2007-08 SURVEY OF RECREATIONAL FISHING IN TASMANIA

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Executive summary

This represents the second comprehensive assessment of recreational fishing undertaken in Tasmania and builds on the National Recreational Fishing Survey (NRFS) conducted in 2000-01. The same methodology developed for the NRFS was applied in the current survey but with several improvements, particularly in relation to data analysis. However, in the absence of a repeat of the national survey, the current survey was limited to fishing in Tasmania by Tasmanian residents. Although not measured, fishing by interstate visitors in Tasmania was not likely to have been significant given that non-resident fishers accounted for just 3% of the total effort (fisher days) for Tasmania during 2000-01.

Information about participation rates and the demographic profile of recreational fishers was derived from a general population telephone survey involving over 3400 Tasmanian households. This was followed by a telephone-diary survey involving over 1000 households (almost 3000 persons) for which fishing activity was monitored over a 12 month period. Response rates across all facets of the study were exceptionally high, giving considerable confidence to the data quality.

In the 12 months prior to November 2007 it was estimated that over 118,000 Tasmanian residents aged five years or older fished at least once, representing an overall participation rate of 26%. By region, residents of the Southern statistical division had the highest participation rate at 33%, which compared with 24-27% for the other Tasmanian regions. Recreational fishing was more popular among males, with a state-wide participation rate of 35%, compared with about 18% for females. Participation rates varied with age, 5-14 year olds having the highest rate of participation (38%) although the greatest numbers of fishers were in the 30-44 years age group. Participation rates generally declined with increasing age, but especially in the 45 years and older age groups.

As this survey was designed to provide a big-picture perspective of the recreational fishery, it is important to recognise that comparatively rare or highly specialised activities, which within the context of the *overall* recreational fishery are minor components, may not be well represented. In such instances estimates of catch and effort tend to be imprecise and alternative, targeted surveys would be required to provide a more reliable assessment of such activities. For the above reasons, aggregation of some regions and species has been necessary when reporting findings.

Information about recreational fishing catch and effort was monitored between December 2007 and November 2008, inclusive. Almost 128,000 Tasmanian residents were estimated to have actually fished in Tasmania during this period, slightly more

than during the previous 12 months. These fishers accounted for about 0.64 million fisher days of effort. The median number of days fished in Tasmania by Tasmanians was five days per fisher, though the distribution of effort was highly skewed, with just 20% of fishers contributing 56% of the total effort.

Overall, one in four fishers fished at least once in freshwater while the vast majority (88%) fished at least once in saltwater. About one quarter of the total effort occurred in freshwater, saltwater fishing (including estuaries) accounted for the remainder. Freshwater fishing in lakes and dams accounted for about three times the level of effort in rivers while the majority of the saltwater fishing occurred in inshore coastal waters, with estuarine fishing of secondary importance. Fishing in offshore waters (>5 km off the coast) was a comparatively minor activity.

Line fishing was the dominant activity undertaken, pursued on 87% of all days fished: that is almost 0.56 million fisher days, representing 1.8 million hours of effort. This was followed by pot fishing (8%), dive harvesting (5%) and the use of gillnets (3%). A range of other fishing methods were also reported, including the use of spears, seine or bait nets, and hand collection, but these activities were of minor significance by comparison.

A wide variety of fish species was caught by recreational fishers during 2007-08, with a total of 1.62 million finfish (excluding small baitfish) retained and 1.24 million finfish released or discarded. Flathead (mainly sand flathead) represented almost two-thirds of the total finfish catch numbers, with an estimated 1.07 million kept and 0.74 million released. Other finfish species or species groups of significance included trout (157,000 kept and 105,000 released), Australian salmon (110,000 kept and 78,000 released), gurnard (13,000 kept and 67,000 released), and black bream (13,000 kept and 35,000 released).

Overall, 43% of all finfish captured were released or discarded; with low rates of release (<10%) for species such as blue warehou and flounder; intermediate rates (10-30%) for garfish, trumpeters, Atlantic salmon and jack mackerel; moderate rates (31-50%) for flathead, trout, Australian salmon, tuna, mullet, barracouta, silver trevally, jackass morwong, eels, river blackfish and redfin; and high rates (>50%) for black bream, wrasse, gurnard, sharks and rays, whiting, cod, pike and leatherjackets. Reasons for release were varied, with size (under legal size or too small) being an important factor for species such as flathead, Australian salmon, silver trevally, mullet and jackass morwong; poor eating qualities were identified as an important factor for release of barracouta, redfin, cod, wrasse, leatherjackets and gurnard; while catch and release (sport) fishing was an important factor for the release of black bream, trout and tuna. Sharks and rays tended to be released or discarded because of poor eating qualities (e.g. dogfish, draughtboard shark) and/or due to regulation (prohibition on retaining sharks from shark refuge areas).

Recreational fishers also caught a variety of shellfish and other invertebrate species. Comparatively high catches of squid, namely Gould's squid (73,000 kept) and southern calamari (40,000 kept), were taken along with rock lobster (72,000 kept), abalone (64,000 kept) and scallops (397,000 kept). Amongst these taxa, rates of release were low for the squids, scallops and abalone, and moderate for rock lobster.

There was a high level of fishery specialisation for species such as tuna, trout, flounder, rock lobster and scallops; these species were taken almost exclusively by targeted effort rather than incidental capture. Other species that tended to be caught primarily as a result of targeted effort included black bream, flathead, garfish and abalone, also implying a level of fishery specialisation for these species. By contrast, jackass morwong, jack mackerel, leatherjackets, wrasse, gurnard, cod and eels were virtually never targeted, which for several of these species is consistent with the fact that they were held in low esteem by fishers.

By applying average weights it was possible to approximate harvest weights and compare recreational and commercial fisheries production. The annual recreational harvest of flathead was estimated at 292 tonnes, four times greater than the commercial catch of flathead taken from state fishing waters. By weight, other species of importance included tuna (145 tonnes), Australian salmon (48 tonnes), southern calamari (45 tonnes), Gould's squid (37 tonnes) and the trumpeters (19 tonnes). As a contributor to total harvest, the share taken by the recreational sector was similar or larger than that taken by the Tasmanian commercial scalefish fishery for flathead, flounder, mullet, cod, barracouta, silver trevally, jackass morwong, and Gould's squid. Conversely, the recreational harvest represented a minor component (<15%) of the total catch for species such as Australian salmon, whiting, garfish, wrasse and jack mackerel.

Catch composition was influenced by many factors, including the water body fished and the fishing method. Trout dominated finfish catches (kept and released numbers) in freshwater (>80%), with redfin, Atlantic salmon and blackfish of secondary importance in the lake and dam fisheries, and redfin and blackfish in the river fisheries. Flathead and Australian salmon dominated estuarine and inshore coastal catches (collectively >75%), with black bream and flounder of secondary importance in the estuarine fishery, and gurnard and wrasse in the inshore coastal fishery. Tuna, flathead and gurnard (mostly ocean perch) were the main species taken in the offshore fishery.

The finfish catch taken by line fishing was dominated by flathead (66% of total numbers), followed by trout (10%), Australian salmon (7%), gurnard (3%) and bream (2%). By contrast, trumpeter (mainly bastard trumpeter) (27%), blue warehou (10%), sharks and rays (9%), mullet (9%) and Atlantic salmon (7%) were the main species caught by gillnets, and flounder were mainly taken by spear. Gould's squid and southern calamari were mostly taken by line methods whereas rock lobster were caught using pots, dive collection and rings, with abalone and scallops more or less exclusively harvested by dive collection.

The east and south-east coasts of Tasmania were a particularly significant for flathead, black bream, tuna, Gould's squid, southern calamari, rock lobster and abalone, with the south east especially important for flounder. By contrast, Australian salmon and mullet catches were concentrated off northern Tasmania. The inland trout fishery was focused largely in the Central Plateau lakes, especially Arthurs Lake and Great Lake, with catches from rivers of secondary importance. Trout catches from the other inland regions were similar in magnitude.

Seasonally, catches of flathead, trout, Australian salmon, black bream, Gould's squid, southern calamari, rock lobster and abalone peaked during summer and autumn. Tuna were restricted to summer-autumn, with a strong peak in February-March. Flounder

catches were highest in late autumn. Catches of each of the major species tended to be low during winter and early spring, reflecting the generally lower levels of fishing activity during that period.

The saltwater fisheries off western and northern Tasmania involved a significant shore-based component whereas shore-based fishing was less important compared with boat-based fishing off eastern and south-eastern Tasmania.

Comparison with 2000-01

To facilitate valid comparisons between 2000-01 and 2007-08, NRFS data were re-analysed using the analytical approach developed for the current study.

In terms of participation, the number of recreational fishers in Tasmania has remained relatively constant since 2000. However, when population growth is taken into account, the actual participation rate experienced a significant decline, from just over 29% in 2000 to 26% in 2007. This decline was experienced in all regions of the state and was more pronounced amongst males than females. Participation rates were also lower across all age groups, with the exception of the 60 years-plus age group. When broader demographic trends are taken into account, specifically dominance of the 'baby-boomer' generation (mostly 45-59 year olds in 2007) and the sharp decline in participation rates amongst the 45 years-plus age groups, our results suggest that overall participation in recreational fishing will continue to decline unless there is growth, or at least maintenance, of involvement in fishing amongst the younger age groups.

Overall effort (fisher days) was 14% lower in 2007-08 compared with 2000-01. This decline was exclusively linked to a reduction in shore-based fishing effort during 2007-08. The most marked declines were experienced in the Eastern inland, West North coast and Derwent regions, mainly due to lower levels of shore-based fishing activity in 2007-08.

Reflecting the decline in effort there was also a reduction in overall catch (kept and released) numbers for finfish in 2007-08, to about 81% of the equivalent estimate for 2000-01. While the catch composition and relative importance of the key species was generally consistent between surveys, there was variability in catch levels for many species; linked in part to differences in effort, changes in fishing practices and species availability. Flathead catches were very stable (within 5%) between the two surveys while there was a moderate increase (17%) in the estimated number of trout caught in 2007-08. By contrast, the 2007-08 catch of Australian salmon was less than half that estimated for 2000-01. Catch increases were experienced for tuna and Gould's squid, both linked to greater availability during 2007-08. Minor increases were also evident for southern calamari and whiting, the former apparently linked to increased popularity of the species amongst recreational fishers.

Release rates were generally higher in 2007-08, which for species such as trout, black bream and tuna was consistent with a trend towards increased catch and release (sport rather than consumptive) fishing. For other species, this change may reflect improved adherence to size limits and/or the impact of decreased bag limits that have been implemented since 2001, as well as response to education programs aimed at encouraging fishers to take only what they need for a feed.

In summary, this study has highlighted the complex and dynamic nature of the recreational fishery and emphasises the need for managers, stakeholders and fisheries scientists to consider management, research and planning issues at appropriate regional and temporal scales. This survey represents a significant step towards achieving this goal, providing an important baseline against which future developments and trends in the fishery can be evaluated.

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1. Introduction

With growing awareness of the significance of recreational fishing in the early 1990s, a national policy for recreational fishing was developed 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' (NRFWG, 1994). The policy recommended that a national survey of recreational fishing be undertaken once every five years. Recognition was also given to public concern over the then poor quality of data on recreational fishing.

Following extensive consultation and development phases, the Commonwealth, state and territory fisheries agencies implemented the National Recreational Fishing Survey (NRFS) in 2000. The principal objectives of the 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 establish attitudes and awareness of recreational fishers to issues relevant to the fishery (Henry and Lyle, 2003).

The NRFS was implemented as a series of state-wide surveys using a common methodology, having the advantage of providing comparable information Australia-wide as well as including the activity of visiting fishers. In addition to nationally aggregated information, Henry and Lyle (2003) provided summary statistics for each of the states and territories. In Tasmania it was established that the rate of recreational fishing participation was higher than the national average (29.5% compared with 19.5%), the average number of days fished per fishers was slightly higher than the national average (6.55 compared with 6.1 days per year) while the average annual expenditure per fisher[1] was lower than the national average ($416 compared with $552). Lyle (2005) provided a more in-depth analysis of the NRFS dataset as it pertained to Tasmania, examining the data at a regional level, for key species and by fishing methods. As such this provided the first comprehensive state-wide assessment of recreational fishing and represents an important benchmark against which future trends in participation, catch and effort can be measured.

Prior to the NRFS, only limited information was available about recreational fishing in Tasmania. In 1983 an Australian Bureau of Statistics (ABS) household survey provided some general statistics on recreational fishing but no estimates of catch or effort (ABS, 1984). At that time about one third of all persons aged 15 or older were engaged in some form of recreational fishing activity. A subsequent survey of home food production estimated home seafood 'production' for the year ending April 1992 at over 1000 tonnes for finfish (including trout), 60 tonnes for rock lobster and 25 tonnes for abalone (ABS, 1994).

There have been several other attempts to gather information about the recreational fishery in Tasmania. A survey of recreational fishing in the Derwent Estuary conducted

[1] Based on attributed expenditure on selected recreational fishing-related items (refer Henry and Lyle, 2003).

in 1984 provided some information about motivation, expenditure and catch rates, but gave no information on effort levels, total catch or catch composition (Winter ,1985). Lyle (2000) conducted a comprehensive survey of licensed marine recreational fishing that provided catch and effort information for the recreational net, rock lobster and abalone fisheries between 1996 and 1998. There have also been several other surveys of the recreational rock lobster and abalone fisheries (Forward and Lyle, 2002; Lyle *et al*., 2005; Lyle and Morton, 2004, 2006; Lyle, 2008) and limited surveys of game fish catch and effort (Smith, 1994; Evans, 1995; Morton and Lyle, 2003). In terms of the inland trout fishery, catch and effort trends have been monitored over several years using mail survey methods (Davies, 1995).

In the absence of plans to repeat the national survey, the present study was developed to provide up-to-date 'big-picture' information on recreational fishing in Tasmania. This information includes state-wide participation rate and demographic profile of recreational fishers, and catch and effort estimates for key methods, regions and species. However, in providing this big-picture perspective, it is also recognised that more targeted surveys will be required to provide greater accuracy and precision for specialised or localised activities such as rock lobster fishing, game fishing, gillnetting, etc.

By adopting essentially the same survey methodology developed for the national survey, valid comparisons can be made with information collected in 2000-01. Several improvements to the statistical analyses were, however, implemented in the present study and therefore data from 2000-01 have been re-analysed accordingly. In conjunction with the previous survey, it is intended that the current study will represent the start of a series of periodic state-wide fishing surveys that will be used to monitor major developments, trends and general status of recreational fishing in Tasmania into the future.

2. Materials and methods

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 the 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.* (2009) 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.

2.1 Survey scope

The survey encompassed the private dwelling resident population of Tasmania, 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 Tasmanian waters (freshwater, estuarine, marine) other than for commercial purposes. All recreational fishing techniques and harvesting activities, including dive and hand collection, the use of pots, nets and spears in addition to line fishing, were considered in-scope.

In contrast to the 2000-01 survey, fishing activities by non-Tasmanian residents in Tasmania and fishing by Tasmanians in other states of Australia was considered out-of-scope.

2.2 Survey methodology

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 population and a subsequent, intensive phase, in which respondents provided detailed catch and effort information over a period of time. 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 focussed on minimising respondent burden and maximising response and data quality.

Additional survey components included non-intending fisher call-backs, a fisher motivation, awareness and attitude survey, and an on-site survey. The non-intending fisher call-backs involved a sample of households that had indicated at screening that none of the residents were likely to do any recreational fishing during the diary period. This component was designed to identify and account for ‘unexpected fishing’ that may have occurred during the diary period. Motivation, awareness and attitudes to fishing-related matters was assessed for diary participants at the end of the diary period in a wash-up survey. On-site (creel) surveys were also conducted to assess fish identification skills of recreational fishers, determine the size distribution of common species and provide independent verification of certain recreational fishing activities.

2.2.1 Screening survey

The primary role of the screening interview was to collect profiling information for all household members as well as establishing eligibility to participate in the follow-up diary phase. Profiling information was important not only to characterise the sample population but also to examine issues relating to representation and response.

The screening survey was administered as a structured interview by telephone on a random sample of Tasmanian households. The white pages directory provided the sample frame, with obvious business numbers, non-private dwellings and multiple listings removed. For each telephone number the suburb was also noted enabling the selection to be assigned to a Local Government Area (LGA) and Statistical Division (SD). Stratified random sampling was undertaken with a higher sampling rate for the Southern SD, lower but equal sampling rates for the Northern and Mersey-Lyell SDs and the lowest rate for the Greater Hobart SD. Within each SD, care was taken to ensure that the proportional breakdown of the sample at the LGA level did not differ significantly to the known proportion of private dwellings based on Australian Bureau of Statistics (ABS) data. In addition to landline numbers, 14% of selected listings were represented by mobile-only numbers.

In order to minimise non-contacts, at least 10 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 October and November 2007.

Within each responding household, the demographic profile (age group and gender) of all usual residents, involvement in recreational fishing over the previous 12 months and likelihood (expectation) of doing any recreational fishing in the following 12-months for residents aged five years or older was established. All respondents who had fished during the 12 months prior to interview were asked whether they had fished in fresh and/or saltwater, whether they had fished interstate and to estimate how many days they had fished in the previous 12 months. This latter detail was used as an index of avidity rather than a direct or accurate measure of prior fishing activity, with fishers broadly classified as infrequent, occasional and regular based on the number of days reported. Previous and intending fishers were also asked whether they were members of fishing clubs or associations; ethnicity was established based on languages other than English spoken at home. 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 during the following 12 months were considered eligible for the second (diary) phase of the study.

2.2.2 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 December 2007 and November 2008, inclusive.

The approach taken in this survey differed to 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, diary survey response rates are low and data quality can suffer in terms of completeness, generality and consistency. 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 diarised must be collected on the basis of recall, if at all.

By contrast, the telephone-diary approach, 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 interview 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 to the common species, and a survey cover letter, data requirements were explained to respondents in a brief interview and then the next contact arranged. Respondents were encouraged to record basic information in their diaries, such as date, location, 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, etc), and reason(s) for release, for each individual fishing event were collected and recorded during the telephone interview. By maintaining regular contact, usually within a couple of weeks of any fishing activity, details of any non-diarised fishing 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.

2.2.3 Non-intending fisher call-backs

The objective of the call-backs 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; the latter group being identified as diarists who, despite indicating an expectation to fish, did no fishing during the diary period.

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 early 2009. 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 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 Tasmania and/or interstate, in salt and/or freshwater, number of days fished during the 12 months of the diary period and whether 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.

2.2.4 Wash-up survey

The survey was conducted with diarists at the end of the diary period and was designed to assess a range of information, including fisher motivation and attitudes to and awareness of fisheries issues. All such information was obtained from the main/key fisher in the household, aged 18 years or older. The survey also confirmed with respondents the completeness of the data for each household member, whether they had reported fishing or not. The results of this survey will be provided in future reports.

2.2.5 On-site survey

A small team of survey staff conducted interviews with fishers at several south-east and east coast boat ramps between December 2007 and April 2008. In addition to collecting information about the fishing trip (fishing location, methods, time fished and catch), the ability of recreational fishers to correctly identify their catch to the taxonomic level required for data analysis was assessed by comparing the species reported by the fishers with the actual identity of the catch based on observation. Where feasible size composition information was also collected and coupled with other data sources, this was used to estimate the mean size and weight for key species. In combination with harvest estimates (numbers), mean weights can be applied to estimate recreational catches by weight for comparison with commercial catch statistics.

2.3 Data analysis

2.3.1 Data expansion

Data analysis was based on a stratified random survey design using single stage cluster sampling, with the household representing the primary sampling unit (PSU) and residents within the household 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*., 2009). 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. Calibration against ABS estimated resident population (ERP) data for Tasmania as at July 2007 was implemented taking account to household size and demographics. Using diary phase uptake and completion rates for eligible households, 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 these in effect represented unexpected 'drop-outs' from the fishery. In order to take into account unexpected 'drop-ins' to the fishery, a final adjustment was necessary and was based on the non-intending fisher call-back 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.* (2009).

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 Statistical uncertainty

As a consequence of surveying a sub-sample rather than the entire population of fishers, all parameter estimates have some statistical uncertainty; that is, estimates may differ from those that would have been produced had the entire population been surveyed. This uncertainty 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 because only a sample was included in the survey. 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 are disaggregated, for example by region or method, SEs expressed as a percentage of the estimate (known as relative standard error or 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 ± 80%) have been highlighted 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 number) was based on stratified random sample design using the four ABS Statistical Divisions (SD) as strata: Greater Hobart, Southern, Northern, and Mersey-Lyell (Fig. 1). In describing household and population characteristics data have been analysed at stratum (SD) and state levels.

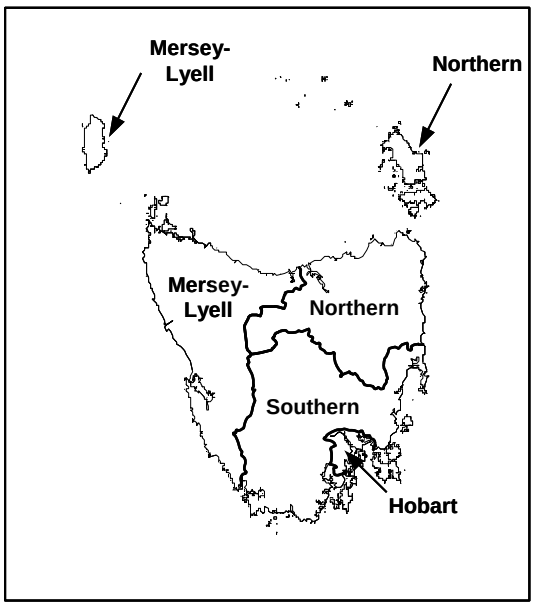

Fig. 1 Map of Tasmania showing ABS Statistical Divisions used for sample stratification.

2.4.2 Fishing regions

During the diary survey, interviewers classified the location of each fishing activity (event) into one of 23 fishing regions as employed in the NRFS. However, unlike the NRFS, the reported fishing location (text) was routinely recorded in the database, both as a validation tool and to provide added flexibility in ongoing analysis work.

