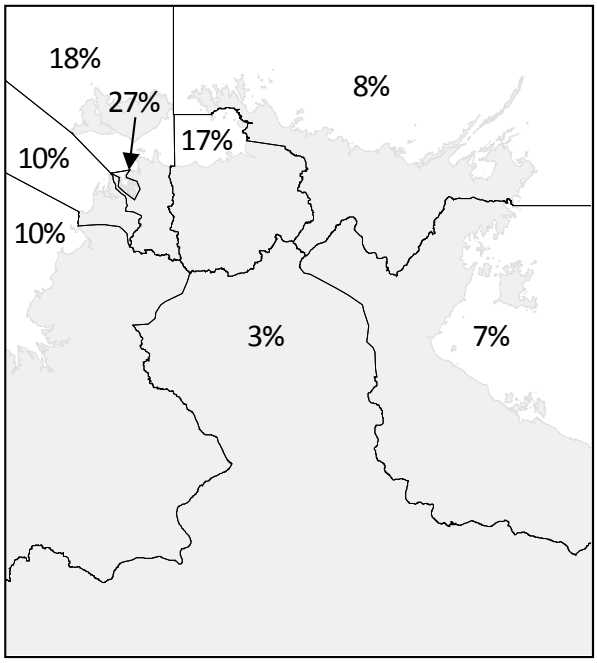

Figure 13. Spatial distribution (percentage) of fishing effort (fisher days) by fishing zone for the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT during 2009-10.

The significance of Darwin Harbour to the recreational fishery is further highlighted by the fact that just under half (48%) of all NT resident fishers fished there at least once during 2009-10 (Appendix 12). The fishing zones immediately adjacent to Darwin (i.e. Darwin Surrounds, Bynoe/Finniss Area, Mary/Alligator Rivers) also attracted comparatively large numbers of fishers, with between 21 and 30% of resident fishers fishing at least once in these zones. The more remote zones, North Coast, East Coast/Gulf Area and Central/Inland, were accessed by between 6 to 9% of resident fishers, while around 15% of fishers fished in the West Coast zone during 2009-10.

6. CATCH – NT RESIDENTS

In this section catches reported by respondents during the Diary Survey are expressed as expanded estimates (adjusted for non-response, after Lyle et al. 2009a) of the numbers of aquatic organisms taken by the non-indigenous resident population of the NT aged five years and older during the period April 2009 to March 2010. For various analysis purposes, catches have also been considered in relation to species targeted, the location of the fishing activity (water body type and region) (refer to Section 8), fishing method and fishing platform.

Recreational fishers captured a diverse range of scalefish, elasmobranchs (sharks and rays), crustaceans, molluscs, and other taxa. A detailed listing of species or species groupings is provided in Appendix 2. For the purposes of reporting and analysis, however, some species have been grouped in recognition that fishers could not reasonably be expected to delineate to the species level due to taxonomic similarities, or where particular species were rarely reported.

6.1 Total Catch, Harvest and Release/Discard Estimates

For recreational fisheries assessment, catches are generally divided into the components that are kept or harvested (i.e. not returned to the water) and released or discarded (i.e. returned to the water whether alive or not). The harvested component may be used for a variety of purposes, most commonly for consumption or for use as bait. The reasons for releasing or discarding catch may include adherence to regulations (such as size and bag limits), ethical reasons (such as catch and release fishing) or undesirability (such as poor eating qualities, damaged or diseased). Catch estimates are provided in detail in Appendix 2 and for the main reporting groups in Table 7.

Overall 20.6% of all fishing events in the NT during 2009-10 resulted in no catch (whether kept or released). Successful fishing events yielded an estimated 771 126 organisms, less than half (351 539) of which were retained, with the remainder (419 587) being released or discarded. Fish (scalefish, sharks and rays) dominated the catch, accounting for 89.6% (691 018) of the total numbers. Crustaceans (57 387) and cephalopods (16 820) were next in importance, contributing 7.4% and 2.2% to the total, respectively.

Barramundi was the most common species caught by NT recreational fishers, with an estimated 147 393 captured, accounting for 21% of all fish caught during 2009-10. Golden snapper (80 530 or 12% of the fish catch), small baitfish (55 854 or 8%), catfish (40 186 or 6%), saddletail/crimson snapper (36 730 or 5%) and mullet (36 260 or 5%) followed in importance (Table 7). Individually, each of the other fish species caught contributed less than 5% to the total numbers. Collectively, however, snappers of the genus *Lutjanus* (red emperor, golden snapper, mangrove jack, Moses' snapper, saddletail/crimson snapper and stripey snapper) accounted for almost one in four of all fish caught by NT recreational fishers. Of the crustaceans, mud crabs accounted for the bulk of the numbers (44 634 or 78%) while the cephalopod catch was exclusively comprised of squid species.

Approximately 42% (286 941) of the fish captured during 2009-10 were kept or retained by recreational fishers, compared with 74% (42 265) of the crustacean and 98% (16 433) of the squid catches. Amongst the retained fish, small baitfish were the most common group, with an estimated 54 065 kept, which represented 19% of the total numbers. Barramundi, with a retained catch of 40 951 was next in importance and accounted for 14% of the total, followed by golden snapper (38 000 or 13%), mullet (33 222 or 12%), and saddletail/crimson snapper combined (14 355 or 5%) (Table 7).

Overall, 58% of all fish caught by recreational fishers were released or discarded (404 078), the actual release rates varying between species. High rates of release (over 75%) were evident for such species as catfish, sharks and rays and stripey snapper, while over half of the catch of species such as barramundi, pikey bream, golden snapper, saddletail/crimson snapper and cod/groupers were also released (Table 7). By contrast, less than half of the mullet, small baitfish, cephalopods, mud crabs, and blue and king threadfin were released. In Table 8, species have been grouped according to release rates, highlighting that some species tend to be released or discarded, whereas others are more likely to be kept or harvested by recreational fishers.

Table 7. Annual catch (total, kept and released numbers) and proportion released/discarded for key species during 2009-10 by non-indigenous Northern Territory residents aged five years and older.

	Total		Kept		Released		
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**(%)**
Barramundi	147 393	23 250	40 951	4851	106 442	19 764	72.2
Bream, pikey	16 186	3160	6414	1382	9771	2383	60.4
Catfish	40 186	5488	***5203***	***2944***	34 983	4584	87.1
Cod/groupers	27 372	3038	7033	932	20 339	2626	74.3
Coral trout	5850	1160	2835	482	3014	853	51.5
Emperor, grass	22 861	4050	10 191	2359	12 670	2528	55.4
Emperor, red	5589	2069	2600	859	***2990***	***1286***	53.5
Emperor, other	***437***	***429***	***34***	***33***	***403***	***396***	92.3
Grunter, sooty	7527	1807	*2308*	*565*	5218	1521	69.3
Javelin fish	8734	2369	*2206*	*599*	6528	2079	74.7
Jewfish, black	10 779	1525	7810	1152	*2969*	*824*	27.5
Mackerel, grey	3390	791	2108	503	*1282*	*399*	37.8
Mackerel, Spanish	8287	1825	3862	731	4424	1466	53.4
Mackerel, spotted	*833*	*279*	*500*	*181*	***333***	***147***	40.0
Moonfish/batfish	8129	1839	*2741*	*869*	*5388*	*1397*	66.3
Mullet	36 260	9078	33 222	8388	***3038***	***2736***	8.4
Queenfish	10 895	2001	3394	650	7501	1758	68.8
Saratoga	6900	1965	***1175***	***602***	5725	1683	83.0
Sharks and rays	27 738	3454	*1506*	*448*	26 232	3378	94.6
Small baitfish	**55 854**	**24 973**	**54 065**	**24 790**	***1790***	***1301***	3.2
Snapper, golden	80 530	9208	38 000	4702	42 531	5504	52.8
Snapper, mangrove jack	9491	2086	5362	1407	4129	1090	43.5
Snapper, Moses'	***7097***	***4020***	***1776***	***1183***	***5321***	***3003***	75.0
Snapper, saddletail/crimson	36 730	7021	14 355	3350	22 375	4276	60.9
Snapper, stripey	21 577	3349	5227	1068	16 350	2692	75.8
Snapper, other	***200***	***188***	***200***	***188***	*0*	*0*	0.0
Tarpon/ox-eye herring	14 835	3824	***5585***	***2794***	9250	2098	62.4
Threadfin, blue	10 892	2091	6630	1370	4262	1470	39.1
Threadfin, king	7150	1688	3744	842	*3406*	*1008*	47.6
Trevally, giant	18 438	4536	2673	583	15 766	4431	85.5
Trevally, other	3556	1013	*736*	*213*	*2819*	*974*	79.3
Wrasse, tuskfish and gropers	5828	997	2350	448	3478	738	59.7
Scalefish, other	23 493	4542	10 145	3032	13 348	2795	56.8
Mud crab	44 634	6339	30 382	3951	14 253	3045	31.9
Cherabin	*8196*	*3018*	*7869*	*2825*	***326***	***320***	4.0
Crustaceans, other	***4558***	***1895***	***4014***	***1807***	***543***	***283***	11.9
Cephalopods	***16 820***	***13 347***	***16 433***	***13 341***	***387***	***255***	2.3
Bivalves	***5858***	***5564***	***5858***	***5564***	*0*	*0*	0.0
Other taxa	***43***	***42***	***43***	***42***	*0*	*0*	0.0

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

Table 8. Comparative summary of the proportion of the recreational catch of key species that was released or discarded during 2009-10 by non-indigenous Northern Territory residents aged five years and older.

Proportion released			
> 75%	**51-75%**	**25-50%**	**< 25%**
Catfish	Barramundi	Jewfish, black	Mullet
Emperor, other	Bream, pikey	Mackerel, grey	Small baitfish
Saratoga	Coral trout	Mackerel, spotted	Snapper, other
Sharks and rays	Cod/groupers	Snapper, mangrove jack	Cherabin
Snapper, stripey	Emperor, grass	Mud crab	Crustaceans, other
Trevally, giant	Emperor, red	Threadfin, blue	Cephalopods
Trevally, other	Grunter, sooty	Threadfin, king	Bivalves
	Javelin fish		Other taxa
	Mackerel, Spanish		
	Moonfish/batfish		
	Queenfish		
	Snapper, golden		
	Snapper, Moses' Snapper, saddletail/ crimson		
	Tarpon/ox-eye herring Wrasse, tuskfish and gropers		
	Scalefish, other		

6.1.1 Reasons for Release

Fishers release or discard catch for a variety of reasons and in order to better understand this behaviour, respondents were routinely questioned about their reasons for not retaining part or all of their catch. This question about reason(s) for release was asked for each fishing event and specifically for each species not retained. Also, the questioning was sensitive to the fact that individuals of a given species could be released for different reasons; for example, some of the catch could have been small fish, while others ultimately exceeded the needs of the fisher (or the possession limit). No attempt was made to ask respondents about the condition (alive or dead) of any non-retained catch.

However, careful attention was given to the reasons provided by respondents and (by using their terminology and 'neutral' questioning), the following categories were identified and included in Table 9: "too small" - implying that the fish was either too small to be retained (personal preference) or under a minimum legal size limit (undersized); "too big" - implying too large to be retained (personal preference); "too many" – implying catch in excess of personal needs (not possession limits, see below); "catch and release" – implying a voluntary release ethic, typically associated with sport fishing and/or conservation; and "unwanted" – implying non-desirability, primarily related to (perceived) poor eating quality. For crustaceans, berried females (i.e. females carrying eggs) was also cited as a reason for release, noting that it is illegal to harvest some crustaceans whilst berried (see further discussion next page). Due to their very low incidence, several other reported reasons have been incorporated into 'Other' in Table 9, such as cases where a possession limit would have been exceeded, including prohibited species, sick or diseased individuals and damage/mutilation (e.g. by sharks).

For many species, ‘too small’ was an important (if not the primary) reason for their release. These included barramundi, pikey bream, coral trout, cod/groupers, grass emperor, red emperor, javelin fish, black jewfish, mackerels, mullet, various species of snapper, blue threadfin, king threadfin and mud crabs (Table 9). Catch and release also featured as a relatively important motive for barramundi and pikey bream, as well as queenfish, saratoga and tarpon. Catfish, sharks and rays, cod/groupers and moonfish were mainly released or discarded because they were identified as being unwanted or undesirable species. The only group for which ‘too many’ was the primary reason for release were small baitfish and Moses’ snapper, although ‘too many’ was also cited as a secondary reason for release of barramundi, coral trout, grass emperor, javelin fish, mackerels, mangrove jack, king threadfin and blue threadfin. Specialist advice from NT Fisheries has indicated that the vast majority of the released mud crabs reported as being berried females (29.6%) are likely to have been incorrectly identified as such, due to the egg mass of the feminising parasite *Loxythylacus ihlei* being commonly mistaken by fishers as that of the crab itself (M. Grubert, pers. comm.).

Table 9. Reasons for release - proportions (%) of total numbers of key species released during 2009-10, by non-indigenous Northern Territory residents aged five years and older.

Species/group	Total number released	Reason for release (%) Too small	Too big	Too many	Catch and release	Berried female	Un-wanted	Other
Barramundi	106 442	52.1	***4.8***	19.3	22.3	0.0	0.0	***1.6***
Bream, pikey	9771	61.5	*0.0*	***0.8***	***28.3***	0.0	***9.4***	0.0
Catfish	34 983	*5.4*	*0.0*	***1.6***	***1.9***	0.0	91.1	0.0
Cod/groupers	20 339	41.2	***0.1***	*5.0*	***2.3***	0.0	51.4	0.0
Coral trout	3014	*76.2*	***1.2***	***15.6***	***4.6***	0.0	***2.4***	0.0
Emperor, grass	12 670	67.8	*0.0*	***17.0***	***3.0***	0.0	***11.9***	***0.3***
Emperor, red	***2990***	***85.7***	***1.2***	***6.9***	***3.4***	0.0	***2.8***	0.0
Emperor, other	***403***	***100.0***	*0.0*	0.0	0.0	0.0	0.0	0.0
Grunter, sooty	5218	***56.5***	***0.4***	***1.9***	***11.5***	0.0	***29.7***	0.0
Javelin fish	6528	*42.6*	*0.0*	***18.9***	0.0	0.0	*38.5*	0.0
Jewfish, black	*2969*	*86.1*	*0.0*	***12.9***	0.0	0.0	0.0	***1.0***
Mackerel, grey	*1282*	*81.4*	*0.0*	***8.6***	***10.0***	0.0	0.0	0.0
Mackerel, Spanish	4424	***62.6***	***0.4***	***18.6***	***13.5***	0.0	***4.8***	0.0
Mackerel, spotted	***333***	***60.3***	*0.0*	***14.7***	0.0	0.0	***25.1***	0.0
Moonfish/batfish	*5388*	*24.7*	*0.0*	***10.3***	***14.5***	0.0	*50.5*	0.0
Mullet	***3038***	***88.3***	*0.0*	***10.6***	0.0	0.0	***1.1***	0.0
Queenfish	7501	*24.4*	*0.0*	***6.0***	***36.7***	0.0	*32.9*	0.0
Saratoga	5725	***17.2***	*0.0*	0.0	***38.8***	0.0	*44.0*	0.0
Sharks and rays	26 232	*2.7*	***0.2***	***2.7***	*11.8*	0.0	82.7	0.0
Small baitfish	***1790***	0.0	*0.0*	***95.1***	***1.1***	0.0	***3.8***	0.0
Snapper, golden	42 531	82.1	***0.2***	*11.5*	***5.9***	0.0	***0.3***	0.0
Snapper, mangrove jack	4129	*61.2*	***5.5***	***19.7***	***11.5***	0.0	***2.1***	0.0
Snapper, Moses'	***5321***	***26.2***	*0.0*	***59.0***	0.0	0.0	***14.9***	0.0
Snapper, saddletail/crimson	22 375	73.8	***0.1***	***13.4***	***0.2***	0.0	***12.6***	0.0
Snapper, stripey	16 350	56.7	*0.0*	***9.8***	***0.7***	0.0	32.8	0.0
Tarpon/ox-eye herring	9250	***21.6***	***0.4***	***2.4***	***21.5***	0.0	54.1	0.0
Threadfin, blue	4262	***49.5***	***0.6***	***16.7***	***7.7***	0.0	***25.5***	0.0
Threadfin, king	*3406*	***52.8***	***0.7***	***21.2***	***10.6***	0.0	***14.6***	0.0
Trevally, giant	15 766	23.0	***1.5***	***7.3***	*19.8*	0.0	***48.0***	***0.5***
Trevally, other	*2819*	***56.9***	*0.0*	***2.4***	***13.4***	0.0	***26.6***	***0.7***
Wrasse, tuskfish and gropers	3478	*40.1*	*0.0*	***5.6***	***14.4***	0.0	*39.9*	0.0
Scalefish, other	13 348	*34.1*	***0.1***	***4.8***	***18.6***	0.0	42.5	0.0
Mud crab	14 253	68.0	***0.3***	***2.1***	0.0	***29.6***	0.0	0.0
Cherabin	***326***	***100.0***	*0.0*	0.0	0.0	0.0	0.0	0.0
Crustaceans, other	***543***	***89.7***	*0.0*	0.0	0.0	***2.3***	***8.0***	0.0
Cephalopods	***387***	***63.2***	*0.0*	***18.4***	***18.4***	0.0	0.0	0.0

Values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

6.1.2 Targeted Fishing

Respondents were routinely asked whether they were fishing for particular species or not, thereby enabling the effort and catch for each fishing event to be classified as being either targeted or non-targeted. Respondents were asked to nominate up to two target species for each event and thus, any resultant catch could be divided into targeted and non-targeted components. An understanding of targeted fishing behaviour provides an insight into the level of specialisation and value that recreational fishers attribute to particular species as well as providing meaningful measures of fishing success, noting that nil catch events are a common characteristic of recreational fisheries (as noted in Section 6.1, just over one in five fishing events during 2009-10 resulted in a nil catch).

Overall, 72.8% of fishing events (expanded estimates) were reported as being targeted at one or more species; conversely, this meant that 27.2% of all events had no nominated target species. Targeted and non-targeted catch estimates by species are provided in Appendices 3 and 4 and the proportion of the total catch attributed to targeted effort is summarised in Table 10 for each species. Of the major recreational species, the vast majority (>90%) of the barramundi, mullet and mud crab catches were derived from targeted fishing effort. By contrast, such species as catfish, cod/groupers, grass emperor, javelin fish, various species of snapper, trevally and wrasse, tuskfish and gropers, along with sharks and rays, were rarely targeted (<10%), implying that catches of these species were mostly incidental. A range of other species were captured with varying degrees of reported targeting; over half of the catch of small baitfish, cherabin and cephalopods was attributed to targeted effort whereas less than half of the golden snapper, pikey bream, coral trout, sooty grunter, black jewfish, mackerel, queenfish, saratoga, tarpon, blue threadfin and king threadfin catches were due to targeted fishing effort.

Table 10. A comparative summary of the proportion of the recreational catch (kept and released) of key species that were taken by targeted effort during 2009-10, by non-indigenous Northern Territory residents aged five years and older.

Proportion of catch targeted			
< 10%	**10-50%**	**51-90%**	**> 90%**
Catfish	Bream, pikey	Small baitfish	Barramundi
Cod/groupers	Coral trout	Cherabin	Mullet
Emperor, grass	Emperor, red	Crustaceans, other	Mud crab
Emperor, other	Grunter, sooty	Cephalopods	Bivalves
Javelin fish	Jewfish, black		
Mackerel, spotted	Mackerel, grey		
Moonfish/batfish	Mackerel, Spanish		
Sharks and rays	Queenfish		
Snapper, Moses'	Saratoga		
Snapper, saddletail/crimson	Snapper, golden		
Snapper, stripey	Snapper, mangrove jack		
Snapper, other	Tarpon/ox-eye herring		
Trevally, giant	Threadfin, blue		
Trevally, other	Threadfin, king		
Wrasse, tuskfish and gropers	Scalefish, other		
Other taxa			

6.2 Catch by Water Body

Catch details by water body type are provided in Appendices 5 and 6 and are summarised for key fish species in Figure 14. Out of the total catch (kept plus released) taken by NT recreational fishers, around 43% was derived from estuarine waters, with a further 30% from inshore waters, 16% from offshore waters and 11% from freshwater rivers.

Saddletail/crimson snapper combined, along with golden snapper were the most frequently caught fish in offshore waters, collectively accounting for just under one third of the total offshore catch (Figure 14A). A range of other reef fish, including grass emperor, stripey snapper and giant trevally, as well as various species of sharks and rays were of secondary importance. In the inshore, excluding small baitfish, saddletail/crimson snapper combined, along with golden snapper were also the most commonly caught species, with a range of other reef and inshore species such as barramundi, cod/groupers, grass emperor, stripey snapper, and sharks and rays also relatively common (Figure 14B). Barramundi was the most numerous species taken in estuarine catches which, together with golden snapper, represented 42% of the total numbers (excluding small baitfish) (Figure 14C). Mullet and catfish were also relatively common in estuarine catches along with cod/groupers, pikey bream and sharks and rays. Catches in freshwater were dominated by barramundi, this species alone accounting for over half of the total numbers, with catfish, sooty grunter, tarpon and saratoga of secondary importance (Figure 14D).

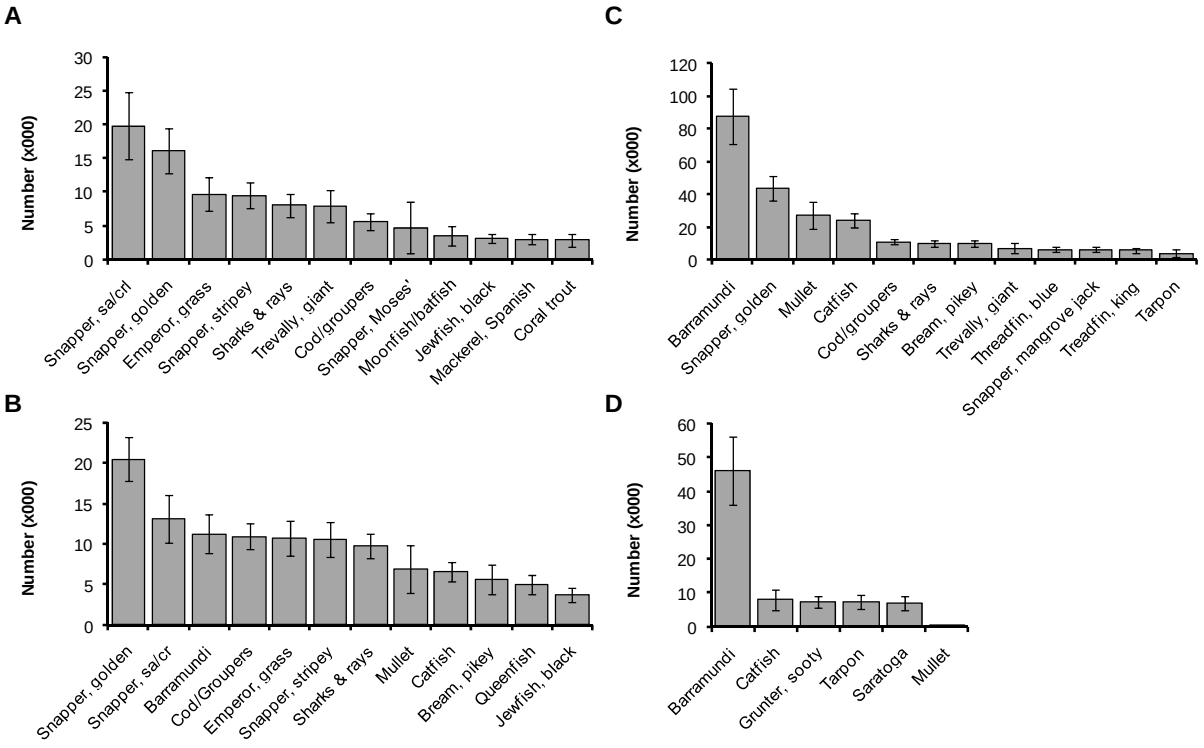

Figure 14. Catch estimates (total numbers caught) of key fish species taken by non-indigenous Northern Territory residents aged five years and older during 2009-10 based on water body: A) Offshore; B) Inshore, C) Estuary and D) River. Error bars represent one standard error; vertical axis scale is variable.

6.3 Catch by Method

Catch details by fishing method are provided in Appendices 7 and 8 and are summarised for key species in Figure 15. Overall, line fishing accounted for 621 485 fish and invertebrates, representing almost 81% of the total catch taken by NT recreational fishers during 2009-10. Cast nets contributed a further 11% (86 928 individuals), pots and traps 7% (52 409 individuals) and other methods around 1% (9290 individuals) to the total catch. Dive collection emerged as an insignificant component of the NT recreational fishery.

Fish accounted for the vast majority of the line catch, with barramundi accounting for almost a quarter of the total numbers (kept and released) (Figure 15A). Other species of significance included golden snapper, catfish, saddletail/crimson snapper, sharks and rays, and a range of other scalefish species. By contrast, the catch taken by pots and traps was almost exclusively comprised of crustaceans, in particular mud crabs but also cherabin (Figure 15B). Cast nets were used to catch a range of fish and invertebrates, with mullet and small baitfish comprising the bulk of the numbers, followed by squid and tarpon (Figure 15C).

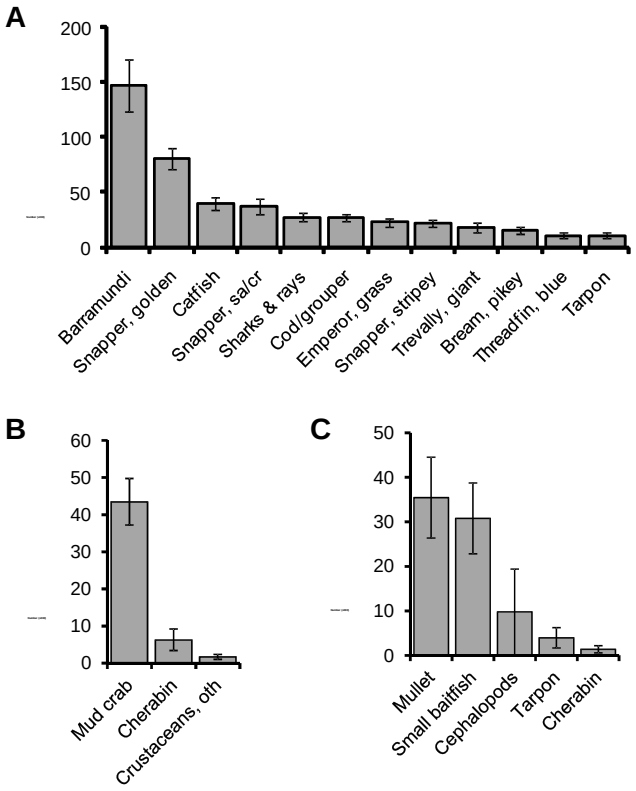

Figure 15. Catch estimates (kept and released) of key species taken by non-indigenous Northern Territory residents aged five years and older during 2009-10 based on fishing method: A) Line, B) Pot/trap and C) Cast net. Error bars represent one standard error, vertical axis scale is variable.

6.3.1 Line Fishing

Line fishing is typically practised using either baited hooks, artificial lures (hard body lures and soft plastics) or flies. In an attempt to understand this aspect of the fishery, line fishing events were further defined in terms of whether bait or lures/flies were used. In practice, however, some fishing events involved the use of both modes and as a result, it was not always feasible to allocate individual catches to one or other fishing mode. Nevertheless, the relative importance of either bait or lure/fly fishing for many of the key species has been assessed in Table 11.

For the major species, bait fishing represented the primary capture mode for red emperor, many species of snapper, javelin fish, black jewfish, moonfish, sharks and rays, wrasse/ tuskfish/gropers and pikey bream. By contrast, barramundi, saratoga, sooty grunter, tarpon and king threadfin were mostly caught using lures or flies. For species such as the mackerels, trevallies, coral trout, queenfish and Moses' snapper, fishing with either bait or lures appeared to be equally effective capture modes.

Table 11. Annual recreational catch (kept and released numbers) of key species by line fishing mode during 2009-10 and proportions taken by bait and/or lure/fly, by non-indigenous Northern Territory residents aged five years and older.

	Bait		Lure/fly		Both		% of total	
Species/group	Number	SE	Number	SE	Number	SE	Bait only	Lure only
Emperor, other	***437***	***429***	*0*	*0*	*0*	*0*	100.0	0.0
Snapper, other	***191***	***188***	*0*	*0*	***9***	***8***	95.6	0.0
Crustaceans, other	***180***	***109***	*0*	*0*	***33***	***32***	84.6	0.0
Emperor, red	**4,643**	**2,021**	***221***	***154***	***712***	***329***	83.3	4.0
Mud crab	*242*	*95*	***41***	***41***	***10***	***9***	82.6	14.2
Snapper, saddletail/crimson	28 155	6178	***459***	***197***	8064	2251	76.8	1.3
Javelin fish	6358	2182	***403***	***254***	*1973*	*504*	72.8	4.6
Jewfish, black	7799	1301	***532***	***250***	*2448*	*688*	72.4	4.9
Snapper, stripey	15 039	2806	***650***	***435***	5838	1439	69.9	3.0
Moonfish/batfish	5367	1426	***416***	***244***	*2346*	*915*	66.0	5.1
Emperor, grass	14 831	2993	*1,235*	*487*	6795	1630	64.9	5.4
Mullet	***518***	***348***	***78***	***55***	***219***	***156***	63.5	9.6
Sharks and rays	17 196	2807	*1346*	*336*	8917	1712	62.6	4.9
Snapper, golden	50 192	7045	8654	2218	21 613	3819	62.4	10.8
Wrasse, tuskfish and gropers	3561	818	***585***	***237***	*1682*	*500*	61.1	10.0
Bream, pikey	8672	2160	*2660*	*803*	4587	1241	54.5	16.7
Cod/groupers	14 007	1940	3912	746	9160	1670	51.7	14.4
Catfish	19 299	4252	10 583	2348	10146	2079	48.2	26.4
Mackerel, grey	*1533*	*545*	*1368*	*519*	*461*	*145*	45.6	40.7
Scalefish, other	8619	2769	6426	1798	3959	1202	45.4	33.8
Coral trout	2560	706	*1770*	*609*	*1356*	*420*	45.0	31.1
Trevally, other	***1565***	***775***	*925*	*349*	***1025***	***521***	44.5	26.3
Snapper, mangrove jack	3987	1456	*2622*	*783*	*2869*	*905*	42.1	27.7
Cephalopods	***2789***	***2564***	***2709***	***1739***	***1544***	***1106***	39.6	38.5
Threadfin, blue	4173	1021	*4206*	*1435*	*2513*	*894*	38.3	38.6
Grunter, sooty	***2420***	***1276***	*4124*	*1193*	*949*	*278*	32.3	55.0
Queenfish	3084	855	4768	1468	2844	742	28.8	44.6
Trevally, giant	5185	1159	**6570**	**2991**	6501	2455	28.4	36.0
Mackerel, Spanish	*2339*	*843*	*1564*	*430*	4360	1516	28.3	18.9
Tarpon/ox-eye herring	***2275***	***1742***	8195	2066	*416*	*152*	20.9	75.3
Saratoga	***1208***	***1167***	5550	1579	***141***	***80***	17.5	80.4
Threadfin, king	*1140*	*337*	*3891*	*1291*	*2023*	*711*	16.2	55.2
Snapper, Moses'	***1118***	***659***	***447***	***397***	***5531***	***3898***	15.8	6.3
Barramundi	12 808	4037	118 354	21 853	16 054	3102	8.7	80.4
Mackerel, spotted	***50***	***29***	***192***	***107***	***566***	***253***	6.2	23.8
Small baitfish	***1144***	***1029***	***6483***	***4482***	***17 198***	***16 304***	4.6	26.1

SE is standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

6.4 Catch by Fishing Platform

About 84% of the total recreational catch, equivalent to an estimated 646 881 fish and invertebrates, was taken by boat-based fishers, compared with 16% or 123 408 individuals taken by shore-based fishers. Catches by fishing platform are provided in detail in Appendices 9 and 10 and are summarised in Table 12. Boat-based fishing activities accounted for the vast majority of the catch (>90%) for many of the key fish species (barramundi, golden snapper, saddletail/crimson snapper combined, grass emperor, etc.) and mud crabs. In addition to this group, catches of a range of predominantly estuarine species including catfish, mullet, mangrove jack, were mostly taken by boat-based fishers. Species for which the majority of the catch was derived from shore-based fishing included sooty grunter (a freshwater species), along with species taken mainly by cast nets (small baitfish, cephalopods) or hand collection (bivalves).

Table 12. A comparative summary of the proportion of the recreational catch (kept and released) of key species that was taken by boat-based fishers during 2009-10, by non-indigenous Northern Territory residents aged five years and older.

Proportion of catch - boat-based			
< 10%	**10-50%**	**51-90%**	**> 90%**
Cephalopods	Grunter, sooty	Bream, pikey	Barramundi
Bivalves	Small baitfish	Catfish	Cod/groupers
Other taxa	Crustaceans, other	Mullet	Coral trout
		Queenfish	Emperor, grass
		Snapper, mangrove jack	Emperor, red
		Tarpon/ox-eye herring	Emperor, other
		Wrasse, tuskfish and gropers	Javelin fish
		Scalefish, other	Jewfish, black
		Cherabin	Mackerel, grey
			Mackerel, Spanish
			Mackerel, spotted
			Moonfish/batfish
			Saratoga
			Sharks and rays
			Snapper, golden
			Snapper, Moses'
			Snapper, saddletail/crimson
			Snapper, stripey
			Snapper, other
			Threadfin, blue
			Threadfin, king
			Trevally, giant
			Trevally, other
			Mud crab

7. FISHERIES FOR KEY SPECIES – NT RESIDENTS

In this section, the fisheries for key species are described in terms of the regional distribution of the catch (refer Appendix 12), numbers kept and released (Table 7), catch by fishing platform (Appendix 9), fishing method (Appendix 7), water body type (Appendix 5) and season (Appendix 11). Catch information was provided by fishers during the Diary Survey and is presented as expanded estimates to represent catches taken by the non-indigenous resident population of the NT aged five years and older during the period April 2009 to March 2010.

7.1 Barramundi

Close to a third (31%) of the recreational catch of barramundi (*Lates calcarifer*) was taken in the Mary/Alligator rivers zone, followed by the West Coast (23%) and a combined total of 15% for the Darwin Harbour and Darwin Surrounds zones (Figure 16A). Over 70% of all barramundi caught were released or discarded (Figure 16B). Boat-based fishing accounted for the vast majority (92%) of the catch (Figure 16C) and virtually all of the catch was taken by line fishing (Figure 16D), primarily using lures rather than bait (Table 11). A majority of the catch was taken in estuarine waters (60%), with freshwater rivers (31%) accounting for most of the remainder (Figure 16E). The period April-June accounted for 40% of the catch, with each of the other seasons at around half this level (Figure 16F).

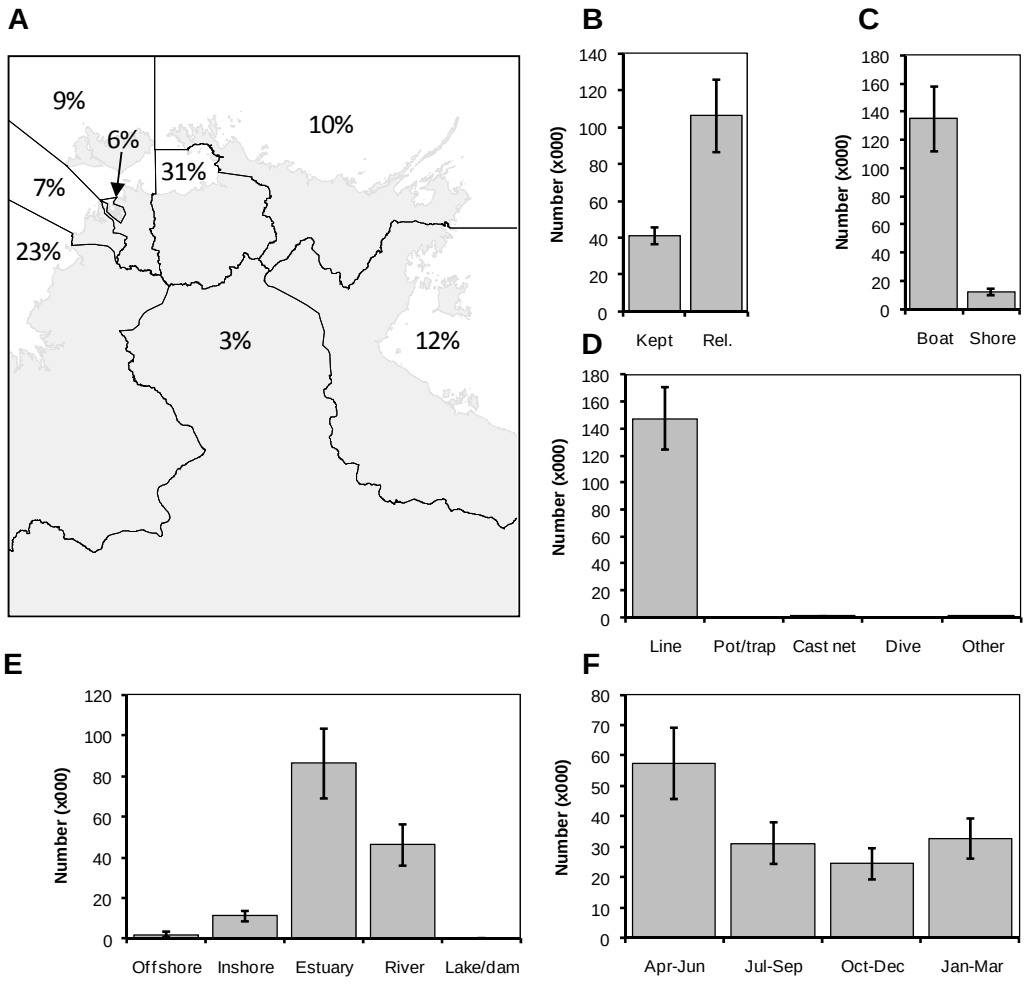

Figure 16. Characteristics of the recreational fishery for barramundi in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.2 Golden Snapper

The majority (55%) of the recreational catch of golden snapper (*Lutjanus johnii*) was taken from the Darwin Harbour and Darwin Surrounds zones, followed by catches from the Bynoe/Finniss Area (17%) and North Coast (11%) zones (Figure 16A). Just over half (53%) of all golden snappers caught were released or discarded (Figure 16B). The vast majority (97%) of the catch was taken by boat-based fishing activity (Figure 16C), almost exclusively by line fishing (Figure 15D) and primarily using bait rather than lures (Table 11). A majority of the catch was taken in estuarine waters (55%), with the remainder more or less equally distributed between inshore and offshore waters (Figure 16E). The period April-June accounted for just over a third of the total catch, with the following two seasons each accounting for about a quarter of the total numbers (Figure 16F).

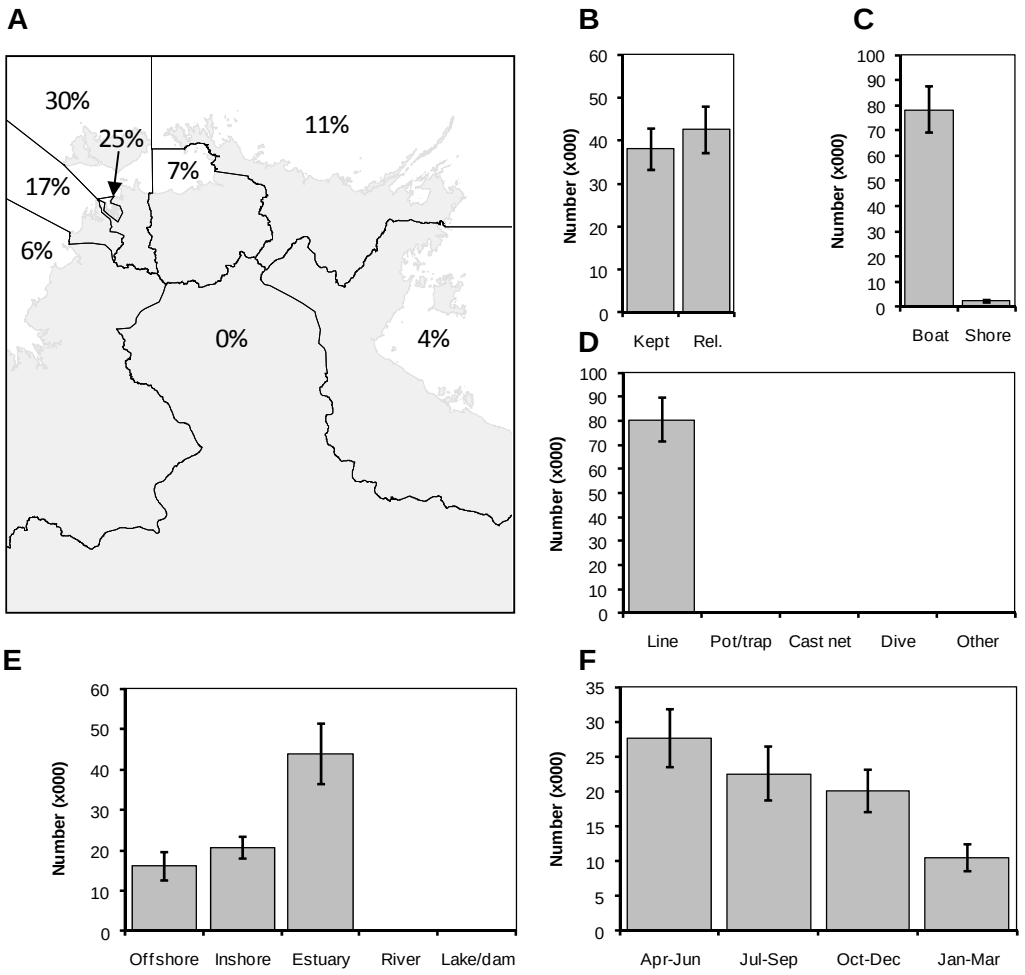

Figure 17. Characteristics of the recreational fishery for golden snapper in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.3 Saddletail/Crimson Snapper

Saddletail snapper (*Lutjanus malabaricus*) and crimson snapper *(L. erythropterus*) are similar in appearance and have been grouped for analysis, recognising that recreational fishers may not be able to distinguish them readily at the species level. One third of the recreational catch of these species was taken from the Darwin Surrounds zone, with a further 23% from the North Coast (Figure 18A). The remainder of the catch was split more or less equally between the Bynoe/Finniss Area, Darwin Harbour and East Coast/Gulf Area zones. Over 60% of the saddletail/crimson snapper caught were released or discarded (Figure 18B). These species were caught almost exclusively from boats (Figure 18C) by line fishing (Figure 18D), with bait used far more commonly than lures (Table 11). A majority of the catch was taken in offshore waters (54%), with inshore waters (36%) accounting for the bulk of the remainder (Figure 18E). Catches taken between July and September and October and December each accounted for over 30% of the annual total, with a further 25% in the April-June period (Figure 18F).

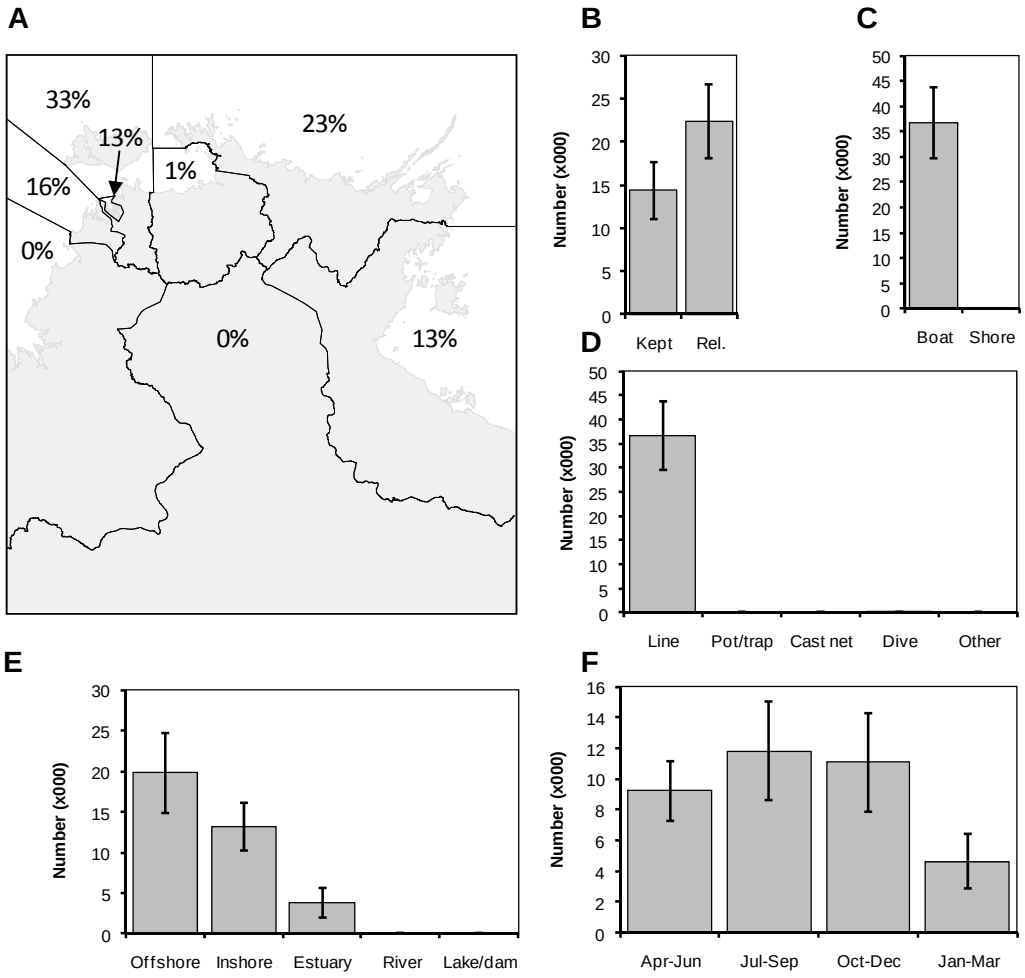

Figure 18. Characteristics of the recreational fishery for saddletail/crimson snapper in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.4 Cod/Groupers

This group, commonly identified as rock cod or groupers, comprises a number of species belonging to the family Serranidae. Almost a third of the recreational catch of this group was taken in the Darwin Surrounds zone, with a further 20% taken in each of the Darwin Harbour and Bynoe/Finniss Area zones (Figure 19A). Comparatively small catches were taken from the remaining coastal zones. Almost three quarters of the cod/groupers caught were released or discarded (Figure 19B). Boat-based fishing accounted for the vast majority (95%) of the catch (Figure 19C) virtually all of which was taken by line fishing (Figure 19D) and mainly using bait (Table 11). Fishing in inshore and estuarine waters collectively accounted for 80% of the total numbers, the remainder being derived from offshore waters (Figure 19E). Catches were highest in the April-June and July-September periods, together accounting for two thirds of the annual total (Figure 19F).

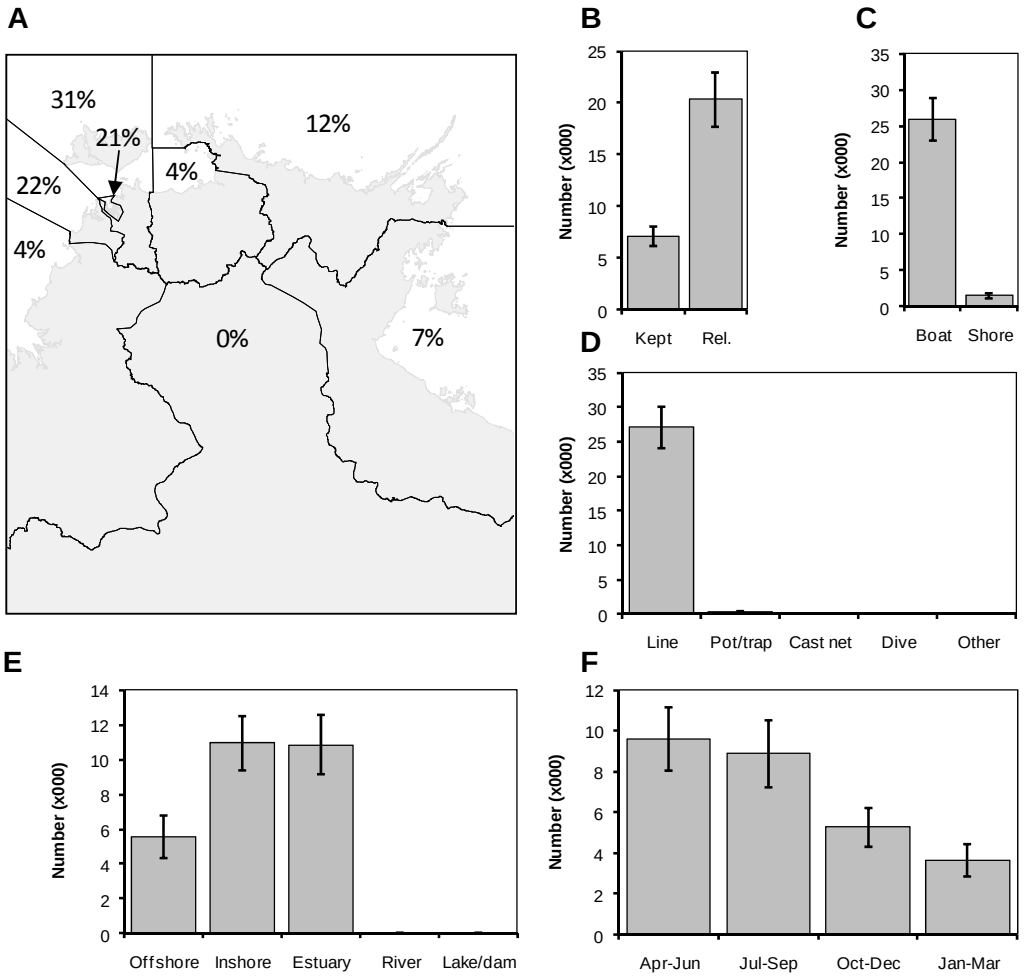

Figure 19. Characteristics of the recreational fishery for rock cod and groupers in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.5 Grass Emperor

More than a quarter (27%) of grass emperors (*Lethrinus laticaudis*) were taken in the East Coast/Gulf Area, followed by the Bynoe/Finniss Area (19%), West Coast (16%) and North Coast (15%) zones (Figure 20A). Just over half (55%) of all grass emperors caught were released or discarded (Figure 20B). Boat-based fishing (Figure 20C) using lines (Figure 20D) accounted for virtually all of the catch, with bait the preferred method (Table 11). Inshore and offshore waters accounted for the vast majority (89%) of the catch, with the remainder being taken in estuarine waters (Figure 20E). Catches rose to a peak in the July-September period (37%) before declining steadily to their lowest level between January and March (9%) (Figure 20F).

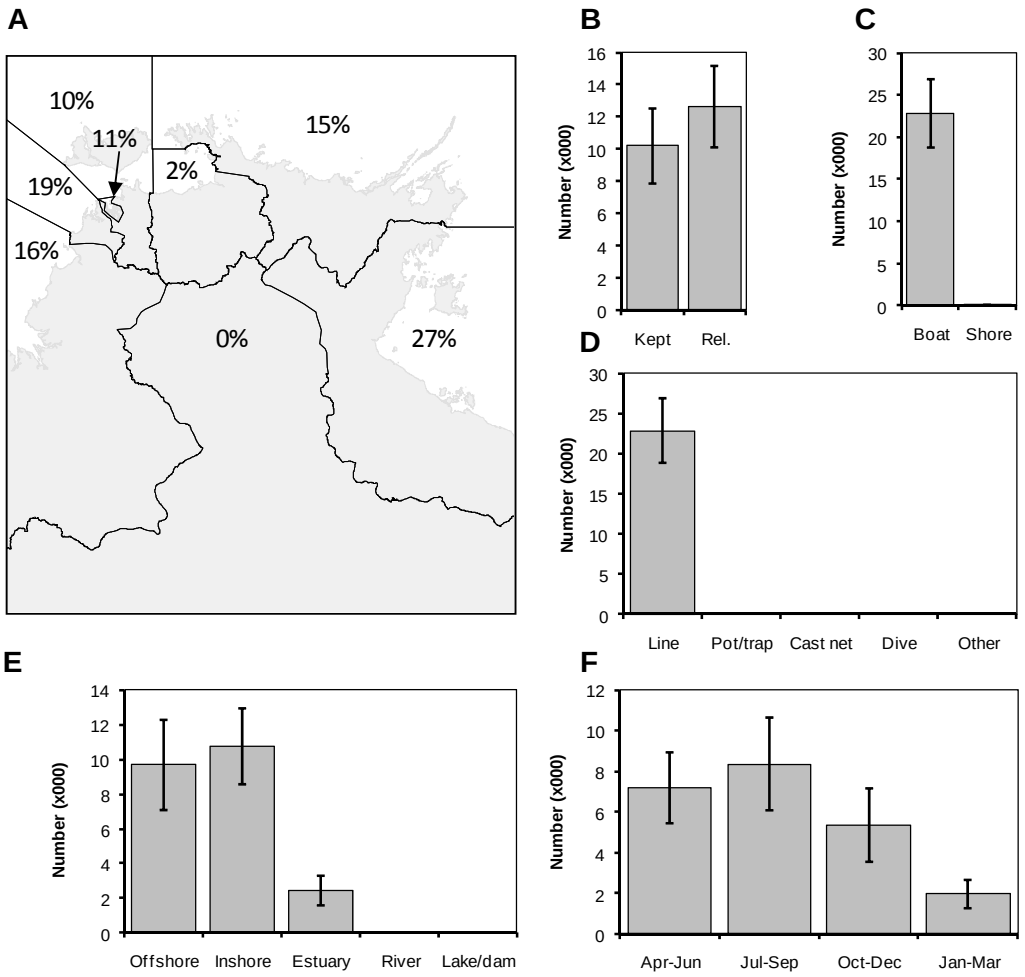

Figure 20. Characteristics of the recreational fishery for grass emperor in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.6 Black Jewfish

Recreational catches of black jewfish (*Protonibea diacanthus*) were concentrated in the Darwin Surrounds (43%) and Bynoe/Finniss Area (20%) zones with a further 12% taken in the Mary/Alligator rivers zone and 10% from Darwin Harbour (Figure 21A). Most (70%) of the black jewfish caught were retained (Figure 21B). Boat-based fishing accounted for the vast majority (98%) of the catch (Figure 21C) which was taken exclusively by line fishing (Figure 21D), primarily using bait rather than lures (Table 11). Catches were taken from estuarine (37%), inshore (34%) and offshore (29%) waters (Figure 21E). The period April-June accounted for 46% of the catch, with the remainder of the catch divided equally across the other seasons (Figure 21F).