For reporting purposes it has been necessary to collapse some regions to ensure that a minimum of 250 fishing events (i.e. raw unexpanded data) occurred in each reporting region. The fishing regions used for data reporting include inland, selected estuarine, and coastal regions as indicated in Fig. 2.

Other fishing location information was also collected in the diary survey in terms of water-body type: marine waters > or < 5kms from the coastline; estuarine waters; freshwater rivers; and freshwater lakes/dams, public or private.

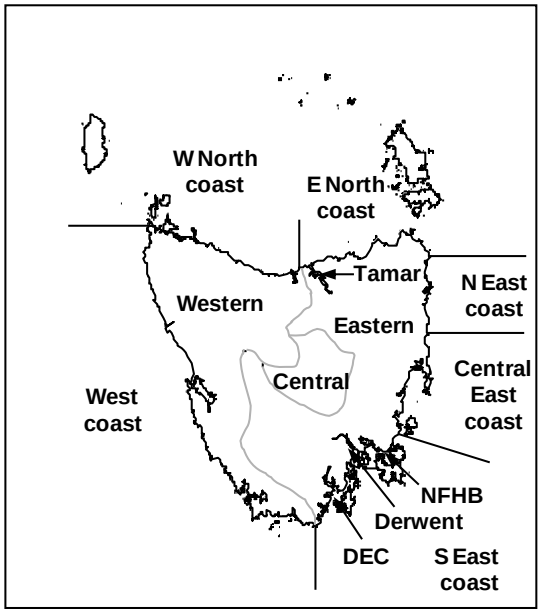

Fig. 2 Map of Tasmania showing analysis regions used for reporting fishing activities. Fishing regions - NFHB Norfolk and Frederick Henry bays; DEC D'Entrecasteaux Channel.

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. In this way a day's fishing trip could comprise more than one event; for instance, fishers may gather bait prior to fishing for flathead. 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 flathead and vice versa. Similarly, the use of passive fishing gear, such as rock lobster pots or gillnets, 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 could be defined, 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 lobster pots or using graball nets, this 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 identified by diarists but for the purposes of analysis the following reporting categories have been defined: line fishing (bait and/or lure/jig/fly or set lines); rock lobster pot; gillnet (graball and mullet nets); dive collection (includes underwater spearfishing and hand collection on snorkel, scuba or hookah), and other methods (including surface hand spearing, lobster rings, beach seine, dip nets, cast nets, bait nets, hand collection and the use of spades). Grouping of the minor fishing methods in this way ensured that overall there was a minimum of 200 events in each method reporting category.

2.7 Catch

A Species Identification Guide including clear colour images was provided to all diarists to optimise the accuracy of species identification in 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 precision 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 identification booklets. For example, icon species such as striped trumpeter were readily recognisable whereas identification to species level for flounder was less certain, even though flounders could be readily distinguished from other groups of fish.

For the purpose of reporting catches, species (e.g. Australian salmon, black bream) or taxonomic groupings (e.g. flathead, trout, flounder) have been used in most instances. Nonetheless, several species or species groups were represented by very few records and thus it was necessary to pool these into broader taxonomic categories for analysis (e.g. sharks and rays, other scalefish). A listing of taxa reported in catches and the catch analysis groupings are provided in Appendix 1.

Catches were reported as numbers of individuals kept or harvested and numbers released or discarded by species. In a small number of instances, respondents reported catches of small and generally abundant species (e.g. whitebait) in units of weight or volume. These catches were later converted to numbers using agreed number to weight or volume conversions[2].

[2] These conversion factors were based on 'best guess' estimates.

3. Sample and response profiles

3.1 Screening survey

Table 1 provides a summary of the number of private-dwelling households in Tasmania as at July 2007 (based on ABS ERP data), sampling details and the response profile relating to the screening survey. Since sampling was undertaken without replacement for sample loss (e.g. disconnected numbers, non-private dwellings including businesses, nursing homes, etc), the net sample was reduced from a gross sample of 4632 to 4082, of which 3451 households (84.5%) fully responded to the screening survey. Response rates were relatively consistent across all sampling strata. Overall, demographic profiling information was collected from 8303 persons aged five years or older. Non-response was due to refusals (8.6% overall), non-contacts (6.4%) and other non-response (0.6%), such as language or communication difficulties. The refusal group was equally split between partial refusals (where at least the substantive question relating to previous household fishing was answered) and full refusals where no information was provided.

Table 1 Tasmanian private dwelling population (number of households), survey sample size, and responses to the screening survey by stratum
Net sample- initial sample less sample loss

Statistical division	Households	Initial sample	Net sample	Response	Refusals	Non-contact	Other non-response	% response
Greater Hobart	82,904	1675	1467	1239	131	87	10	84.5
Southern	14,414	483	423	346	32	44	1	81.8
Northern	55,913	1395	1227	1038	105	79	5	84.6
Mersey-Lyell	44,066	1079	965	828	82	51	4	85.8
Total	197,297	4632	4082	3451	350	261	20	84.5

3.2 Diary survey

Table 2 summarises response details as they related to the diary survey. Of those households identified at screening as having at least one resident with an intention to do some recreational fishing during the diary period (December 2007 to November 2008), almost 85% fully responded to the diary survey. In total, 1037 Tasmanian households, representing 2936 persons aged five years and older, participated in the diary survey, with consistent response rates across all strata. The diary survey yielded a total of 10,148 fishing events.

Based on those households which initially agreed to take part in the diary survey (1082), the effective diary completion rate was 95.8%. A similar diary completion rate (96.8%) was achieved for the Tasmanian component of the NRFS (Lyle, 2005).

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 indicator in terms of the efficacy of the survey instrument.

Table 2 Diary survey response profile by stratum

Statistical division	Eligible households	Completed diary	% response
Greater Hobart	419	352	84.0
Southern	159	138	86.8
Northern	363	306	84.3
Mersey- Lyell	285	241	84.6
Total	1226	1037	84.6

3.3 Non-intending fishery call-backs

Response rates for the non-intending fisher call-backs are presented in Table 3. Approximately half of the 2225 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) was taken into account, an overall response rate of 92% was achieved for this segment of the study, again with consistently high response rates between strata.

Table 3 Response profile (household) to the non-intending fisher call-back survey by stratum

Statistical division	Initial sample	Net sample	Response	Refusals	Non-contact	Other non-response	% response
Greater Hobart	403	368	341	15	10	2	92.7
Southern	93	86	79	3	4	0	91.9
Northern	335	305	274	16	13	2	89.8
Mersey- Lyell	268	246	230	11	5	0	93.5
Total	1,099	1,005	924	45	32	4	91.9

4. Fisher characteristics

The following analyses are based on information derived from the screening survey of Tasmanian residents and are expanded, with non-response adjustments, to represent the resident private dwelling population of Tasmania.

4.1 Participation rates

An estimated 118,399 (SE 3363) Tasmanian residents aged five years or older fished at least once in the 12 months prior to November 2007 (Appendix 2). About 43% of the fishers resided in the Greater Hobart, 27% in the Northern, 20% in the Mersey-Lyell and 9% in the Southern SDs (Fig. 3A). The effective participation rate (proportion of resident population) was 26.1% (SE 0.7%) of Tasmanians; regional participation rates were relatively consistent between 24 and 27% apart from the Southern SD, where 33% of the population engaged in some form of recreational fishing (Fig. 3B).

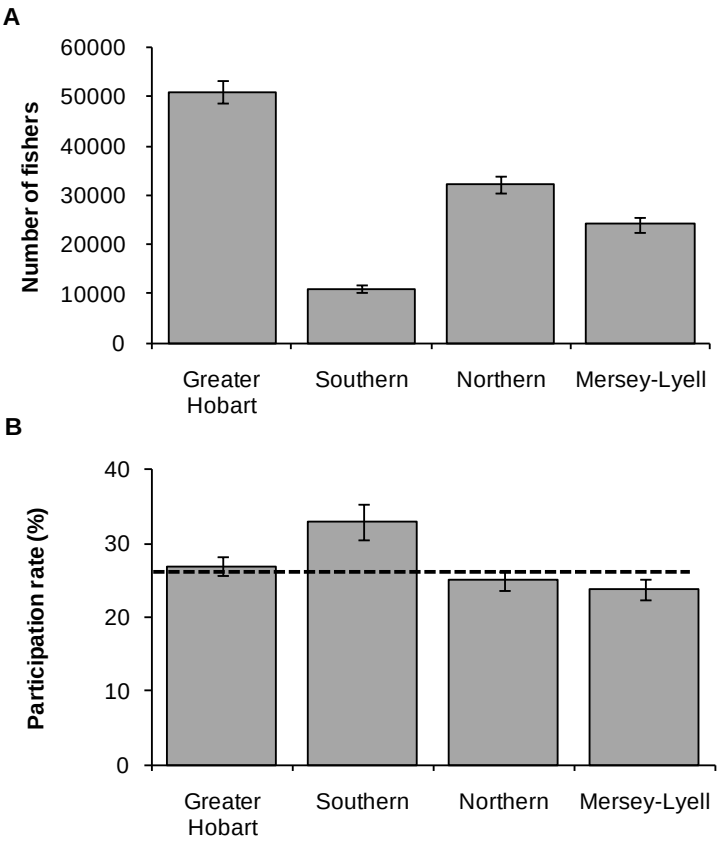

Fig. 3 Fishing participation in the 12 months prior to November 2007 by SD for persons aged five years or older: A) Number of persons; and B) proportion of the resident population. Error bars represent one standard error and the dotted line represents the participation rate for Tasmania as a whole.

4.2 Age and gender

Recreational fishing was more popular among males, with 34.9% (SE 0.9%) of the male and 17.5% (SE 0.8%) of the female resident population in Tasmania aged five years or older participating in recreational fishing in the 12 months prior to November 2007 (Appendix 3). By numbers, almost twice as many males (78,177; SE 2120) than females (40,222; SE 1770) did some form of recreational fishing.

The predominance of males involved in fishing, by number and proportion of population, was evident across all age groups (Fig. 4) and by statistical division (Appendix 3). The number of persons (both males and females) who fished generally increased with age up until 30-44 years after which numbers declined quite markedly, such that by 60 years or older comparatively few persons were involved in fishing (Fig 4A, Appendix 3). By contrast, participation rates generally declined with age, falling to just 12.8% amongst persons aged 60 years plus (21.5% of males and 4.8% of females) (Fig 4B, Appendix 3). Thus, although the greatest numbers of fishers were in the 30-44 years age group (19,545 males and 10,785 females), the highest participation rates occurred in the 5-14 years age group, 37.7% overall (44.9% for males and 30.1% for females).

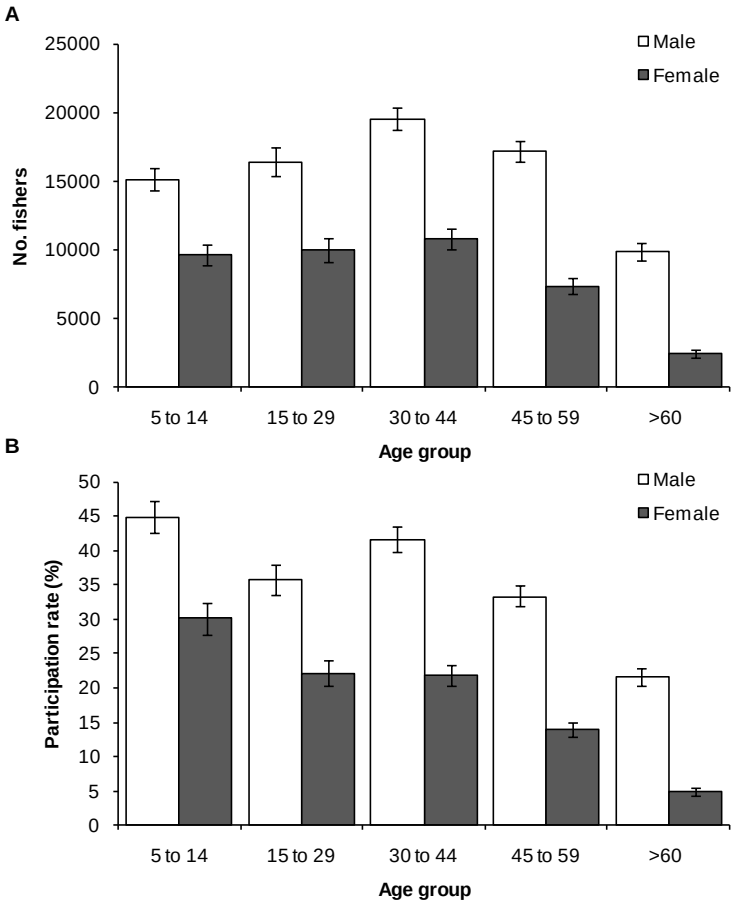

Fig. 4 Fishing participation in the 12 months prior to November 2007 by age group and gender by Tasmanian residents aged five years or older: A) number of persons; and B) proportion (%) of the resident population.

5. Fishing effort

Fishing effort is used to describe the pressure applied to a resource by fishers and to derive (with catch data) indices of resource abundance and fishing success. The response of fish populations to variations in fishing effort represents an important foundation for stock assessment.

For the purposes of this report only effort undertaken by Tasmanian residents in Tasmania and its adjacent waters has been considered. Effort can be described in several ways, for instance on the basis of fisher days (regardless of time fished on the day), hours fished or events (as defined in this study). For this report, the primary effort metric used is fisher days, noting that a fisher day of effort can be disaggregated by fishing region, water body type, platform and/or method.

Based on reported activity by diarists, with appropriate non-response and drop-out and drop-in adjustments, it was estimated that overall 127,781 Tasmanian's fished between December 2007 and November 2008 (Table 4). This represents a slight, but not statistically significant increase (7.9%) over the number of persons who fished in the 12 months prior to this period.

In terms of effort, Tasmanian residents accounted for over 640,000 fisher days of effort during the 12 month diary period. Overall 25.7% of fishers fished at least once in freshwater while 88.3% fished at least once in saltwater, with 23.2% of the effort (fisher days) involving freshwater fishing and 76.8% fishing in saltwater (Table 4).

Table 4. Estimated number of persons and days fished by Tasmanian residents aged five years or older who fished in freshwater and saltwater in Tasmania during 2007-08.

SE is standard error

	Freshwater		Saltwater		Total	
Effort	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Persons	32,821	2267	112,884	3,989	127,781	4,079
Fisher days	149,248	13,264	492,655	24,294	641,489	28,924

5.1 Days fished

In recreational fisheries, most fishers typically do relatively little fishing (and catch few fish) while, at the other extreme; relatively few fishers are very active and contribute disproportionately to the overall effort (and catch). The distribution of fishing effort is, therefore, characteristically highly skewed. Consistent with this general observation, about 70% of all fishers (some 92,000 persons) were estimated to have fished five or fewer days over the 12-month survey period while just 3% (about 3,400 persons) fished more than 20 days (Fig. 5). The median number of days fished per person was five for the survey period.

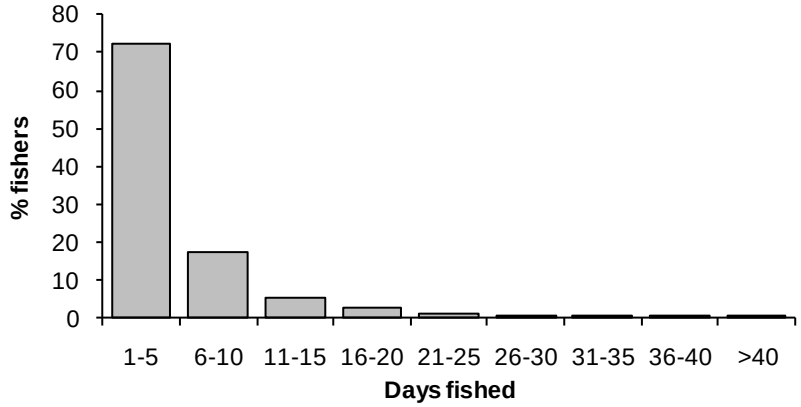

Fig. 5 Distribution of fishing effort by annual days fished for Tasmanian residents aged five years or older fishing in Tasmania during 2007-08.

The impact of individual fishers on total fishing effort was examined by ranking fishers based on their annual fishing effort (days fished) and then calculating the effect of progressively adding a fisher's effort to the total (Fig. 6). From this relationship it was evident that 80% of fishers accounted for just 44% of the effort or conversely, 20% of fishers accounted for 56% of the effort. This clearly highlights the potential for a relatively small proportion of the recreational fisher population to exert a substantial impact in terms of effort (and also catch), suggesting that minor shifts in the dynamics of participation (based on activity levels) at the upper end of the fishery will have significant implications on effort (and catch) levels.

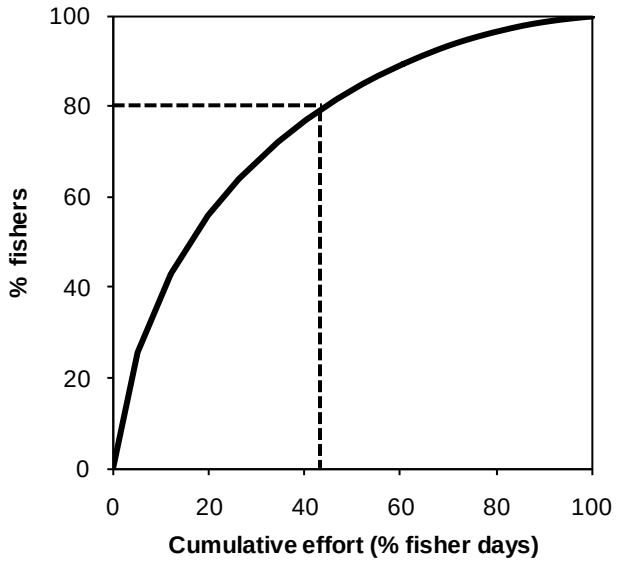

Fig. 6 Relationship between the number of fishers and their cumulative fishing effort (days fished) for Tasmanian residents aged five years or older who fished in Tasmania during 2007-08. Dotted lines indicate that 80% of the total number of fishers accounted for just 44% of the total days fished.

5.2 Water body

An important feature of the Tasmanian fishery was the concentration of fishing effort in inshore coastal (55% fisher days) and estuarine waters (20% fisher days) (Fig. 7, Appendix 6). Comparatively little fishing effort was directed in offshore (>5km offshore) waters. Fishing activity in inland waters collectively represented 23% of the state-wide fishing effort and was dominated by lake and dam fishing, which accounted for almost three times the effort in rivers.

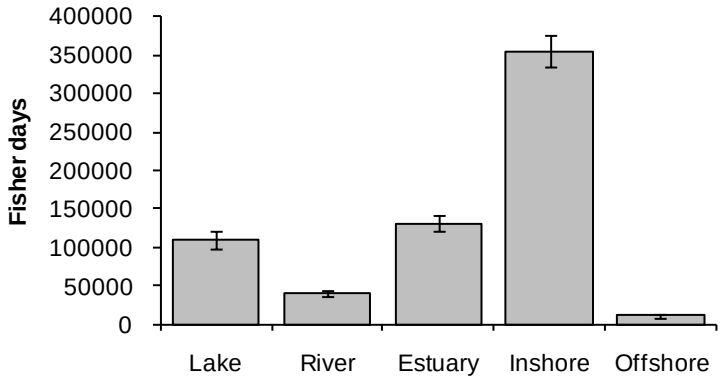

Fig. 7 Fishing effort (fisher days) by water body type for Tasmanian residents aged five years or older who fished in Tasmania during 2007-08. Error bars represent one standard error.

5.3 Fishing method

Line fishing (including the use of bait, artificial lures and jigs, and set lines) represented the primary recreational fishing activity, occurring on 87% of all fisher days of effort during 2007-08 (Fig. 8, Appendix 8). Overall, line fishing accounted for almost 560,000 fisher days or 1.8 million hours of effort, implying an average of 3.3 hours per fishing day. Pot fishing was next in importance, reported on 8% of fisher days, followed by diving (5%), gillnet fishing (3%) and other methods (2%).

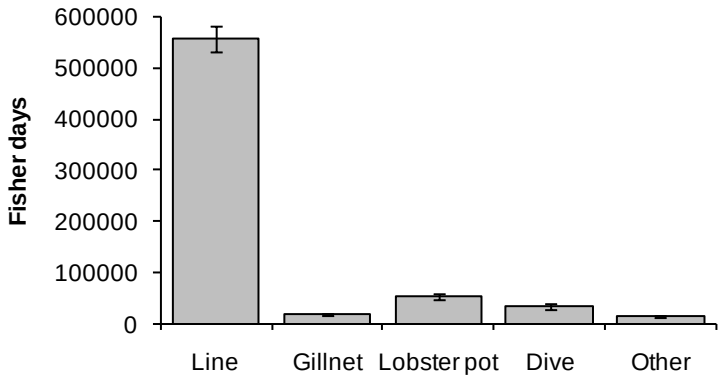

Fig. 8 Fishing effort (fisher days) by fishing method for Tasmanian residents aged five years or older who fished in Tasmania during 2007-08. Error bars represent one standard error.

5.4 Fishing region

Over half (55%) of the state's total fishing effort (fisher days) was focused off the east and south east coasts, with the south east, including the D'Entrecasteaux Channel, Derwent and Norfolk-Frederick Henry Bay regions, collectively accounting for 35% of the total state-wide effort (Fig. 9, Appendix 12). Off eastern Tasmania, the Central East (including Great Oyster Bay) attracted slightly higher levels of effort than the North East region. Effort off the north coast was distributed relatively evenly between the western and eastern (including the Tamar) regions, representing 21% of the overall fishing effort. Comparatively low levels of activity were estimated for the west coast (3%). As noted previously, approximately one quarter of the total fishing effort occurred in inland waters, with effort particularly concentrated in the Central Plateau (12%) and similar levels of effort directed in the Eastern and Western regions (5-6%).