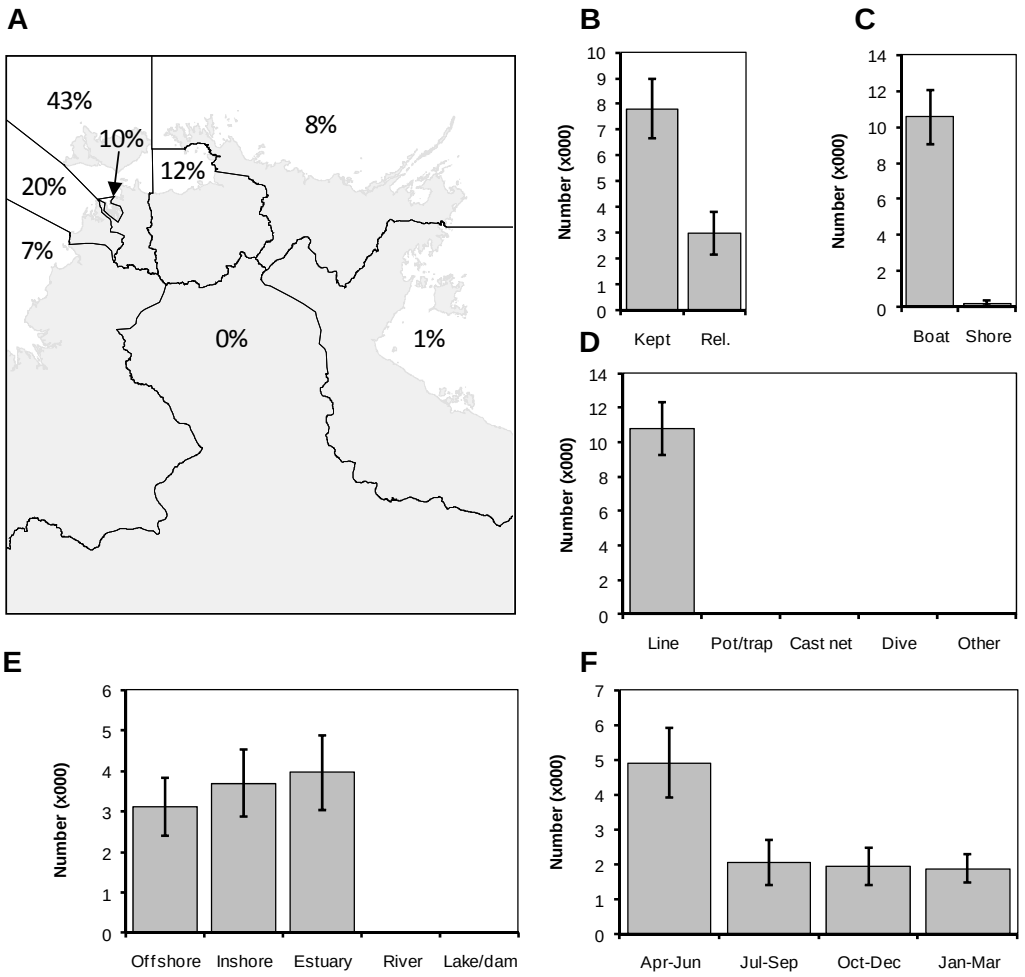

Figure 21. Characteristics of the recreational fishery for black jewfish in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.7 Spanish Mackerel

Recreational catches of Spanish mackerel (*Scomberomorus commerson*) were mainly focussed in the Bynoe/Finniss Area and Darwin Surrounds zones (collectively 60%), followed by the North Coast (20%) and Darwin Harbour (10%) (Figure 22A). Just over half of all Spanish mackerels caught were released or discarded (Figure 22B). Boat-based fishing accounted for the vast majority (97%) of the catch (Figure 22C), virtually all of which was taken by line fishing (Figure 22D), with both lures and bait used (Table 11). Inshore and offshore waters together accounted for over three quarters of the total catch, with the remainder being taken in estuarine waters (Figure 22E). Catches rose to a peak between July and September, accounting for 46% of the annual total, falling to low levels in the subsequent seasons (Figure 22F).

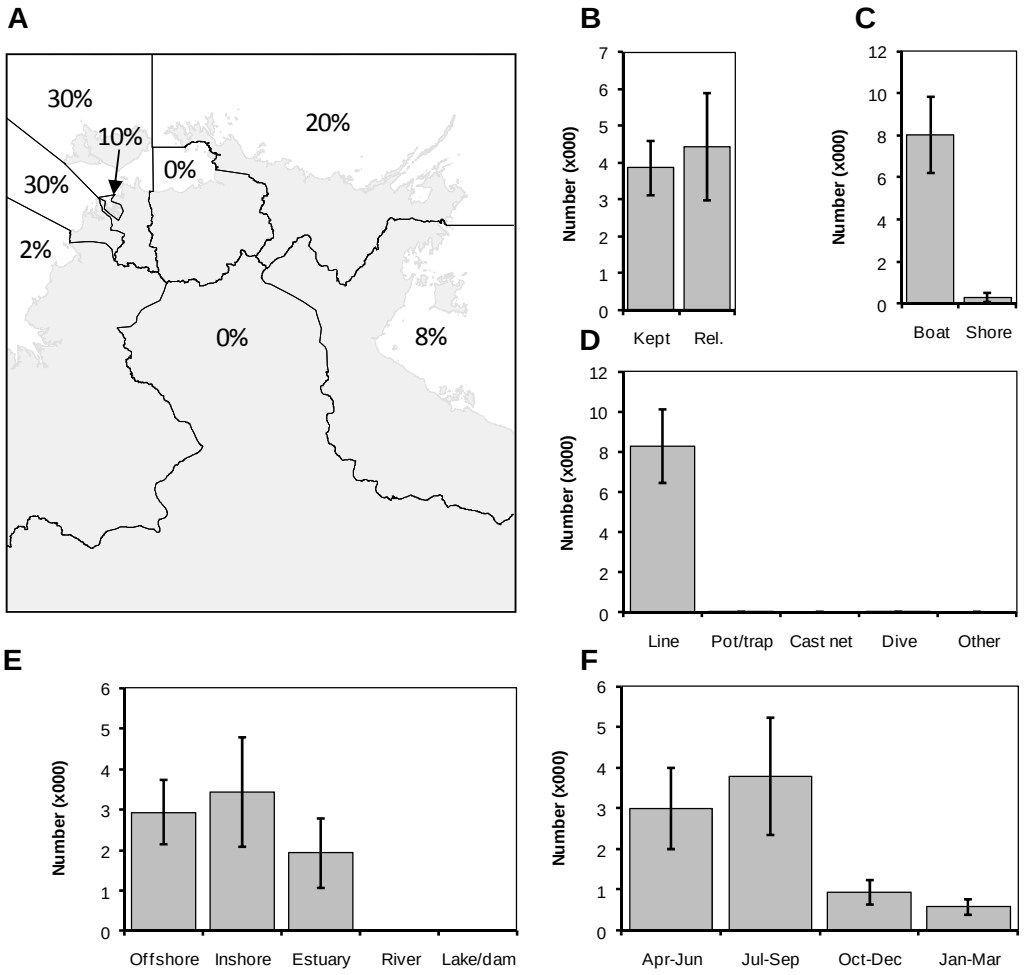

Figure 22. Characteristics of the recreational fishery for Spanish mackerel in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.8 Blue Threadfin

Over a quarter (27%) of the recreational catch of blue threadfin (*Eleutheronema tetradaetylum*) was taken in the Darwin Surrounds zone, followed by the Bynoe/Finniss Area and Mary/Alligator Rivers zones (17% each), and Darwin Harbour and West Coast zones (over 10% each) (Figure 23A). Less than 40% of all blue threadfins caught were released or discarded (Figure 23B). Boat-based fishing accounted for the vast majority (97%) of the catch (Figure 23C), which was taken entirely by line fishing (Figure 23D) using lures or bait in more or less equal proportions (Table 11). Most of the catch was taken in estuarine waters (57%), with the remainder split equally between inshore and offshore waters (Figure 23E). Catches were concentrated between April and September, accounting for over 80% of the annual total (Figure 23F).

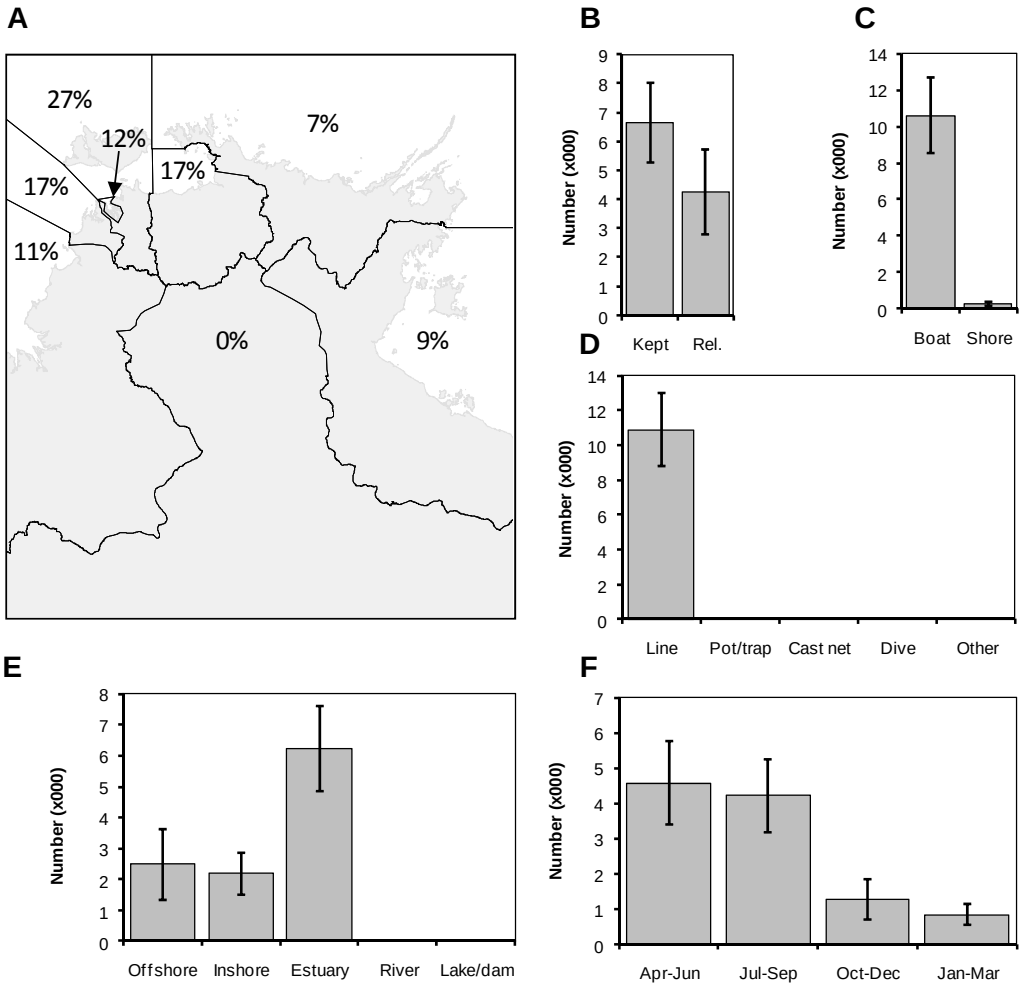

Figure 23. Characteristics of the recreational fishery for blue threadfin in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.9 King Threadfin

King threadfin (*Polydactylus macrochir*) catches were concentrated in the Darwin Surrounds (43%) and the Mary/Alligator Rivers zones (24%), with relatively minor catches reported for the other coastal zones (Figure 24A). Just under half of all king threadfins caught were released or discarded (Figure 24B). Boat-based fishing accounted for the vast majority (93%) of the catch (Figure 24C), virtually all of which was taken by line fishing (Figure 24D), with lures used more commonly than bait (Table 11). King threadfins were mainly taken in estuarine waters (82%) while catches in inshore and offshore waters were relatively low (Figure 24E). Peak catches occurred in the July-September and January-March periods (32% each) and were lowest between October and December (Figure 24F).

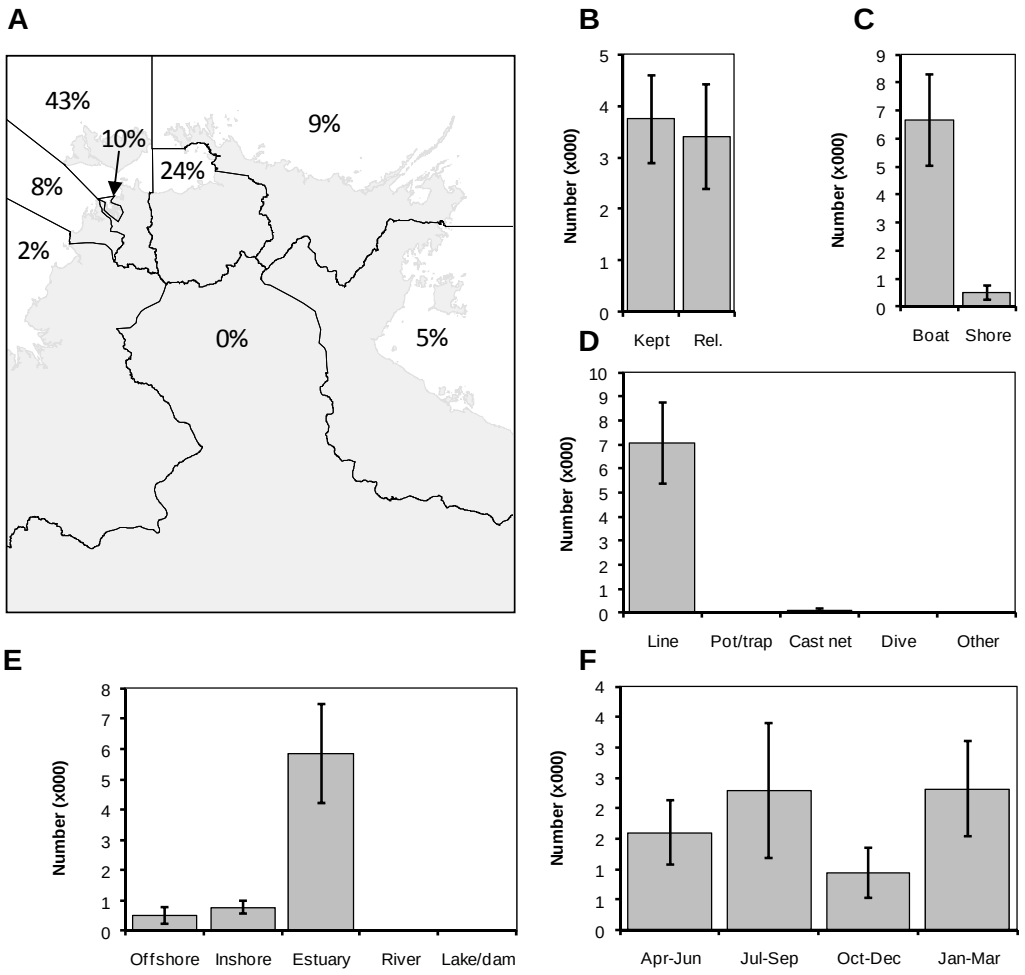

Figure 24. Characteristics of the recreational fishery for king threadfin in the Northern Territory during 2009-10 by non-Indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.10 Mud Crabs

Almost half of the recreational catch of mud crabs (*Scylla* spp) was derived from the Darwin Surrounds zone, with a further 21% from Darwin Harbour (Figure 25A). Over two-thirds of the mud crab catch was retained (Figure 25B). Boat-based fishing accounted for the vast majority (91%) of the catch (Figure 25C), virtually all of which was taken using pots or traps (Figure 25D). The catch was mainly taken in estuarine waters (63%), with inshore waters accounting for virtually all of the remainder (Figure 25E). Almost three-quarters of the catch occurred between April and September, with catches declining progressively in the subsequent seasons (Figure 25F).

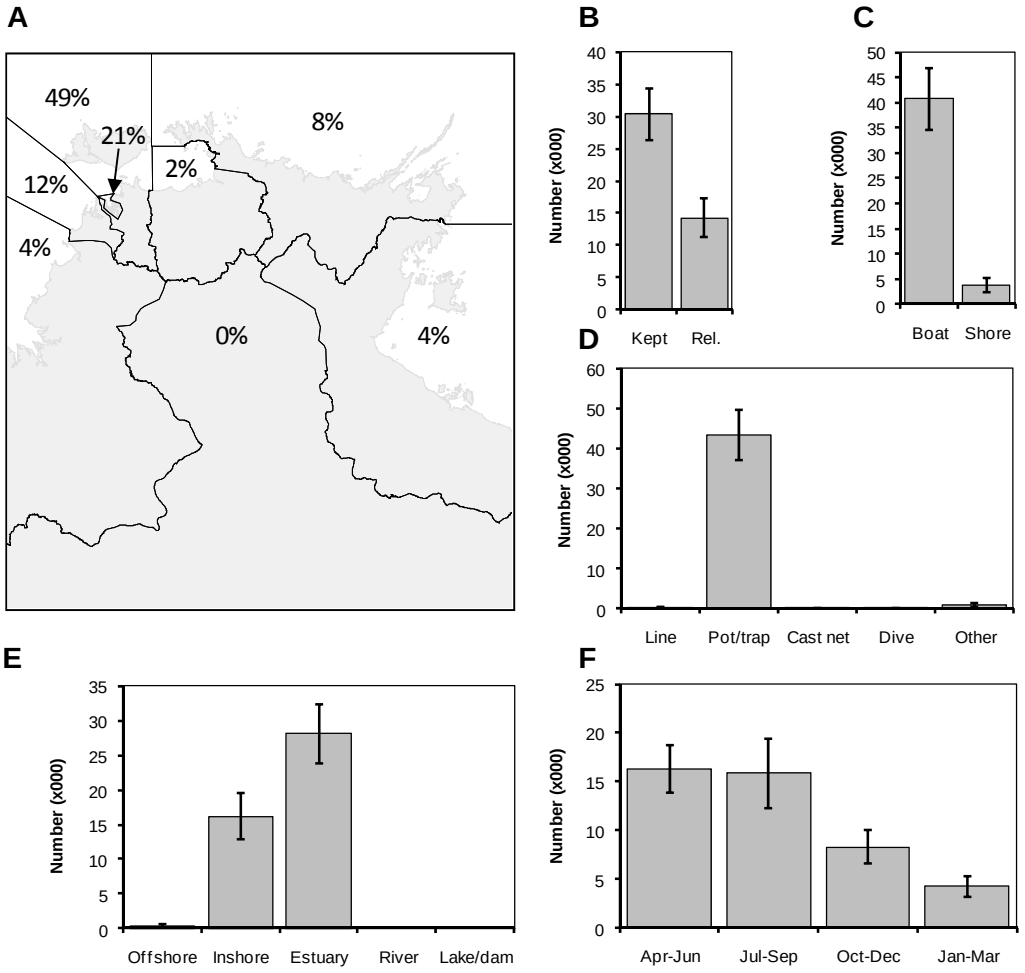

Figure 25. Characteristics of the recreational fishery for mud crab in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished, and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.11 Cherabin

The West Coast represented the most important region for recreational catches of cherabin (*Macrobrachium* spp) (38%), followed by Darwin Surrounds (27%), Central/Inland (14%) and East Coast/Gulf Area (12%) zones (Figure 26A). The vast majority (94%) of the cherabin catch was retained (Figure 26B). Catches were taken more or less equally by boat and shore-based fishing (Figure 26C); with pots and traps the main fishing method (76%) and cast nets of secondary importance (Figure 26D). The majority (80%) of the catch was taken in freshwater rivers with the balance from estuarine waters (Figure 26E). Almost half of the total catch was taken in the April-June period (48%), with the bulk of the remainder in July-September and January-March and very low catches between October and December (Figure 26F).

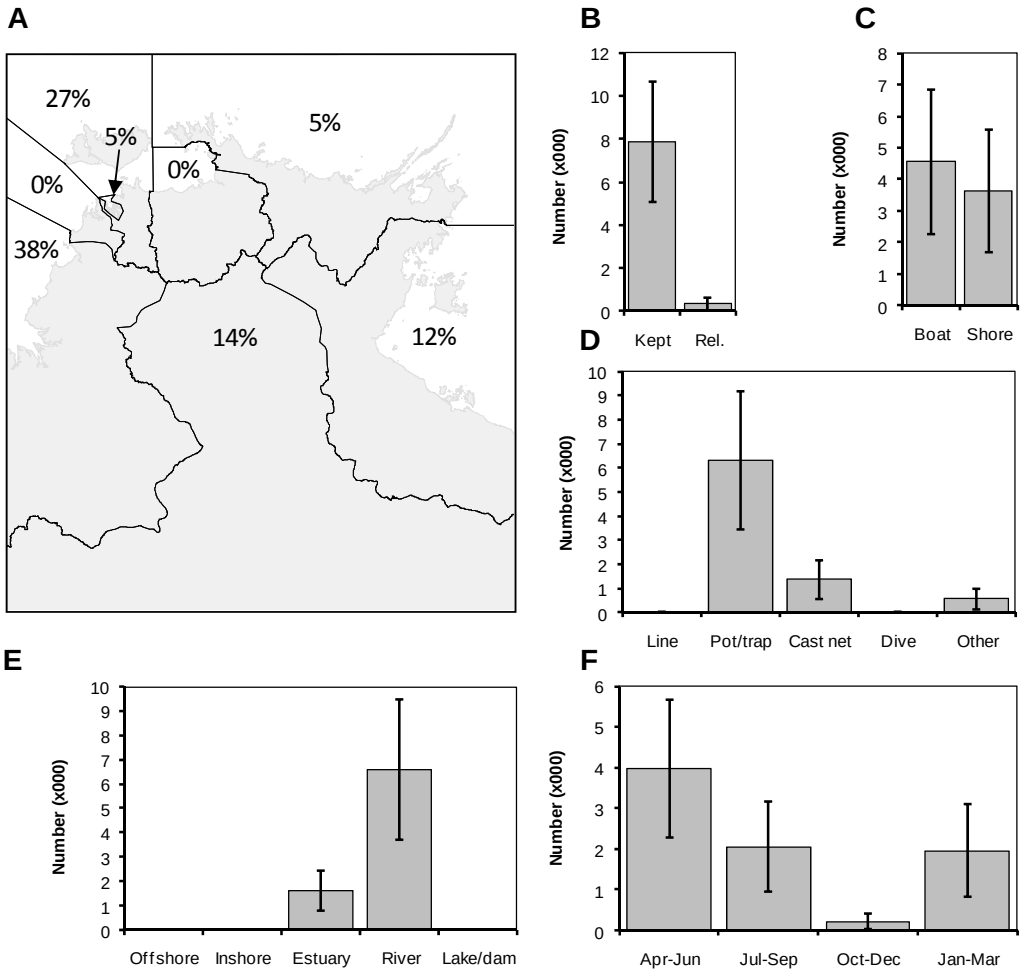

Figure 26. Characteristics of the recreational fishery for cherabin (freshwater prawns) in the Northern Territory during 2009-10 by non-indigenous NT residents aged five years and older: A) proportion (%) of the total catch (numbers) by fishing zone, B) total numbers kept and released, C) total catch (numbers) by boat and shore based fishing activities, D) total catch (numbers) by fishing method, E) total catch (numbers) by water body fished and F) seasonality in the catch (numbers). Error bars represent one standard error.

8. REGIONAL FISHERIES – NT RESIDENTS

In this section, fishing activity (effort) within the main Fishing Zones (Figure 5) is evaluated in the context of where fishers reside (Residential Strata, Figure 2), providing insight into the significance of effort derived from fishers residing outside the areas concerned, along with platform and water body fished and overall catch composition. Detailed information on catch and effort by Fishing Zone is provided in Appendices 12 and 13. Catch and effort information was provided as part of the Diary Survey and has been expanded to represent the fishing activity undertaken by the non-Indigenous resident population of the NT aged five years and older during the period April 2009 to March 2010.

8.1 West Coast

West Coast fishing activity was mostly attributable to 'Darwin and Rural' stratum residents (68%), with 'Other coastal' residents (30%) accounting for virtually all of the remainder (Figure 27A). Fishing was primarily boat-based (79%) (Figure 27B) and concentrated in estuarine waters (58%), with freshwater rivers of secondary importance (Figure 27C). Barramundi was by far the most common species caught, with such species as catfish, mullet, golden snapper and grass emperor being taken in relatively low numbers (Figure 27D).

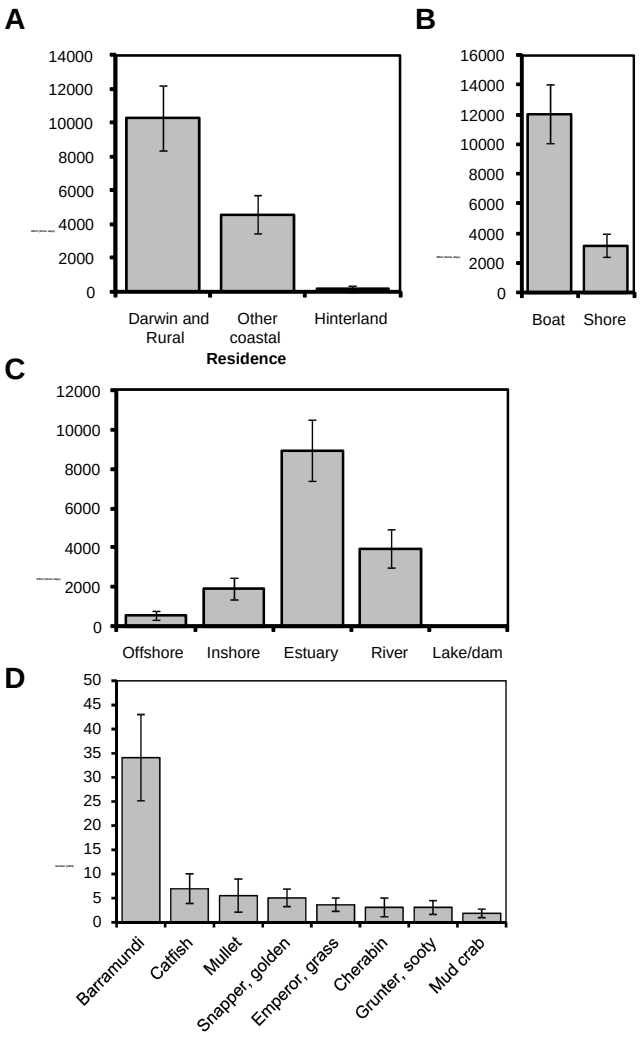

Figure 27. Characteristics of the West Coast recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.2 Bynoe/Finniss Area

Residents of the 'Darwin and Rural' stratum accounted for the vast majority (95%) of the fishing activity in the Bynoe/Finniss Area, with 'Other coastal' residents accounting for the remainder (Figure 28A). Boat-based fishing (90%) dominated (Figure 28B), the majority of which was directed in inshore waters (53%), with estuarine and offshore waters of secondary importance (Figure 28C). Golden snapper was the main species caught followed by barramundi and stripey snapper (Figure 28D).

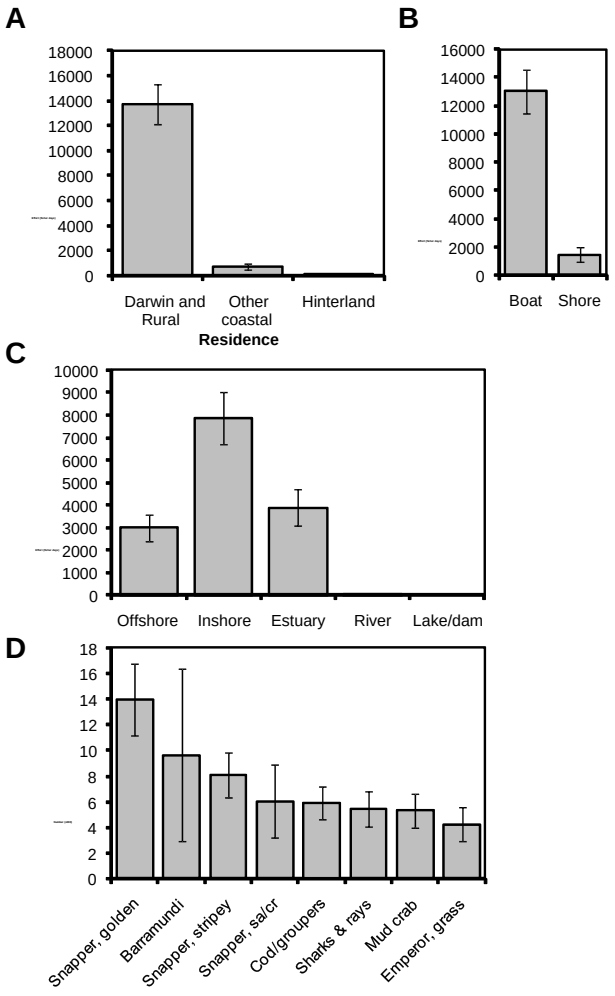

Figure 28. Characteristics of the Bynoe/Finniss Area recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.3 Darwin Harbour

Residents of the 'Darwin and Rural' stratum accounted for almost all (99%) of the fishing effort in Darwin Harbour (Figure 29A), dominated by boat-based activity (79%) (Figure 29B). Fishing effort was concentrated in estuarine (62%) and to a lesser extent (36%) inshore waters (Figure 29C). Golden snapper was the main species caught, followed by cephalopods (squid), although a high standard error applies to the latter catch estimate (Figure 29D). Other species of significance included mullet, mud crabs, barramundi and pikey bream.

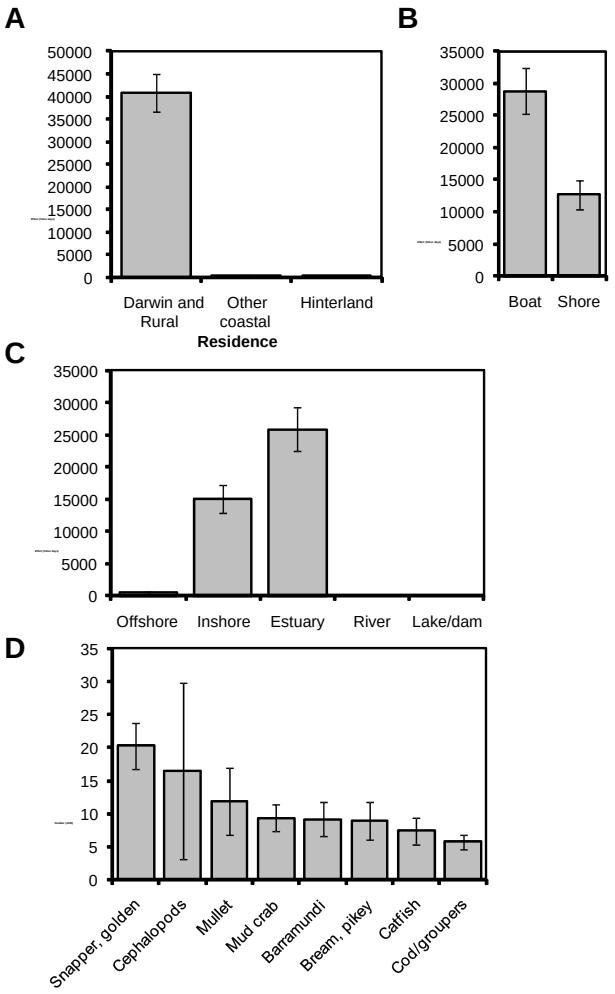

Figure 29. Characteristics of the Darwin Harbour recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.4 Darwin Surrounds

The vast majority of the fishing effort in the Darwin Surrounds zone was attributable to the activity of residents of the 'Darwin and Rural' stratum (89%), with 'Other coastal' residents contributing almost all of the remainder (Figure 30A). Boat-based effort (81%) dominated (Figure 30B) with estuarine waters attracting the bulk of the effort (54%), followed by inshore (22%), offshore (15%) and freshwater rivers (8%, Figure 30C). Golden snapper and mud crabs dominated the catch, with barramundi and saddletail/crimson snapper of secondary importance (Figure 30D).

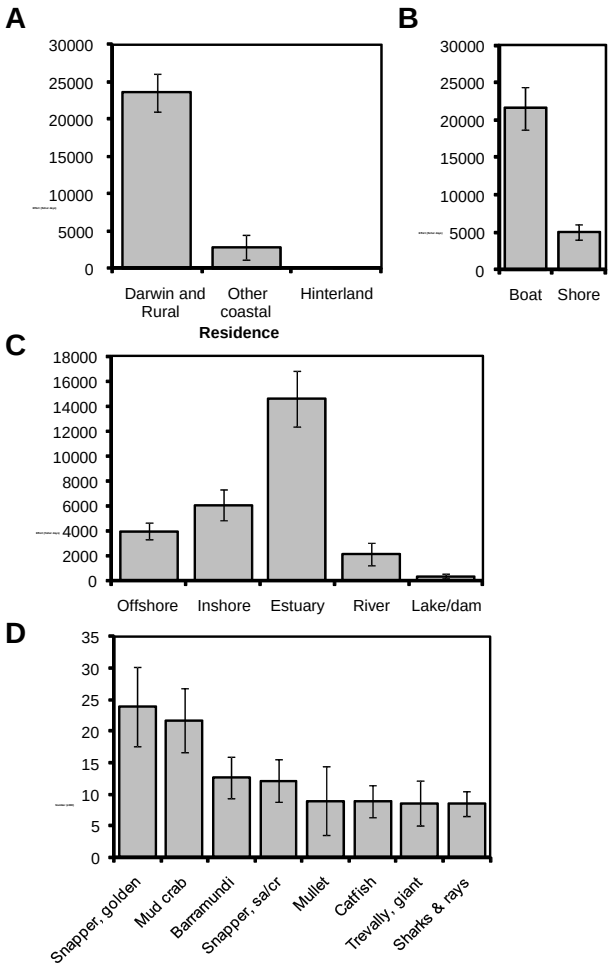

Figure 30. Characteristics of the Darwin Surrounds recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.5 Mary/Alligator Rivers

The bulk (82%) of the effort in the Mary/Alligator Rivers zone was a result of fishing by 'Darwin and Rural' stratum residents, with 'Other coastal' and 'Hinterland' strata residents contributing relatively low, but similar levels of effort (Figure 31A). Fishing was mostly undertaken from boats, accounting for over 90% of the total effort (Figure 31B). Fishing activity was mainly directed in freshwater rivers (60%), with estuarine waters (36%) of secondary importance (Figure 31C). Barramundi dominated the catch, with around five times the numbers taken compared with the next most common species, catfish (Figure 31D).

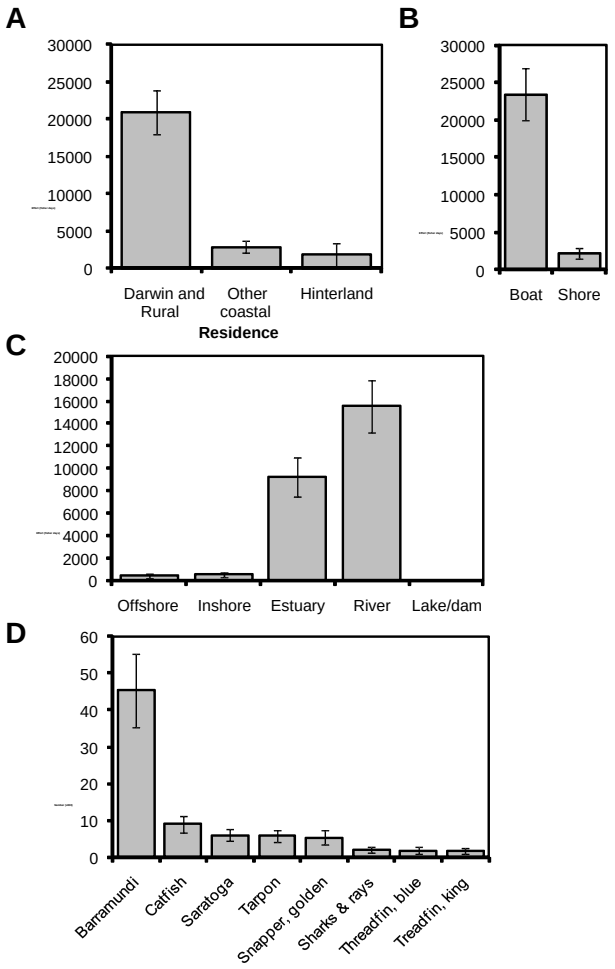

Figure 31. Characteristics of the Mary/Alligator rivers recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species Error bars represent one standard error.

8.6 North Coast

Fishing off the North Coast was mostly attributable to residents of the 'Other coastal' stratum (78%), with low but similar effort levels from residents from the 'Darwin and Rural' and 'Hinterland' strata (Figure 32A). Fishing occurred mostly from boats (78%) as opposed to shore-based (Figure 32B) and was concentrated in inshore waters (55%), followed by estuarine (28%) and offshore waters (17%) (Figure 32C). Barramundi was the main species caught, with golden snapper and saddletail/crimson snapper also of significance (Figure 32D). Bivalves (cockles) also featured in the catch, although a high standard error applies to this estimate.

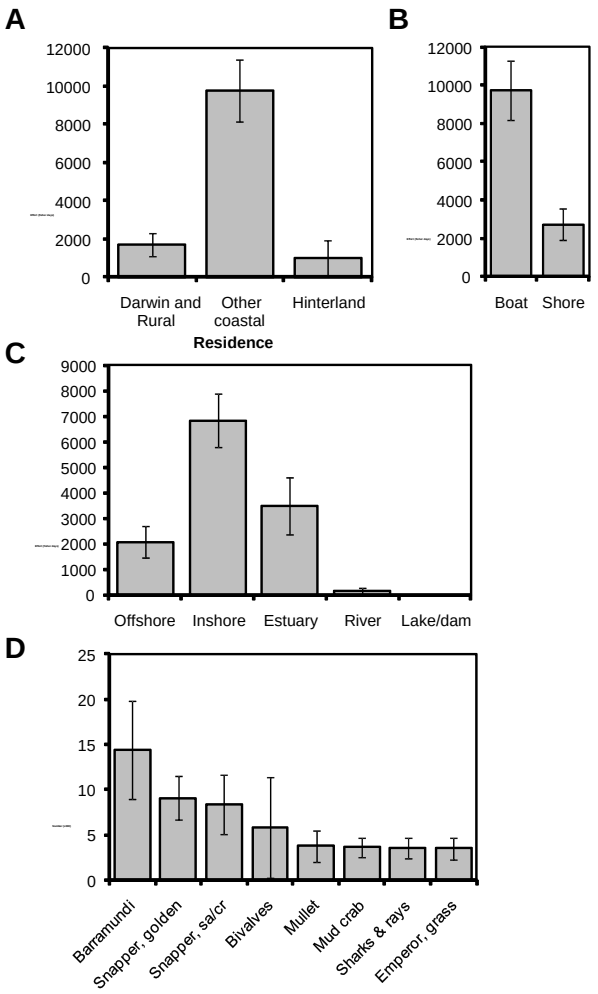

Figure 32. Characteristics of the North Coast recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.7 East Coast/Gulf Area

The majority (77%) of the effort in the East Coast/Gulf Area was due to the activities of residents from the 'Other coastal' stratum, followed by Hinterland residents (16%) (Figure 33A). Fishing was conducted primarily from boats, accounting for over 80% of the total effort (Figure 33B). Just under half of the fishing effort occurred in estuarine waters, followed by inshore, offshore and freshwater rivers (Figure 33C). Barramundi dominated the catch, with around three times the numbers taken compared with the next most important species, namely grass emperor, mullet and saddletail/crimson snapper (Figure 33D).

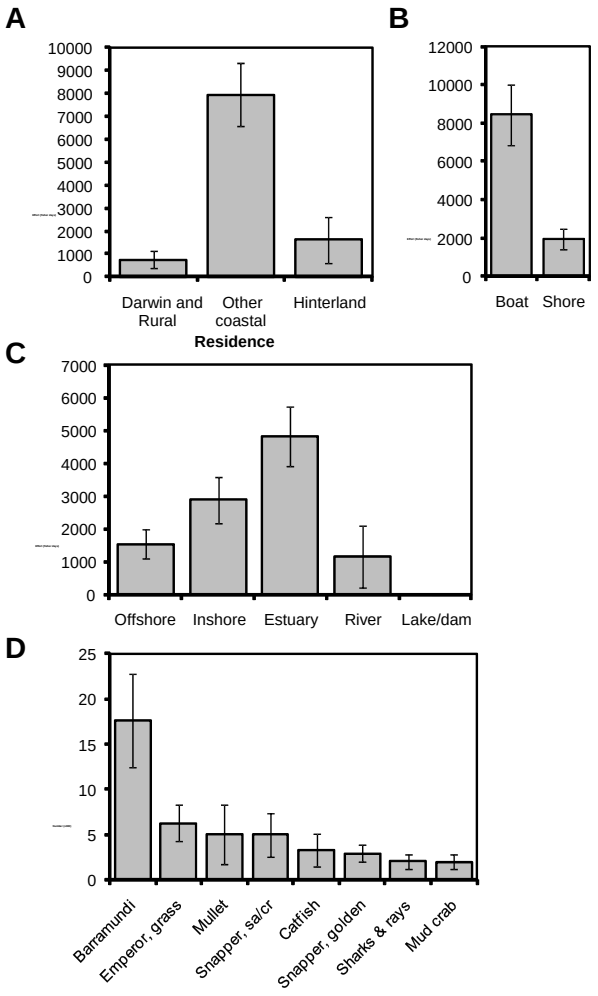

Figure 33. Characteristics of the East Coast/Gulf Area recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

8.8 Central/Inland

Residents of the 'Other coastal' stratum accounted for the vast majority (92%) of Central/Inland zone fishing activity (Figure 34A). Shore-based effort (65%) was the predominant fishing mode (Figure 34B), with fishing undertaken exclusively in freshwater rivers (Figure 34C). Barramundi was the main species caught, with sooty grunter, cherabin and catfish of secondary importance (Figure 34D).

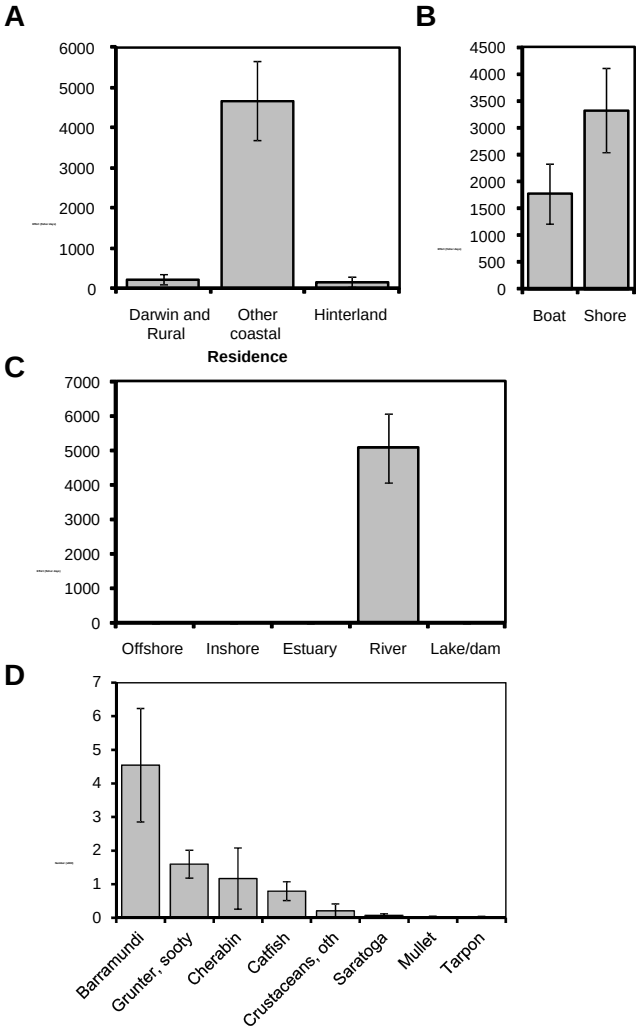

Figure 34. Characteristics of the Central/Inland recreational fishery based on 2009-10 fishing activity by non-indigenous Northern Territory residents aged five years and older: A) fishing effort (fisher days) based on residential stratum, B) effort (fisher days) by platform, C) effort (fisher days) by water body type and D) total catch (numbers) for the key species. Error bars represent one standard error.

9. EXPENDITURE – NT RESIDENTS

In this section, the fishing-related expenditure of respondents reported during the Diary Survey, supplemented with information collected through the Wash-up Survey, are reported as expanded estimates (adjusted for non-response, after Lyle et al. 2009a), with the inclusion of the Phase 3 calibration for the Wash-up Survey data. These estimates represent the fishing-related expenditure of the non-indigenous resident population of the NT aged five years and older during the period April 2009 to March 2010. Fishing-related goods and services were classified into 20 reporting categories and respondents were asked to estimate the proportion of the expenditure that was directly attributable to recreational fishing, as opposed to other uses or benefits. Furthermore, expenditure was classified as having occurred within or outside of the NT, based on information provided by respondents.

NT residents spent an estimated $51 million on goods and services relevant to recreational fishing during 2009-10, of which $47 million (92%) was directly attributable to recreational fishing (Table 13, Appendix 14). 'Darwin and Rural' stratum residents accounted for 70% of the total attributable expenditure, with 'Other coastal' residents 23% and 'Hinterland' residents 7%. Overall, recreational fishers spent an average of over $1500 per person during 2009-10, with higher average expenditure for 'Other coastal' and 'Hinterland' residents; however, a high standard error applies to the latter. The vast majority of attributable expenditure (almost $44 million or 93%) was transacted within the NT as opposed to interstate or overseas, with an annual average of over $1400 per fisher spent within the NT.

Table 13. Annual total and average attributable expenditure (total and NT-based) by residential stratum during 2009-10, by non-indigenous NT resident fishers aged five years and older.

	Attributable expenditure ($)			**NT-based vs. interstate etc. ($)**			
Residential stratum	**Total**	**SE**	**Average per fisher**	**Total**	**SE**	**% NT**	**Average per fisher**
'Darwin and Rural'	33 106 474	4 823 886	1382	29 902 680	3 890 531	90.3	1248
'Other 'coastal'	10 832 407	1 635 487	1833	10 687 889	1 631 150	98.7	1809
'Hinterland'	***3 103 011***	***2 364 468***	***4604***	***3 103 011***	***2 364 468***	100.0	***4604***
Total	47 041 892	5 615 639	1540	43 693 579	4 836 072	92.9	1431

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded fishing-related expenditure

Detailed expenditure for the various fishing-related goods and services is provided in Appendix 15 and is summarised in Table 14. Annual expenditure on boats and trailers represented the largest expenditure category, accounting for close to $33 million of expenditure (69% of the total), equivalent to an average of around $1000 per fisher per year. Boat and trailer purchases (capital items) accounted for almost two thirds of this expenditure, with boat and trailer maintenance representing a further 25% (Appendix 15). Travel associated with fishing was the second highest expenditure category at over $7 million (16%) and an average of $239 per fisher per year – the vast majority (96%) of which related to vehicle travel costs (kilometres travelled). Attributable expenditure on fishing and dive gear was in the order of $2.8 million or $92 per fisher per year.

Expenditure on fishing-related items outside of the NT was highest in proportional and absolute terms for boats and trailers – $3.1 million, or almost 10% of the total expenditure in this category (Table 14). With the exception of fishing and dive gear (around 7% purchased outside the NT), virtually all expenditure on other goods and services occurred within the NT.

Table 14. Annual total and average attributable expenditure (total and NT-based) by expenditure category during 2009-10, by non-indigenous Northern Territory resident fishers aged five years and older.

	Attributable expenditure ($)			NT-based vs. interstate etc. ($)			
Expenditure category	**Total**	**SE**	**Average per fisher**	**Total**	**SE**	**% NT**	**Average per fisher**
Accommodation	764 275	116 613	25	764 275	116 613	100.0	25
Bait/berley/ice	683 357	55 210	22	683 357	55 210	100.0	22
Boat hire/charter	679 748	161 487	22	679 748	161 487	100.0	22
Boat/trailer	32 689 515	5 219 592	1070	29 545 778	4 386 022	90.4	968
Camping gear	**1 210 994**	**607 193**	**40**	**1 207 907**	**607 189**	99.7	**40**
Clothing	535 525	63 892	18	534 634	63 887	99.8	18
Fees/licences	328 614	76 280	11	328 614	76 280	100.0	11
Fishing/dive gear	2 801 140	301 484	92	2 600 542	240 961	92.8	85
Travel	7 309 528	604 755	239	7 309 528	604 755	100.0	239
Other	39 197	9943	1	39 197	9943	100.0	1
Total	47 041 892	5 615 639	1540	43 693 579	4 836 072	92.9	1431

SE is standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded expenditure for the item

10. BOAT OWNERSHIP AND VESSEL CHARACTERISTICS – NT RESIDENTS

Boat ownership has been assessed for all NT households based on the Screening Survey. However, detailed vessel profiling information (length, main propulsion method, usage for fishing, navigational and fishing aids, mode of storage and market value) was assessed for households reporting fishing activity during 2009-10,as part of the Wash-up/Attitudinal Survey. The former information has been expanded to represent boat ownership for the resident, non-indigenous population of the NT as at March 2009, whereas the latter applies only to the population of recreational fishers as at March 2010 and provides a detailed assessment of the NT recreational fishing fleet.

10.1 Household Boat Ownership

Details of boat ownership are provided in Appendix 16 and are summarised in Figure 35. In March 2009, an estimated 10 300 non-indigenous resident NT households owned at least one boat, representing an overall household boat ownership rate of 17.5%. Boat ownership rates for households with fishers were, however, significantly greater than for non-fisher households, with over half of all fisher households owning a boat compared with just 4% of non-fisher households. There was some variability in boat ownership based on residential stratum, with over two-thirds of fisher households in the 'Other coastal' stratum, just over half of the 'Darwin and Rural' stratum and only 28% of the 'Hinterland' stratum owning boats. Boat ownership rates amongst non-fisher households were consistently low (2-6%) for each of the residential strata.

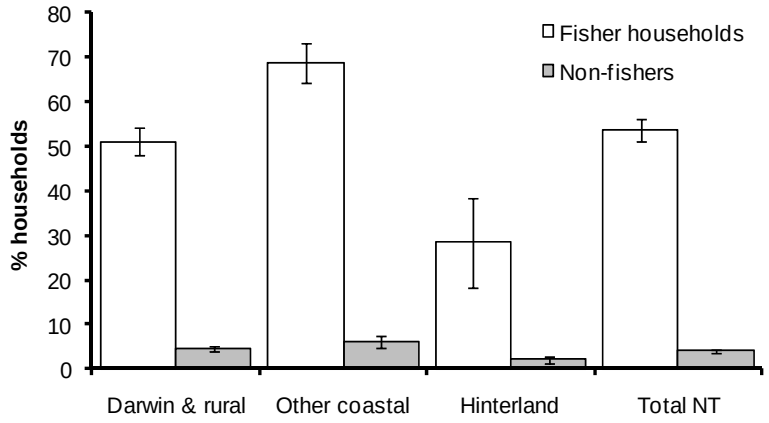

Figure 35. Proportion of fisher and non-fisher households reporting boat ownership in March 2009 by residential stratum, i.e. households containing one or more non-indigenous Northern Territory residents. Error bars represent one standard error.

Boat ownership by fisher households (those that had fished during 2009-10) was estimated in March 2010 and suggested that there had been a slight but non-significant increase in both ownership rates (from 54% to 58%) and the number of fisher households with boats (from 8549 to 9551) (Table 16, Figure 36). Boat ownership rates by residential stratum were consistent between the assessment periods with the exception of the 'Hinterland' stratum where, as indicated by the large standard error (36% RSE), the estimate was imprecise. In any case, this change had little influence on NT-wide estimates given the small number of fishers in the stratum.

Overall, fisher households owned an estimated 10 770 boats in March 2010, equivalent to 1.1 boats per boat-owning household. The average number of boats varied between 1.1 and 1.2 per household depending on residential stratum (Table 16).

Table 16. Numbers and proportions of fisher households reporting boat ownership and number of boats in March 2010 by residential stratum, i.e. households with one or more non-indigenous Northern Territory residents.

		Boat ownership (households)				Number of boats		
Residential stratum	**Total fisher households**	**Number**	**SE**	**Owner-ship (%)**	**SE**	**Number**	**SE**	**Av. per household**
'Darwin and Rural'	13 009	7197	378	55.3	2.9	7959	450	1.1
'Other coastal'	3025	2106	155	69.6	5.1	2505	207	1.2
'Hinterland'	397	*248*	*90*	*62.4*	*22.6*	***306***	***132***	*1.2*
Total	16 431	9551	418	58.1	2.5	10 770	513	1.1

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reported boat ownership

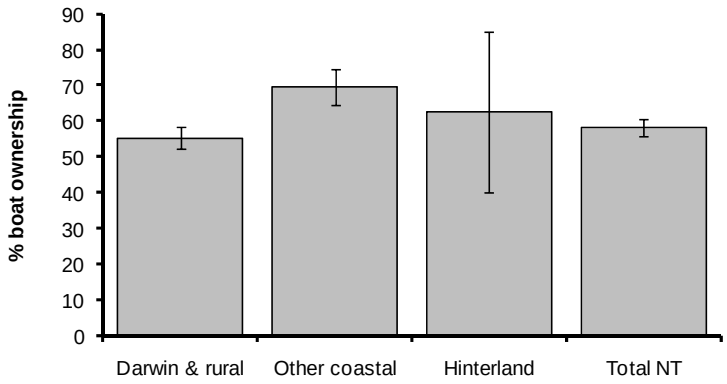

Figure 36. Proportion of fisher households reporting boat ownership in March 2010 by residential stratum, i.e. households with one or more non-indigenous Northern Territory residents. Error bars represent one standard error.

10.2 Vessel Characteristics

10.2.1 Size and Usage for Recreational Fishing

Out of the total number of boats owned by fisher households in March 2010, an estimated 9946 (92%) were used for recreational fishing (Table 17). Usage rates for recreational fishing tended to be below 90% for vessels less than 5 m in length and those over 7 m, but exceeded 95% for vessels in the intermediate size classes. Overall, vessels in the 5 to 5.9 m size class accounted for 44%, 4 to 4.9 m for 27%, 6 to 6.9 m for 14%, less than 4 m for 9% and over 7 m for 6% of the NT recreational fishing fleet.

Table 17. Numbers of boats owned by fishing households in March 2010 and usage for recreational fishing in 2009-10 by overall length (group) and residential stratum, i.e. households with one or more non-indigenous Northern Territory residents.