The significance of the D'Entrecasteaux Channel as a recreational fishing area was clearly evident based not only on the number of fisher days of effort (92,000) but also the number of fishers (31,000) estimated to have utilised the region during 2007-08 (Appendix 12). Of the other regions, Norfolk-Frederick Henry Bay, the South East (including the Tasman Peninsula and Bruny Island), the Central East and West North coast were also popular, with estimates of around 19,000 persons having fished at least once in each of them.

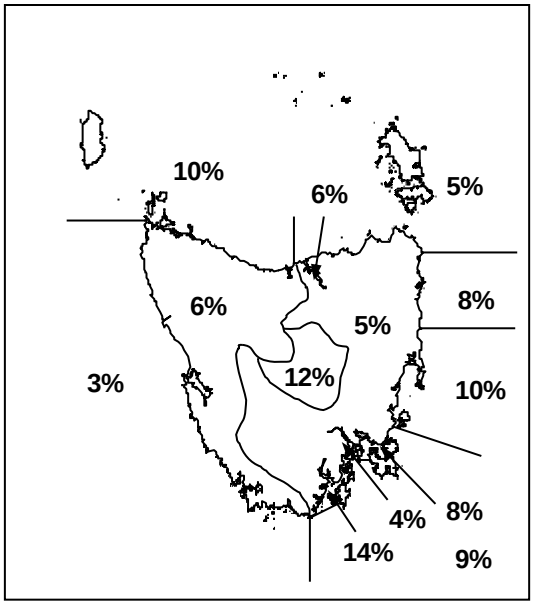

Fig. 9 Regional distribution (percentage) of fishing effort (fisher days) for Tasmanian residents aged five years or older who fished in Tasmania during 2007-08.

5.5 Fishing platform

Boat-based activities dominated the state-wide fishing effort (57% of fisher days) although by water body type there were considerable differences in the relative proportion of shore- and boat-based effort (Fig. 10). Effort levels for shore and boat fishing were

similar in magnitude in the inland lake and dam fisheries whereas river fishing was almost entirely conducted from the shore. Shore-based effort was about 1.6 times greater than that from boats in the estuarine fisheries while boat-based effort was over twice as prevalent as shore-based effort in the inshore coastal fishery. Offshore fishing was exclusively boat-based.

Shore-based fishing was split according to whether the event occurred from jetties or wharves, other manmade structures (e.g. bridges, dam walls, breakwaters) or from naturally occurring structures (e.g. river bank, beach, rocks). The majority of the events occurred from natural structures: 72% overall, >95% for lakes and rivers, 59% for estuarine, and 61% for coastal fishing. Jetties and wharves also represented significant access points for estuarine (30%) and coastal (34%) fishing. Fishing from other manmade structures was a comparatively minor activity (6% overall).

In terms of boat-based fishing activities, the vast majority (99%) of events occurred from privately owned vessels. Fishing from charter-boats was only relatively important in the offshore fishery where it accounted for 13% of events. Charter and hire boat fishing was also reported in the inshore fishery but only represented just 1% of events.

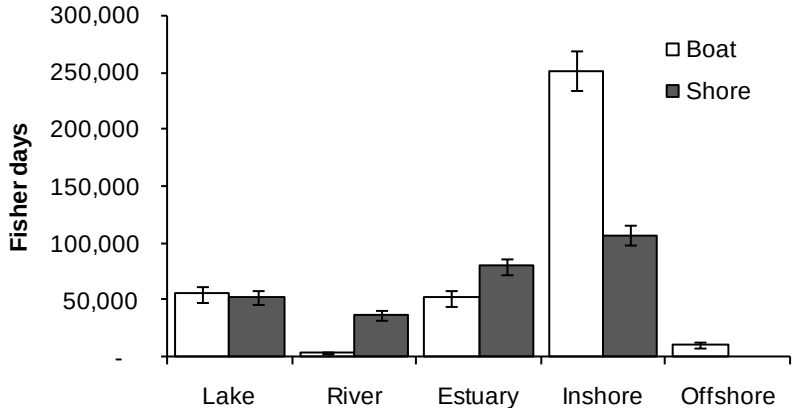

Fig. 10 Fishing effort (fisher days) for Tasmanian residents aged five years or older who fished in Tasmania during 2007-08 by fishing platform and water body type. Error bars represent one standard error.

6. Catch

Recreational fishers harvested a diverse range of finfish, crustaceans, molluscs, and other taxa; a listing of all species and their relative occurrence by fishing method is provided in Appendix 1. For the purposes of reporting and analysis, however, some species have been grouped (typically at the family level), in recognition of the fact that fishers could not reasonably be expected to delineate to species or where particular species were rarely reported. A listing of the taxa that comprise each of the reporting groups is provided in Appendix 1.

6.1 Total catch, harvest and release/discards

In recreational fisheries, catches can be split into retained (harvested) and released/discarded components. The harvested portion may be used for a range of purposes including consumption or as bait, whereas fish may be released because of regulation (e.g. size and/or bag limits), ethical reasons, undesirability of the species, and so on.

Excluding small baitfish, an estimated 2.86 million finfish were caught by Tasmanian recreational fishers during 2007-08, almost two-thirds of which (1.81 million) were flathead (Table 5). Other species of significance in order of descending importance included trout (262,000 or 9%), Australian salmon (188,000 or 7%), gurnard (80,000 or 3%), black bream (48,000 or 2%), tuna (45,000 or 2%), wrasse (45,000 or 2%) and mullet (38,000 or 1%). While the bulk of the finfish were marine species, freshwater species other than trout included redfin, river blackfish and eels (Table 5).

Furthermore, around 133,000 cephalopods (squid and octopus) were captured, with Gould's squid accounting for 62% (82,000) of the total numbers, followed by southern calamari (35,000 or 34%) in importance. Other invertebrate species of significance included rock lobster (135,000), abalone (78,000) and scallops (402,000). A range of other taxa, including crabs, prawns, oysters, mussels, clams, and urchins were caught by recreational fishers.

In total, 1.62 million finfish (excluding small baitfish) were retained, indicating that just over half of all finfish caught were harvested (Table 5). Flathead dominated the retained catch (1.07 million or 66%), followed by trout (157,000 or 10%), Australian salmon (110,000 or 7%), flounder (32,000 or 2%), tuna (27,000 or 2%) and mullet (24,000 or 2%). Amongst the other key taxa, significant numbers of Gould's squid (73,000), southern calamari (40,000), rock lobster (72,000), abalone (64,000) and scallops (397,000) were harvested.

Overall, 1.24 million finfish were released or discarded; actual release rates varied depending upon species (Table 5). High release rates (>70%) were reported for gurnard, sharks and rays, wrasse, and black bream, whereas very low release rates (<5%) were reported for blue warehou and flounder. Relatively low release rates were also apparent for Gould's squid, southern calamari and scallops. When species were grouped based on reported release rates a continuum from those species that were almost exclusively released or discarded to those that are rarely released was apparent (Table 6).

Table 5 Estimated annual catch (total, kept and released nos) and proportion released/discarded for key species during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Total		Kept		Released		%
Species	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**released**
Trout	261,935	35,827	157,284	22,910	104,651	20,755	40.0
Atlantic salmon	10,298	2,798	8,399	2,070	**1,899**	**1,533**	18.4
Redfin	15,788	4,549	9,890	3,109	**5,898**	**2,565**	37.4
River blackfish	*8,076*	*3,101*	***5,618***	***2,343***	***2,458***	***1,174***	*30.4*
Australian salmon	188,227	21,280	110,312	14,373	77,915	10,662	41.4
Barracouta	19,608	4,231	11,577	3,691	8,030	2,018	41.0
Black bream	**48,070**	**20,148**	13,134	3,404	**34,935**	**19,011**	72.7
Blue warehou	*8,814*	*3,330*	*8,723*	*3,326*	+		*1.0*
Cod	31,866	5,156	14,263	2,990	17,603	3,251	55.2
Eel	5,188	1,189	2,601	843	2,587	701	49.9
Flathead	1,811,233	138,077	1,066,293	83,612	744,940	63,283	41.1
Flounder	33,924	11,547	32,436	11,471	1,487	566	4.4
Garfish	*16,353*	*6,065*	*14,568*	*5,573*	***1,785***	***867***	*10.9*
Gurnard	80,228	12,290	13,186	3,313	67,043	10,663	83.6
Jack mackerel	***6,944***	***2,971***	***5,216***	***2,847***	*1,729*	*567*	*24.9*
Jackass morwong	18,964	4,096	9,979	2,222	8,985	2,680	47.4
Leatherjacket	19,046	4,659	7,619	2,674	11,426	2,557	60.0
Mullet	37,856	5,641	24,152	4,672	13,704	2,357	36.2
Pike	*3,792*	*1,021*	*1,626*	*582*	*2,165*	*828*	*57.1*
Silver trevally	21,288	4,350	10,636	2,411	10,652	2,859	50.0
Trumpeter	19,867	4,326	17,321	3,823	**2,545**	**1,054**	12.8
Tuna	45,538	11,405	26,805	5,891	18,733	6,336	41.1
Whiting	30,565	9,777	**14,992**	**6,004**	15,573	5,278	51.0
Wrasse	45,043	6,612	11,640	2,530	33,404	4,922	74.2
Scalefish, other	29,509	4,518	13,760	3,090	15,749	2,953	53.4
Small baitfish	***63,619***	***29,179***	***60,686***	***29,091***	***2,934***	***2,680***	*4.6*
Sharks & rays	40,899	5,999	8,993	1,779	31,907	4,809	78.0
Rock lobster	135,284	17,835	71,965	9,471	63,319	10,307	46.8
Crustaceans, other	*13,684*	*4,207*	***5,956***	***3,053***	*7,729*	*2,854*	*56.5*
Southern calamari	44,889	9,052	40,525	8,271	**4,364**	**2,185**	9.7
Gould's squid	82,269	11,517	73,236	10,697	9,034	2,278	11.0
Cephalopod, other	*5,605*	*1,843*	***1,149***	***489***	*4,456*	*1,723*	*79.5*
Abalone	78,505	16,271	64,421	14,219	14,084	4,092	17.9
Scallop	401,864	93,617	396,685	92,996	**5,180**	**2,490**	1.3
Bivalve, other	***73,270***	***31,435***	***73,079***	***31,428***	+		*0.3*
Other taxa	***10,170***	***7,402***	***10,170***	***7,402***			

Table 6 Summary table indicating groupings based on the proportion of the recreational catch for key species that was released or discarded by fishers during 2007-08.

Released → **Kept**

Proportion released				
> 70%	**51-70%**	**31-50%**	**10-30%**	**< 10%**
Black bream	Whiting	River blackfish	Garfish	Blue warehou
Wrasse	Cod	Mullet	Trumpeter	Flounder
Gurnards	Pike	Redfin	Atlantic salmon	Southern calamari
Sharks & rays	Leatherjacket	Trout	Jack mackerel	Scallops
		Barracouta	Goulds squid	
		Flathead	Abalone	
		Tuna		
		Australian salmon		
		Jackass morwong		
		Eels		
		Silver trevally		
		Rocklobster		

6.1.1 Reasons for release

The reasons why fish are released or discarded varies and include adherence to regulations (size and bag limits, closed seasons or protected species), ethical factors such as catch and release fishing, damage or poor quality, or the species being considered undesirable, often based on its perceived eating qualities. To better understand fisher motivations in relation to releasing or discarding species, respondents were asked to identify the reason(s) for release and the numbers of each species to which the particular reason applied for each fishing event reported. This approach recognised that there may be several reasons for releasing the catch and sought to attribute a reason for each individual fish. Based on terminology used by the respondent, the following release categories were identified: 'too small' - implying that the fish was too small to be retained (not necessarily due to size limits regulations); 'undersized' – implying some knowledge and adherence to size limit regulations; 'catch and release' – implying a voluntary release ethic associated with either sport fishing or conservation (no inference about fish size); and 'too many' – implying a catch number in excess of needs (note, while 'over the bag limit' was a reporting category there were very few instances where this was an identified reason and for analysis those responses have been treated as the same as too many). Other reasons for release included poor eating qualities, damaged or poor quality, and prohibited species.

The breakdown of reasons for release of the main species is presented in Fig. 11. Size, mainly in response to minimum size limits, was the primary reason for release of flathead, silver trevally, mullet, Australian salmon, jackass morwong, abalone and rock lobster. The only species for which catch and release was identified as a significant motivation were black bream, trout and tuna. Species for which poor eating qualities were identified as an important reason for release included barracouta, redfin, cod, wrasse, leatherjacket and gurnard. Poor eating qualities were identified as reasons for some shark and ray species (e.g. draughtboard shark, dogfish, rays) along with regulation as protected species was also noted (mainly when caught in shark refuge areas).

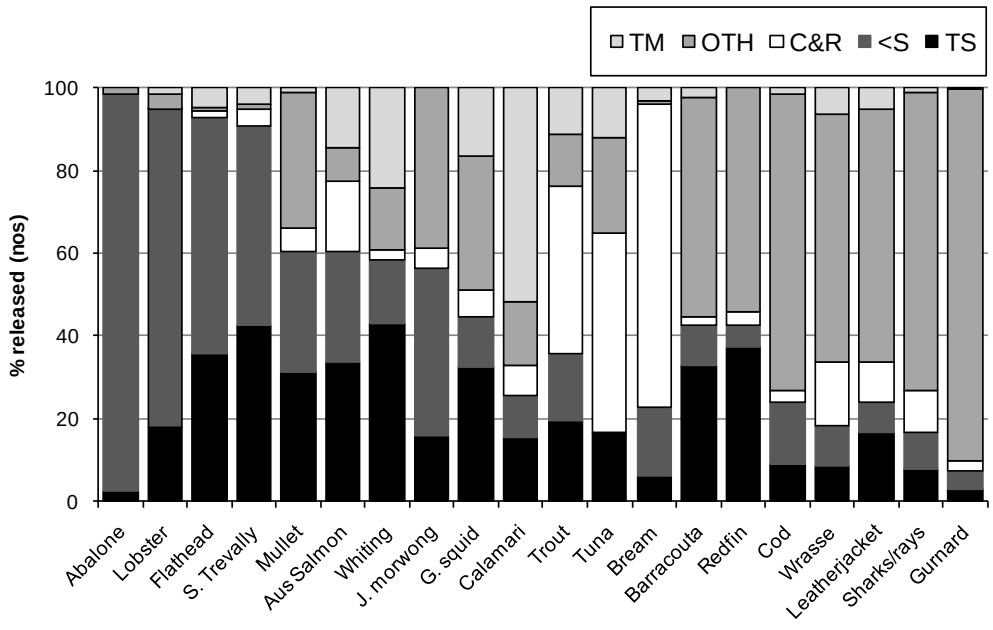

Fig. 11 Relative importance (% total release numbers) of different reasons for release of key species taken by Tasmanian residents aged five years or older who fished in Tasmania during 2007-08. TS too small; <S undersized; C&R catch and release; TM too many; OTH other reasons.

6.1.2 Targeted fishing

In order to understand targeting practices, respondents were asked whether they were fishing for particular species or not for each fishing event. This enabled fishing effort to be defined as being targeted at a species or group (up to two species could be nominated) and whether or not that species was actually captured. Non-targeted effort was often articulated by respondents as 'fishing for a feed', 'whatever takes the bait' or 'nothing in particular'.

Knowledge of targeting enables effort and catch rates to be attributed appropriately since recreational fisheries are typically characterised by a high proportion of nil catch events. For instance, in this study 22% of all events resulted in no catch (kept or released) and when instances where the target species was not caught are considered this figure was substantially higher. While it is possible to estimate targeted effort and targeted catch rates (which take account of nil catches), the primary objective of the current analysis was to examine the extent to which catches of key species were the result of targeted, as opposed to non-targeted, effort.

Targeted and non-targeted catch estimates for the key species are provided in Appendices 4 and 5 and the proportion of the catches contributed to by targeted effort is summarised in Table 7. At one end of the continuum, tuna, trout, flounder, scallops and rock lobster were taken almost exclusively as a result of targeted effort, implying a very high level of fishery specialisation for these species. For example, the game fishery for tuna is a very discrete activity as is the inland fishery for trout or the rock lobster fishery which is based on pots, rings or dive collection methods. Other species that tended to be caught

primarily as a result of targeted effort included black bream, flathead, garfish and abalone, also implying a level of fishery specialisation for these species. By contrast, jackass morwong, jack mackerel, leatherjackets, wrasse, gurnard, cod and eels were rarely targeted, and thus catches were largely taken as a by-product or by-catch of fishing for other species. As indicated in the previous section, several of the species in this latter group were held in low esteem by fishers.

Table 7 Summary table indicating groupings based on the proportion of the recreational catch (kept and released) of key species that was taken by targeted effort during 2007-08.

Non-target → **Target**

Proportion of catch targeted					
< 10%	**11 - 30%**	**31 - 50%**	**51 - 70%**	**71 - 90%**	**> 90%**
Jackass morwong	Blue warehou	Trumpeter	Australian salmon	Black bream	Tuna
Jack mackerel	Redfin	Atlantic salmon	River blackfish	Flathead	Trout
Leatherjacket	Mullet	Silver trevally	Southern calamari	Garfish	Flounder
Wrasse	Pike	Gould's squid		Abalone	Rock lobster
Gurnards	Whiting				Scallop
Cod	Sharks & rays				
Eel	Barracouta				

6.1.3 Harvest weights

Catch information reported during the diary survey was based on numbers rather than weight or size (length) since these latter parameters tend to be less reliably estimated when self-reported by recreational fishers. However, the weight of the recreational harvest is of particular interest to resource managers, scientists, the broader fishing community (commercial and recreational) and other stakeholder groups with an interest in the aquatic environment. Commercial production is generally reported in terms of weight and thus to permit comparisons between sectors it is desirable to report recreational harvest by weight.

It is possible to approximate recreational harvest weights for a given species by multiplying numbers caught by the average weight of an individual. However, achieving accuracy and precision in determining average weight for a species is complex because fish populations tend to exhibit structuring based on size (and age) over a range of temporal and spatial scales. There are also issues of gear selectivity, skill and personal ethics of individual fishers that will also affect the sizes of fish captured and retained. Ideally all of these factors should be taken into account when calculating average individual weight estimates. As this is rarely the case in large-scale studies, and was beyond the scope of the limited on-site surveys undertaken as part of this survey, the simple application of an average individual weight will introduce an additional degree of uncertainty to the harvest (weight) estimates. Furthermore, in some instances related species have been grouped together for reporting purposes, thereby confounding the notion of a simple average individual weight for all of the species in the group. *For these reasons it is necessary to view harvest weights for particular species or species groups as indicative rather than absolute point estimates of recreational fishery production*.

On-site (creel) surveys conducted as part of the present survey and information from a research angler logbook program (TAFI, unpubl. data) as well as information from alternative sources, such as commercial size composition information, have been used to approximate the average size of fish retained by recreational fishers (Table 8). Where lengths were available, length/weight relationships have been used to derive mean weights and these have been applied to harvest numbers to derive catch weights of the recreational catch (Table 8).

This survey has clearly established that, for a range of species, recreational catches were significant, with catches of flathead and tuna each exceeding 140 tonnes. Overall, flathead not only dominated recreational catch numbers but by weight (290 tonnes) it was the most significant component of the harvest and exceeded the commercial flathead catch from Tasmanian waters by a factor of about four.

The provision of harvest weights for selected species enabled comparisons with commercial production and has relevance for stock assessment and management, including issues relating to resource sharing and allocation. Recreational catches were roughly equivalent to or greater than production from the Tasmanian commercial scalefish fishery for species such as flathead, flounder, mullet, cod, barracouta, silver trevally, jackass morwong and Gould's squid (Table 8). Conversely, compared with the commercial sector, the recreational harvest represented a minor component (<15%) of the total catch for Australian salmon, whiting, garfish, wrasse and jack mackerel. Commercial fishers are not permitted to take black bream and apart from eels and whitebait, there are no commercial fisheries in inland waters meaning that trout, redfin and river blackfish are effectively recreational species (apart from any trout by-catch taken in marine waters). Atlantic salmon are stocked in selected inland waters and escapees from fish farms are targeted in marine waters by recreational fishers and taken as a by-catch by commercial fisher, although fishers are not permitted to offer them for sale.

Table 8. Annual harvest (numbers), average weight and estimated harvest weight for key species taken by recreational fishers in Tasmania during 2007-08, based on Tasmanian residents aged five years or older, and compared with commercial production in Tasmania. Commercial finfish catch data are based on General Fishing logbook returns.

Average weights based on on-site survey (2008) and research angler data (2008-09); [A] weighted average according to the average species weight and relative catch; [B] other data sources utilised; na not available

	Recreational					
Species	Harvest (No.)	Av. weight (kg)	Estimated harvest (tonnes)	Commercial catch (tonnes)	Combined catch (tonnes)	% recreational
Flathead	1,066,293	0.27	292.6	73.2	365.8	80.0
Trout	157,284	na		-		na
Australian salmon	110,312	0.44	48.1	299.8	347.9	13.8
Flounder	32,436	0.31	10.1	7.8	17.9	56.3
Tuna	26,805	5.40[A]	144.7	na		na
Mullet	24,152	0.27	6.6	2.4	9.0	73.3
Trumpeter	17,321	1.10[A]	19.1	29.3	48.4	39.4
Whiting	14,992	0.22	3.4	35.4	38.8	8.7
Garfish	14,568	0.13	2.0	51.0	53.0	3.7
Cod	14,263	0.58	8.2	2.5	10.7	76.7
Gurnard	13,186	na	na	3.6		na
Black bream	13,134	0.87	11.4	-		na
Wrasse	11,640	0.88	10.3	68.5	78.8	13.1
Barracouta	11,577	0.94	10.8	13.9	24.7	43.8
Silver trevally	10,636	0.40	4.2	2.0	6.2	67.9
Jackass morwong	9,979	0.68	6.8	3.8	10.6	64.2
Redfin	9,890	na		-		na
Sharks & rays	8,993	na		18.9		na
Blue warehou	8,723	0.80	7.0	26.6	33.6	20.8
Atlantic salmon	8,399	na		1.7		na
Blackfish	8,076	na		-		na
Leatherjackets	7,619	0.34	2.6	4.2	6.8	38.0
Jack mackerel	5,216	0.18	1.0	225.7	226.7	0.4
Eels	2,601	na		-		na
Pike	1,626	na		11.2	11.2	na
Southern calamari	40,525	1.10	44.6	102.6	147.2	30.3
Gould's squid	73,236	0.5[B]	36.6	45.8	82.4	44.4

6.2 Catch by water body

Catch details by water body are provided in Appendices 6 and 7 and the relative importance of the main finfish species (excluding small baitfish) are summarised in Fig. 12. Of the total finfish catch (2.86 million fish), about 8% was taken from lakes and dams, 3% from rivers, 19% from estuarine waters, 68% from inshore coastal waters and 3% from offshore waters.