Residential stratum	Overall length	Used for fishing		Not used		Boats used for fishing (%)
		Number	SE	Number	SE	
'Darwin and Rural'						
	< 4 m	*545*	*161*	***135***	***68***	80.2
	4-4.9 m	1893	263	***230***	***94***	89.2
	5-5.9 m	3594	338	***95***	***66***	97.4
	6-6.9 m	868	179	***52***	***50***	94.4
	7 m plus	*426*	*126*	***120***	***68***	78.0
	Total	7327	443	*632*	*155*	92.1
'Other coastal'						
	< 4 m	*304*	*91*	***43***	***24***	87.7
	4-4.9 m	699	115	***95***	***41***	88.1
	5-5.9 m	667	108	0		100.0
	6-6.9 m	493	86	0		100.0
	7 m plus	*189*	*59*	***16***	***15***	92.0
	Total	2352	201	*154*	*50*	93.9
'Hinterland'						
	< 4 m	***39***	***29***	0		100.0
	4-4.9 m	***109***	***66***	***38***	***36***	74.0
	5-5.9 m	***88***	***63***	0		100.0
	6-6.9 m	***31***	***30***	0		100.0
	7 m plus	0		0		-
	Total	***268***	***127***	***38***	***36***	87.5
Total NT						
	< 4 m	887	187	***177***	***72***	83.3
	4-4.9 m	2702	294	*363*	*109*	88.1
	5-5.9 m	4350	361	***95***	***66***	97.9
	6-6.9 m	1393	201	***52***	***50***	96.4
	7 m plus	*615*	*139*	***136***	***70***	81.9
	Total	9946	503	824	167	92.3

SE= standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reported fishing boat ownership

Based on the proportional usage for recreational fishing, over three-quarters of the recreational fleet were reported as being used exclusively for recreational fishing (Table 18). Of the remaining vessels, recreational fishing accounted for over half of the usage in the vast majority (89%) of cases. In terms of exclusive usage for fishing, rates tended to be higher for vessels smaller than 5 m (81 to 87%) than for larger vessels (62 to 77%).

Table 18. Numbers of fishing boats in March 2010 by overall length (grouped) and proportion of all usage for recreational fishing in 2009-10, i.e. owned by households with one or more non-indigenous Northern Territory resident fishers.

Overall length	<50%			50-99%			100%		
	Number	SE	% (row)	Number	SE	% (row)	Number	SE	% (row)
< 4 m	0		0.0	***171***	***79***	19.3	*716*	*170*	80.7
4-4.9 m	***59***	***40***	2.2	*286*	*93*	10.6	2357	280	87.2
5-5.9 m	***109***	***75***	2.5	*1,032*	*197*	23.7	3209	324	73.8
6-6.9 m	***36***	***36***	2.6	*286*	*91*	20.5	1071	179	76.9
7 m plus	***70***	***57***	11.4	***165***	***77***	26.8	*380*	*104*	61.8
Total	***275***	***133***	2.8	1940	253	19.5	7732	468	77.7

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

10.2.2 Vessel Propulsion

Vessels were categorised according to their primary propulsion method and while all types (power, sail and row/paddle) were used for recreational fishing, the vast majority (>90%) of recreational fishing vessels across all size classes were powered (Table 19). Paddled and sailing boats used for fishing were restricted to the smaller and largest vessel size groups, respectively.

Table 19. Numbers of fishing boats in March 2010 by overall length (grouped) and main propulsion method, i.e. owned by households with one or more non-indigenous Northern Territory resident fishers.

Overall length	Power			Sail			Row/paddle		
	Number	SE	% (row)	Number	SE	% (row)	Number	SE	% (row)
< 4 m	*814*	*176*	91.7	0		0.0	***74***	***51***	8.3
4-4.9 m	2673	293	98.9	0		0.0	***29***	***28***	1.1
5-5.9 m	4350	361	100.0	0		0.0	0		0.0
6-6.9 m	1393	201	100.0	0		0.0	0		0.0
7 m plus	*555*	*135*	90.3	***60***	***36***	9.7	0		0.0
Total	9785	496	98.4	***60***	***36***	0.6	***102***	***58***	1.0

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

10.2.3 Vessel Storage

Over 90% of all recreational fishing vessels were trailered, with a small proportion of ‘car toppers’ (mainly less than 4 m vessels); vessels berthed in marinas (mainly in the 7 m plus group) or vessels primarily stored on the shore (mainly less than 4 m) (Table 20).

Table 20. Numbers of fishing boats in March 2010 by overall length (grouped) and main storage mode, owned by households with one or more non-indigenous Northern Territory resident fishers.

	Trailer			Mooring/marina			Car topper			Shore-based		
Overall length	**Number**	**SE**	**% (row)**	**Number**	**SE**	**% (row)**	**Number**	**SE**	**% (row)**	**Number**	**SE**	**% (row)**
< 4 m	*454*	*115*	51.2	-		0.0	*297*	*107*	33.5	***136***	***62***	15.4
4-4.9 m	2645	292	97.9	-		0.0	***12***	***12***	0.4	***44***	***32***	1.6
5-5.9 m	4221	357	97.0	***57***	***56***	1.3	-		0.0	***72***	***70***	1.7
6-6.9 m	1393	201	100.0	-		0.0	-		0.0	-		0.0
7 m plus	*350*	*101*	57.0	*265*	*98*	43.0	-		0.0	-		0.0
Total	9063	467	91.1	***322***	***137***	3.2	*309*	*108*	3.1	***253***	***101***	2.5

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

10.2.4 Electronic Fishing Aids

Echo-sounders (fish finders) and global positioning systems (GPS) were present on 87% (Table 21) and 77% (Table 22), respectively of the recreational fishing vessels. Echo sounders and GPS electronic aids are used to assist in fish location and navigation, with the former being most common on vessels larger than 4 m (more than 87%) and the latter on vessels over 5 m (more than 84%).

Table 21. Numbers of fishing boats in March 2010 by overall length (grouped) and echo sounder/fish finder availability (fitted or portable), owned by households with one or more non-indigenous Northern Territory resident fishers.

	Echo sounder			No echo sounder		
Overall length	**Number**	**SE**	**% (row)**	**Number**	**SE**	**% (row)**
<4m	***322***	***130***	36.3	*565*	*135*	63.7
4-4.9 m	2361	278	87.4	*341*	*104*	12.6
5-5.9 m	4032	349	92.7	*318*	*124*	7.3
6-6.9 m	1373	200	98.6	***20***	***19***	1.4
7 m plus	*555*	*135*	90.3	***60***	***36***	9.7
Total	8643	465	86.9	1,304	218	13.1

SE is standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

Table 22. Numbers of fishing boats in March 2010 by overall length (grouped) and global positioning system (GPS) availability (fitted or portable), owned by households with one or more non-indigenous Northern Territory resident fishers.

	GPS			No GPS		
Overall length	**Number**	**SE**	**% (row)**	**Number**	**SE**	**% (row)**
< 4 m	352	131	39.6	*536*	*135*	60.4
4-4.9 m	1813	254	67.1	888	166	32.9
5-5.9 m	3664	335	84.2	686	168	15.8
6-6. 9 m	1324	196	95.1	***69***	***47***	4.9
7 m plus	*519*	*126*	*84.4*	***96***	***62***	15.6
Total	7671	458	77.1	2275	286	22.9

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

10.2.5 Vessel Market Value

The total estimated market value of recreational boats used for fishing in the NT during 2009-10 was $194 million, representing an attributed value of $176 million when recreational fishing usage is taken into account. Some two thirds of this attributed value refers to vessels between 5 and 6.9 m in length (Table 23). While the average attributed value was over $16 000 per vessel, this was highly dependent on size, increasing from around $1700 for vessels under 4 m to almost $41 000 for vessels over 7 m.

Table 23. Numbers of fishing boats in March 2010 by overall length (grouped) and total and attributable market value (total and average), owned by households with one or more non-indigenous Northern Territory resident fishers.

	Total value ($)			Attributable value ($)			
Overall length	**Total**	**SE**	**Average per boat**	**Total**	**SE**	**% attribution**	**Average per boat**
< 4 m	1 938 635	549 822	1821	1 863 562	541 013	96.1	1751
4-4.9 m	22 893 371	2 742 867	7469	21 781 316	2 630 107	95.1	7106
5-5.9 m	80 096 203	7 390 637	18 018	76 202 833	7 174 529	95.1	17 142
6-6.9 m	48 855 700	7 066 221	33 824	45 658 745	6 675 398	93.5	31 611
7 m plus	*40 387 048*	*9 979 255*	*53 771*	*30 662 585*	8 197 257	75.9	40 824
Total	194 170 957	13 403 526	18 028	176 169041	12 088 750	90.7	16 357

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households reporting fishing boat ownership

11. OTHER RESULTS: WASH-UP/ATTITUDINAL SURVEY – NT RESIDENTS

The opinions and attitudes of diarists were obtained in this survey in terms of various fishing-related matters, from the main/key fisher in each household, aged 15 years and older. Summary results of this questioning are discussed below, with more detailed analysis and classification of 'verbatim' responses to be undertaken by NT Fisheries.

In this questioning, the main/key fisher was invited to provide any comments or suggestions relating to recreational fishing, initially in the form of a 'top of mind response' (i.e. without prompting) and subsequently, through prompting on a range of structured categories (see below). Among the 652 households that completed the Wash-up/Attitudinal Survey, comments were provided by 391 households (60%). Higher comment rates occurred among households that fished in the diary period (66.2%) than non-fishers (34.9%). A total of 742 separate comments and suggestions were reported in the eight categories below:

1. General initial comments (without prompting): 140 comments/suggestions across a range of issues (not covered by items 2 to 8 below) including: commercial fishing impacts, access to indigenous land/permits, other access issues/roads, crocodiles, general population growth/increased fishing pressures, policing/enforcement and a number of generally positive comments, such as "It's all pretty good in the Territory".

2. Particular species, including bait: 13 comments, mainly specific issues concerning barramundi, mud crabs and cherabin and several about restrictions on skinning/ filleting of fish.

3. Size and possession limits for recreational fishing: 157 comments, including a large number which noted the importance of such limits to sustainability, many suggested existing limits should not be changed, others identified general/specific limits to be increased or decreased, the introduction of an upper size limit for barramundi and policing/enforcement issues.

4. Other recreational fishing regulations: 64 comments, including again, a number noting the importance of such regulations, various licensing-related comments (recreational. fishing, boat drivers and boat registration), fishing permits and policing/enforcement issues.

5. Ramps, jetties or other facilities: 172 comments, including many suggestions for improvements at specific ramps, others noted that ramps had generally improved but more work was needed, positive comments about large Darwin ramps (Dinah Beach and East Arm), various safety issues (crocodiles, slipping risks), vehicle/trailer security, better parking facilities and a minor mention of wharf/jetty issues.

6. Waterways or the environment: 43 comments, including various pollution-related comments (mainly litter/more bins, but also sewage and industrial waste), boat safety issues (speeding, recklessness, alcohol) and related policing/enforcement issues.

7. Survey-related: 136 comments, virtually all were positive and many reported enjoying the survey, others offered to continue and several suggested more frequent studies were needed and/or acknowledged the need for this research.

8. Other comments/suggestions: 17 comments with the majority equating to a final 'positive' statement, such as "Everything is OK".

In the final questioning for the survey, respondents were asked if they would like to receive a copy of the survey results; among the 652 households, 514 households (78.8%) said 'yes', with higher rates among fisher households (84.3%) than non-fishers (56.6%). All respondents were also asked about their willingness to participate in future research by NT Fisheries. The vast majority (85.4%) were willing, with higher rates among fisher households (89.9%) than for non-fishers (67.4%).

12. BOAT RAMP SURVEY RESULTS – NT RESIDENTS AND VISITORS

As discussed in Section 2.2.6, the primary objective of the Boat Ramp Survey was to provide a cost-effective assessment of visitor fishing activity for key catchments where visitor populations could not be isolated (as in the Accommodation Survey) – and primarily, the areas around Darwin. The results in this section (and related Appendices) have been disaggregated for NT residents and visitors, with the proportions of visitor effort and catch routinely shown as a percentage of the totals. After re-analysis of the NRFS data has been completed, only limited comparative analysis of these results will be achievable on this proportional basis, primarily due to the inclusion of indigenous residents in the boat ramp surveys and their ultimate exclusion from the NRFS re-analysis (and the recent telephone/diary survey).

However, more appropriate comparisons can be made between the two surveys for visitor fishing activity in absolute terms, such as estimates of total days fished in key catchments. Yet, this will require exclusion of overseas visitors from the recent boat ramp surveys (albeit less than 5% of all visitors in the following results), as the NRFS visitor data only referred to Australian residents.

In the meantime, a preliminary analysis of the NRFS data has been conducted to provide comparable guideline estimates of fishing effort (days fished) by interstate visitors during the survey period for these catchments and broad comparisons are discussed in this section. In terms of catch data (kept or released), such comparisons have been confined to general trend information, such as slightly lower proportions of visitor catch compared with their proportions of fishing effort.

12.1 Fishing Effort

Estimates of total days fished by NT residents and visitors (from interstate or overseas) for the Boat Ramp Survey are presented in Table 24. The proportions of visitor fishing effort in the Darwin Harbour and Leaders Creek catchments were similar at close to 20% of all fishing effort, although a high RSE applies to the latter. Higher proportions of visitor effort were estimated for Dundee Beach (24.8%), Bynoe Harbour (31.5%) and the Mary River (41.6%).

When compared with guideline NRFS data for the areas covered by the first four catchments in Table 24 (Bynoe Harbour, Darwin Harbour, Dundee Beach and Leaders Creek), these estimates represent a consistent increase in visitor fishing effort, both proportionally and in absolute terms. Current NRFS estimates show a total of around 7300 boat-based fisher days (excluding charter fishing) by interstate visitors for these four catchments during the period April to November compared with a total of around 17 000 fisher days in Table 24. However, standard error calculations from the NRFS re-analysis will ultimately be required to assess the significance (or otherwise) of any such change. Also, guideline NRFS data shows a total of around 7600 boat-based fisher days by visitors for the entire Mary River (i.e. including all boat ramps/access points) compared with a similar estimate for the two ramps covered by the recent Boat Ramp Survey (Table 24).

Table 24. Estimated number of days fished by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Boat Ramp Survey.

	NT residents		Visitors		Total		%
Catchment	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Bynoe Harbour	6806	1542	3134	1047	9940	1864	31.5
Darwin Harbour	51 191	5341	11 633	2546	62 824	5917	18.5
Dundee Beach [1]	4590	917	1517	527	6107	1058	24.8
Leaders Creek	3019	671	**721**	**328**	3739	747	19.3
Mary River	10 840	1528	7733	1291	18 572	2001	41.6
All catchments	76 445	5776	24 737	3286	101 182	6646	24.4

[1] The survey period for Dundee Beach was June to November, 2009

SE = standard error; values in bold indicate relative standard error > 40%

12.2 Catch

The total numbers of all species caught and kept by NT residents and visitors (from interstate or overseas) for the Boat Ramp Survey are summarised in Table 25. More detailed analyses of key species by catchment have been provided in Appendices 17 to 21, where for example, very different species compositions occurred in the Mary River compared with the four coastal catchments. The proportion of total harvest by visitors in the Darwin Harbour catchment (Table 25) was 19.3%, with higher proportions for Bynoe Harbour (23.2%) and the Mary River (35%) and lower proportions for Dundee Beach (18.7%) and Leaders Creek (11.2%) but again with a high RSE. Compared with effort proportions in Table 24, somewhat lower visitor harvest proportions were reported across all catchments (with the exception of Darwin Harbour) and this is generally consistent with NFRS results.

Table 25. Estimated total numbers kept of all species by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Boat Ramp Survey.

	NT Residents		Visitors		Total		%
Catchment	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Bynoe Harbour	10 473	1411	3163	868	13 636	1656	23.2
Darwin Harbour	75 753	6853	18 100	3564	93 852	7724	19.3
Dundee Beach [1]	11 063	1018	2540	472	13 603	1122	18.7
Leaders Creek	8559	1477	**1076**	**466**	9635	1548	11.2
Mary River	2649	731	1425	396	4074	832	35.0
All catchments	108 497	7260	26 304	3748	134 801	8170	19.5

[1] The survey period for Dundee Beach was June to November, 2009

SE = standard error; values in bold indicate relative standard error > 40%

The total numbers of all species released or discarded by NT residents and visitors (from interstate or overseas) for the Boat Ramp Survey are summarised in Table 26. More detailed analyses of key species by catchment are provided in Appendices 22 to 26. The proportion of total catch released or discarded by visitors in the Darwin Harbour catchment was 14.3%, with higher proportions for Bynoe Harbour (22.1%), Dundee Beach (24.3%) and the Mary River (38.1%), and a lower proportion for Leaders Creek (10.6%) again with a high RSE. Compared with effort proportions in Table 24, somewhat lower visitor proportions were reported across all catchments; again, this is generally consistent with NFRS results.

Table 26. Estimated total numbers released or discarded of all species caught by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Boat Ramp Survey.

	NT residents		Visitors		Total		%
Catchment	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Bynoe Harbour	15 046	2506	4277	1109	19 323	2740	22.1
Darwin Harbour	93 410	7545	15 526	2986	108 936	8114	14.3
Dundee Beach [1]	18 591	2032	5959	1254	24 551	2388	24.3
Leaders Creek	13 598	2296	**1620**	**845**	15 218	2447	10.6
Mary River	18 708	2702	11 515	2182	30 222	3473	38.1
All catchments	159 353	8939	38 898	4146	198 250	9854	19.6

[1] The survey period for Dundee Beach was June to November, 2009

SE = standard error; values in bold indicate relative standard error > 40%

13. ACCOMMODATION SURVEY RESULTS – NT RESIDENTS AND VISITORS

As discussed in Section 2.2.7, the primary objective of the Accommodation Survey was to provide a cost-effective assessment of visitor fishing activity for key catchments where visitor populations could be isolated. Eight accommodation establishments in three remote catchments were included. As for the Boat Ramp Survey, the results in this section (and related Appendices) have been disaggregated for NT residents and visitors, with the proportions of visitor effort and catch routinely shown as a percentage of the totals.

However, unlike for the Boat Ramp Survey, a comparison of visitor proportions (vs. NT residents) derived from the Accommodation Survey with any guideline NRFS data is generally inappropriate due to the fact that NT residents from within or near the catchment were simply not included in the Accommodation Survey (unless they happened to stay at a selected establishment). Therefore, comparisons with guideline NRFS data have been largely confined to estimates of visitor fishing effort; and in the recent Accommodation Survey, less than 1% of all visitors were from overseas.

13.1 Fishing Effort

The numbers of estimated total days fished by NT residents and visitors (from interstate or overseas) for the Accommodation Survey are presented in Table 27. Visitors comprised the vast majority of total fishing effort for all establishments/catchments: the Daly River (86%), the McArthur River (89.7%) and the Roper River (93.8%). In absolute terms, high levels of visitor fishing effort were recorded for the McArthur River (33 017 fisher days) and the Daly River (14 634 fisher days). However, as discussed in Section 2.2.7, only five of the eight accommodation establishments in the Daly River catchment were included in the survey. Based on available information for the excluded establishments (including site capacity, occupancy rates and visitor proportions), these have been estimated to account for around a third of the total effort and catch estimates in this report (based only on the five establishments) and therefore, a likely total of close to 20 000 fisher days by visitors to the Daly River. A similar increase would also be applicable to any catch estimates for the area.

Compared with guideline NRFS data, this represents a substantial increase for the Daly River – four times the estimate of around 5000 fisher days, including shore-based and charter fishing for the period April to November. Also, visitor fishing effort for the McArthur River represents a substantial increase compared with just over 13 000 fisher days from the NRFS data. Although standard error calculations will be required from the NRFS re-analysis, the significance of this growth for the Daly and McArthur Rivers is likely to be confirmed and is consistent with a range of anecdotal/other information for these areas. By contrast, estimated visitor fishing effort for the Roper River (all downstream of Roper Bar) was slightly less than the comparable NRFS estimate of around 7400 fisher days.

Table 27. Estimated number of days fished by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Accommodation Survey.

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Daly River	**2392**	**945**	14 634	2338	17 026	2522	86.0
McArthur River	3799	1103	33 017	3252	36 816	3434	89.7
Roper River	**345**	**309**	5216	1202	5561	1241	93.8
All catchments	6535	1472	52 867	4187	59 402	4438	89.0

SE = standard error; values in bold indicate relative standard error > 40%

13.2 Catch

The total numbers of all species caught and kept by NT residents and visitors (from interstate or overseas) for the Accommodation Survey are summarised in Table 28. More detailed analyses of key species by catchment have been provided in Appendices 27 to 29, where for example, very different species compositions occurred in the Daly and Roper Rivers compared with the (more coastal) McArthur River. The proportion of total harvest by visitors in all three catchments largely reflects the effort level; in each catchment, significant components of the total harvest refer to bait species, such as mullet for the McArthur River (Appendix 28) and cherabin for the Daly and Roper Rivers (Appendices 27 and 29, respectively).

Table 28. Estimated total numbers of all species kept by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Accommodation Survey.

	NT residents		Visitors		Total		%
Catchment	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Daly River	**2067**	**1326**	40 106	6894	42 174	7020	95.1
McArthur River	27 267	6185	191 545	16 631	218 812	17 744	87.5
Roper River	**3617**	**2944**	49 374	11 176	52 991	11557	93.2
All catchments	32 952	6977	281 025	21 190	313 977	22 309	89.5

SE = standard error; values in bold indicate relative standard error > 40%

The total numbers of all species released or discarded by NT residents and visitors (from interstate or overseas) for the Accommodation Survey are summarised in Table 29. More detailed analyses of key species by catchment are provided in Appendices 30 to 32. The proportion of total catch released or discarded by visitors again reflects the effort level by visitors in all three catchments.

Table 29. Estimated total numbers of released or discarded species by Northern Territory residents and visitors aged five years and older in the period April to November 2009, by catchment for the Accommodation Survey.

	NT residents		Visitors		Total		%
Catchment	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Daly River	**4011**	**1604**	30 857	4389	34 868	4673	88.5
McArthur River	24 255	5932	123 988	11 276	148 243	12 741	83.6
Roper River	**1901**	**1366**	25 019	5868	26 920	6025	92.9
All catchments	30 167	6295	179 864	13 448	210 031	14 848	85.6

SE = standard error; values in bold indicate relative standard error > 40%

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APPENDICES

Appendix 1: Estimated number and proportion of the non-indigenous resident population of the Northern Territory aged five years and older who fished recreationally in the NT in the 12 months prior to April 2009 - by gender, age and stratum

SE = standard error; values in bold indicate relative standard error > 40%

		Male					Female					Total				
Residential stratum	**Age group**	**Pop'n**	**Fishers**	**SE**	**% fishers**	**SE**	**Pop'n**	**Fishers**	**SE**	**% fishers**	**SE**	**Pop'n**	**Fishers**	**SE**	**% fishers**	**SE**
'Darwin and Rural'																
	5 to 14	7185	2421	255	33.7	3.5	6792	1951	227	28.7	3.3	13 977	4372	387	31.3	2.8
	15 to 29	13 195	4260	385	32.3	2.9	11 894	1990	272	16.7	2.3	25 089	6250	552	24.9	2.2
	30 to 44	13 868	4862	305	35.1	2.2	13 332	2683	231	20.1	1.7	27 200	7545	456	27.7	1.7
	45 to 59	12 353	3938	276	31.9	2.2	10 941	1471	184	13.4	1.7	23 294	5409	389	23.2	1.7
	60 plus	6813	1205	161	17.7	2.4	5220	289	80	5.5	1.5	12 033	1494	199	12.4	1.7
	Total	53 414	16 687	766	31.2	1.4	48 179	8383	537	17.4	1.1	101 593	25 070	1159	24.7	1.1
'Other coastal'																
	5 to 14	1075	549	53	51.1	4.9	917	377	51	41.1	5.6	1992	925	83	46.5	4.2
	15 to 29	1665	740	86	44.5	5.1	1752	407	71	23.2	4.1	3417	1147	130	33.6	3.8
	30 to 44	2568	1402	97	54.6	3.8	2261	671	80	29.7	3.5	4829	2073	150	42.9	3.1
	45 to 59	2239	1054	81	47.1	3.6	1684	425	60	25.2	3.6	3923	1479	118	37.7	3.0
	60 plus	957	227	43	23.7	4.4	491	109	30	22.2	6.2	1448	336	65	23.2	4.5
	Total	8504	3971	197	46.7	2.3	7105	1989	155	28.0	2.2	15 609	5960	310	38.2	2.0
'Hinterland'																
	5 to 14	1740	**56**	**32**	**3.2**	**1.8**	1515	0	0	0.0	0	3255	**56**	**32**	**1.7**	**1.0**
	15 to 29	2873	**74**	**45**	**2.6**	**1.6**	3337	0	0	0.0	0	6210	**74**	**45**	**1.2**	**0.7**
	30 to 44	3356	236	70	7.0	2.1	3264	**38**	**27**	**1.2**	**0.8**	6620	275	97	4.2	1.5
	45 to 59	3257	272	80	8.3	2.5	3240	**69**	**34**	**2.1**	**1.1**	6497	341	114	5.3	1.8
	60 plus	1600	**14**	**13**	**0.9**	**0.8**	1357	0	0	0.0	0	2957	**14**	**13**	**0.5**	**0.4**
	Total	12 826	652	145	5.1	1.1	12 713	**108**	**44**	**0.8**	**0.3**	25 539	760	166	3.0	0.6
Northern Territory																
	5 to 14	10 000	3027	262	30.3	2.6	9224	2327	233	25.2	2.5	19 224	5354	397	27.8	2.1
	15 to 29	17 733	5074	397	28.6	2.2	16 983	2397	281	14.1	1.7	34 716	7471	569	21.5	1.6
	30 to 44	19 792	6500	328	32.8	1.7	18857	3392	246	18.0	1.3	38 649	9893	487	25.6	1.3
	45 to 59	17 849	5264	298	29.5	1.7	15 865	1965	197	12.4	1.2	33 714	7229	419	21.4	1.2
	60 plus	9370	1445	167	15.4	1.8	7068	398	85	5.6	1.2	16 438	1843	210	11.2	1.3
	Total	74 744	21 310	804	28.5	1.1	67 997	10 480	561	15.4	0.8	142 741	31 790	1211	22.3	0.8

Appendix 2: Annual recreational catch (total, kept and released numbers) by reporting group and species during 2009-10, by non-indigenous NT residents aged five years or older

SE is standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

			Total		Kept		Released	
Reporting group	**Standard fish name**	**Scientific name/s**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Barramundi	Barramundi	*Lates calcarifer*	147 393	23 250	40 951	4 851	106 442	19 764
Bream, pikey	Pikey bream	*Acanthopagrus berda*	16 186	3 160	6 414	1 382	9 771	2 383
Catfish	Eeltail catfish	Plotosidae	*833*	*260*	***57***	***56***	*776*	*254*
	Forktail catfish	Ariidae	39 353	5 472	***5 146***	***2 944***	34 207	4 571
Cod/groupers	Rockcod/groupers	Serranidae - undifferentiated	27 372	3 038	7 033	932	20 339	2 626
Coral trout	Coral trout	*Plectropomus* spp	5 850	1 160	2 835	482	3 014	853
Emperor, grass	Grass emperor	*Lethrinus laticaudis*	22 861	4 050	10 191	2 359	12 670	2 528
Emperor, red	Red emperor	*Lutjanus sebae*	5 589	2 069	2 600	859	***2 990***	***1 286***
Emperor, other	Emperor, other	Lethrinidae	***437***	***429***	***34***	***33***	***403***	***396***
Grunter, sooty	Sooty grunter	*Hephaestus fuliginosus*	7 527	1 807	*2 308*	*565*	5 218	1 521
Javelin fish	Barred javelin	*Pomadasys kaakan*	8 734	2 369	*2 206*	*599*	6 528	2 079
Jewfish, black	Black jewfish	*Protonibea diacanthus*	10 779	1 525	7 810	1 152	*2 969*	*824*
Mackerel, grey	Grey mackerel	*Scomberomorus semifasciatus*	3 390	791	2 108	503	*1 282*	*399*
Mackerel, Spanish	Spanish mackerel	*Scomberomorus commerson*	8 287	1 825	3 862	731	4 424	1 466
Mackerel, spotted	Spotted mackerel	*Scomberomorus munroi*	*833*	*279*	*500*	*181*	***333***	***147***
Moonfish/Batfish	Batfish	Ephippidae	8 129	1 839	*2 741*	*869*	*5 388*	*1 397*
Mullet	Mullet	Mugilidae - undifferentiated	36 260	9 078	33 222	8 388	***3 038***	***2 736***
Queenfish	Queenfish	*Scomberoides* spp	10 895	2 001	3 394	650	7 501	1 758
Saratoga	Northern saratoga	*Scleropages jardinii*	6 900	1 965	***1 175***	***602***	5 725	1 683
Sharks and rays	Rays/skates	Dasyatidae	*979*	*265*	***115***	***90***	*865*	*246*
	Sawshark	Pristidae	***158***	***91***	*0*	*0*	***158***	***91***
	Shark	Various families	26 601	3 420	*1 392*	*419*	25 209	3 349
Small baitfish	Baitfish, unspecified	Several families	**55 510**	**24 973**	**53 740**	**24 789**	***1 770***	***1 301***
	Herring, other	Clupeidae	***345***	***317***	***324***	***316***	***20***	***20***
Snapper, golden	Golden snapper	*Lutjanus johnii*	80 530	9 208	38 000	4 702	42 531	5 504
Snapper, mangrove jack	Mangrove Jack	*Lutjanus argentimaculatus*	9 491	2 086	5 362	1 407	4 129	1 090
Snapper, Moses'	Moses' snapper	*Lutjanus russellii*	***7 097***	***4 020***	***1 776***	***1 183***	***5 321***	***3 003***
Snapper, saddletail/crimson	Saddletail and crimson snapper	*Lutjanus malabaricus* and *erythropterus*	36 730	7 021	14 355	3 350	22 375	4 276
Snapper, stripey	Stripey snapper	*Lutjanus carpontatus*	21 577	3 349	5 227	1 068	16 350	2 692

			Total		Kept		Released	
Reporting group	**Standard fish name**	**Scientific name/s**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Snapper, other	Chinamanfish	*Symphorus nematophorus*	***9***	***8***	***9***	***8***	*0*	*0*
	Goldband snapper	*Pristipomoides multidens*	***191***	***188***	***191***	***188***	*0*	*0*
Tarpon/ox-eye herring	Oxeye herring	*Megalops cyprinoides*	14 835	3 824	***5 585***	***2 794***	9 250	2 098
Threadfin, blue	Blue threadfin	*Eleutheronema tetradaectylum*	10 892	2 091	6 630	1 370	4 262	1 470
Threadfin, king	King threadfin	*Polydactylus macrochir*	7 150	1 688	3 744	842	*3 406*	*1 008*
Trevally, giant	Giant trevally	*Caranx ignobilis*	18 438	4 536	2 673	583	15 766	4 431
Trevally, other	Golden trevally	*Gnathanodon speciosus*	*3 266*	*1 001*	*636*	*201*	*2 630*	*964*
	Trevally, other	Carangidae - undifferentiated	***290***	***155***	***100***	***56***	***190***	***139***
Wrasse, tuskfish and gropers	Maori wrasse	*Cheilinus* and *Oxycheilinus* spp	***27***	***27***	***27***	***27***	*0*	*0*
	Parrotfish/tuskfish	Scaridae - undifferentiated	5 771	995	2 323	447	3 448	736
	Queensland groper	*Epinephelus lanceolatus*	***30***	***20***	*0*	*0*	***30***	***20***
Scalefish, other	Archer fish	Toxotidae - undifferentiated	***1 630***	***1 148***	***11***	***10***	***1 619***	***1 148***
	Bony bream	*Nematalosa erebi*	***1 622***	***1 580***	***1 622***	***1 580***	*0*	*0*
	Bream, other	Sparidae	***39***	***29***	*0*	*0*	***39***	***29***
	Cobia	*Rachycentron canadum*	*331*	*128*	***290***	***123***	***42***	***31***
	Dolphinfish	Coryphaenidae	***82***	***57***	***47***	***45***	***35***	***35***
	Eel	Various families	***80***	***47***	*0*	*0*	***80***	***47***
	Fish, other	Various families	***1 124***	***684***	***44***	***43***	***1 081***	***683***
	Fish, unknown	n/a	***1 465***	***1 364***	*0*	*0*	***1 465***	***1 364***
	Flathead	Platycephalidae - undifferentiated	*1 376*	*469*	*571*	*174*	***804***	***358***
	Garfish	Hemiramphidae - undifferentiated	***3 413***	***2 090***	***3 258***	***2 083***	***155***	***153***
	Leatherjacket	Monacanthidae	***155***	***118***	*0*	*0*	***155***	***118***
	Long Tom	Belonidae	***916***	***429***	***164***	***89***	***753***	***420***
	Longtail tuna	*Thunnus tonggol*	*1 165*	*303*	*719*	*208*	*447*	*167*
	Mackerel tuna	*Euthynnus affinis*	***1 330***	***669***	***493***	***356***	***838***	***471***
	Marlin	Istiophoridae - undifferentiated	***26***	***15***	*0*	*0*	***26***	***15***
	Milkfish	*Chanos chanos*	***748***	***731***	*0*	*0*	***748***	***731***
	Remora	Echeneidae - undifferentiated	***142***	***85***	***41***	***40***	***101***	***75***
	Sailfish	*Istiophorus platypterus*	*225*	*80*	***94***	***54***	***131***	***60***
	Sand bass	*Psammoperca waigiensis*	***138***	***90***	*0*	*0*	***138***	***90***
	Stargazer	Uranoscopidae - undifferentiated	***49***	***38***	*0*	*0*	***49***	***38***
	Striped seapike	*Sphyraena* spp	2 049	443	*450*	*147*	1 600	406
	Sweetlips	Haemulidae	*1 251*	*300*	*646*	*178*	*606*	*239*
	Toads/pufferfish	Various families	***832***	***335***	*0*	*0*	***832***	***335***

			Total		Kept		Released	
Reporting group	**Standard fish name**	**Scientific name/s**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Scalefish, other (cont)	Tripletail	*Lobotes surinamensis*	***82***	***80***	*0*	*0*	***82***	***80***
	Whiting	Sillaginidae - undifferentiated	***3 100***	***1 729***	***1 617***	***1 189***	***1 482***	***767***
	Yellowtail scad	*Trachurus novaezelandiae*	***122***	***89***	***82***	***80***	***41***	***40***
Mud crab	Mud crab	*Scylla* spp	44 634	6 339	30 382	3 951	14 253	3 045
Cherabin	Prawn, freshwater	*Macrobrachium* spp	*8 196*	*3 018*	*7 869*	*2 825*	***326***	***320***
Crustaceans, other	Blue swimmer crab	*Portunus pelagicus*	***1 212***	***487***	***751***	***402***	***461***	***273***
	Crab, other	Brachyura - undifferentiated	***142***	***102***	***99***	***92***	***44***	***42***
	Lobster	Palinuridae - undifferentiated	***407***	***223***	***368***	***219***	***39***	***38***
	Prawn, marine	Penaeoidea and Caridea - undifferentiated	***470***	***370***	***470***	***370***	*0*	*0*
	Redclaw	*Cherax quadricarinatus*	***2 326***	***1 701***	***2 326***	***1 701***	*0*	*0*
Cephalopods	Squid	Loliginidae - undifferentiated	***16 820***	***13 347***	***16 433***	***13 341***	***387***	***255***
Bivalves	Cockles	Malletiidae - undifferentiated	***5 858***	***5 564***	***5 858***	***5 564***	*0*	*0*
Other taxa	Non-fish, other	Various families	***43***	***42***	***43***	***42***	*0*	*0*

Appendix 3: Annual recreational catch (kept and released numbers) of key species by targeted and non-targeted effort during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Targeted		Non-targeted		%
Species/group	**Number**	**SE**	**Number**	**SE**	**targeted**
Barramundi	139 268	22 834	**8125**	**3752**	94.5
Bream, pikey	***3809***	***2145***	12 377	1918	23.5
Catfish	*0*	*0*	40 186	5488	0.0
Cod/groupers	***1***	***9***	27 371	3038	0.0
Coral trout	***804***	***408***	5046	1038	13.7
Emperor, grass	***903***	***620***	21 958	3998	4.0
Emperor, red	***644***	***494***	4945	1985	11.5
Emperor, other	*0*	*0*	***437***	***429***	0.0
Grunter, sooty	***2699***	***1154***	4828	1106	35.9
Javelin fish	*0*	*0*	8734	2369	0.0
Jewfish, black	4180	857	6599	1178	38.8
Mackerel, grey	*911*	*326*	*2479*	*646*	26.9
Mackerel, Spanish	*2524*	*697*	5763	1647	30.5
Mackerel, spotted	***74***	***70***	*759*	*270*	8.9
Moonfish/batfish	*0*	*0*	8129	1839	0.0
Mullet	*33 498*	*8982*	***2762***	***1434***	92.4
Queenfish	*1937*	*667*	8959	1815	17.8
Saratoga	***903***	***569***	5996	1784	13.1
Sharks and rays	***60***	***46***	27 678	3451	0.2
Small baitfish	***46 561***	***20 650***	***9293***	***4882***	83.4
Snapper, golden	30 941	5574	49 590	5486	38.4
Snapper, mangrove jack	*2628*	*963*	6863	1521	27.7
Snapper, Moses'	*0*	*0*	***7097***	***4020***	0.0
Snapper, saddletail/crimson	***2513***	***1606***	34 217	6424	6.8
Snapper, stripey	***409***	***284***	21 168	3243	1.9
Snapper, other	*0*	*0*	***200***	***188***	0.0
Tarpon/ox-eye herring	***4769***	***2442***	10 066	2633	32.1
Threadfin, blue	*1361*	*506*	9532	1933	12.5
Threadfin, king	***1609***	***967***	5541	1172	22.5
Trevally, giant	***1045***	***440***	17 393	4414	5.7
Trevally, other	***18***	***17***	3537	1013	0.5
Wrasse, tuskfish and gropers	***145***	***142***	5683	936	2.5
Scalefish, other	***7381***	***3095***	16 112	2734	31.4
Mud crab	44 314	6336	320	106	99.3
Cherabin	***6209***	***2867***	**1987**	**902**	75.8
Crustaceans, other	***2863***	***1720***	1694	611	62.8
Cephalopods	***13 019***	***10 175***	**3801**	**3225**	77.4
Bivalves	***5858***	***5564***	*0*	*0*	100.0
Other taxa	*0*	*0*	**43**	**42**	0.0

Appendix 4: Annual recreational harvest (kept numbers) of key species by targeted and non-targeted effort during 2009-10, by non-lidigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Targeted		Non-targeted		%
Species/group	**Number**	**SE**	**Number**	**SE**	**targeted**
Barramundi	37 494	4381	**3457**	**1671**	91.6
Bream, pikey	**1457**	**902**	4958	1002	22.7
Catfish	*0*	*0*	**5203**	**2944**	0.0
Cod/groupers	*0*	*0*	7033	932	0.0
Coral trout	**652**	**311**	2184	357	23.0
Emperor, grass	**845**	**602**	9346	2271	8.3
Emperor, red	**301**	**176**	2299	824	11.6
Emperor, other	*0*	*0*	***34***	***33***	*0.0*
Grunter, sooty	1006	397	1302	393	43.6
Javelin fish	*0*	*0*	2206	599	0.0
Jewfish, black	3100	589	4710	869	39.7
Mackerel, grey	687	262	1421	402	32.6
Mackerel, Spanish	1640	415	2222	556	42.5
Mackerel, spotted	***74***	***70***	*426*	*167*	*14.8*
Moonfish/batfish	*0*	*0*	2741	869	0.0
Mullet	30 600	8281	**2622**	**1432**	92.1
Queenfish	**912**	**371**	2482	491	26.9
Saratoga	**81**	**79**	**1093**	**593**	6.9
Sharks and rays	**43**	**43**	1463	432	2.9
Small baitfish	**44 859**	**20 428**	**9205**	**4878**	83.0
Snapper, golden	15 598	2963	22402	2547	41.0
Snapper, mangrove jack	**1641**	**666**	3721	861	30.6
Snapper, Moses'	*0*	*0*	***1776***	***1183***	*0.0*
Snapper, saddletail/crimson	**1450**	**1019**	12 905	3046	10.1
Snapper, stripey	**278**	**205**	4949	1000	5.3
Snapper, other	*0*	*0*	***200***	***188***	*0.0*
Tarpon/ox-eye herring	**3383**	**2226**	**2202**	**1692**	60.6
Threadfin, blue	1043	356	5587	1210	15.7
Threadfin, king	**693**	**372**	3052	633	18.5
Trevally, giant	**317**	**203**	2356	439	11.8
Trevally, other	*0*	*0*	736	213	0.0
Wrasse, tuskfish and gropers	**145**	**142**	2205	426	6.2
Scalefish, other	**5633**	**2820**	4512	899	55.5
Mud crab	30 148	3949	**234**	**93**	99.2
Cherabin	***5883***	***2663***	***1987***	***902***	*74.8*
Crustaceans, other	***2863***	***1720***	***1151***	***541***	*71.3*
Cephalopods	***12 876***	***10 173***	***3556***	***3206***	*78.4*
Bivalves	***5858***	***5564***	*0*	*0*	*100.0*
Other taxa	*0*	*0*	***43***	***42***	*0.0*

Appendix 5: Annual recreational effort (numbers of fishers, fisher days and hours) and catch (kept and released numbers) of key species by water body type during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Offshore		Inshore		Estuary		River		Lake/dam	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort										
Fishers	5236	497	15 409	750	19 111	705	9631	760	***305***	***181***
Fisher days	11 962	1366	41192	3151	70 811	5276	27 978	3100	***305***	***181***
Hours	73 108	8698	218 634	18 214	406 832	31 183	156 981	20 875	***1298***	***854***
Catch										
Barramundi	***2093***	***1079***	11267	2449	87 868	17 061	46 165	9954		
Bream, pikey	***764***	***429***	*5630*	*1860*	9792	2116				
Catfish	*1681*	*605*	6554	1257	23 984	4243	7967	3005		
Cod/groupers	5557	1225	10 949	1583	10 865	1738				
Coral trout	*2831*	*908*	2372	576	*647*	*216*				
Emperor, grass	9680	2567	10 742	2199	*2439*	*834*				
Emperor, red	*828*	*248*	*2387*	*876*	***2375***	***1859***				
Emperor, other					***437***	***429***				
Grunter, sooty					***186***	***166***	7341	1800		
Javelin fish	***2748***	***1711***	*2200*	*669*	*3787*	*1030*				
Jewfish, black	3114	713	3698	822	3967	926				
Mackerel, grey	*979*	*340*	*1623*	*451*	***788***	***330***				
Mackerel, Spanish	*2932*	*791*	3431	1342	***1924***	***871***				
Mackerel, spotted	***445***	***243***	*243*	*91*	***145***	***102***				
Moonfish/batfish	*3481*	*1360*	*2761*	*934*	*1887*	*693*				
Mullet	***1931***	***1125***	***6842***	***2939***	*27 327*	*8142*	***160***	***133***		
Queenfish	***2059***	***860***	4976	1172	3860	879				
Saratoga							6900	1965		
Sharks and rays	8018	1771	9707	1517	9960	1762	***53***	***44***		
Small baitfish	***20***	***20***	***32 488***	***23 975***	*22 071*	*6438*	***1274***	***598***		
Snapper, golden	16 107	3439	20 508	2699	43 916	7559				
Snapper, mangrove jack	***1550***	***793***	*1779*	*704*	6162	1701				
Snapper, Moses'	***4696***	***3863***	***412***	***166***	***1989***	***1118***				

	Offshore		Inshore		Estuary		River		Lake/dam	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Snapper, saddletail/crimson	19 788	4988	13 158	2967	***3784***	***1776***				
Snapper, stripey	9455	1923	10 607	2133	*1516*	*424*				
Snapper, other	***200***	***188***								
Tarpon/ox-eye herring	***119***	***75***	***3460***	***2129***	***3972***	***2036***	7244	1964	***40***	***40***
Threadfin, blue	***2488***	***1151***	*2189*	*678*	6216	1374				
Threadfin, king	***506***	***265***	*778*	*225*	5866	1633				
Trevally, giant	7923	2411	3625	854	**6891**	**3177**				
Trevally, other	*1090*	*409*	***1926***	***891***	*540*	*193*				
Wrasse, tuskfish and gropers	*1203*	*347*	3153	684	*1472*	*536*				
Scalefish, other	4348	1636	10 395	2848	6373	1640	***2378***	***1600***		
Mud crab	***361***	***240***	16 165	3362	28 109	4199				
Cherabin					***1603***	***825***	***6592***	***2878***		
Crustaceans, other	***242***	***160***	***784***	***407***	***1206***	***486***	***2326***	***1701***		
Cephalopods	***30***	***29***	***16 576***	***13 346***	***214***	***209***				
Bivalves			***5858***	***5564***						
Other taxa					***43***	***42***				

Appendix 6: Annual recreational harvest (kept numbers) of key species by water body type during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Offshore		Inshore		Estuary		River		Lake/dam	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Barramundi	***598***	***255***	4357	854	25 471	3480	10 525	2013		
Bream, pikey	***214***	***126***	***2212***	***974***	3988	963				
Catfish			***451***	***201***	***1113***	***462***	***3638***	***2904***		
Cod/groupers	1694	388	3260	640	2079	395				
Coral trout	*1079*	*288*	*1343*	*309*	*414*	*146*				
Emperor, grass	3913	1071	5214	1516	*1064*	*373*				
Emperor, red	*483*	*166*	*1149*	*392*	***968***	***737***				
Emperor, other					***34***	***33***				
Grunter, sooty					***150***	***142***	*2158*	*547*		
Javelin fish	***315***	***156***	***651***	***320***	*1240*	*469*				
Jewfish, black	2494	522	2436	524	2880	708				
Mackerel, grey	*586*	*198*	*1121*	*303*	***401***	***217***				
Mackerel, Spanish	*1598*	*426*	1384	301	***880***	***454***				
Mackerel, spotted	***290***	***158***	***157***	***72***	***53***	***52***				
Moonfish/batfish	***1041***	***582***	*511*	*192*	***1189***	***618***				
Mullet	***1931***	***1125***	***6759***	***2938***	*24 396*	*7361*	***136***	***132***		
Queenfish	*220*	*84*	*1696*	*489*	*1478*	*417*				
Saratoga							***1175***	***602***		
Sharks and rays	***290***	***158***	*811*	*308*	***397***	***211***	***9***	***9***		
Small baitfish			***32 306***	***23 973***	*20 552*	*5836*	***1207***	***566***		
Snapper, golden	8025	1419	10 658	1424	19 317	4055				
Snapper, mangrove jack	***572***	***240***	***1243***	***512***	3547	1295				
Snapper, Moses'	***978***	***953***	***95***	***80***	***702***	***633***				
Snapper, saddletail/crimson	*8021*	*2508*	4579	1164	***1756***	***754***				
Snapper, stripey	*2461*	*729*	*2134*	*580*	***632***	***283***				
Snapper, other	***200***	***188***								
Tarpon/ox-eye herring			***2865***	***2017***	***2313***	***1923***	***407***	***279***		
Threadfin, blue	***1496***	***824***	*1829*	*623*	3305	759				

	Offshore		Inshore		Estuary		River		Lake/dam	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Threadfin, king	***453***	***259***	*650*	*194*	2641	751				
Trevally, giant	*1420*	*483*	*627*	*193*	*626*	*188*				
Trevally, other	***235***	***126***	***239***	***101***	***262***	***127***				
Wrasse, tuskfish and gropers	*543*	*166*	*1379*	*380*	*428*	*167*				
Scalefish, other	*1369*	*436*	**5544**	**2384**	*1536*	*440*	***1697***	***1580***		
Mud crab	***203***	***141***	11 177	1939	19 002	2903				
Cherabin					***1603***	***825***	***6266***	***2674***		
Crustaceans, other	***242***	***160***	***706***	***400***	***740***	***399***	***2326***	***1701***		
Cephalopods	***30***	***29***	***16 332***	***13 341***	***71***	***70***				
Bivalves			***5858***	***5564***						
Other taxa					***43***	***42***				

Appendix 7: Annual recreational effort (numbers of fishers, fisher days and hours) and catch (kept and released numbers) of key species by fishing method during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Line		Pot/trap		Cast net		Dive		Other	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort										
Fishers	30 123	442	7250	608	1623	228	*211*	*67*	*274*	*94*
Fisher days	143 470	8076	16 516	1704	4081	*678*	*347*	*115*	*827*	*330*
Hours	720 427	46 850	130 945	15 943	3007	623	*1196*	*447*	***1279***	***552***
Catch										
Barramundi	147 216	23 251			***161***	***99***			***16***	***15***
Bream, pikey	15 919	3149	***68***	***67***	***198***	***195***				
Catfish	40 028	5485	***75***	***55***	***83***	***57***				
Cod/groupers	27 079	3025	***260***	***140***			***32***	***32***		
Coral trout	5686	1149					***164***	***105***		
Emperor, grass	22 861	4050								
Emperor, red	5576	2069					***13***	***13***		
Emperor, other	***437***	***429***								
Grunter, sooty	7492	1807	***34***	***33***						
Javelin fish	8734	2369								
Jewfish, black	10 779	1525								
Mackerel, grey	3361	791					***29***	***27***		
Mackerel, Spanish	8,63	1825	***10***	***10***			***13***	***13***		
Mackerel, spotted	*809*	*278*					***24***	***23***		
Moonfish/batfish	8129	1839								
Mullet	***815***	***384***	***20***	***20***	35 424	9068				
Queenfish	10 695	1987			***150***	***142***	***30***	***29***	***20***	***20***
Saratoga	6900	1965								
Sharks and rays	27 458	3455	***12***	***12***	***267***	***226***				
Small baitfish	***24 826***	***21 641***	***245***	***152***	*30 784*	*7969*				
Snapper, golden	80 459	9203					***72***	***59***		
Snapper, mangrove jack	9477	2086					***13***	***13***		
Snapper, Moses'	***7097***	***4020***								

	Line		Pot/trap		Cast net		Dive		Other	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Snapper, saddletail/crimson	36 677	7021					***53***	***36***		
Snapper, stripey	21 527	3348	***32***	***32***			***18***	***17***		
Snapper, other	***200***	***188***								
Tarpon/ox-eye herring	10 886	2789			***3950***	***2272***				
Threadfin, blue	10 892	2091								
Threadfin, king	7054	1685			***96***	***68***				
Trevally, giant	18 256	4532			***153***	***149***	***30***	***29***		
Trevally, other	3515	1013			***41***	***40***				
Wrasse, tuskfish and gropers	5828	997								
Scalefish, other	19 005	3712	***191***	***139***	***3990***	***2330***	***25***	***23***	***284***	***277***
Mud crab	*293*	*103*	43 463	6,310	***28***	***26***	***32***	***32***	***818***	***492***
Cherabin			***6293***	***2,877***	***1355***	***813***			***548***	***411***
Crustaceans, other	***213***	***114***	*1705*	*677*	***470***	***370***	***467***	***290***	***1703***	***1669***
Cephalopods	***7042***	***4049***			***9778***	***9602***				
Bivalves									***5858***	***5564***
Other taxa									***43***	***42***

Appendix 8: Annual recreational harvest (kept numbers) of key species by fishing method during 2009-10, by non-iIndigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Line		Pot/trap		Cast net		Dive		Other	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Barramundi	40 900	4851			***34***	***34***			***16***	***15***
Bream, pikey	6414	1382								
Catfish	***5203***	***2944***								
Cod/groupers	6836	924	***165***	***104***			***32***	***32***		
Coral trout	2672	471					***164***	***105***		
Emperor, grass	10 191	2359								
Emperor, red	2586	859					***13***	***13***		
Emperor, other	***34***	***33***								
Grunter, sooty	*2308*	*565*								
Javelin fish	*2206*	*599*								
Jewfish, black	7810	1152								
Mackerel, grey	2079	503					***29***	***27***		
Mackerel, Spanish	3849	731					***13***	***13***		
Mackerel, spotted	*475*	*180*					***24***	***23***		
Moonfish/batfish	*2741*	*869*								
Mullet	***550***	***325***	***20***	***20***	32 651	8377				
Queenfish	3194	633			***150***	***142***	***30***	***29***	***20***	***20***
Saratoga	***1175***	***602***								
Sharks and rays	*1277*	*392*			***229***	***223***				
Small baitfish	***24 738***	***21 640***	***245***	***152***	*29 082*	*7376*				
Snapper, golden	37 928	4692					***72***	***59***		
Snapper, mangrove jack	5349	1407					***13***	***13***		
Snapper, Moses'	***1776***	***1183***								
Snapper, saddletail/crimson	14 302	3350					***53***	***36***		
Snapper, stripey	5209	1067					***18***	***17***		
Snapper, other	***200***	***188***								
Tarpon/ox-eye herring	***1902***	***1676***			***3683***	***2235***				
Threadfin, blue	6630	1370								

	Line		Pot/trap		Cast net		Dive		Other	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Threadfin, king	3648	837			***96***	***68***				
Trevally, giant	2643	579					***30***	***29***		
Trevally, other	*696*	*210*			***41***	***40***				
Wrasse, tuskfish and gropers	2350	448								
Scalefish, other	7764	2452	***20***	***20***	***2255***	***1659***	***25***	***23***	***81***	***79***
Mud crab	***206***	***89***	29 579	3929	***28***	***26***	***32***	***32***	***537***	***283***
Cherabin			***5966***	***2673***	***1355***	***813***			***548***	***411***
Crustaceans, other	***76***	***54***	***1337***	***626***	***470***	***370***	***467***	***290***	***1664***	***1631***
Cephalopods	***6655***	***4030***			***9778***	***9602***				
Bivalves									***5858***	***5564***
Other taxa									***43***	***42***

Appendix 9: Annual recreational effort (numbers of fishers, fisher days and hours) and catch (kept and released numbers) of key species by fishing platform during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Boat		Shore		%
Species/group	**Number**	**SE**	**Number**	**SE**	**boat**
Effort					
Fishers	24 757	670	12 290	787	81.1
Fisher days	118 562	7887	32 487	3172	78.8
Hours	736 615	51 405	120 238	14 708	86.0
Catch					
Barramundi	135 208	23083	12 185	2431	91.7
Bream, pikey	11 784	2307	***4402***	***2151***	72.8
Catfish	35 965	4741	**4221**	**1896**	89.5
Cod/groupers	25 880	3010	1491	376	94.6
Coral trout	5660	1151	***190***	***118***	96.8
Emperor, grass	22 810	4050	***52***	***50***	99.8
Emperor, red	5489	2067	***101***	***99***	98.2
Emperor, other	***437***	***429***			100.0
Grunter, sooty	*3609*	*1187*	3917	1041	48.0
Javelin fish	8397	2360	***338***	***236***	96.1
Jewfish, black	10 553	1524	***226***	***122***	97.9
Mackerel, grey	3210	718	***180***	***178***	94.7
Mackerel, Spanish	8015	1810	***272***	***213***	96.7
Mackerel, spotted	*833*	*279*			100.0
Moonfish/batfish	7369	1732	***761***	***630***	90.6
Mullet	*30 463*	*8567*	*5797*	*2044*	84.0
Queenfish	8660	1713	*2235*	*776*	79.5
Saratoga	6842	1965	***57***	***39***	99.2
Sharks and rays	26 431	3436	*1308*	*414*	95.3
Small baitfish	*21 585*	*6794*	***34 270***	***23 994***	38.6
Snapper, golden	78 259	9165	*2271*	*603*	97.2
Snapper, mangrove jack	8529	2057	***962***	***381***	89.9
Snapper, Moses'	***7009***	***4020***	***88***	***82***	98.8
Snapper, saddletail/crimson	36 713	7021	***17***	***18***	100.0
Snapper, stripey	21 163	3345	***414***	***200***	98.1
Snapper, other	***200***	***188***			100.0
Tarpon/ox-eye herring	8447	1923	***6388***	***2939***	56.9
Threadfin, blue	10605	2088	***287***	***124***	97.4
Threadfin, king	6659	1619	***491***	***254***	93.1
Trevally, giant	17 215	4371	*1224*	*389*	93.4
Trevally, other	*3399*	*1011*	***157***	***76***	95.6
Wrasse, tuskfish and gropers	5244	912	***584***	***246***	90.0
Scalefish, other	15 845	3149	7649	2924	67.4
Mud crab	40 791	6096	*3843*	*1438*	91.4
Cherabin	***4557***	***2279***	***3639***	***1948***	55.6
Crustaceans, other	*2226*	*697*	***2331***	***1730***	48.8
Cephalopods	***822***	***546***	***15 998***	***13 338***	4.9
Bivalves			***5858***	***5564***	0.0
Other taxa			***43***	***42***	0.0