Trout accounted for the vast majority (>80%) of the freshwater catch, with redfin, Atlantic salmon and river blackfish of secondary importance in the lake and dam fisheries and redfin, river blackfish and eels in the river fisheries (Fig. 12). Flathead and Australian salmon dominated estuarine and inshore catches, collectively accounting for over 70% of total numbers taken from estuarine and inshore waters (Fig. 12). Other species of significance included black bream and flounder in the estuarine fishery, and gurnard and wrasse in the inshore fishery. Although based on comparatively low numbers, offshore catches included a range of pelagic and demersal species, including various tuna, flathead, gurnard (mainly ocean perch), and shark and ray species.

Squid (Gould's squid and southern calamari) were mainly captured in inshore waters with catches also taken from estuarine waters. Rock lobster, abalone and scallop catches were effectively restricted to inshore coastal waters (Appendices 6 and 7).

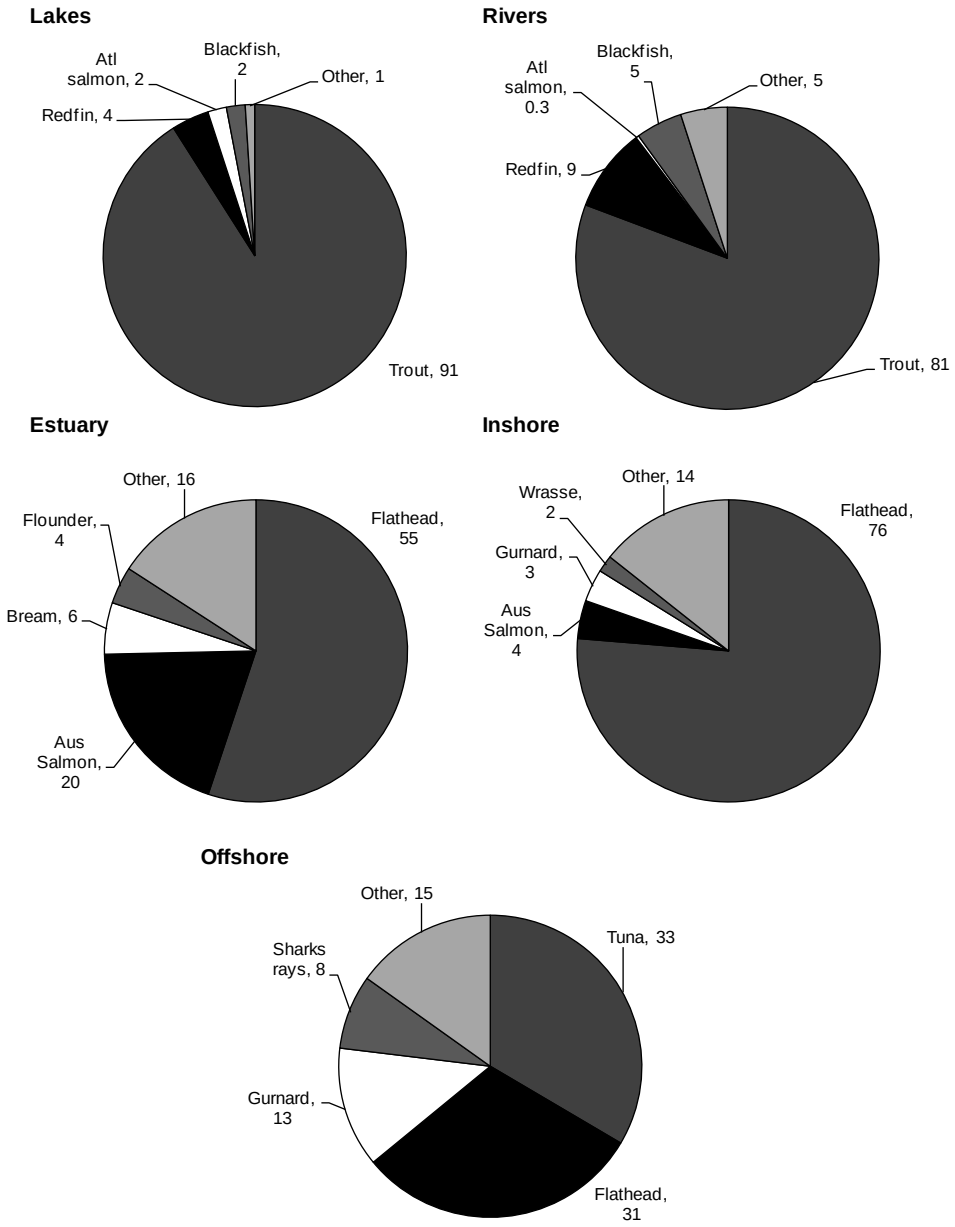

Fig. 12 Percentage composition of the recreational finfish catch (kept and released numbers) by water body for Tasmania during 2007-08. Percentage values are indicated.

6.3 Catch by method

Catch details by fishing method are provided in Appendices 8 and 9. Overall, line fishing accounted for 96% of the total finfish (excluding small baitfish) catch (2.27 million fish), with a further 2% (60,000) taken by gillnet. Flathead represented about two-thirds of the line catch, while trout, Australian salmon, gurnard and black bream were of secondary importance (Fig. 13). The vast majority of the Gould's squid and southern calamari were taken by line fishing. By contrast, bastard trumpeter, blue warehou, various species of sharks and rays, mullet and Atlantic salmon were the main species taken by gillnet (Fig. 13), while flounder were mainly taken by spear and to a lesser extent by gillnet. Small baitfish (especially whitebait) were taken almost exclusively by bait nets and traps.

Not unexpectedly, rock lobster was the primary species taken in pots; the species was also targeted by divers. Abalone and scallops were more or less exclusively harvested by divers (Appendices 8 and 9).

Fig. 13 Percentage composition of the recreational finfish catch ((kept and released numbers) by line and gillnet fishing methods for Tasmania during 2007-08. Percentage values are indicated

6.3.1 Line fishing

Line fishing was categorised by whether bait, lures/flies, or a combination of bait and lure/fly fishing was undertaken for each fishing event. The use of set lines was also identified, with recreational fishers permitted to use up to 30 hooks (typically baited) on a line, either set as a long line or drop line. Table 9 summarises the relative importance of the different line fishing modes (set lines have been excluded) for the key species. For such species as river blackfish, cod, silver trevally, mullet, and jackass morwong, at least three quarters of the catch was taken using bait. By contrast, trout, tuna, and redfin perch were primarily targeted using lures or flies. Bait and lure fishing were significant line capture techniques for species such as Australian salmon and black bream.

In Australia there has been a growing awareness and acceptance of the use of lures, in particular soft plastics, for what have traditionally been bait capture species. Species for which this is particularly true include flathead and black bream and the extent to which this trend has impacted on the Tasmanian fishery is evident by comparison with results of the 2000-01 survey where at that time around 90% of the catch of both species was taken by bait fishing (Lyle 2005).

Table 9 Estimated catch by line fishing mode indicating catch numbers and proportions taken by bait and/or lure/fly for key species during 2007-08, based on Tasmanian residents aged five years or older.

Values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group; + indicates fewer than 1000 individuals.

	Numbers			% total	
Species	**Bait**	**Lure/fly**	**Both**	**Bait only**	**Lure only**
River blackfish	*8,076*			100.0	-
Cod	24,469	2,805	2,783	81.4	9.3
Silver trevally	14,805	1,298	2,337	80.3	7.0
Mullet	21,007	3,242	3,108	76.8	11.9
Jackass morwong	13,296	2,046	2,256	75.6	11.6
Sharks & rays	20,586	1,477	7,810	68.9	4.9
Whiting	20,272	5,980	4,195	66.6	19.6
Flathead	1,168,520	263,791	376,713	64.6	14.6
Leatherjacket	9,695	1,789	3,784	63.5	11.7
Wrasse	24,806	9,932	5,709	61.3	24.6
Jack mackerel	*4,082*	+	*1,841*	59.8	13.2
Gurnard	44,315	7,658	25,420	57.3	9.9
Black bream	**16,798**	**26,338**	**3,607**	35.9	56.3
Australian salmon	50,829	104,707	30,133	27.4	56.4
Gould's squid	20,695	35,863	25,631	25.2	43.6
Atlantic salmon	1,483	3,693	+	24.1	60.0
Barracouta	4,196	10,626	4,786	21.4	54.2
Redfin	2,336	10,483	+	18.0	80.6
Southern calamari	6,192	26,534	11,553	14.0	59.9
Trout	27,808	223,574	10,493	10.6	85.4
Tuna	2,251	39,917	3,227	5.0	87.9

6.4 Catch by platform

Overall about 80% of the total finfish catch (excluding small baitfish) was taken by boat-based fishers. The proportion of the catch taken by boat as opposed to shore-based fishing, however, varied considerably between species influenced by the species distribution and fishing methods (Appendices 10 and 11).

Offshore species - for example, tuna and striped trumpeter - were exclusively caught from boats (Table 10). Other finfish that were primarily captured by boat-based fishers (>90%) included gurnard, bastard trumpeter and flathead while boat-based effort also produced most of the catch for species such as Atlantic salmon, Australian salmon, barracouta, black bream, jackass morwong, garfish, leatherjacket, whiting, wrasse and sharks. By contrast, shore-based fishing dominated catches for the freshwater species, including trout, redfin, eels and river blackfish, along with several marine species including cod, flounder, jack mackerel, mullet and silver trevally. The vast majority of the rock lobster, Gould's squid and scallop catches were taken by boat fishers. Southern calamari and abalone were mainly taken by boat-based effort but shore-based catches were relatively common.

Table 10 Summary table indicating groupings based on the proportion of the recreational catch of key species that was taken by boat-based fishers during 2007-08.

Shore → **Boat**

Proportion boat-based				
< 15%	**30-50%**	**51-70%**	**71-90%**	**>90%**
River blackfish	Trout	Atlantic salmon	Barracouta	Flathead
Eel	Redfin	Australian salmon	Black bream	Gurnard
Flounder	Cod	Pike	Blue warehou	Trumpeter
	Jack mackerel	Wrasse	Garfish	Tuna
	Mullet	Southern calamari	Jackass morwong	Goulds squid
	Silver trevally		Leatherjacket	Rocklobster
			Whiting	Scallops
			Sharks & rays	
			Abalone	

7. Key species

In the following section, the fisheries for key species are described in terms of regional distribution of the catch (refer Appendix 12), numbers kept and released (Table 5), catch by fishing platform (Appendix 10), method (Appendix 8), water body (Appendix 6) and season. Catch information was provided by fishers during the 12-month diary survey and has been presented as expanded estimates.

7.1 Flathead

Southern sand flathead (*Platycephalus bassensis*) and tiger flathead (*Neoplatycephalus richardsoni*) were the dominant species of flathead taken in Tasmanian waters. Of the total catch numbers, 95% (1,719,452; SE 135,243) were southern sand flathead and just 3% (54,295; SE 11,357) were tiger flathead. The balance (37,484; SE 10,010) were reported as unspecified flathead.

The vast majority (>85%) of the catch was derived from the Central East and South East coasts, with the D'Entrecasteaux Channel and Norfolk-Frederick Henry Bay regions particularly significant (Fig. 14A). By comparison, north coast catches, including the Tamar, were comparatively low while West coast catches were insignificant. Over 40% of all flathead caught were released or discarded (Fig. 14B). Boat based fishing accounted for the vast majority (95%) of the catch (Fig. 14C), and virtually all of the catch was taken by line fishing (Fig. 14D), primarily using bait rather than lures. Flathead catches were concentrated in inshore coastal waters with relatively small numbers also taken from estuarine and, to a lesser extent, offshore waters (Fig. 14E). The flathead fishery was highly seasonal, with a strong peak in January-February and a distinct trough between June and September (Fig. 14F). The main fishing period between December and March accounted for almost three quarters of the annual catch.

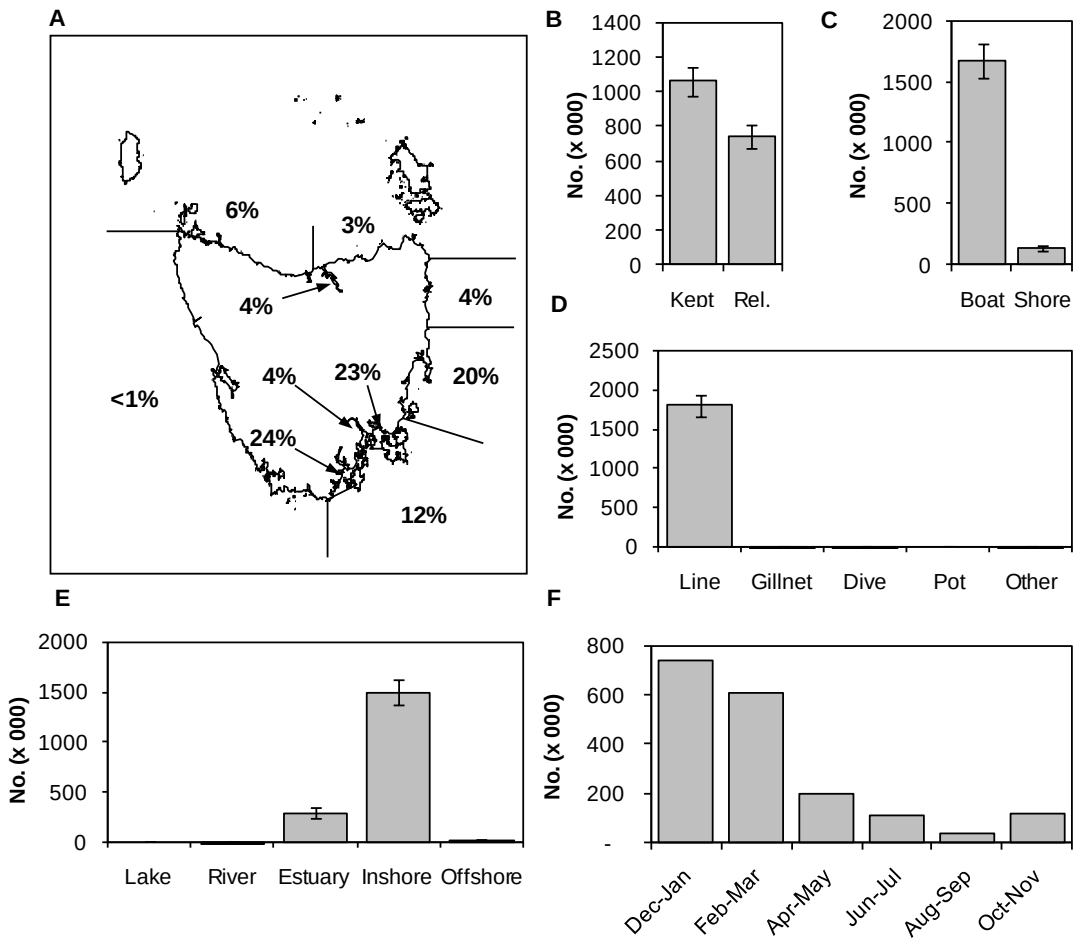

Fig. 14 Characteristics of the recreational fishery for flathead in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.2 Trout

Overall, brown trout (*Salmo trutta*) represented 85% (223,262; SE 32,113) of the catch numbers with rainbow trout (*Oncoryhnchus mykiss*) comprising the bulk of the remainder (36,655; SE 6500). A small proportion of the catch was not identified to species level by survey respondents (1918; SE 837).

The importance of the Central Plateau region to the trout fishery is clearly evident in Fig. 15A, accounting for almost two thirds of the state's catch of trout, with Arthurs Lake and Great Lake together producing about half of the catch from this region. The Western and Eastern inland regions were roughly equivalent in terms of catches (17-18% of total), while catches from other regions were insignificant. Out of a total catch of 0.26 million trout, about 40% were released (Fig. 15B), taken almost equally between boat- and shore-based fishers (Fig. 15C). Trout were caught almost exclusively by line fishing (Fig. 15D), with lures/flies the main (>85%) gear used. The catch from lakes and dams was over three times greater than that from rivers; very minor quantities of trout were taken

from estuarine and inshore waters (Fig. 15E). Catches peaked during January-February and then declined to very low levels during winter, corresponding to closure of parts of the fishery, before increasing again in the spring months (Fig. 15F).

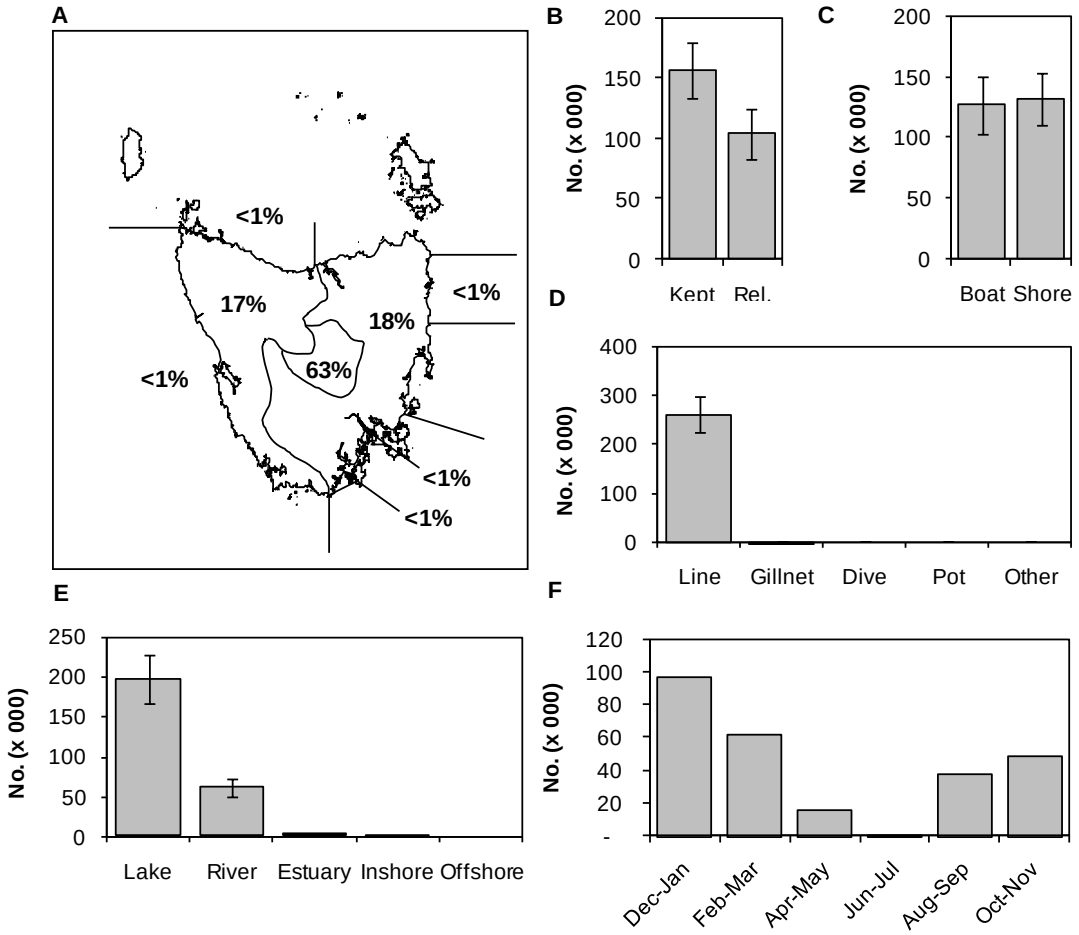

Fig. 15 Characteristics of the recreational fishery for trout in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.3 Australian salmon

The recreational fishery for Australian salmon (*Arripis trutta* and *A. truttaceus*) was concentrated off northern Tasmania (58%), in particular the West North (Fig. 16A). The North East coast was also relatively important (17% total), with catches off the Central East, South East (including associated waterways), and West coasts regions of more or less similar importance in terms of catch levels (around 10% each). Numerically, Australian salmon were the third most frequently caught finfish in Tasmania, with about 40% of the total catch of 188,000 fish released or discarded (Fig. 16B). In addition to boat-based catches, there was a substantial shore-based fishery for the species (Fig. 16C), with line fishing by far the major fishing method (Fig. 16D). Bait and lure fishing represented important capture methods, with over half of the catch taken by lures. Catches were concentrated in estuarine and inshore coastal waters (Fig. 16E), with evidence of a spring-summer (October-March) peak in fishing activity (Fig. 16F).

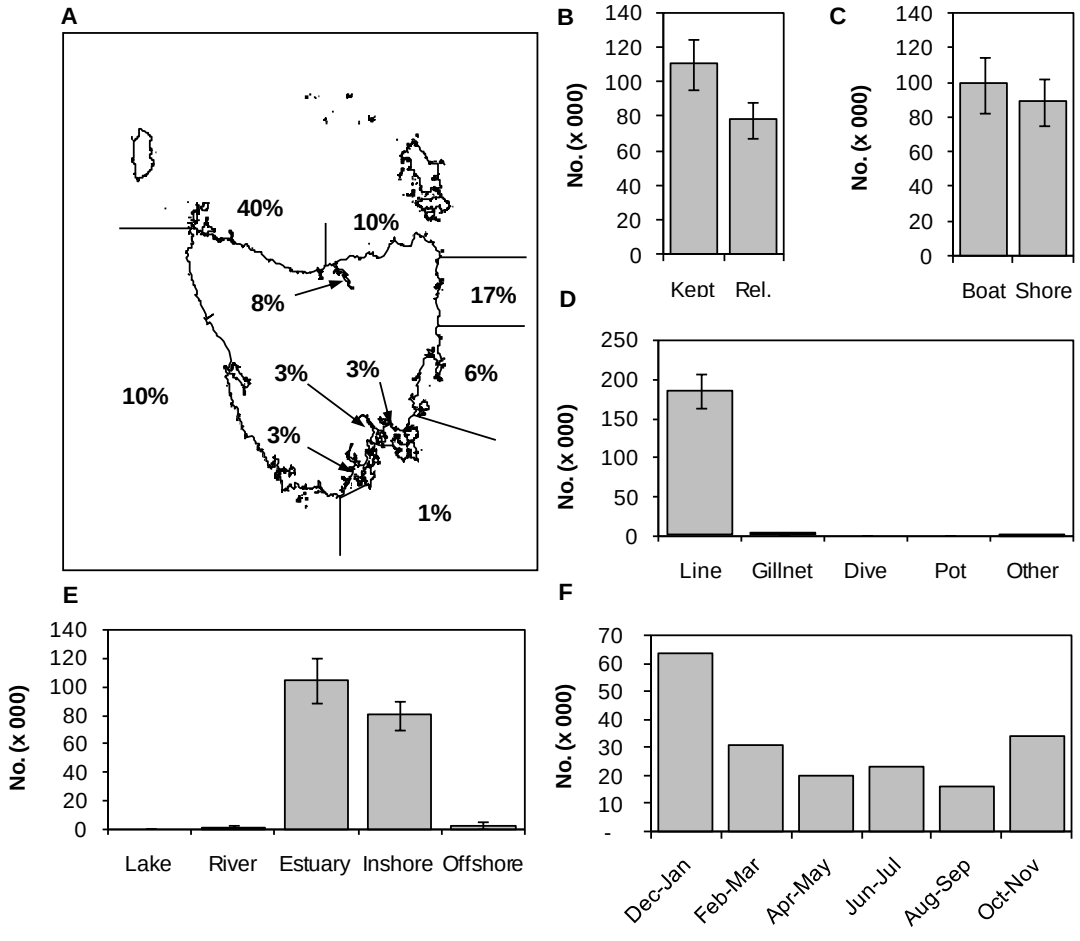

Fig. 16 Characteristics of the recreational fishery for Australian salmon in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by 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 Mullet

Yellow-eye mullet (*Aldrichetta forsteri*) and sea mullet (*Mugil cephalus*) occur in Tasmania waters, and although survey respondents did not distinguish between species, yellow-eye mullet is known to dominate catches in Tasmania. Catches were concentrated in the north coast regions, in particular the West North (Fig. 17A). Apart from the North East, catches from all other regions were relatively small. Just over one third of the catch was released (Fig. 17B), with shore-based fishers accounting for the majority (66%) of the take (Fig. 17C). Mullet were captured mainly by line fishing though gillnet and seine nets were also relatively important methods (Fig. 17D), with the species taken from inshore coastal and estuarine waters (Fig. 17E). There was a strong peak in catches between December and March, with comparatively low quantities taken at other times of the year (Fig. 17F).

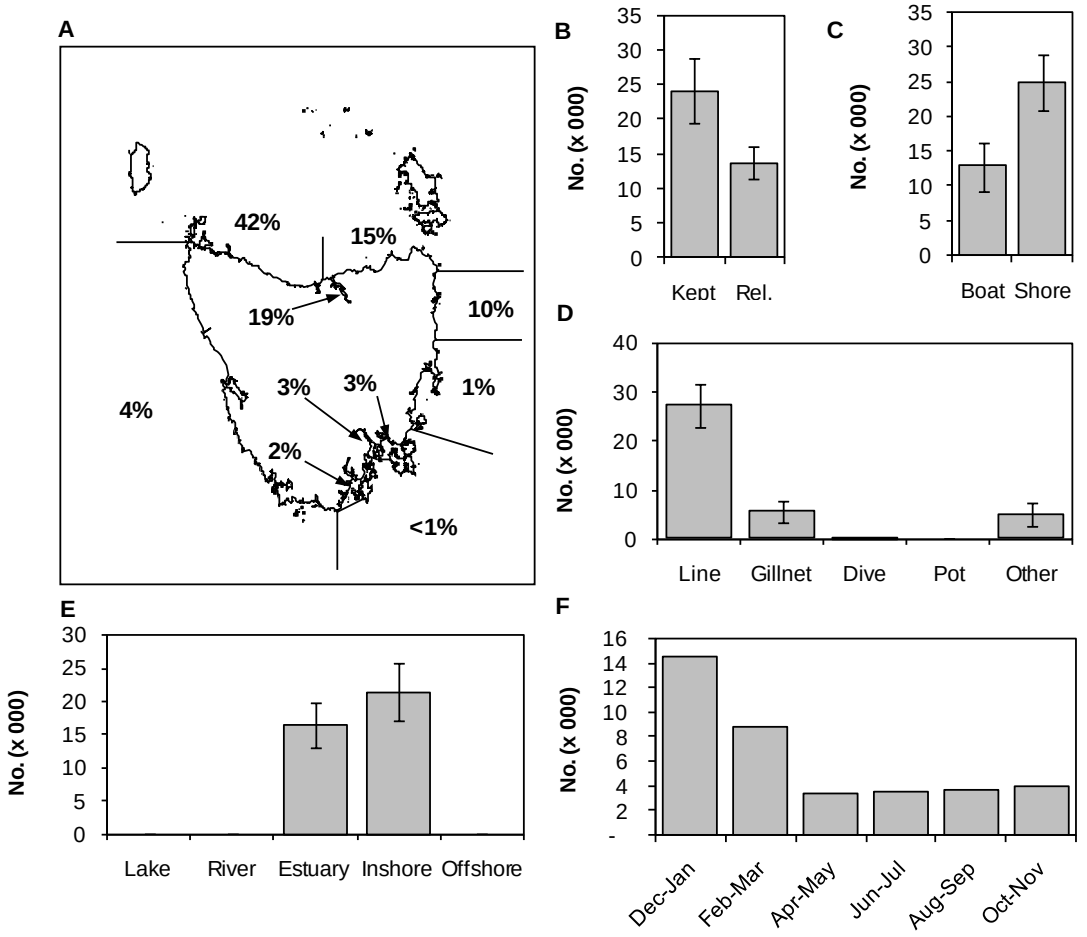

Fig. 17 Characteristics of the recreational fishery for mullet in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.5 Flounder

Several species of flounder occur in Tasmanian waters, the most frequently caught being the greenback flounder (*Rhombosolea tapirina*), with the long-snouted flounder (*Ammotretis rostratus*) occasionally taken. Survey respondents did not, however, distinguish catch by species.

Flounder were mainly caught in sheltered inshore waters, in particular from south eastern Tasmania, namely the Derwent, Norfolk- Frederick Henry Bay and D'Entrecasteaux Channel regions. Collectively, northern and western Tasmania accounted for about 15% of the total catch, the west coast fishery being centred in Macquarie Harbour (Fig. 18A). Only a very small proportion of the catch was released (Fig. 18B) and shore-based fishing produced the bulk of the harvest (Fig. 18C). Spearing was the main method of capture, with a very minor component taken by line and gillnet (Fig. 18D). As indicated above, flounder were caught exclusively in inshore coastal and estuarine waters (Fig, 18E). Catches exhibited a marked peak in April-May and a trough between August and November (Fig. 18F).

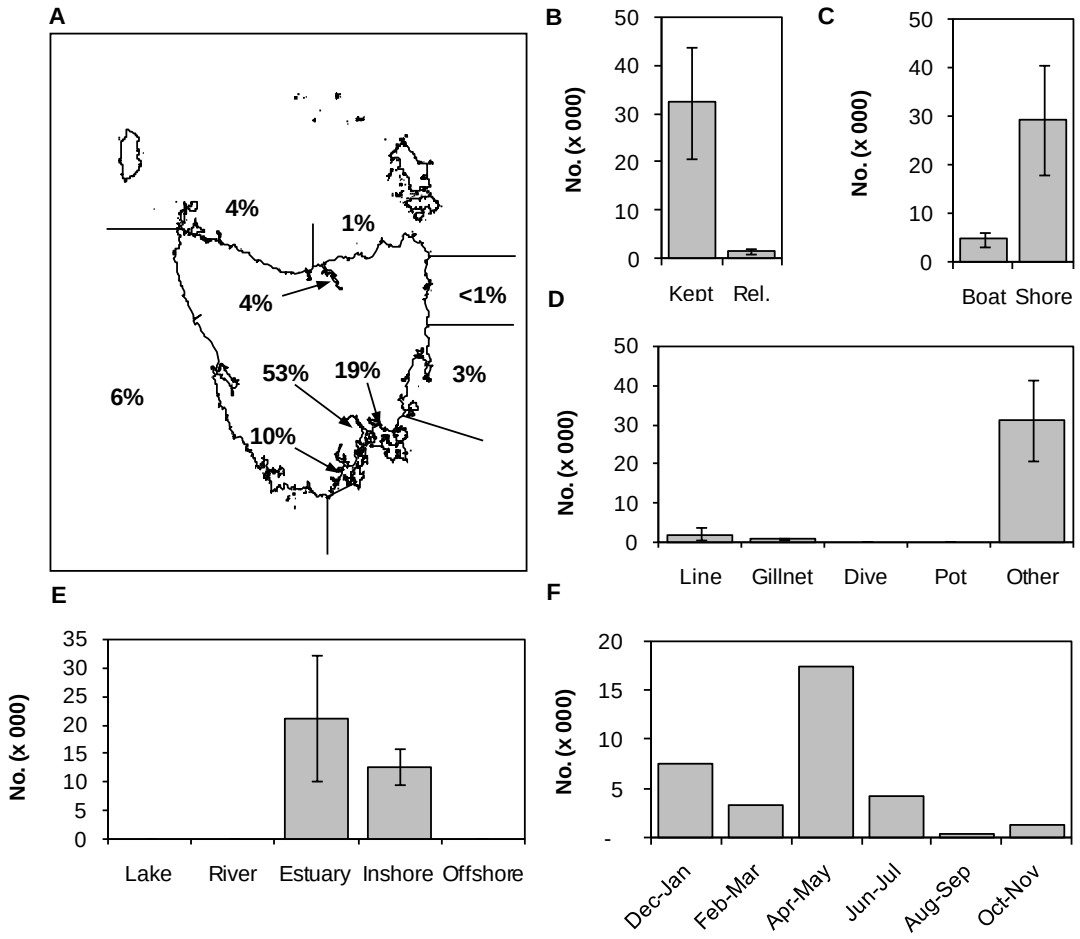

Fig. 18 Characteristics of the recreational fishery for flounder in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.6 Black bream

The North East (mainly the Scamander River, Georges Bay and Ansons Bay) represented the most significant region for black bream (*Acanthopagrus butcheri*), accounting for about half of catch numbers (Fig. 19A). The Central East (mainly Swan River and Little Swanport) was of secondary importance, followed by the Derwent Estuary. Minor catches were also reported from other areas around Tasmania. The majority of the catch was released (Fig. 19B), mainly reflecting a catch and release ethic (Fig. 11). Boat-based fishing was by far the dominant fishing mode (Fig. 19C), with line fishing, using both bait and lures, along with a relatively minor gillnet catch, accounting for the vast majority of the black bream catch (Fig. 19D). Catches were taken primarily from estuarine waters, with inshore coastal waters also important (Fig. 19E). The fishery exhibited a strong peak during the summer months (December–March) with only small quantities of black bream taken during winter and early spring (Fig. 19F).

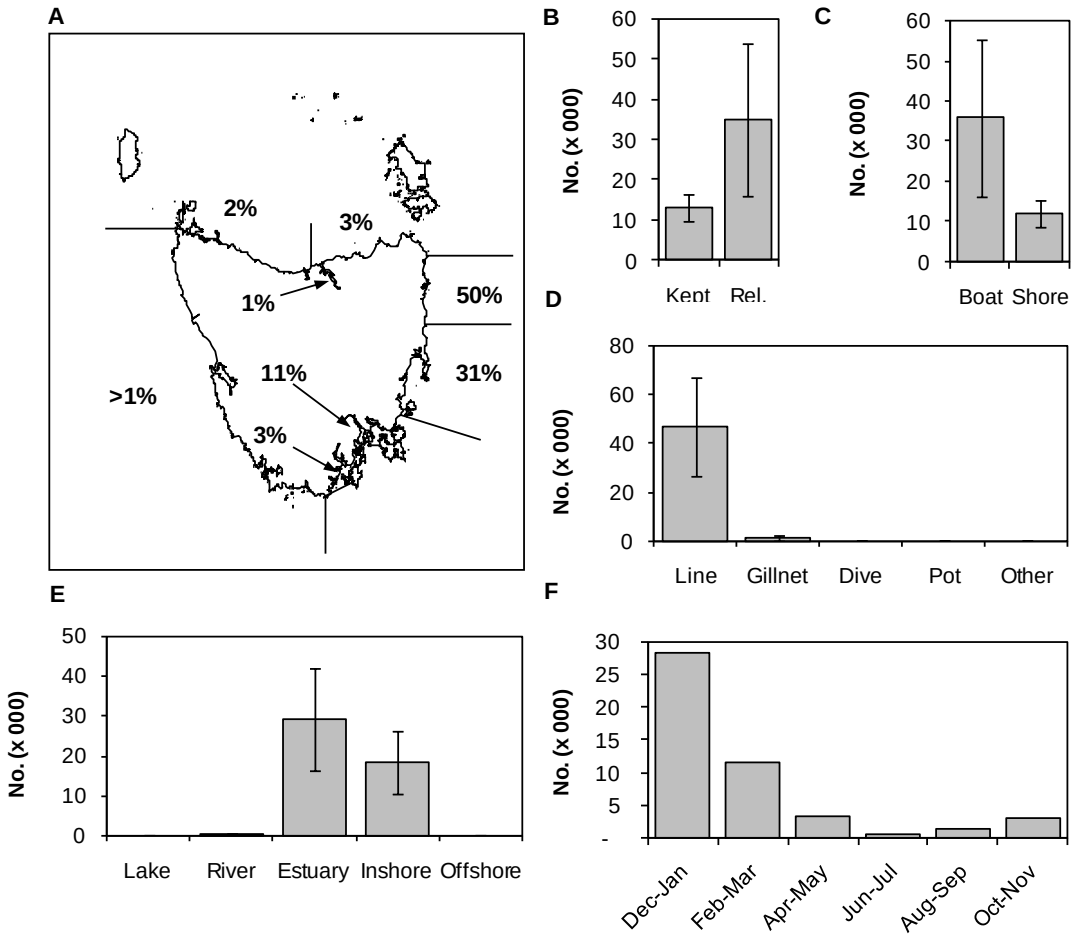

Fig. 19 Characteristics of the recreational fishery for black bream in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.7 Tuna

Recreational fishers reported catching several species of tuna; skipjack tuna (*Katsuwonus pelamis*) was the most common, representing 51% of catch numbers (23,296; SE 6732), followed by albacore (*Thunnus alalunga*) at 46% (20,728; SE 5674), and southern bluefin tuna (*T. maccoyii*) at 3% (1485; SE 674). Yellowfin tuna (*T. albacores*) was also taken but in very low numbers.

The tuna fishery was more or less restricted to the east coast of Tasmania, in particular the North East and South East regions (Fig. 20A). Overall about 40% of the catch of tuna was released, although the proportion varied between species such that over half (56%) of the skipjack tuna were released whereas just 26–28% of the albacore and southern bluefin tuna were released (Fig. 20B). The tuna fishery was exclusively a boat-based (Fig. 20C) line fishery (Fig. 20D), primarily involving the use of lures. Catches were mainly derived from offshore waters (>5 km from the coast) but were also reported from more inshore waters (Fig. 20E). Tuna catches were restricted to the summer–autumn period, with a marked peak in numbers during February-March (Fig. 20F).

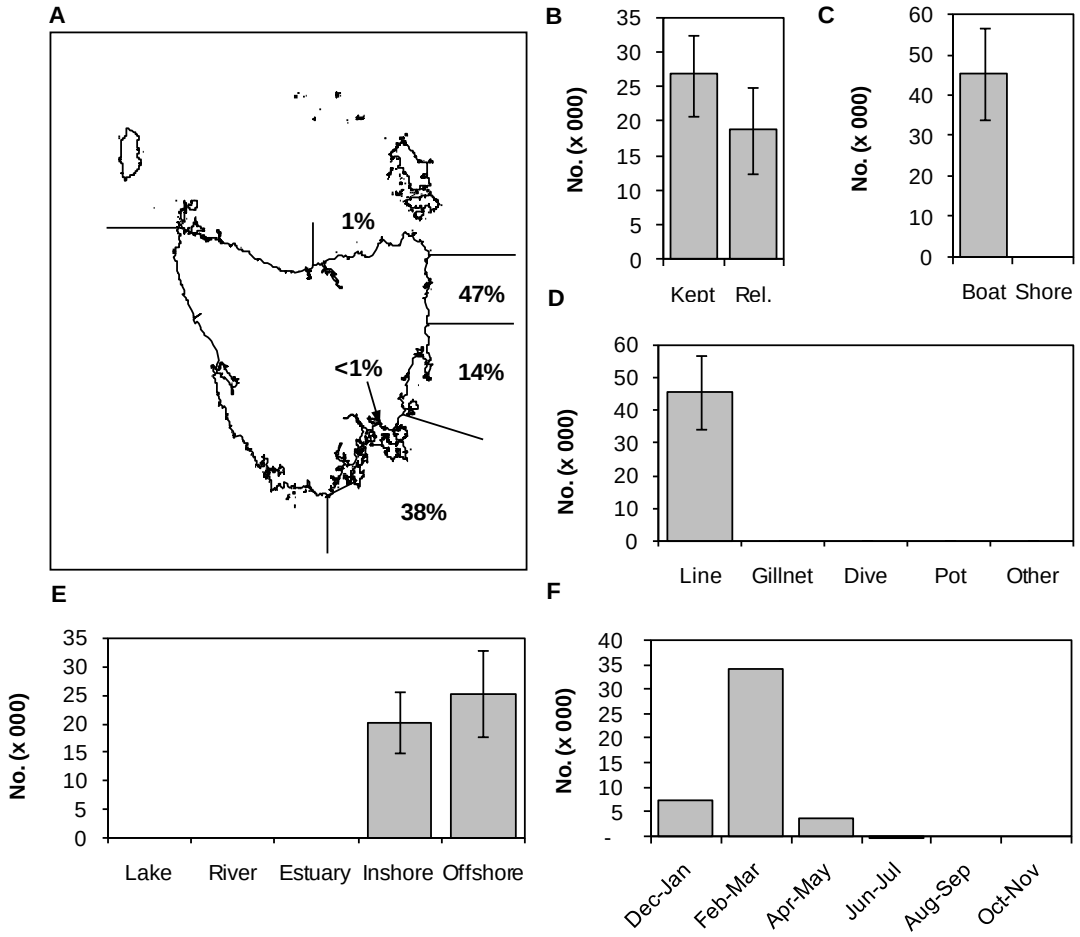

Fig. 20 Characteristics of the recreational fishery for tuna in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.8 Gould's squid

Gould's squid (*Nototodarus gouldi*) catches were heavily concentrated in the Central East, South East and D'Entrecasteaux Channel regions (Fig. 21A). Relatively small numbers were also taken off northern and north eastern Tasmania. The vast majority of the catch was retained (Fig. 21B), being taken primarily by boat-based fishers (Fig. 21C). Line fishing (mostly lures) (Fig. 21D) in inshore, and to a lesser extent, estuarine waters (Fig. 21E) was the predominant fishing method. Catches were largely restricted to summer and early autumn months, with a marked peak during December-January (Fig. 21F).