Appendix 10: Annual recreational harvest (kept numbers) of key species by fishing platform during 200910, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Boat		Shore		%
Species/group	**Number**	**SE**	**Number**	**SE**	**boat**
Barramundi	36 695	4724	4255	658	89.6
Bream, pikey	5242	1303	*1173*	*428*	81.7
Catfish	***2958***	***1193***	***2245***	***1839***	56.8
Cod/groupers	6505	913	*527*	*174*	92.5
Coral trout	2731	472	***105***	***61***	96.3
Emperor, grass	10 191	2359			100.0
Emperor, red	2600	859			100.0
Emperor, other	***34***	***33***			100.0
Grunter, sooty	***869***	***365***	*1439*	*416*	37.7
Javelin fish	*2202*	*599*	***4***	***4***	99.8
Jewfish, black	7584	1147	***226***	***122***	97.1
Mackerel, grey	2048	488	***60***	***59***	97.1
Mackerel, Spanish	3788	724	***74***	***52***	98.1
Mackerel, spotted	*500*	*181*			100.0
Moonfish/batfish	*2653*	*868*	***88***	***52***	96.8
Mullet	*27 449*	*7826*	*5773*	*2044*	82.6
Queenfish	2328	475	***1066***	***449***	68.6
Saratoga	***1157***	***602***	***18***	***17***	98.5
Sharks and rays	*1046*	*342*	***460***	***282***	69.4
Small baitfish	*19 862*	*6088*	***34 202***	***23 993***	36.7
Snapper, golden	36 922	4674	*1078*	*374*	97.2
Snapper, mangrove jack	4812	1395	*550*	*210*	89.7
Snapper, Moses'	***1772***	***1183***	***4***	***6***	99.8
Snapper, saddletail/crimson	14 338	3350	***17***	***18***	99.9
Snapper, stripey	5209	1067	***18***	***17***	99.7
Snapper, other	***200***	***188***			100.0
Tarpon/ox-eye herring	***358***	***157***	***5227***	***2785***	6.4
Threadfin, blue	6474	1367	***155***	***96***	97.7
Threadfin, king	3386	811	***358***	***234***	90.4
Trevally, giant	2537	580	***136***	***60***	94.9
Trevally, other	*580*	*200*	***157***	***76***	78.7
Wrasse, tuskfish and gropers	1991	397	***359***	***192***	84.7
Scalefish, other	6188	2140	***3958***	***2062***	61.0
Mud crab	27 928	3816	*2454*	*866*	91.9
Cherabin	***4230***	***2017***	***3639***	***1948***	53.8
Crustaceans, other	*1749*	*641*	***2266***	***1693***	43.6
Cephalopods	***795***	***545***	***15 638***	***13 333***	4.8
Bivalves			***5858***	***5564***	0.0
Other taxa			***43***	***42***	0.0

Appendix 11: Seasonal recreational catch (kept and released numbers) of key species during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	Apr - Jun		Jul - Sep		Oct - Dec		Jan - Mar	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Barramundi	58 393	11 525	31 326	6736	24 696	5018	32 979	6481
Bream, pikey	4139	1005	8899	2397	*1275*	*376*	*1873*	*544*
Catfish	13 913	1952	9880	2931	8063	1589	8330	1951
Cod/groupers	9598	1548	8884	1649	5256	950	3634	767
Coral trout	*982*	*254*	1320	392	*2237*	*712*	***1311***	***586***
Emperor, grass	7186	1771	8346	2299	5364	1799	*1964*	*692*
Emperor, red	***1303***	***637***	***2762***	***1508***	***1140***	***451***	*386*	*119*
Emperor, other			***437***	***429***				
Grunter, sooty	*3606*	*1115*	*1304*	*487*	*615*	*234*	***2002***	***942***
Javelin fish	*4368*	*1628*	*2937*	*1011*	*1156*	*356*	***273***	***113***
Jewfish, black	4911	988	*2045*	*648*	*1945*	*535*	*1879*	*407*
Mackerel, grey	*723*	*288*	*1422*	*438*	*988*	*335*	***257***	***133***
Mackerel, Spanish	*2996*	*995*	*3796*	*1444*	*928*	*306*	*567*	*194*
Mackerel, spotted	***252***	***122***	***105***	***61***	***375***	***226***	***101***	***84***
Moonfish/batfish	*3054*	*1021*	*3009*	*1183*	*1751*	*678*	***315***	***177***
Mullet	*16 437*	*4615*	*9123*	*3240*	*8070*	*2866*	***2630***	***1402***
Queenfish	2665	606	2731	805	*2517*	*722*	*2982*	*904*
Threadfin, blue	4575	1188	4212	1051	***1266***	***570***	*839*	*291*
Threadfin, king	*1600*	*525*	***2289***	***1100***	***940***	***406***	*2321*	*791*
Saratoga	*2588*	*935*	*3560*	*1355*	*402*	*157*	***350***	***213***
Sharks and rays	11 442	1945	6867	1327	5093	979	4336	911
Small baitfish	***34 229***	***22 992***	***7729***	***3120***	*5627*	*2075*	***8270***	***3601***
Snapper, golden	27 605	4105	22 481	3912	20 034	3029	10 410	1899
Snapper, mangrove jack	*2594*	*791*	*2810*	*837*	*2729*	*885*	*1358*	*498*
Snapper, Moses'	***737***	***429***	***5213***	***3887***	***1113***	***666***	***34***	***23***
Snapper, saddletail/crimson	9227	1949	11 808	3188	11 061	3228	*4634*	*1796*
Snapper, stripey	8226	1630	7831	1742	*3105*	*1021*	***2416***	***1123***
Snapper, other	***191***	***188***	***9***	***8***				

	Apr - Jun		Jul - Sep		Oct - Dec		Jan - Mar	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Tarpon/ox-eye herring	7817	2873	***1100***	***457***	***1966***	***1169***	***3952***	***1905***
Trevally, giant	4592	1056	7701	2459	*4603*	*1522*	*1542*	*408*
Trevally, other	***208***	***97***	*634*	*244*	***1,730***	***789***	***984***	***559***
Wrasse, tuskfish and gropers	*1466*	*395*	*2013*	*497*	*2070*	*633*	***278***	***142***
Scalefish, other	11 207	3332	6391	1486	**4653**	**1872**	*1243*	*379*
Mud crab	16 267	2472	15 831	3529	8295	1721	*4241*	*1058*
Cherabin	***3972***	***1690***	***2051***	***1120***	***213***	***198***	***1960***	***1137***
Crustaceans, other	***1259***	***498***	***3011***	***1745***	***188***	***118***	***99***	***67***
Cephalopods	***15 562***	***13 332***	***640***	***444***	***493***	***344***	***124***	***122***
Bivalves	***1010***	***959***	***2828***	***2686***	***2020***	***1919***		
Other taxa					***43***	***42***		

Appendix 12: Annual recreational effort (numbers of fishers, fisher days and hours) and catch (kept and released numbers) of key species by fishing zone during 2009-10, by non-indigenous NT residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	West coast		Bynoe/Finniss Area		Darwin Harbour		Darwin surrounds		Mary/Alligator rivers		North coast		East Coast/Gulf Area		Central/Inland	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort																
Fishers	4645	525	6402	578	14 795	681	9174	656	7915	694	2894	358	2207	290	1871	290
Fisher days	15 086	2236	14 472	1608	41 364	4161	26 449	3013	25 638	3482	12 470	1956	10 313	1733	5076	995
Hours	98 761	17 406	104 470	13 440	192 227	18 152	161484	20 516	150 754	20 728	62 915	10 251	64 261	12 372	21 980	4887
Catch																
Barramundi	34 091	8929	***9657***	***6704***	9147	2617	12 635	3221	45314	10 107	14 414	5396	17 593	5152	4542	1691
Bream, pikey	***699***	***379***	*2008*	*696*	8907	2796	***2319***	***966***	***307***	***195***	***589***	***333***	***1356***	***656***		
Catfish	**6957**	**3051**	*2359*	*657*	7369	2065	8815	2527	9010	2217	***1588***	***699***	***3294***	***1789***	*794*	*281*
Cod/groupers	***1058***	***519***	5934	1264	5708	1084	8433	2090	*1037*	*370*	3257	810	*1945*	*466*		
Coral trout	***760***	***498***	***696***	***353***	***334***	***146***	***996***	***604***	***32***	***31***	*1275*	*372*	*1757*	*693*		
Emperor, grass	*3626*	*1370*	*4245*	*1338*	***2534***	***1744***	*2289*	*797*	***436***	***383***	*3465*	*1172*	*6267*	*2046*		
Emperor, red	***80***	***56***	***381***	***169***	***259***	***121***	***2790***	***1909***	***305***	***212***	***998***	***615***	***776***	***415***		
Emperor, other					***437***	***429***										
Grunter, sooty	***3064***	***1432***	***717***	***701***			***1092***	***659***	***824***	***400***			***235***	***171***	*1,596*	*416*
Javelin fish	***39***	***27***	***2627***	***1652***	*2256*	*619*	*2006*	*666*	***451***	***444***	***521***	***296***	***832***	***651***		
Jewfish, black	*729*	*246*	*2176*	*761*	*1075*	*354*	4624	1073	*1257*	*336*	***823***	***455***	***95***	***45***		
Mackerel, grey	***216***	***176***	***81***	***48***	***740***	***322***	*1346*	*479*			*704*	*246*	***303***	***129***		
Mackerel, Spanish	***149***	***75***	***2459***	***1371***	*789*	*297*	*2489*	*992*	***32***	***31***	*1691*	*561*	***678***	***271***		
Mackerel, spotted	***84***	***82***	***120***	***97***	***49***	***35***	***392***	***228***	***32***	***31***	***117***	***67***	***40***	***38***		
Moonfish/batfish	***139***	***97***	***1860***	***766***	*2313*	*807*	***3027***	***1346***			***716***	***512***	***75***	***50***		
Mullet	***5532***	***3418***	***1107***	***852***	***11902***	***5111***	***8929***	***5401***			***3756***	***1773***	***5010***	***3297***	***25***	***23***
Queenfish	***729***	***406***	***1338***	***708***	4629	1189	***1004***	***561***	***11***	***10***	***1204***	***509***	*1980*	*756*		
Saratoga	***20***	***19***					***139***	***107***	5981	1653			***689***	***676***	***70***	***49***
Sharks and rays	*1418*	*473*	5407	1378	4775	837	8521	1981	*2066*	*791*	3536	1109	***2015***	***815***		
Small baitfish	***7304***	***3909***	***1038***	***702***	***34 775***	***24 159***	***4402***	***1992***	***68***	***64***	***4567***	***2977***	***3379***	***2766***	***322***	***258***
Snapper, golden	*5041*	*1800*	14 008	2801	20 302	3467	23 906	6287	*5297*	*1896*	9074	2386	*2903*	*959*		
Snapper, mangrove jack	***145***	***101***	***375***	***221***	*1716*	*526*	***3646***	***1635***	***593***	***298***	***1570***	***644***	***1446***	***748***		

	West coast		Bynoe/Finniss Area		Darwin Harbour		Darwin surrounds		Mary/Alligator rivers		North coast		East Coast/Gulf Area		Central/Inland	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Snapper, Moses'					***2256***	***1186***	***4549***	***3860***			***274***	***161***	***18***	***17***		
Snapper, saddletail/crimson	***69***	***56***	***6047***	***2875***	*4837*	*1776*	*12 141*	*3421*	***387***	***381***	*8295*	*3277*	***4955***	***2443***		
Snapper, stripey	***1694***	***821***	8096	1795	*3319*	*831*	*6600*	*1738*	***255***	***184***	***1008***	***460***	***605***	***487***		
Snapper, other			***191***	***188***									***9***	***8***		
Tarpon/ox-eye herring	***1655***	***889***	***304***	***166***	***3531***	***2133***	***3425***	***2131***	*5824*	*1638*			***75***	***71***	***21***	***20***
Threadfin, blue	***1161***	***1005***	*1894*	*726*	*1326*	*435*	*2894*	*1129*	***1845***	***871***	***775***	***501***	*997*	*377*		
Threadfin, king	***124***	***66***	***543***	***274***	*726*	*255*	***3046***	***1423***	***1748***	***708***	***611***	***295***	***352***	***146***		
Trevally, giant	***864***	***465***	*1506*	*462*	*3414*	*1037*	***8552***	***3594***	***384***	***271***	2240	676	*1479*	*488*		
Trevally, other			***300***	***244***	*582*	*220*	***1307***	***770***	***11***	***10***	***1026***	***531***	***330***	***176***		
Wrasse, tuskfish and gropers	***523***	***292***	*852*	*263*	*3004*	*826*	*849*	*298*			***179***	***83***	***421***	***174***		
Scalefish, other	***1882***	***1585***	*1573*	*610*	11 036	3315	*4647*	*1735*	*669*	*261*	*1920*	*497*	1659	407	***107***	***85***
Mud crab	***1834***	***871***	*5312*	*1327*	9375	2036	21 674	5091	***815***	***542***	*3641*	*1076*	*1984*	*745*		
Cherabin	***3080***	***1911***			***397***	***388***	***2203***	***1935***			***387***	***379***	***961***	***689***	***1168***	***911***
Crustaceans, other	***559***	***452***	***148***	***103***	***1347***	***585***					***1868***	***1674***	***425***	***287***	***210***	***201***
Cephalopods	***390***	***285***			***16 430***	***13 342***										
Bivalves											***5858***	***5564***				
Other taxa													***43***	***42***		

Appendix 13: Annual recreational harvest (kept numbers) of key species by fishing zone during 2009-10, by non-indigenous Northern Territory residents aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded catches of the species

	West coast		Bynoe/Finniss Area		Darwin Harbour		Darwin surrounds		Mary/Alligator rivers		North coast		East Coast/Gulf Area		Central/Inland	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Barramundi	7363	1461	*2146*	*734*	***3926***	***1860***	5878	1502	11 012	2099	4856	1645	4463	1157	*1,307*	*464*
Bream, pikey	***341***	***233***	***849***	***419***	*3122*	*1096*	***1064***	***607***	***35***	***23***	***283***	***149***	***720***	***320***		
Catfish	***3177***	***2890***	***37***	***36***	***709***	***376***	***217***	***139***	***459***	***297***	***419***	***304***	***73***	***69***	***113***	***84***
Cod/groupers	***221***	***102***	*1773*	*534*	*1134*	*253*	2076	500	***217***	***92***	*1078*	*412*	*535*	*168*		
Coral trout	***448***	***282***	*356*	*135*	***267***	***138***	***143***	***107***	***32***	***31***	*872*	*249*	*717*	*225*		
Emperor, grass	***1846***	***1032***	*2133*	*678*	***1033***	***632***	*944*	*361*	***307***	***258***	*1932*	*766*	*1997*	*792*		
Emperor, red	***34***	***33***	***154***	***79***	***182***	***97***	***966***	***741***	***305***	***212***	***528***	***274***	***430***	***198***		
Emperor, other					***34***	***33***										
Grunter, sooty	***510***	***280***	***279***	***273***			***170***	***166***	***343***	***203***			***189***	***147***	*818*	*271*
Javelin fish	***16***	***15***	***276***	***133***	***569***	***242***	***491***	***227***	***43***	***42***	***286***	***246***	***525***	***392***		
Jewfish, black	*612*	*204*	*1295*	*377*	*903*	*334*	3370	888	*1016*	*232*	***532***	***256***	***82***	***43***		
Mackerel, grey	***85***	***59***	***52***	***38***	***583***	***272***	***640***	***260***			*631*	*223*	***118***	***61***		
Mackerel, Spanish	***102***	***61***	***767***	***378***	*292*	*103*	***1100***	***453***	***32***	***31***	*1258*	*370*	*312*	*121*		
Mackerel, spotted			***97***	***95***	***49***	***35***	***229***	***131***			***99***	***61***	***27***	***25***		
Moonfish/batfish	***79***	***77***	***405***	***196***	***921***	***391***	***765***	***556***			***528***	***500***	***42***	***23***		
Mullet	***5532***	***3418***	***1107***	***852***	***8888***	***3741***	***8929***	***5401***			***3756***	***1773***	***5010***	***3297***		
Queenfish	***16***	***15***	***85***	***64***	*2,000*	*551*	***300***	***159***			***514***	***244***	*478*	*176*		
Saratoga							***102***	***101***	***741***	***328***			***313***	***307***	***18***	***17***
Sharks and rays	***132***	***83***	***198***	***103***	***588***	***254***	***322***	***146***			***249***	***223***	***17***	***16***		
Small baitfish	***7093***	***3797***	***1018***	***701***	***33 466***	***24 023***	***4219***	***1959***			***4567***	***2977***	***3379***	***2766***	***322***	***258***
Snapper, golden	*2195*	*668*	6761	1151	7869	1540	12 339	3652	*2323*	*804*	5122	1459	*1390*	*493*		
Snapper, mangrove jack	***57***	***53***	***310***	***212***	*814*	*264*	***2058***	***1232***	***561***	***290***	*1079*	*485*	*483*	*169*		
Snapper, Moses'					***761***	***712***	***978***	***953***			***18***	***15***	***18***	***17***		
Snapper, saddletail/crimson	***69***	***56***	***2151***	***1334***	***1489***	***809***	***3152***	***1504***	***65***	***63***	*4856*	*1810*	*2574*	*1212*		
Snapper, stripey	***69***	***59***	*1659*	*439*	*1207*	*405*	*1658*	*653*	***94***	***92***	***333***	***189***	***207***	***177***		
Snapper, other			***191***	***188***									***9***	***8***		
Tarpon/ox-eye herring	***271***	***263***			***2921***	***2018***	***2181***	***1921***	***136***	***94***			***75***	***71***		

	West coast		Bynoe/Finniss Area		Darwin Harbour		Darwin surrounds		Mary/Alligator rivers		North coast		East Coast/Gulf Area		Central/Inland	
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Threadfin, blue	***113***	***64***	***1163***	***498***	*1104*	*395*	***1954***	***805***	***1322***	***785***	***412***	***257***	***563***	***246***		
Threadfin, king	***87***	***56***	***490***	***269***	*497*	*156*	***1538***	***694***	*681*	*236*	***277***	***134***	***175***	***75***		
Trevally, giant			***576***	***250***	*518*	*149*	*744*	*291*			*666*	*206*	*169*	*64*		
Trevally, other			***27***	***27***	***245***	***104***	***90***	***89***	***11***	***10***	***318***	***156***	***44***	***26***		
Wrasse, tuskfish and gropers	***246***	***122***	*412*	*138*	*1,033*	*342*	*340*	*131*			***121***	***68***	***199***	***125***		
Scalefish, other	***1769***	***1583***	***692***	***401***	***5587***	***2407***	***760***	***346***	***43***	***33***	*648*	*242*	*645*	*181*		
Mud crab	***1378***	***631***	*4302*	*1067*	6700	1304	13 306	3041	***549***	***380***	*2649*	*792*	*1498*	*512*		
Macrobrachium/ cherabin	***3080***	***1911***			***397***	***388***	***1876***	***1,618***			***387***	***379***	***961***	***689***	***1168***	***911***
Crustaceans, other	***559***	***452***	***148***	***103***	***843***	***514***					***1829***	***1636***	***425***	***287***	***210***	***201***
Cephalopods	***390***	***285***			***16 043***	***13 337***										
Bivalves											***5858***	***5564***				
Other taxa													***43***	***42***		

Appendix 14: Annual total and average expenditure (total, attributable and NT-based) by residential stratum during 2009-10, by non-indigenous Northern Territory resident fishers aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded expenditure from the stratum

		Total expenditure		Attributable expenditure				NT-based (attributable expenditure)			
Residential stratum	**Number of fishers**	**$**	**SE**	**$**	**SE**	**% attrib.**	**Average per fisher ($)**	**$**	**SE**	**% NT**	**Average per fisher ($)**
Darwin and Rural	23 955	36 169 813	5 131 547	33 106 474	4 823 886	91.5	1382	29 902 680	3 890 531	90.3	1248
'Other coastal'	5909	11 730 495	1 907 125	10 832 407	1 635 487	92.3	1833	10 687 889	1 631 150	98.7	1809
Hinterland	674	***3 237 691***	***2 445 018***	***3 103 011***	***2 364 468***	95.8	***4604***	***3 103 011***	***2 364 468***	100.0	***4604***
Total	30 538	51 137 999	5 995 666	47 041 892	5 615 639	92.0	1540	43 693 579	4 836 072	92.9	1431

Appendix 15: Annual total and average expenditure (total, attributable and NT-based) by expenditure category/item during 2009-10, by non-indigenous Northern Territory resident fishers aged five years and older

SE = standard error; values in bold indicate relative standard error > 40%; values in italics indicate fewer than 30 households recorded expenditure for the item

		Total expenditure		Attributable expenditure				NT-based (attributable expenditure)			
Expenditure category	**Expenditure item**	**$**	**SE**	**$**	**SE**	**% attrib.**	**Av. per fisher ($)**	**$**	**SE**	**% NT**	**Av. per fisher ($)**
Accommodation	Accomm./camping (fees)	831 568	124 591	764 275	116 613	91.9	25	764 275	116 613	100.0	25
Bait/berley/ice	Bait/berley	503 078	44 628	503 078	44 628	100.0	16	503 078	44 628	100.0	16
	Ice	182 564	20 081	180 279	19 806	98.7	6	180 279	19 806	100.0	6
Boat hire/charter	Boat - hire	*166 142*	*48 317*	*153 163*	*46 031*	92.2	*5*	*153 163*	*46 031*	100.0	*5*
	Boat - charter	526 585	155476	526 585	155 476	100.0	17	526 585	155 476	100.0	17
Boat/trailer	Boat/trailer - capital	23 082 207	5 139 223	21 243 750	4 881 693	92.0	696	18 223 950	4 036 113	85.8	597
	Boat/trailer - maintenance	9 665 358	1 303 652	8 179 984	746 134	84.6	268	8 056 047	724 047	98.5	264
	Boat - fuel/oil	2 908 635	267 486	2 903 855	267 469	99.8	95	2 903 855	267 469	100.0	95
	Boat - ramp fees	62 759	18 752	62 759	18 752	100.0	2	62 759	18 752	100.0	2
	Boat - mooring/marina/ storage fees	***308 191***	***172 415***	***299 168***	***170 379***	97.1	***10***	***299 168***	***170 379***	100.0	***10***
Camping gear	Camping equipment (capital/maintenance)	**1 647 951**	**712 868**	**1 210 994**	**607 193**	73.5	**40**	**1 207 907**	**607 189**	99.7	**40**
Clothing	Clothing/sunglasses/ sunscreen/etc.	607 909	72 800	535 525	63 892	88.1	18	534 634	63 887	99.8	18
Fees/licences	Fees - club membership	82 821	15 457	82 743	15 454	99.9	3	82 743	15 454	100.0	3
	Fees - competition entry	*199 376*	*70 322*	*199 376*	*70 322*	100.0	*7*	*199 376*	*70 322*	100.0	*7*
	Other access fees (not ramp/accom. fees)	***46 496***	***19 529***	***46 496***	***19 529***	100.0	***2***	***46 496***	***19 529***	100.0	***2***
Fishing/diving gear	Tackle etc. - capital/maintenance	2 801 140	301 484	2 801 140	301 484	100.0	92	2 600 542	240 961	92.8	85
Travel	Vehicle - km travelled (@ 75 cents/km)	7 234 748	601 248	7 071 189	588 019	97.7	232	7 071 189	588 019	100.0	232
	Car - capital/maintenance (fishing-related)	***128 105***	***60 452***	***125 168***	***60 261***	97.7	***4***	***125 168***	***60 261***	100.0	***4***
	Other transport (car hire, airfares, etc.)	***113 171***	***69 829***	***113 171***	***69 829***	100.0	***4***	***113 171***	***69 829***	100.0	***4***
Other	Books/maps/etc.	39 197	9943	39 197	9943	100.0	1	39 197	9943	100.0	1
Total		51 137 999	5 995 666	47 041 892	5 615 639	92.0	1540	43 693 579	4 836 072	92.9	1431

Appendix 16: Numbers and proportions of households (fishers, non-fishers and total) reporting boat ownership in March 2009 by residential stratum, i.e. households with one or more non-indigenous Northern Territory residents

SE = standard error

Residential stratum	Fishers (2008-09)	Total households	Boat ownership			
			Number	SE	% ownership	SE
'Darwin and Rural'						
	Fishers	12 405	6339	389	51.1	3.1
	Non-fishers	29 738	1325	190	4.5	0.6
	Total	42 143	7663	420	18.2	1.0
'Other coastal'						
	Fishers	2989	2054	130	68.7	4.4
	Non-fishers	3487	211	46	6.1	1.3
	Total	6476	2265	133	35.0	2.0
'Hinterland'						
	Fishers	548	156	55	28.4	10.0
	Non-fishers	9687	198	65	2.0	0.7
	Total	10 235	354	84	3.5	0.8
Total NT						
	Fishers	15 943	8549	413	53.6	2.6
	Non-fishers	42 911	1734	206	4.0	0.5
	Total	58 854	10 283	449	17.5	0.8

Appendix 17: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Bynoe Harbour Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	266	87	**58**	**41**	324	96	17.9
Bream, pikey	**874**	**676**	**63**	**181**	**937**	**700**	6.7
Cod/groupers	506	140	**75**	**54**	581	150	13.0
Coral trout	**19**	**19**	0	0	**19**	**19**	0.0
Emperor, grass	**239**	**103**	0	0	**239**	**103**	0.0
Javelin fish	**148**	**199**	**179**	**219**	**327**	**296**	54.8
Jewfish, black	**213**	**101**	**111**	**73**	324	125	34.2
Mackerel, grey	**38**	**38**	0	0	**38**	**38**	0.0
Mackerel, spotted	**84**	**84**	0	0	**84**	**84**	0.0
Moonfish/Batfish	**133**	**102**	0	0	**133**	**102**	0.0
Mullet	1508	434	**76**	**98**	1,584	445	4.8
Queenfish	**221**	**161**	**53**	**79**	**274**	**179**	19.3
Sharks and rays	**133**	**102**	0	0	**133**	**102**	0.0
Small baitfish	**38**	**38**	0	0	**38**	**38**	0.0
Snapper, golden	1695	445	**191**	**149**	1886	469	10.1
Snapper, mangrove jack	0	0	**63**	**31**	**63**	**31**	100.0
Snapper, saddletail/crimson	**451**	**350**	**168**	**214**	**619**	**410**	27.1
Snapper, stripey	**152**	**107**	0	0	**152**	**107**	0.0
Threadfin, blue	**228**	**113**	**172**	**98**	401	150	43.0
Threadfin, king	**81**	**45**	**42**	**33**	**123**	**56**	34.2
Trevally, giant	**152**	**120**	0	0	**152**	**120**	0.0
Trevally, other	**161**	**80**	**15**	**25**	**176**	**84**	8.6
Wrasse, tuskfish and gropers	**469**	**345**	0	0	**469**	**345**	0.0
Scalefish, other	295	96	0	0	295	96	0.0
Mud crab	2298	837	**1851**	**751**	4149	1124	44.6
Crustaceans, other	**72**	**58**	**46**	**46**	**118**	**74**	38.7
All taxa combined	10 473	1411	3163	868	13 636	1656	23.2