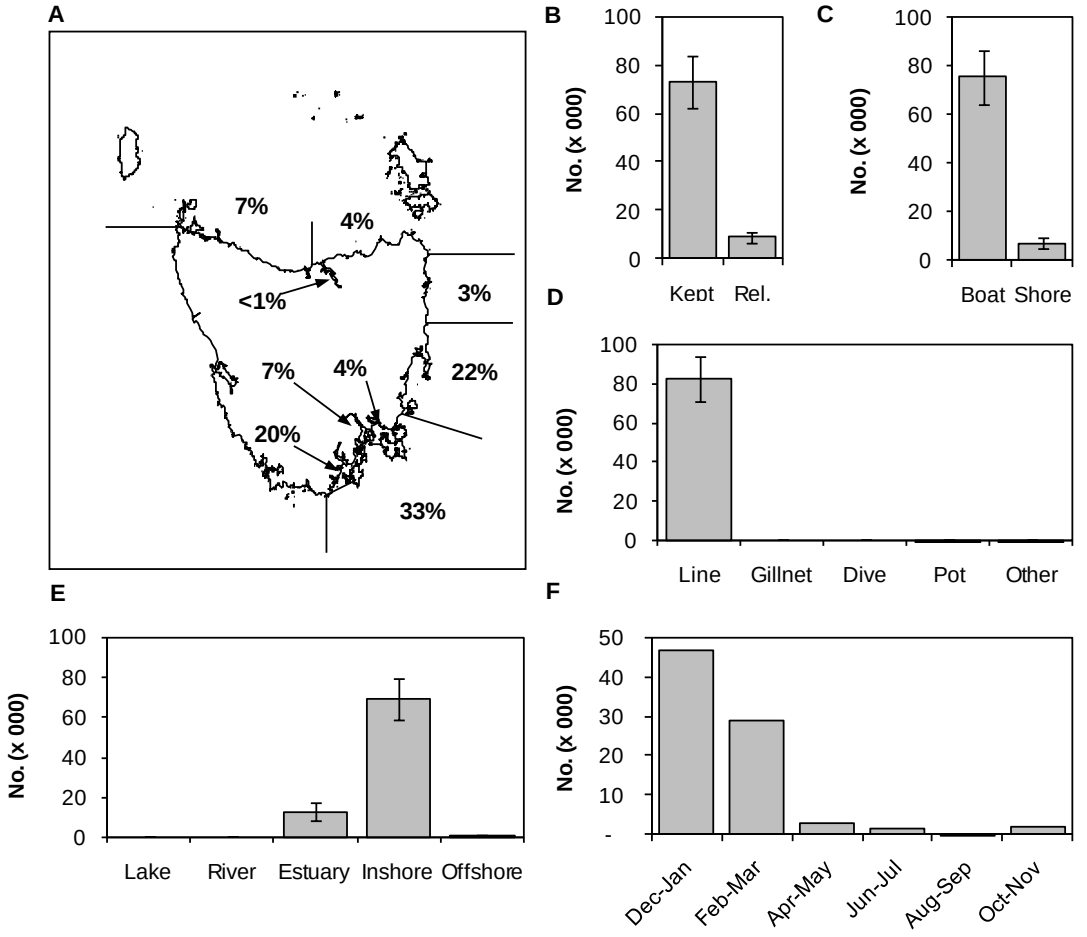

Fig. 21 Characteristics of the recreational fishery for Gould's squid in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.9 Southern calamari

Over half of the southern calamari (*Sepioteuthis australis*) catch was taken from the Central East coast and south-eastern Tasmania, with moderate catches also taken from regions in the north of the state (Fig. 22A). The vast majority of the catch was retained (Fig. 22B), with boat-based fishers accounting for slightly more of the catch than shore-based fishers (Fig. 22C). Line fishing (primarily using lures/jigs) represented the main capture method but there were also relatively minor seine and spear catch components (Fig. 22D). Most of the southern calamari catch was from inshore coastal waters, with moderate quantities reported from estuarine areas (Fig. 22E). Catches were concentrated over the summer–autumn period (December–March); relatively low numbers were taken at other times of the year (Fig. 22F).

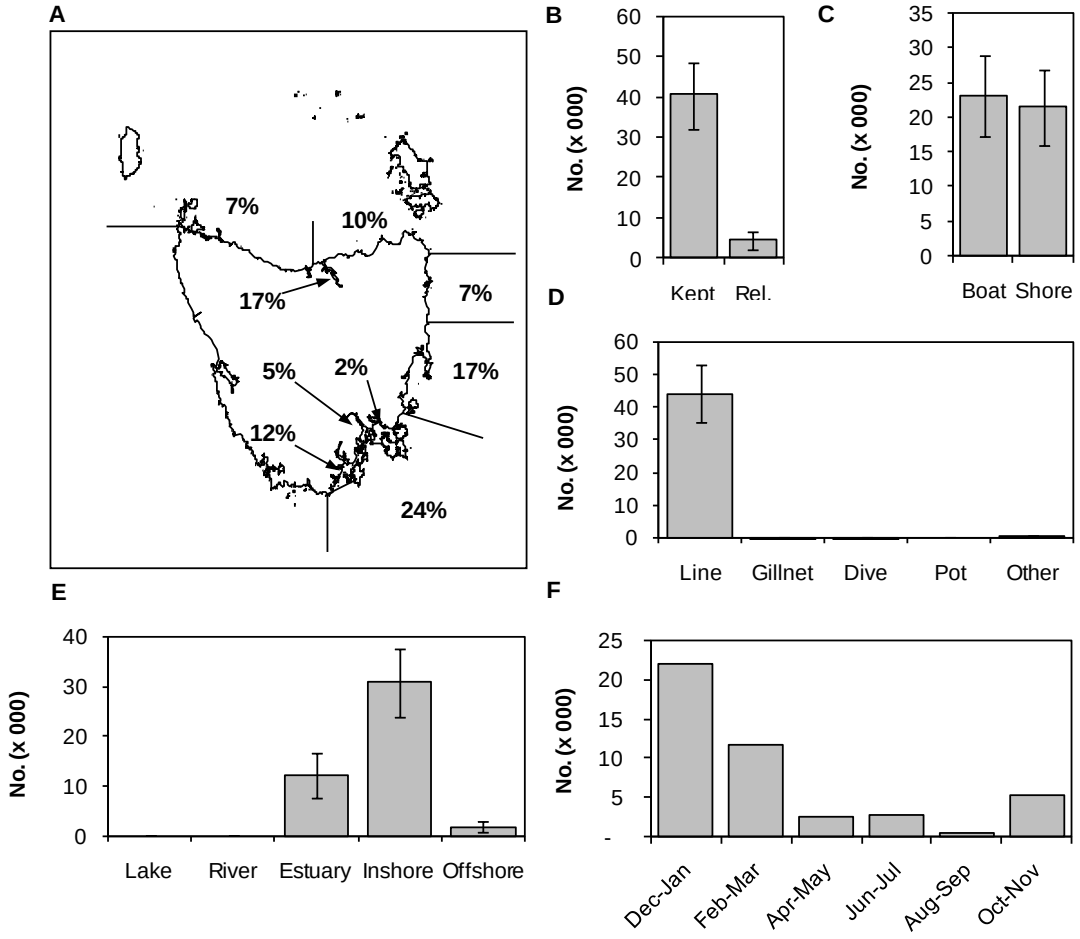

Fig. 22 Characteristics of the recreational fishery for southern calamari in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by 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 Rock lobster

Catches of rock lobster (predominantly if not exclusively *Jasus edwardsii*) from south-eastern Tasmania, accounted for over half of the state's total (Fig. 23A). Moderate quantities were also taken from the Central East and West coasts regions; catches from North East and the north coast regions were relatively small. Over half of the lobsters caught were released (Fig. 23B) with boat-based fishers accounting for the vast majority of the catch (Fig. 23C). Lobster pots accounted for about 70% of the catch (60% of the harvest) and dive collection accounted for the bulk of the remainder (Fig. 23D). Virtually all of the catch was taken from inshore coastal waters (Fig. 23E), primarily between November and March, with a marked rise in activity immediately following the opening of the fishing season in November (Fig. 23F). The impact of the fishery closure during September and October was clearly apparent. The characterisation of the recreational lobster fishery based on fishing region, method and seasonality in this study is consistent with that reported for targeted surveys of lobster licence-holders (Lyle *et al*., 2005; Lyle and Morton, 2006; Lyle, 2008).

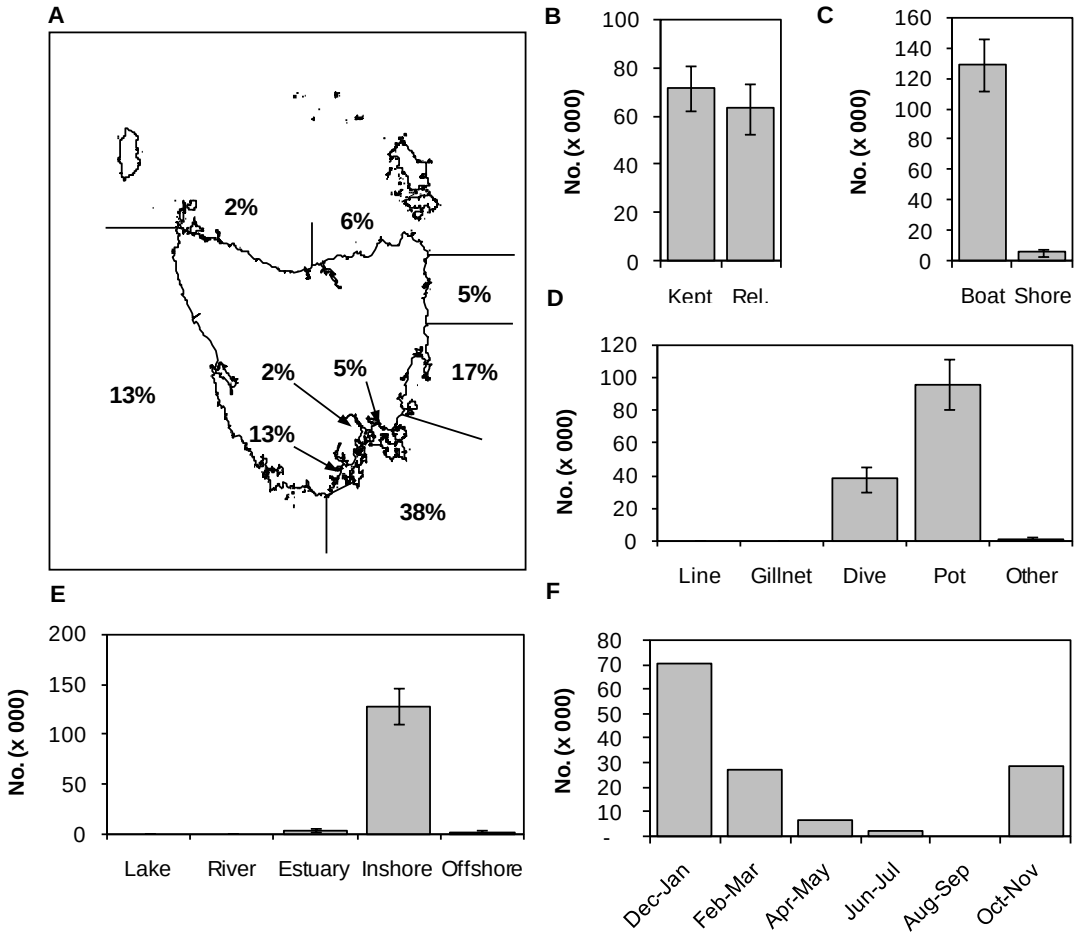

Fig. 23 Characteristics of the recreational fishery for rock lobster in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

7.11 Abalone

Two species of abalone are fished in Tasmanian waters, namely blacklip abalone (*Haliotis. rubra*) and greenlip abalone (*H. laevigata*). Blacklip abalone are widely distributed in Tasmanian coastal waters and dominated (94%) the recreational catch (73,497; SE 16,124). Greenlip abalone have a more restricted distribution to northern Tasmania and represented a minor component (6%) of the catch total (5008; SE 1807).

Abalone catches were largely concentrated off south-eastern Tasmania, including the D'Entrecasteaux Channel, and the Central East coast region (Fig. 24A). Comparatively minor catches were reported from the North East, North and West coast regions. The majority of the catch was retained (Fig. 24B), taken by a combination of boat- and shore-based divers (Fig. 24C&D) operating in inshore coastal waters (Fig. 24E). Catches were highest during summer–autumn, with a marked peak in December–January (Fig. 24F). Winter and early spring catches were comparatively very low. The spatial and temporal characterisation of the abalone fishery is consistent with that described from directed surveys of recreational licence-holders (Lyle, 2000, 2008; Lyle and Morton, 2004, 2006).

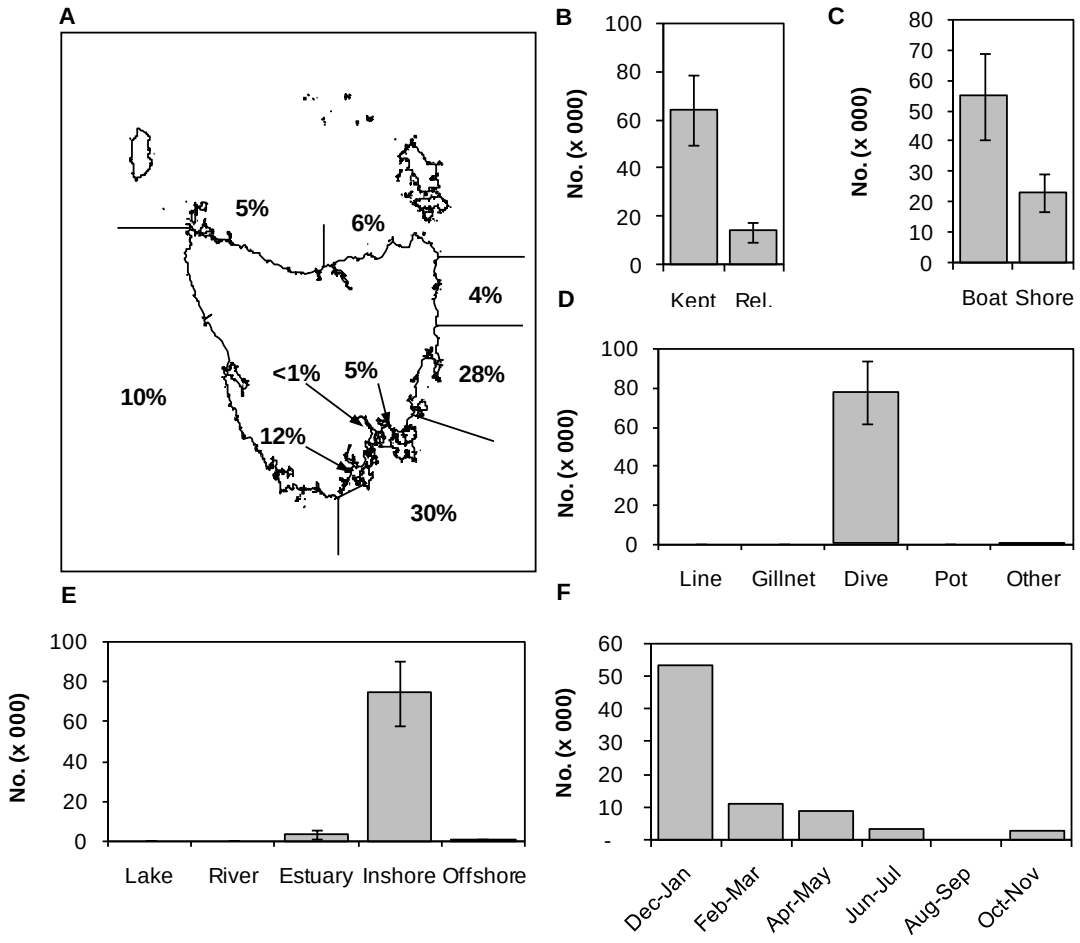

Fig. 24 Characteristics of the recreational fishery for abalone in Tasmania during 2007-08: A) proportion (%) of the total catch (numbers) by fishing region; B) total numbers kept and released; C) total catch (numbers) by boat and shore based fishing activities; D) total catch (numbers) by fishing method; E) total catch (numbers) by water body fished; and F) seasonality in the catch (numbers). Error bars represent one standard error.

8. Regional fisheries

In this section, effort within a fishing region is considered in the context of where fishers reside, providing an understanding of importance of 'imported' activity – that is effort derived from fishers residing outside of the region – and fishing platform. Catch and effort information was provided by fishers during the 12-month diary survey and has been presented as expanded estimates. All references to fishing regions relate to those depicted in Fig. 2, while region of residence relates to the statistical divisions in which fishers resided and is based on Fig. 1. Detailed information on catch and effort (estimated numbers of fishers and days fished) by region is provided in Appendices 12 and 13.

8.1 Inland fishery

Tasmania's inland fishery was divided into three main regions: Western, Central Plateau and Eastern. Fishing effort in the Western region was primarily derived from residents of the Mersey-Lyell and Northern SDs, implying a low level of effort from fishers resident outside of the region (Fig. 25A). A different pattern was evident for the Central Plateau, with a significant proportion of the effort derived from residents of the Greater Hobart SD, indicating the importance of imported effort to that fishery (Fig. 25B). Effort in the Eastern region was derived mainly from residents of the Northern SD, followed by the Greater Hobart and Southern SDs (Fig. 25C).

The significance of boat- and shore-based fishing varied between regions, with the Western and Eastern region fisheries dominated by shore-based effort (Fig. 25 D&F); in the Central Plateau region boat-based effort was comparatively more important (Fig 25E). Regional variability was linked largely to the relative importance of river as opposed to lake or dam fishing, noting that the vast majority of river based effort (>90% of events) was shore-based, whereas the lake fisheries involved similar levels of shore- and boat-based fishing. Just 17% of fishing trips (events) in the Central Plateau region were river based, compared with 32% in the Western and 74% in the Eastern regions.

Trout clearly dominated the finfish catches (excluding small baitfish, principally whitebait), accounting for over 70% of catch in the Western and Eastern regions and 98% in the Central Plateau. In the Western region the balance of the catch was comprised mainly of Atlantic salmon and river blackfish while in the Eastern region redfin and river blackfish were of secondary importance (Fig. 25G).

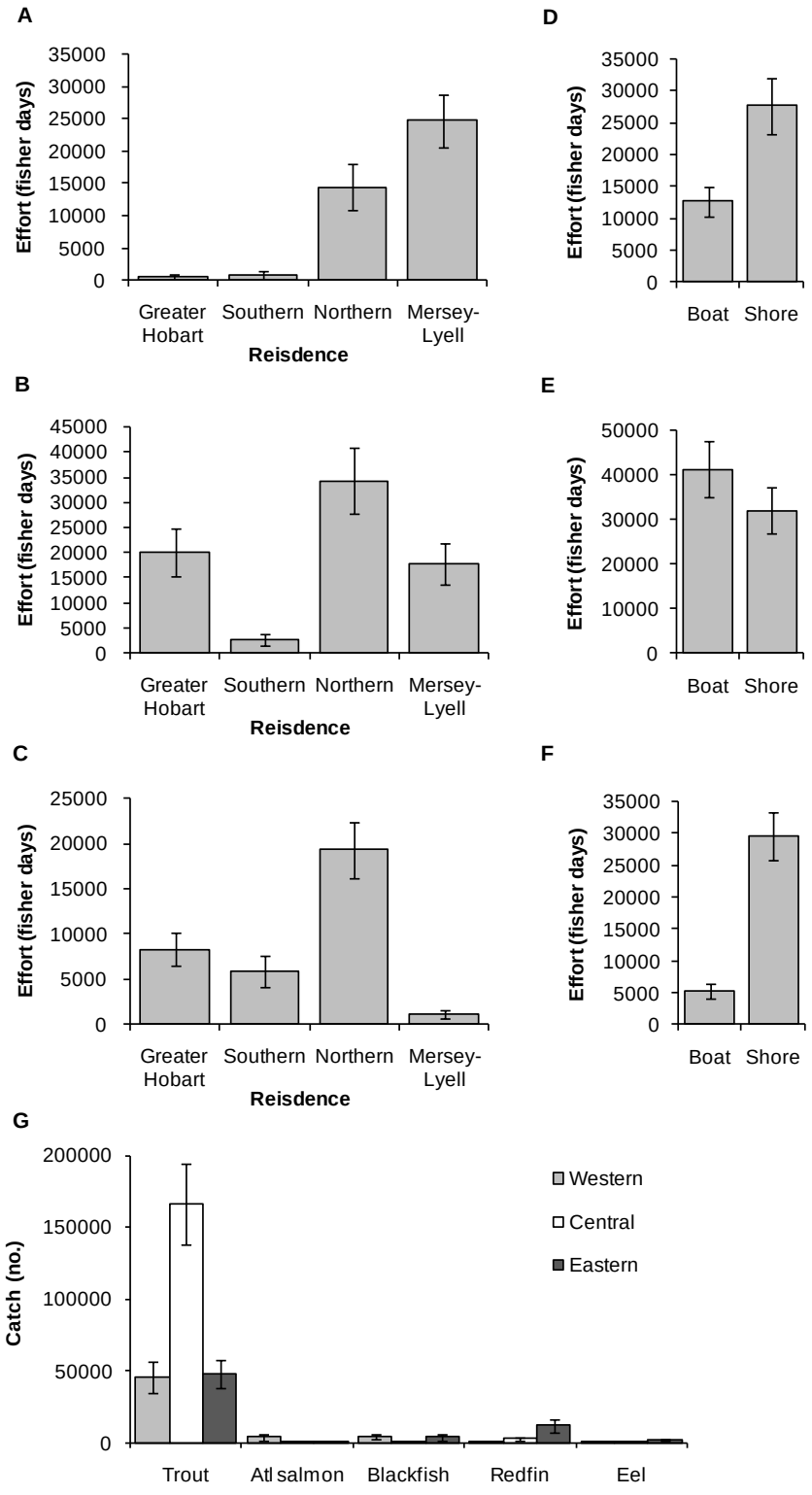

Fig. 25 Characteristics of the inland recreational fishery based on based on 2007-08 activity: A) fishing effort (fisher days) in the Western region; based on region of residence (statistical division) of fishers B) fishing effort in the Central Plateau region, based on region of residence of fishers; C) fishing effort in the Eastern region, based on region of residence of fishers, D) fishing effort by platform in the Western region;, E) fishing effort by platform in the Central Plateau region; F) fishing effort by platform in the Eastern region; and G) catch (numbers) for the key finfish species by fishing region. Error bars represent one standard error.

8.2 West coast

The vast majority of the West coast effort was attributed to fishers residing in adjacent areas (Mersey-Lyell SD), indicating very limited imported effort (Fig. 26A). Shore-based effort was slightly more significant that boat-based effort in this region (Fig. 26B). Australian salmon was the main species caught, followed by rock lobster, abalone and trumpeter (bastard trumpeter) (Fig. 26C).

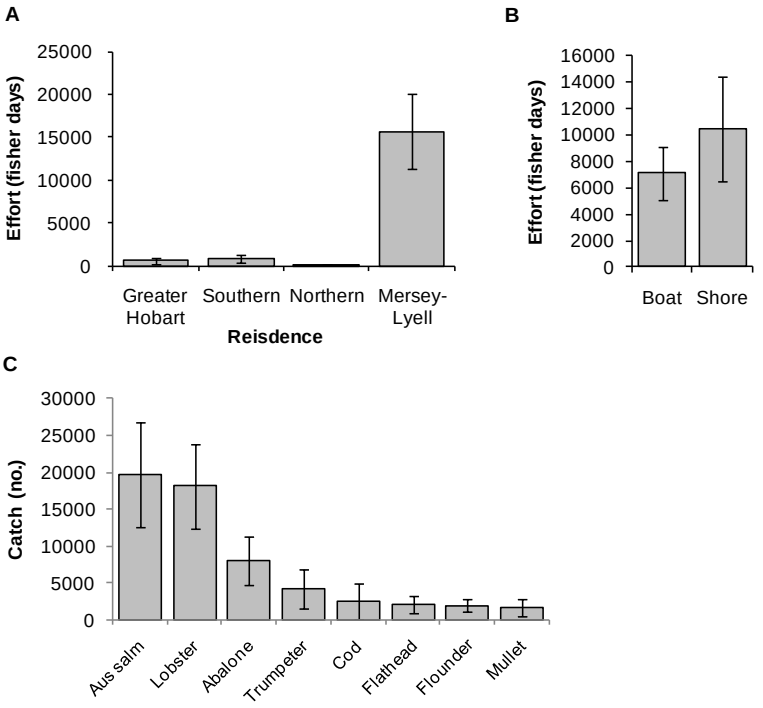

Fig. 26 Characteristics of the west coast recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.3 West north coast

Effort in this region was largely derived from residents of the Mersey-Lyell SD, with limited evidence of effort imported to the region (Fig. 27A). Shore-based fishing effort was slightly more important that boat-based fishing (Fig. 27B). Flathead and Australian salmon dominated catches, with a range of other finfish of secondary importance (Fig. 27C).

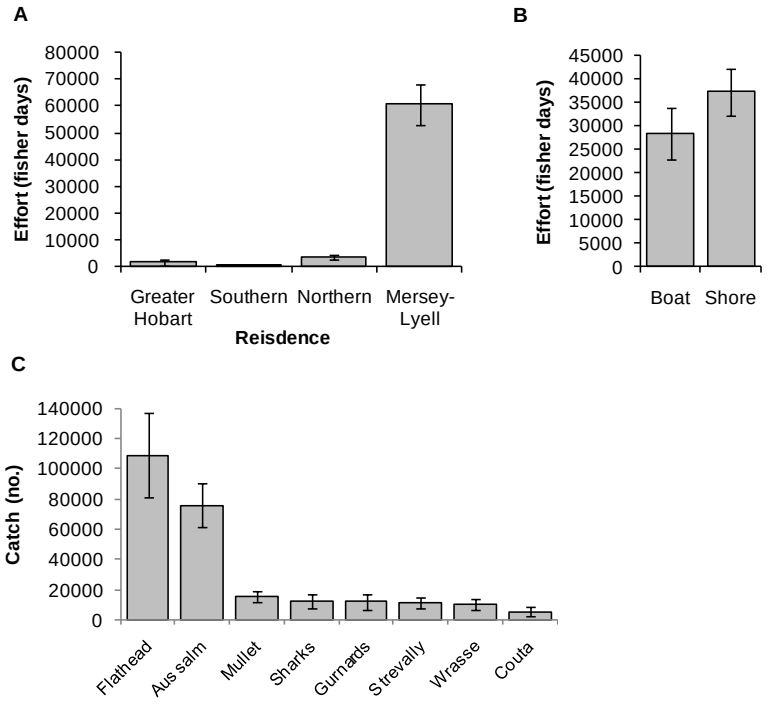

Fig. 27 Characteristics of the West North coast recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.4 Tamar Estuary

Residents of the surrounding region (Northern SD) accounted for most of the fishing activity in the Tamar, though some fishers, mainly from the Mersey-Lyell SD, travelled to fish the area (Fig. 28A). Shore-based effort was substantially more important than boat-based effort in the Tamar fishery (Fig. 28B). Flathead clearly dominated catches by numbers caught, followed in importance by Australian salmon, southern calamari, mullet and cod (Fig. 28C).

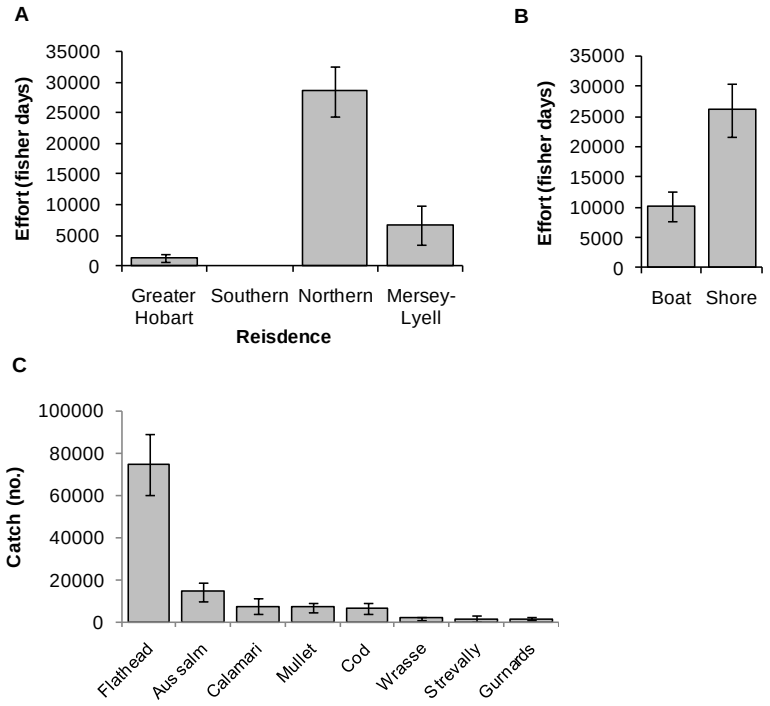

Fig. 28 Characteristics of the recreational fishery in the Tamar Estuary based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.5 East north coast

Locally based fishers (Northern SD) accounted for just over three quarters of the total effort while Mersey-Lyell and Greater Hobart SD residents contributed the bulk of the remainder (Fig. 29A). Boat and shore-based fishing were roughly equivalent in terms of fisher days of effort (Fig. 29B). Flathead were the most numerous species caught, followed by Australian salmon, rock lobster and mullet (Fig. 29C).

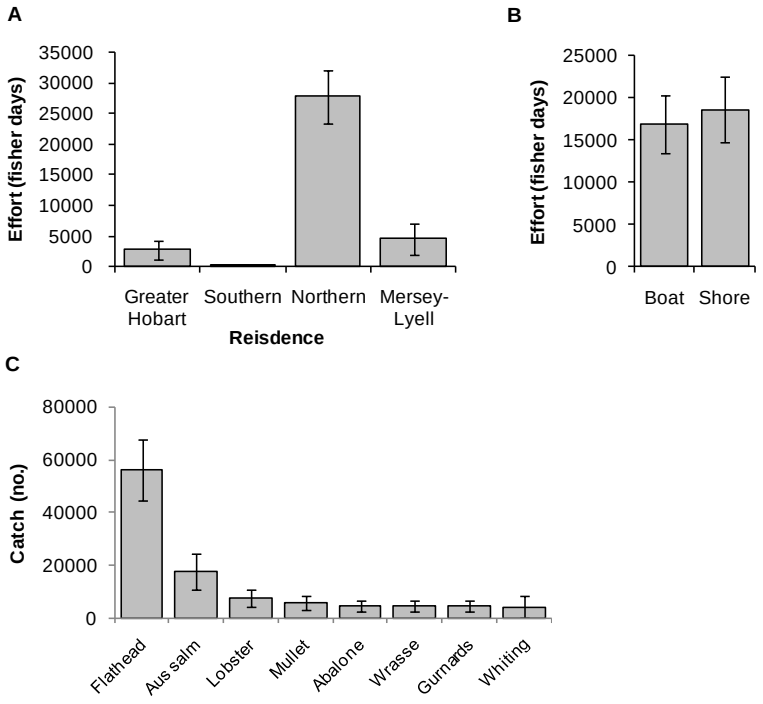

Fig. 29 Characteristics of the recreational fishery in the East North region based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.6 North east coast

Northern SD residents were the main contributors to the fishing effort (70%), with residents travelling from the Greater Hobart and Mersey-Lyell SDs of secondary importance (Fig. 30A). Boat-based fishing effort dominated in this region (Fig. 30B) and flathead was the main species caught; Australian salmon, bream and tuna were also relatively common in the catch (Fig. 30C).

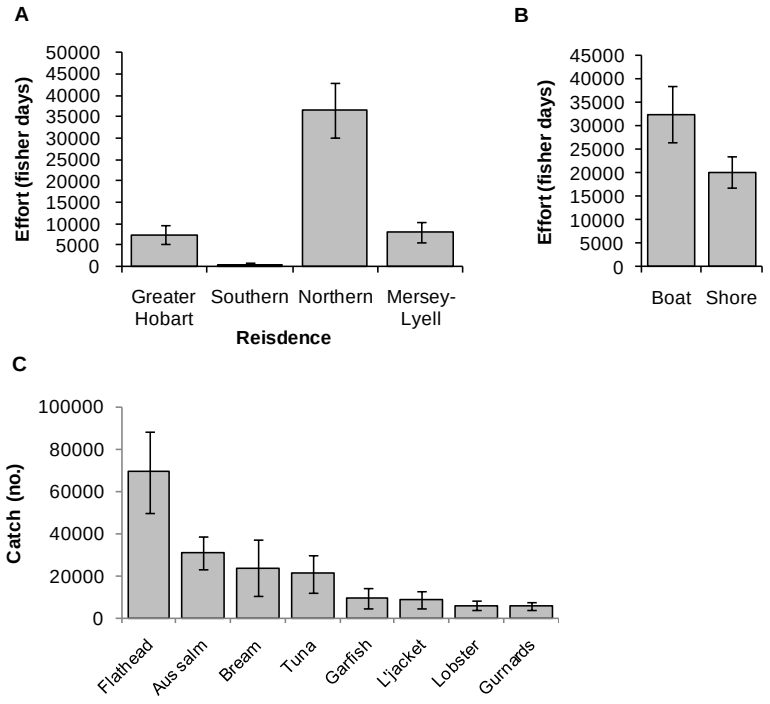

Fig. 30 Characteristics of the North East coast recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.7 Central east coast

Although the Southern SD represented the adjacent region, fishing effort by Greater Hobart and Northern SD residents clearly exceeded that of local residents (Fig. 31A). The fishery was primarily boat-based (Fig. 31B) and flathead were by far the most common species taken in the region, with a variety of other finfish and shellfish also caught (Fig. 31C).

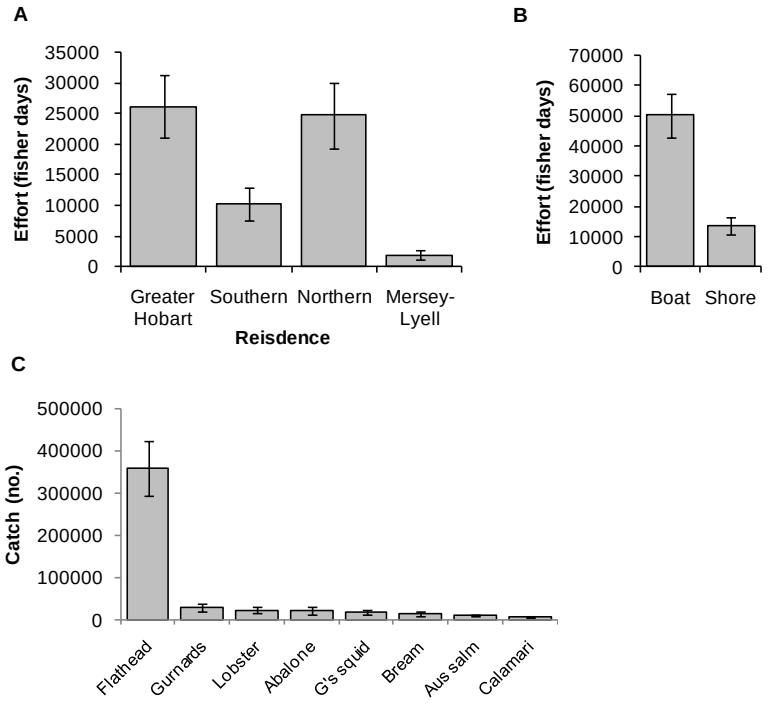

Fig. 31 Characteristics of the Central East coast recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.8 South east coast

The impact of fishers residing in the Greater Hobart SD was clearly evident, accounting for almost 80% of the fisher days of effort in the south east (Fig. 32A). Boat-based fishing effort was especially important in the region, with comparatively limited shore-based fishing reported (Fig. 32B). Flathead were the dominant catch, followed by rock lobster, Gould's squid, abalone, gurnard and tuna (Fig. 32B).

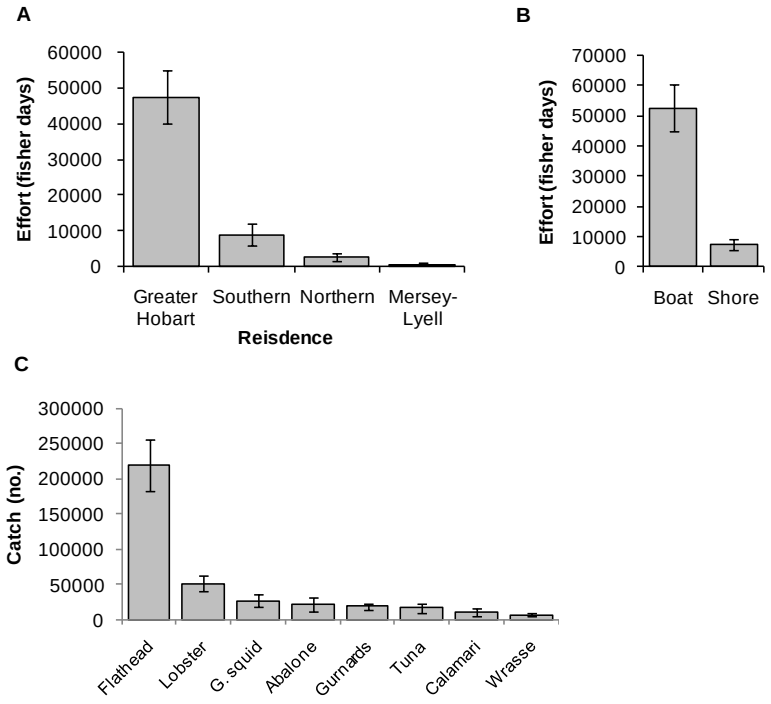

Fig. 32 Characteristics of the South East coast recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.9 Norfolk-Frederick Henry Bay

Fishers from the surrounding regions, Greater Hobart and Southern SDs accounted for virtually all of the fishing effort in the Norfolk-Frederick Henry Bay region (Fig. 33A). Boat-based fishing accounted for the majority of the effort in the region (Fig. 33B) and flathead represented the vast majority of the overall catch, with whiting and flounder next in importance (Fig. 33C).

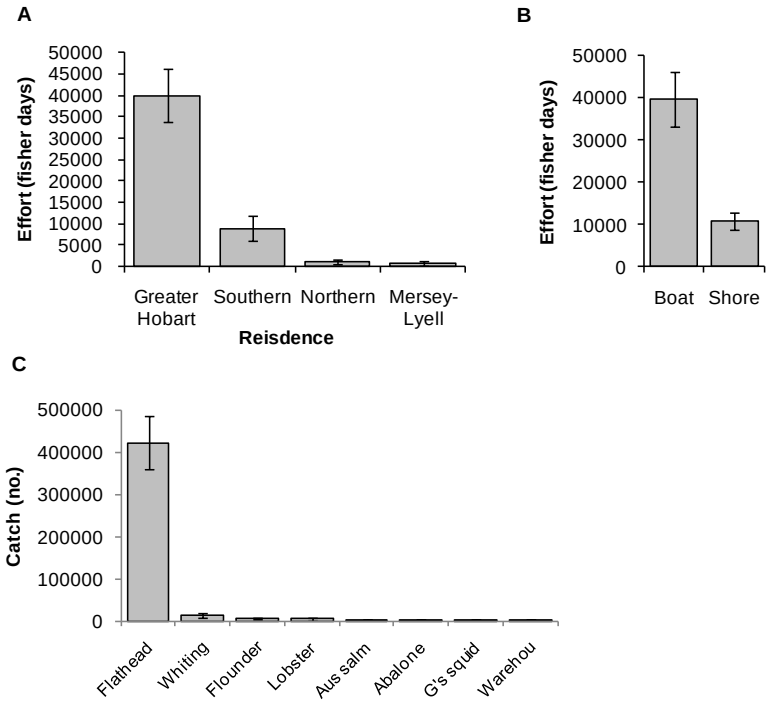

Fig. 33 Characteristics of the Norfolk-Frederick Henry Bay recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.10 Derwent Estuary

The vast majority of the fishing activity in the Derwent was attributed to locally based fishers (Fig. 34A); shore-based fishing effort was particularly significant in the Derwent (Fig. 34B). While flathead dominated the catch, flounder, Gould's squid, whiting and bream were of secondary importance (Fig. 34C).

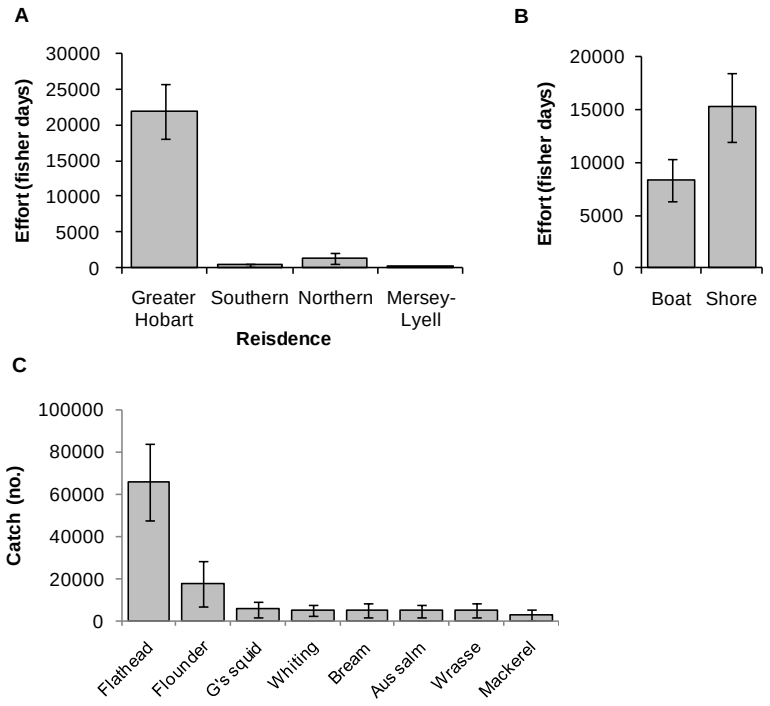

Fig. 34 Characteristics of the Derwent recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

8.11 D'Entrecasteaux Channel

Based on the number of fishers and total fisher days of effort, the D'Entrecasteaux Channel represented the most heavily fished region in Tasmania (Appendix 12). The Channel was clearly very popular amongst locals - Greater Hobart and Southern SD residents (Fig. 35A). The majority of the fishing activity in this region was boat-based (Fig. 35B). Numerically flathead were the most commonly caught species, with large numbers of scallops also taken (Fig. 35C), this region representing the focal point for the recreational scallop fishery in Tasmania (Tracey and Lyle, 2008). Species of secondary importance included rock lobster, Gould's squid, abalone, cod, wrasse and southern calamari.

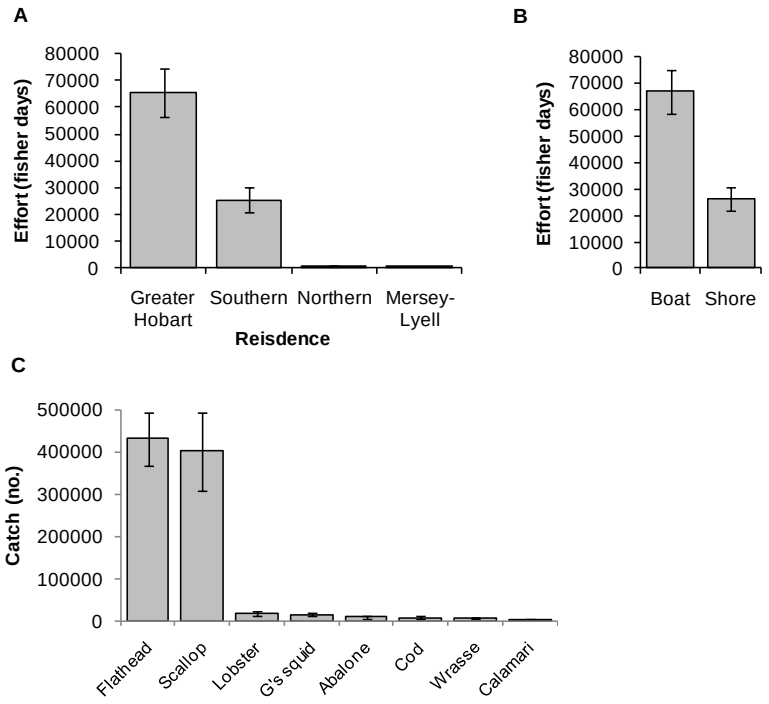

Fig. 35 Characteristics of the D'Entrecasteaux Channel recreational fishery based on 2007-08 activity: A) fishing effort (fisher days) based on the region of residence (statistical division) of fishers; B) effort (fisher days) by platform; and C) catch (numbers) for the key species. Error bars represent one standard error.

9. Comparisons with 2000-01

In this section data from the Tasmanian component of the 2000-01 National Recreational Fishing Survey are compared with the present survey to investigate similarities and differences in the fishery since the early 2000s. While the 2000-01 survey data have been reported previously by Henry and Lyle (2003) and in detail by Lyle (2005), the current presentation of the data has involved a complete re-analysis of the data using the statistical protocols developed for the present study. This, coupled with the fact that previous analyses included fishing activity in Tasmania by non-residents, has meant that there may be variability between the previously reported (Lyle, 2005) and re-analysed estimates.