Appendix 18: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Darwin Harbour Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	790	278	**66**	**80**	856	290	7.7
Bream, pikey	**2165**	**913**	**1520**	**765**	3685	1191	41.3
Cod/groupers	2923	437	524	185	3447	475	15.2
Coral trout	**176**	**74**	**66**	**45**	242	87	27.2
Emperor, grass	1261	329	**112**	**98**	1373	343	8.1
Emperor, red	**336**	**275**	**43**	**98**	**379**	**292**	11.3
Javelin fish	1489	584	**356**	**285**	1845	650	19.3
Jewfish, black	**1329**	**663**	0	0	**1329**	**663**	0.0
Mackerel, grey	695	273	**237**	**160**	932	316	25.4
Mackerel, Spanish	**325**	**181**	**266**	**164**	**592**	**244**	45.0
Mackerel, spotted	**186**	**118**	**151**	**106**	**337**	**159**	44.8
Moonfish/Batfish	556	174	**45**	**50**	601	181	7.6
Mullet	15 819	4191	**4134**	**2143**	19 952	4707	20.7
Queenfish	1236	432	**240**	**190**	1476	472	16.3
Sharks and rays	**274**	**114**	**212**	**101**	486	152	43.7
Small baitfish	**2837**	**1455**	0	0	**2837**	**1455**	0.0
Snapper, golden	8494	1371	**829**	**428**	9323	1436	8.9
Snapper, mangrove jack	360	107	**64**	**45**	424	116	15.1
Snapper, Moses'	**340**	**261**	0	0	**340**	**261**	0.0
Snapper, saddletail/crimson	2496	791	**140**	**188**	2637	813	5.3
Snapper, stripey	2407	805	**670**	**424**	3076	910	21.8
Tarpon/ox-eye herring	**357**	**231**	0	0	**357**	**231**	0.0
Threadfin, blue	1706	608	**181**	**198**	1886	640	9.6
Threadfin, king	**387**	**188**	**30**	**52**	**416**	**195**	7.1
Trevally, giant	**352**	**151**	**35**	**47**	**387**	**159**	8.9
Trevally, other	1278	382	**268**	**175**	1546	420	17.3
Wrasse, tuskfish and gropers	1295	315	**197**	**123**	1493	338	13.2
Scalefish, other	**6106**	**3364**	**1932**	**1893**	**8038**	**3860**	24.0
Mud crab	16 236	3054	5303	1745	21 539	3517	24.6
Crustaceans, other	1543	505	**113**	**137**	1656	523	6.8
Cephalopods	0	0	**365**	**365**	**365**	**365**	100.0
All taxa combined	75 753	6853	18 100	3564	93 852	7724	19.3

Appendix 19: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older, in the period June to November, 2009 - Dundee Beach Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**101**	**53**	**16**	**21**	**117**	**57**	14.0
Bream, pikey	**68**	**46**	0	0	**68**	**46**	0.0
Catfish	**77**	**40**	0	0	**77**	**40**	0.0
Cod/groupers	987	271	**188**	**118**	1,175	295	16.0
Coral trout	**486**	**207**	**54**	**69**	**540**	**218**	10.0
Emperor, grass	1749	402	**421**	**197**	2170	448	19.4
Emperor, red	**184**	**88**	**95**	**63**	279	108	34.2
Emperor, other	**41**	**41**	0	0	**41**	**41**	0.0
Javelin fish	**37**	**22**	0	0	**37**	**22**	0.0
Jewfish, black	**174**	**79**	**84**	**55**	258	96	32.6
Mackerel, grey	**142**	**57**	**28**	**25**	171	62	16.5
Mackerel, Spanish	**195**	**118**	**140**	**100**	**335**	**154**	41.7
Mackerel, spotted	**108**	**63**	0	0	**108**	**63**	0.0
Moonfish/Batfish	**137**	**71**	**16**	**24**	**153**	**75**	10.4
Mullet	**588**	**290**	0	0	**588**	**290**	0.0
Sharks and rays	**144**	**97**	**135**	**94**	**279**	**135**	48.4
Snapper, golden	1968	488	**251**	**174**	2219	518	11.3
Snapper, mangrove jack	**14**	**9**	0	0	**14**	**9**	0.0
Snapper, saddletail/crimson	**150**	**89**	**62**	**57**	**213**	**105**	29.3
Snapper, stripey	1501	369	**465**	**205**	1966	423	23.6
Snapper, other	**14**	**14**	0	0	**14**	**14**	0.0
Threadfin, blue	**78**	**55**	**81**	**56**	**159**	**78**	50.8
Threadfin, king	**123**	**60**	0	0	**123**	**60**	0.0
Trevally, giant	**9**	**9**	0	0	**9**	**9**	0.0
Trevally, other	**155**	**153**	**173**	**162**	**328**	**223**	52.7
Wrasse, tuskfish and gropers	1042	385	**153**	**148**	1195	412	12.8
Scalefish, other	712	225	**62**	**66**	774	235	8.0
Mud crab	**79**	**64**	**116**	**78**	**195**	**101**	59.6
All taxa combined	11 063	1018	2540	472	13 603	1122	18.7

Appendix 20: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older, in the period April to November, 2009 - Leaders Creek Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**63**	**41**	0	0	**63**	**41**	0.0
Bream, pikey	**259**	**111**	0	0	**259**	**111**	0.0
Cod/groupers	**309**	**141**	**63**	**64**	**373**	**155**	17.0
Coral trout	**91**	**56**	**13**	**21**	**104**	**60**	12.2
Emperor, grass	**25**	**25**	0	0	**25**	**25**	0.0
Javelin fish	**42**	**29**	**8**	**13**	**51**	**32**	16.5
Jewfish, black	**165**	**101**	**63**	**62**	**228**	**118**	27.8
Mackerel, Spanish	**13**	**13**	0	0	**13**	**13**	0.0
Mackerel, spotted	**13**	**13**	0	0	**13**	**13**	0.0
Moonfish/Batfish	**25**	**25**	0	0	**25**	**25**	0.0
Mullet	**2283**	**1033**	0	0	**2283**	**1033**	0.0
Queenfish	**173**	**105**	0	0	**173**	**105**	0.0
Snapper, golden	**1127**	**488**	**302**	**252**	1429	549	21.1
Snapper, mangrove jack	**41**	**31**	0	0	**41**	**31**	0.0
Snapper, saddletail/crimson	**114**	**87**	0	0	**114**	**87**	0.0
Snapper, stripey	**279**	**167**	0	0	**279**	**167**	0.0
Threadfin, blue	**394**	**191**	**17**	**40**	**411**	**195**	4.1
Threadfin, king	**372**	**239**	**21**	**57**	**393**	**246**	5.4
Trevally, giant	**152**	**117**	**13**	**34**	**165**	**122**	7.7
Trevally, other	**63**	**63**	**25**	**40**	**89**	**75**	28.6
Wrasse, tuskfish and gropers	**38**	**17**	0	0	**38**	**17**	0.0
Scalefish, other	**117**	**81**	**41**	**48**	**157**	**94**	25.8
Mud crab	1959	721	**509**	**368**	2468	810	20.6
Crustaceans, other	**443**	**373**	0	0	**443**	**373**	0.0
All taxa combined	8559	1477	**1076**	**466**	9635	1548	11.2

Appendix 21: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older, in the period April to November, 2009 - Mary River Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	1616	428	1360	393	2976	581	45.7
Catfish	**46**	**28**	**5**	**10**	**51**	**29**	10.6
Jewfish, black	**124**	**114**	0	0	**124**	**114**	0.0
Saratoga	**63**	**63**	0	0	**63**	**63**	0.0
Snapper, golden	**570**	**570**	0	0	**570**	**570**	0.0
Snapper, mangrove jack	**57**	**57**	0	0	**57**	**57**	0.0
Tarpon/ox-eye herring	**60**	**46**	0	0	**60**	**46**	0.0
Threadfin, blue	**38**	**38**	0	0	**38**	**38**	0.0
Threadfin, king	**38**	**35**	**22**	**27**	**60**	**44**	36.7
Mud crab	**38**	**27**	0	0	**38**	**27**	0.0
Cherabin	0	0	**38**	**38**	**38**	**38**	100.0
All taxa combined	2649	731	1425	396	4074	832	35.0

Appendix 22: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Bynoe Harbour Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	668	230	**273**	**147**	941	273	29.0
Bream, pikey	**163**	**99**	**138**	**91**	**301**	**134**	45.9
Catfish	417	157	**256**	**123**	672	200	38.0
Cod/groupers	**1299**	**539**	**684**	**391**	1984	666	34.5
Emperor, grass	**377**	**194**	**21**	**46**	**398**	**200**	5.3
Emperor, red	**76**	**76**	0	0	**76**	**76**	0.0
Javelin fish	**695**	**514**	**714**	**521**	**1409**	**732**	50.7
Jewfish, black	**21**	**36**	**42**	**51**	**63**	**63**	66.7
Mackerel, grey	**290**	**250**	**11**	**48**	**301**	**255**	3.6
Moonfish/Batfish	**608**	**377**	**11**	**50**	**619**	**381**	1.8
Mullet	**54**	**54**	0	0	**54**	**54**	0.0
Queenfish	**453**	**244**	**33**	**66**	**486**	**253**	6.7
Sharks and rays	631	200	**266**	**130**	897	238	29.7
Small baitfish	**147**	**106**	**22**	**41**	**168**	**114**	12.9
Snapper, golden	**3818**	**1901**	**337**	**565**	**4155**	**1983**	8.1
Snapper, mangrove jack	**186**	**130**	**11**	**31**	**197**	**134**	5.5
Snapper, Moses'	**19**	**19**	0	0	**19**	**19**	0.0
Snapper, saddletail/crimson	**938**	**589**	**126**	**216**	**1064**	**627**	11.8
Snapper, stripey	**665**	**446**	**95**	**168**	**760**	**477**	12.5
Tarpon/ox-eye herring	**80**	**47**	0	0	**80**	**47**	0.0
Threadfin, blue	**124**	**117**	**138**	**123**	**262**	**170**	52.6
Threadfin, king	**11**	**11**	0	0	**11**	**11**	0.0
Trevally, giant	**1117**	**835**	**41**	**159**	**1157**	**850**	3.5
Trevally, other	**172**	**70**	**21**	**24**	193	74	10.9
Wrasse, tuskfish and gropers	**128**	**75**	0	0	**128**	**75**	0.0
Scalefish, other	**858**	**355**	**106**	**125**	964	376	11.0
Mud crab	**683**	**463**	**863**	**520**	**1547**	**696**	55.8
Crustaceans, other	**348**	**179**	**70**	**80**	**418**	**196**	16.8
All taxa combined	15 046	2506	4277	1109	19 323	2740	22.1

Appendix 23: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Darwin Harbour Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	1274	314	**211**	**128**	1485	339	14.2
Bream, pikey	**1934**	**964**	**1772**	**922**	3706	1334	47.8
Catfish	4809	1236	**816**	**509**	5625	1337	14.5
Cod/groupers	6945	877	1052	341	7996	941	13.2
Coral trout	**27**	**27**	0	0	**27**	**27**	0.0
Emperor, grass	1787	568	**153**	**166**	1940	591	7.9
Emperor, red	**1004**	**1080**	**789**	**957**	**1793**	**1443**	44.0
Javelin fish	2359	648	**503**	**299**	2862	714	17.6
Jewfish, black	**684**	**372**	0	0	**684**	**372**	0.0
Mackerel, grey	**245**	**148**	**16**	**38**	**261**	**152**	6.1
Mackerel, Spanish	**280**	**162**	**18**	**41**	**299**	**167**	6.1
Mackerel, spotted	**184**	**112**	**67**	**68**	**251**	**131**	26.8
Moonfish/Batfish	2725	843	0	0	2725	843	0.0
Mullet	**2802**	**1165**	0	0	**2802**	**1165**	0.0
Queenfish	2521	680	**351**	**254**	2872	725	12.2
Sharks and rays	6588	1467	**626**	**452**	7214	1535	8.7
Small baitfish	**1914**	**1302**	0	0	**1914**	**1302**	0.0
Snapper, golden	13 474	4548	**1816**	**1670**	15 290	4845	11.9
Snapper, mangrove jack	**231**	**94**	**19**	**27**	250	98	7.6
Snapper, Moses'	**1879**	**1175**	**503**	**608**	**2382**	**1323**	21.1
Snapper, saddletail/crimson	3906	1234	**1285**	**707**	5191	1422	24.7
Snapper, stripey	5535	1138	**950**	**471**	6485	1232	14.7
Tarpon/ox-eye herring	**1022**	**928**	0	0	**1022**	**928**	0.0
Threadfin, blue	**903**	**632**	**20**	**94**	**923**	**639**	2.2
Threadfin, king	**139**	**70**	**33**	**34**	**172**	**78**	18.9
Trevally, giant	**2332**	**1823**	**215**	**553**	**2,547**	**1905**	8.4
Trevally, other	**2491**	**1021**	**401**	**410**	2892	1101	13.9
Wrasse, tuskfish and gropers	3092	836	**165**	**193**	3257	858	5.1
Scalefish, other	4363	996	**631**	**379**	4994	1065	12.6
Mud crab	12 696	2693	**3083**	**1327**	15 780	3002	19.5
Crustaceans, other	**3267**	**2377**	**32**	**234**	**3298**	**2388**	1.0
All taxa combined	93 410	7545	15 526	2986	108 936	8114	14.3

Appendix 24: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period June to November, 2009 - Dundee Beach Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**698**	**599**	**8**	**65**	**707**	**603**	1.2
Bream, pikey	**26**	**26**	0	0	**26**	**26**	0.0
Catfish	**919**	**371**	**547**	**286**	1466	469	37.3
Cod/groupers	2041	579	**623**	**320**	2664	662	23.4
Coral trout	**144**	**68**	**42**	**37**	**186**	**78**	22.6
Emperor, grass	2110	580	**528**	**290**	2639	649	20.0
Emperor, red	**249**	**244**	**150**	**190**	**399**	**309**	37.6
Javelin fish	**773**	**598**	**545**	**502**	**1318**	**781**	41.4
Jewfish, black	**83**	**117**	**154**	**159**	**237**	**197**	65.0
Mackerel, grey	**38**	**48**	**38**	**48**	**77**	**68**	50.0
Mackerel, Spanish	**188**	**105**	**60**	**59**	**248**	**121**	24.2
Mackerel, spotted	**9**	**15**	**32**	**29**	**41**	**33**	78.6
Moonfish/Batfish	**483**	**301**	**58**	**104**	**540**	**318**	10.7
Queenfish	**15**	**15**	0	0	**15**	**15**	0.0
Sharks and rays	2249	513	776	301	3024	594	25.7
Snapper, golden	1919	682	**631**	**391**	2550	786	24.7
Snapper, mangrove jack	**25**	**20**	**19**	**17**	**44**	**26**	43.4
Snapper, Moses'	**3**	**9**	**44**	**38**	**47**	**39**	94.2
Snapper, saddletail/crimson	**536**	**301**	**164**	**167**	**700**	**344**	23.4
Snapper, stripey	2871	635	**515**	**269**	3386	690	15.2
Threadfin, blue	**58**	**43**	**15**	**22**	**73**	**48**	20.7
Threadfin, king	0	0	**16**	**16**	**16**	**16**	100.0
Trevally, giant	**188**	**360**	**832**	**758**	**1020**	**839**	81.6
Trevally, other	**457**	**245**	**14**	**43**	**471**	**249**	2.9
Wrasse, tuskfish and gropers	**503**	**350**	**47**	**107**	**550**	**366**	8.5
Scalefish, other	**1925**	**936**	**66**	**174**	**1992**	**952**	3.3
Mud crab	**83**	**88**	**34**	**56**	**118**	**104**	29.2
All taxa combined	18 591	2032	5959	1254	24 551	2388	24.3

Appendix 25: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Leaders Creek Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**101**	**63**	**-**	**-**	**101**	**63**	0.0
Bream, pikey	**13**	**16**	**25**	**23**	**38**	**28**	66.7
Catfish	2002	698	**175**	**207**	2177	728	8.1
Cod/groupers	**487**	**190**	**65**	**70**	553	203	11.8
Coral trout	**38**	**38**	0	0	**38**	**38**	0.0
Emperor, grass	**152**	**152**	0	0	**152**	**152**	0.0
Javelin fish	**118**	**137**	**84**	**116**	**203**	**179**	41.7
Jewfish, black	**1268**	**547**	**170**	**200**	**1438**	**582**	11.8
Mullet	**507**	**320**	0	0	**507**	**320**	0.0
Queenfish	**101**	**91**	**76**	**79**	**177**	**120**	42.9
Sharks and rays	**793**	**393**	**53**	**102**	**847**	**406**	6.3
Snapper, golden	**837**	**440**	**112**	**161**	**949**	**468**	11.8
Snapper, mangrove jack	**13**	**17**	**28**	**26**	**41**	**31**	68.9
Snapper, saddletail/crimson	**1585**	**1032**	**196**	**363**	**1781**	**1094**	11.0
Snapper, stripey	**1062**	**606**	**25**	**94**	**1087**	**613**	2.3
Threadfin, blue	**251**	**120**	0	0	**251**	**120**	0.0
Threadfin, king	**304**	**196**	0	0	**304**	**196**	0.0
Trevally, giant	**396**	**214**	**25**	**54**	**421**	**221**	6.0
Trevally, other	**63**	**80**	**38**	**62**	**101**	**101**	37.5
Wrasse, tuskfish and gropers	**228**	**109**	0	0	**228**	**109**	0.0
Scalefish, other	**249**	**209**	**30**	**72**	**279**	**221**	10.6
Mud crab	**2659**	**1508**	**478**	**639**	**3137**	**1637**	15.2
Crustaceans, other	**369**	**278**	**38**	**89**	**407**	**292**	9.3
All taxa combined	13 598	2296	**1620**	**845**	15 218	2447	*10.6*

Appendix 26: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Mary River Boat Ramp Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	10 006	2119	7846	1876	17 852	2830	44.0
Bream, pikey	**190**	**190**	0	0	**190**	**190**	0.0
Catfish	2945	883	**1474**	**625**	4419	1081	33.4
Cod/groupers	**38**	**38**	0	0	**38**	**38**	0.0
Grunter, sooty	**30**	**30**	0	0	**30**	**30**	0.0
Saratoga	**1691**	**668**	**637**	**410**	2327	784	27.4
Sharks and rays	**399**	**371**	**22**	**87**	**421**	**381**	5.2
Snapper, golden	**399**	**399**	0	0	**399**	**399**	0.0
Snapper, saddletail/crimson	**38**	**38**	0	0	**38**	**38**	0.0
Snapper, stripey	**38**	**38**	0	0	**38**	**38**	0.0
Tarpon/ox-eye herring	**2228**	**1100**	**1204**	**809**	**3433**	**1366**	35.1
Threadfin, blue	**76**	**87**	**59**	**77**	**135**	**116**	43.7
Threadfin, king	**67**	**71**	**60**	**67**	**127**	**98**	47.4
Scalefish, other	487	152	**213**	**100**	700	182	30.4
Mud crab	76	60	0	0	**76**	**60**	0.0
All taxa combined	18 708	2702	11 515	2182	30 222	3473	38.1

Appendix 27: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Daly River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**870**	**435**	4933	1036	5804	1123	85.0
Catfish	**5**	**38**	**516**	**374**	**521**	**376**	99.0
Cod/groupers	0	0	**52**	**38**	**52**	**38**	100.0
Grunter, sooty	**31**	**34**	**67**	**49**	**98**	**60**	68.1
Mullet	0	0	**914**	**914**	**914**	**914**	100.0
Sharks and rays	0	0	**86**	**65**	**86**	**65**	100.0
Snapper, mangrove jack	0	0	**32**	**32**	**32**	**32**	100.0
Threadfin, king	0	0	**53**	**38**	**53**	**38**	100.0
Scalefish, other	**20**	**32**	**61**	**56**	**81**	**64**	75.0
Mud crab	0	0	**378**	**378**	**378**	**378**	100.0
Cherabin	**1140**	**1251**	33 014	6732	34 154	6848	96.7
All taxa combined	**2067**	**1326**	40 106	6894	42 174	7020	95.1

Appendix 28: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - McArthur River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**945**	**539**	5088	1250	6033	1361	84.3
Bream, pikey	0	0	3629	1102	3629	1102	100.0
Catfish	**182**	**187**	**628**	**347**	**810**	**394**	77.6
Cod/groupers	1413	383	**5727**	**772**	7141	862	80.2
Coral trout	**154**	**128**	**623**	**258**	777	288	80.2
Emperor, grass	**218**	**240**	1759	682	1977	724	89.0
Emperor, red	**45**	**64**	**45**	**64**	**91**	**91**	50.0
Javelin fish	**444**	**371**	5009	1246	5454	1300	91.9
Jewfish, black	**110**	**158**	**1391**	**563**	1501	585	92.7
Mackerel, Spanish	0	0	**28**	**28**	**28**	**28**	100.0
Moonfish/Batfish	0	0	**396**	**212**	**396**	**212**	100.0
Mullet	14 135	5632	84 992	13 810	99 127	14 914	85.7
Queenfish	**269**	**259**	1,706	652	1975	701	86.4
Sharks and rays	0	0	56	56	**56**	**56**	100.0
Small baitfish	**3674**	**1599**	26 223	4271	29 897	4560	87.7
Snapper, golden	**1216**	**622**	3746	1091	4962	1256	75.5
Snapper, mangrove jack	**732**	**496**	3489	1082	4221	1190	82.6
Snapper, saddletail/crimson	0	0	**347**	**267**	**347**	**267**	100.0
Snapper, stripey	**196**	**136**	**463**	**209**	659	249	70.3
Threadfin, blue	**346**	**377**	3023	1115	3369	1177	89.7
Threadfin, king	**111**	**139**	**913**	**399**	**1025**	**422**	89.1
Trevally, giant	**75**	**127**	**696**	**387**	**771**	**407**	90.2
Trevally, other	**116**	**97**	**187**	**123**	**304**	**157**	61.6
Wrasse, tuskfish and gropers	**114**	**138**	**776**	**360**	**891**	**386**	87.2
Scalefish, other	**635**	**448**	3260	1016	3895	1110	83.7
Mud crab	**1436**	**904**	11 073	2511	12 509	2669	88.5
Cherabin	0	0	**112**	**112**	**112**	**112**	100.0
Crustaceans, other	**699**	**1153**	26 158	7053	26 857	7147	97.4
All taxa combined	27 267	6185	191 545	16 631	218 812	17 744	87.5

Appendix 29: Estimated numbers of key species kept by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Roper River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**181**	**184**	2032	617	2213	644	91.8
Catfish	0	0	**25**	**25**	**25**	**25**	100.0
Mullet	**203**	**249**	**376**	**338**	**580**	**420**	64.9
Sharks and rays	0	0	**10**	**10**	**10**	**10**	100.0
Cherabin	**3233**	**2927**	46 931	11 154	50 164	11531	93.6
All taxa combined	**3617**	**2944**	49 374	11 176	52 991	11557	93.2

Appendix 30: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Daly River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**3300**	**1539**	15 118	3293	18 418	3635	82.1
Catfish	**397**	**303**	3767	932	4164	980	90.5
Cod/groupers	0	0	**95**	**95**	**95**	**95**	100.0
Grunter, sooty	**20**	**23**	218	74	238	78	91.5
Sharks and rays	**84**	**96**	849	305	933	319	91.0
Tarpon/ox-eye herring	**20**	**36**	**181**	**107**	**201**	**113**	89.9
Threadfin, blue	0	0	116	97	116	97	100.0
Threadfin, king	**22**	**21**	**20**	**21**	**42**	**30**	48.3
Scalefish, other	**31**	**46**	**305**	**146**	**336**	**153**	90.9
Cherabin	**136**	**315**	10 188	2720	10 324	2738	98.7
All taxa combined	**4011**	**1604**	30 857	4389	34 868	4673	88.5

Appendix 31: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - McArthur River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**700**	**612**	3992	1463	4692	1586	85.1
Bream, pikey	0	0	**4606**	**2050**	**4606**	**2050**	100.0
Catfish	**1821**	**1491**	20 032	4947	21 853	5167	91.7
Cod/groupers	**3072**	**1456**	14 684	3182	17 756	3499	82.7
Coral trout	0	0	**222**	**126**	**222**	**126**	100.0
Emperor, grass	**516**	**872**	**5083**	**2737**	**5600**	**2873**	90.8
Javelin fish	**322**	**401**	6898	1857	7220	1900	95.5
Jewfish, black	0	0	**292**	**146**	**292**	**146**	100.0
Mackerel, Spanish	0	0	**14**	**14**	**14**	**14**	100.0
Moonfish/Batfish	0	0	**112**	**112**	**112**	**112**	100.0
Mullet	**5938**	**2687**	20 667	5012	26 605	5687	77.7
Queenfish	**408**	**371**	3927	1152	4335	1210	90.6
Sharks and rays	**1708**	**907**	6143	1721	7851	1946	78.2
Small baitfish	**1312**	**1244**	**5673**	**2586**	**6985**	**2870**	81.2
Snapper, golden	**638**	**1113**	**4034**	**2799**	**4672**	**3012**	86.4
Snapper, mangrove jack	**264**	**369**	**1478**	**873**	**1742**	**947**	84.8
Snapper, Moses'	0	0	**168**	**168**	**168**	**168**	100.0
Snapper, saddletail/crimson	0	0	**45**	**45**	**45**	**45**	100.0
Snapper, stripey	**555**	**400**	**1748**	**710**	2303	814	75.9
Tarpon/ox-eye herring	0	0	**65**	**65**	**65**	**65**	100.0
Threadfin, blue	**47**	**120**	**1005**	**555**	**1052**	**568**	95.5
Threadfin, king	0	0	**300**	**300**	**300**	**300**	100.0
Trevally, giant	0	0	**1614**	**1089**	**1614**	**1089**	100.0
Trevally, other	0	0	**24**	**24**	**24**	**24**	100.0
Wrasse, tuskfish and gropers	**14**	**36**	633	241	647	243	97.8
Scalefish, other	**2181**	**1268**	5417	1998	7598	2366	71.3
Mud crab	**1144**	**708**	10 709	2166	11 853	2279	90.3
Crustaceans, other	**3617**	**4020**	**4400**	**4434**	**8016**	**5985**	54.9
All taxa combined	24 255	5932	123 988	11 276	148 243	12 741	83.6

Appendix 32: Estimated numbers of key species released or discarded by Northern Territory residents and visitors aged five years and older in the period April to November, 2009 - Roper River Accommodation Survey

SE = standard error; values in bold indicate relative standard error > 40%

	NT residents		Visitors		Total		%
Species/group	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**visitors**
Barramundi	**809**	**526**	3431	1082	4241	1203	80.9
Catfish	**55**	**68**	940	280	995	288	94.5
Jewfish, black	0	0	**16**	**16**	**16**	**16**	100.0
Sharks and rays	**61**	**47**	**126**	**68**	**187**	**82**	67.3
Scalefish, other	0	0	**38**	**26**	**38**	**26**	100.0
Cherabin	**976**	**1258**	20 449	5760	21 425	5896	95.4
Crustaceans, other	0	0	19	**19**	**19**	**19**	100.0
All taxa combined	**1901**	**1366**	25 019	5868	26 920	6025	92.9