In relation to comparability with the 2007-08 data, the only analytical difference has been in how the fisher drop-in adjustment has been implemented. Although the national survey included non-intending fisher call-backs, the sample size proved insufficient to enable a robust drop-in adjustment to be made as was the case in the present survey. For this re-analysis, equilibrium has been assumed; that is, fishers who dropped out of the fishery were effectively replaced by counterparts who dropped-in such that the participation rate and fisher characteristics (demographic and avidity profile) determined at screening were effectively maintained for the diary period. Apart from this issue, the application of consistent methodology and analytical procedures means that the two datasets can be compared validly to identify potential trends in the fishery.

9.1 Fisher characteristics

9.1.1 Participation rates

In 2000 an estimated 125,018 (SE 3565)Tasmanian residents aged five years or older fished at least once in the previous 12 months (Appendix 14) whereas by 2007 this number had fallen slightly, but not significantly, to 118,399 (SE 3363) persons. However, when expressed as participation rates (i.e. proportion of the resident population) this difference was significant: 29.4% (SE 0.8%) in 2000 declining to 26.1% (SE 0.7%) in 2007. The significantly lower participation rate in 2007 was due to population growth in Tasmania that was not matched by proportional growth in fisher numbers.

Compared with 2000 there were fewer fishers in each of the regions with the exception of the Greater Hobart SD, where there had been a slight but not significant increase in numbers (Fig. 36A). Participation rates, however, declined in all regions, the largest percentage decline being amongst Southern SD residents, from 38.9% to 32.9% (Fig. 35B). Participation rates for the remaining regions were generally consistent within a given year: 28-30% for 2000 and between 24-27% for 2007.

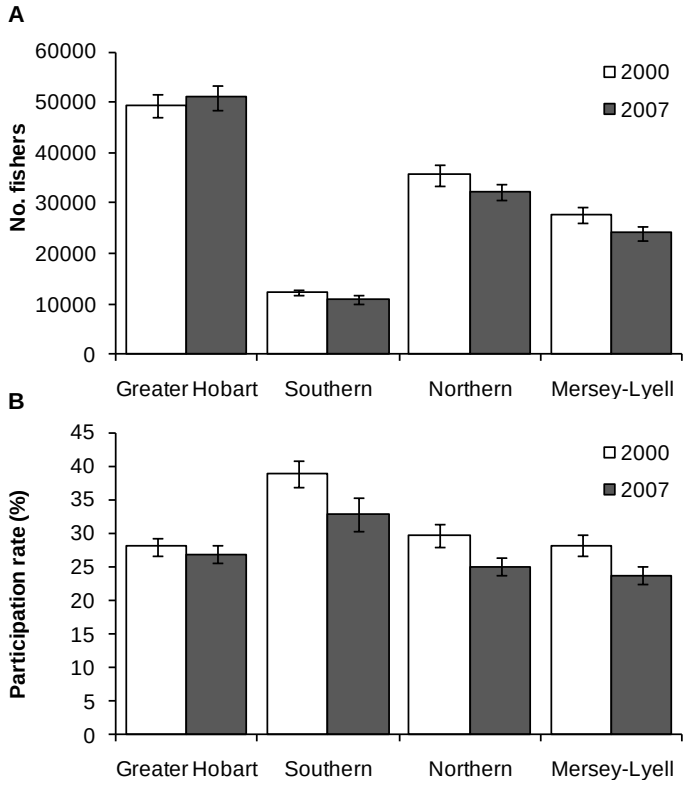

Fig. 36 Fishing participation in the 12 months prior to May 2000 or November 2007 by SD for persons aged five years or older: A) number of persons; and B) proportion of the resident population. Error bars represent one standard error.

9.1.2 Age and gender

In absolute and relative terms the decline in participation was more pronounced amongst males, from 83,580 (SE 2267) persons or 40.0% (SE 1.1%) in 2000 to 78,177 (SE 2120) or 34.9% (SE 1.1%) in 2007, compared with females, from 41,428 (SE 1897) or 19.1% (0.9%) in 2000 to 40,222 (SE1770) or 17.5% (SE 0.7%) in 2007.

Based on age, it was evident that while participation amongst the younger age groups had declined, there were slightly more fishers in the older age groups (45-59 years and 60 years plus) in 2007 than in 2000 (Fig. 37A). By contrast, participation rates were only slightly higher in 2007 for the 60 plus age group (Fig. 37B). In both years, the greatest number of fishers fell into the 30-44 years age group whereas the highest participation rate was amongst the 5-14 years age group.

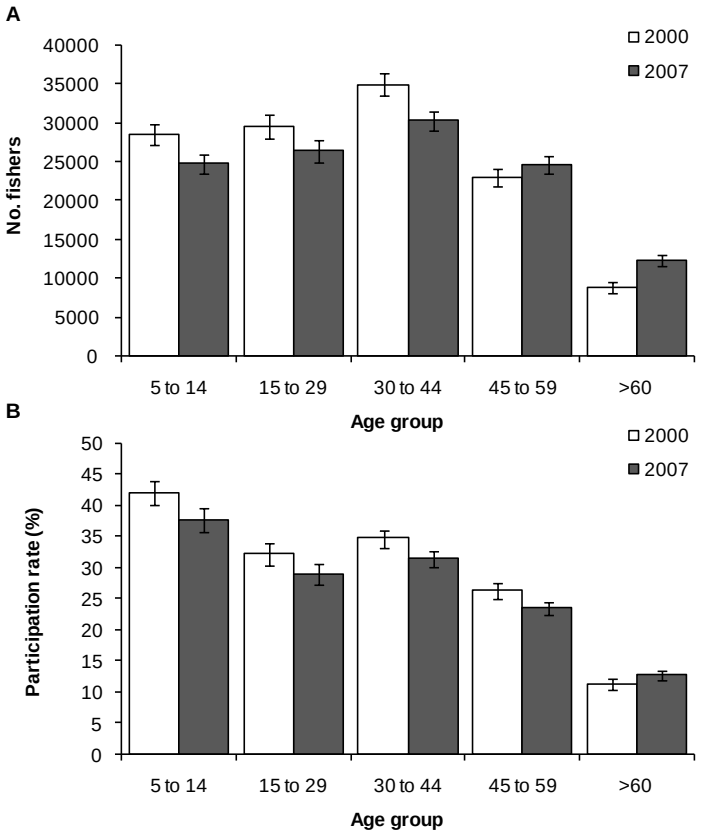

Fig. 37 Fishing participation by age group for Tasmanian residents aged five years or older for 2000 and 2007: A) number of persons; and B) proportion (%) of the resident population.

9.1.3 Participation rates since 1983

The only other estimate of recreational fishing participation in Tasmania was based on an ABS survey of about 2100 private dwelling households in October 1983 using face to face interviews to obtain information about fishing activities (ABS 1984). The survey established that 107,031 Tasmanian residents aged 15 years or older fished at least once a year, representing a participation rate of 33.1%[3]. Using the same age criterion, there were an estimated 96,470 persons in 2000 and 93,650 persons in 2007 who fished at least once a year, representing participation rates of 26.9% and 24.1%, respectively. Thus, in absolute and relative terms there has been a decline in recreational fishing participation since the early 1980s and the present time.

By gender, 48.7% of males aged 15 years and older (77,665 persons) fished at least once in 1983 compared with 37.6% (65,594 persons) in 2000 and 33.1% (63,025 persons) in 2007. For females, the equivalent rates were 17.9% (29,366 persons) in 1983, 16.8% (30,876 persons) in 2000 and 15.4% (30,624 persons) in 2007. The substantial fall in participation amongst males was clearly the underlying cause of the lower overall participation rates observed in 2000 and 2007.

[3] ABS document 3201.0 Population by Age and Sex, Australian States and Territories - Table 6. Estimated Resident Population By Single Year Of Age, Tasmania (December 2003).

9.2 Fishing effort

In 2000-01, Tasmanian residents aged 5 years and older expended an estimated 746,335 (SE 44,462) fisher days of effort in Tasmania, some 16% higher than the equivalent measure in 2007-08 (Table 4). The effective decline in effort in 2007-08 compared with 2000-01 was evident in both freshwater and marine fisheries (Fig. 38A) and was due to a significant fall (32%) in shore-based effort, rather than a change in overall boat-based fishing, noting that boat-based effort had risen slightly, but not significantly, in 2007-08 (Fig. 38B).

By method, line fishing effort declined by 15% in 2007-08 whereas there had been a significant decline in gillnet effort to about 40% of the level of activity estimated in 2000-01 (Fig 39). The change in gillnet effort was undoubtedly linked to increased restrictions on net usage, specifically prohibition of overnight netting in most areas, coupled with apparent lower availability of several key net species; for example, blue warehou and bastard trumpeter (Ziegler and Lyle, 2009).

When effort was disaggregated based on fishing region and by platform, a number of conspicuous changes were apparent, though it is acknowledged that some of the variability at this level of disaggregation may have occurred by chance, reflecting the limitations of sampling (reflected in the magnitude of the RSE). The inland fishery experienced a marked decline in effort (especially shore-based) in the Eastern region during 2007-08, possibly linked to the effects of the drought (Fig. 40). By contrast there was general consistency in effort levels for the other inland regions. The main regional shifts in the marine fishery were associated with relatively large falls in effort in the West North coast and Derwent regions, largely driven by lower levels of shore-based fishing effort (Fig. 41). While factors influencing these changes are unclear, the recent closure of several wharves to fishing, particularly in north-western ports, may have had an impact. The sharp fall in effort in the Derwent appeared to have been offset to some extent by increased effort in adjacent regions, D'Entrecasteaux Channel, Norfolk-Frederick Henry Bay and South East coast. Estimated fisher numbers and days fished by region in 2000-01 are presented in Appendix 15 and can be compared with comparable information for 2007-08 provided in Appendix 12.

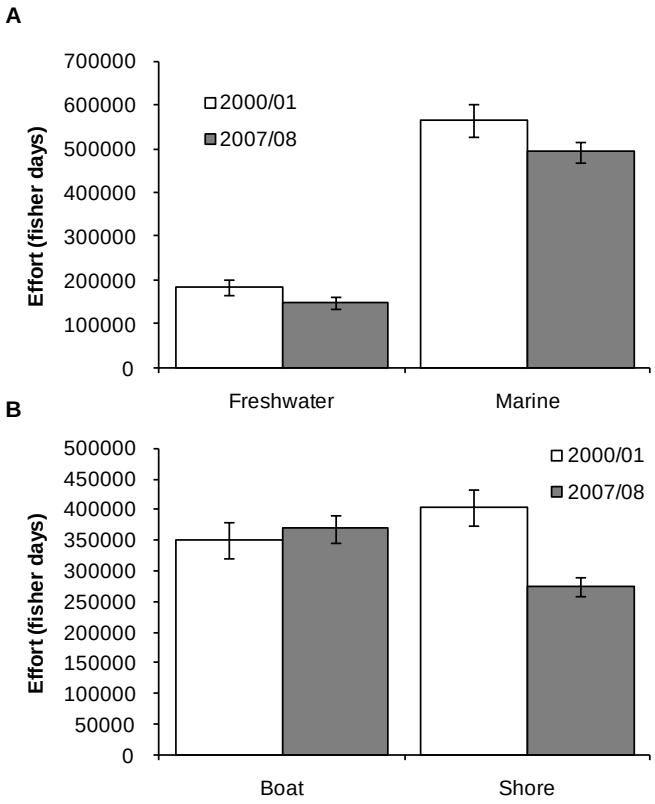

Fig. 38 Comparison of fishing effort (fisher days) for Tasmanian residents aged five years or older who fished in Tasmania during 2000-01 and 2007-08: A) based on marine and freshwater waters; and B) based on fishing platform. Error bars represent one standard error

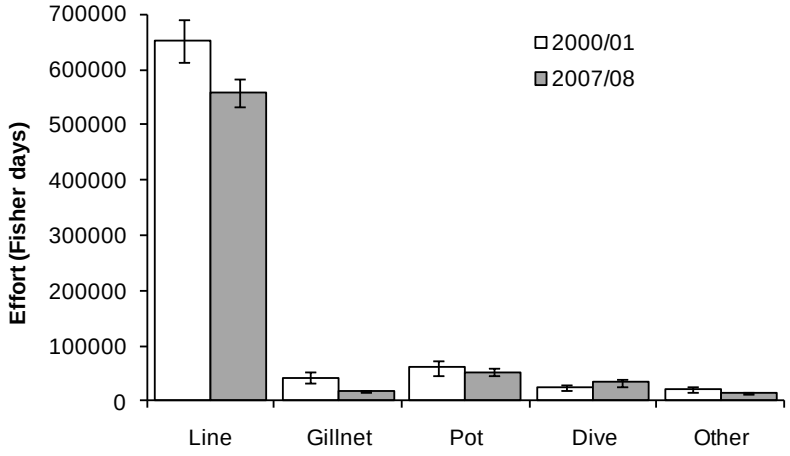

Fig. 39 Comparison of fishing effort (fisher days) by fishing method for Tasmanian residents aged five years or older who fished in Tasmania during 2000-01 and 2007-08. Error bars represent one standard error

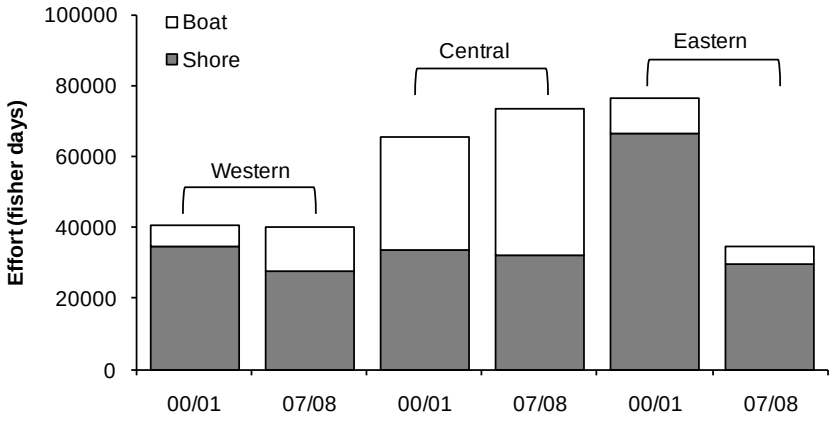

Fig . 40 Comparison of fishing effort (fisher days) by inland fishing regions and fishing platform for Tasmanian residents aged five years or older who fished in Tasmania during 2000-01 and 2007-08.

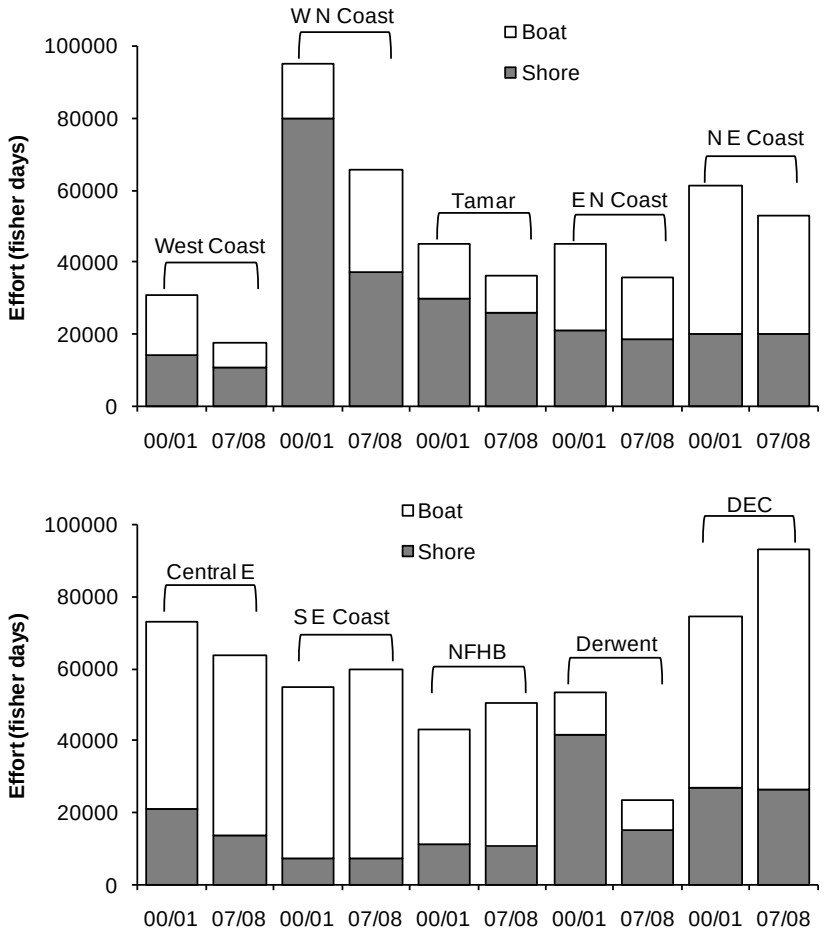

Fig. 41 Comparison of fishing effort (fisher days) by coastal fishing regions and fishing platform for Tasmanian residents aged five years or older who fished in Tasmania during 2000-01 and 2007-08. NFHB is Norfolk-Frederick Henry Bay, DEC is D'Entrecasteaux Channel.

9.3 Catch

Re-analysed catch information for 2000-01 are provided in Table 11. Excluding small baitfish, an estimated 3.52 million finfish were caught (kept and released) by Tasmanian recreational fishers during 2000-01 compared with 2.86 million in 2007-08. Flathead represented over half of the total (1.90 million) and other species of significance in order of descending importance included Australian salmon (406,000 or 11%), trout (224,000 or 6%), mullet (145,000 or 4%), and cod (100,000 or 3%). While flathead also dominated 2007-08 catches, trout rather than Australian salmon were the second most commonly caught finfish, with Australian salmon third in importance.

Around 47,000 cephalopods (squid and octopus) were also captured, with southern calamari (31,000) representing almost two-thirds of this total. Other species of significance included rock lobster (147,000) and abalone (110,000) along with a range of other taxa, including crabs, prawns, oysters, mussels, clams, and urchins. As the recreational scallop fishery was closed in 2000-01 there were no catches taken.

In total, 2.29 million finfish (excluding small baitfish) were retained compared with 1.62 million in 2007-08, reflecting the combined effects the higher overall catch and generally lower release rates in 2000-01 (34.7% overall compared with 43.3% in 2007-08) (Table 11). Flathead dominated the retained finfish catch (1.24 million or 54%), followed by Australian salmon (300,000 or 13%) and trout (166,000 or 70%). Amongst the other key taxa, about 79,000 rock lobster and 108,000 abalone were harvested. The estimated number of finfish released or discarded was very similar between surveys, 1.22 million in 2000-01 and 1.24 million in 2007-08.

Comparisons of catch data provided in Tables 5 and 10 have been summarised for the key species in Fig. 42. The significance of any variability between years needs to be assessed in the context of the uncertainties associated with estimates (represented by standard errors). For instance, the most conspicuous variation was the substantially lower catch of Australian salmon in 2007-08 (Fig. 42A). However, the 2000-01 estimate was associated with a relatively large relative standard error (27%) compared with that for 2007-08 (11%), implying greater uncertainty in the former estimate. Flathead, mullet and cod catches were also markedly lower in 2007-08, whereas catches of Gould's squid, trout and tuna were higher in 2007-08. Statistically, based on non-overlapping 95% confidence intervals (effectively estimate ± 2SE), the only species for which catch differences were significant were cod, mullet, tuna and Gould's squid. The increased Gould's squid and tuna catches were almost certainly linked to increased availability of these species during 2007-08.

The comparison of harvest rather than catch estimates had the effect of reducing the magnitude of the variability between years for most species (Fig. 42B). Flathead was a notable exception, with size of difference in harvest numbers almost doubling in absolute terms, a consequence of a higher release rate in 2007-08 (41% compared with 35%). The higher release rates for trout in 2007-08 (40% compared with 28%) effectively resulted in no difference in harvest numbers between years. Statistically, only the harvest of Gould's squid, tuna and pike differed significantly between years, though in practice pike represented a very minor component of the catch in either year.

Table 11 Estimated annual catch (total, kept and released numbers) and proportion released/discarded for key species during 2000-01, based on Tasmanian residents aged five years or older. SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Total		Kept		Released		%
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**released**
Trout	223,715	34,554	161,575	25,671	62,141	12,622	27.8
Atlantic salmon	15,181	4,580	14,402	4,542	+		5.1
Redfin	***19,375***	***9,536***	***10,543***	***8,486***	***8,832***	***4,271***	45.6
River blackfish	*8,485*	*2,381*	*6,149*	*1,882*	***2,336***	***1,121***	27.5
Australian salmon	405,685	108,123	300,456	103,878	105,229	20,013	25.9
Barracouta	29,560	6,699	24,320	6,314	5,239	1,980	17.7
Black bream	57,622	18,650	34,336	13,149	23,285	6,237	40.4
Blue warehou	*17,192*	*5,611*	*16,359*	*5,297*	+		4.8
Cod	100,363	25,344	65,115	22,806	35,248	6,974	35.1
Eel	9,144	2,163	6,601	1,845	2,543	983	27.8
Flathead	1,905,232	207,900	1,236,675	161,591	668,557	67,296	35.1
Flounder	53,908	15,138	50,582	14,851	**3,326**	**1,609**	6.2
Garfish	*18,176*	*5,248*	*15,669*	*4,835*	***2,507***	***1,434***	13.8
Gurnard	96,876	27,631	**32,182**	**13,123**	64,694	16,388	66.8
Jack mackerel	24,102	6,543	15,770	3,953	8,332	3,205	34.6
Jackass morwong	31,581	10,146	27,041	9,580	**4,540**	**2,026**	14.4
Leatherjacket	41,993	13,399	18,706	6,233	23,288	7,758	55.5
Mullet	144,612	43,082	111,025	40,746	33,586	8,274	23.2
Pike	11,389	3,688	10,109	3,625	**1,280**	**575**	11.2
Silver trevally	42,347	12,912	16,812	3,987	**25,535**	**11,185**	60.3
Trumpeter	48,095	13,862	42,580	11,759	**5,515**	**2,476**	11.5
Tuna	*8,141*	*2,866*	*7,964*	*2,832*	+		2.2
Whiting	13,379	3,905	7,480	2,498	**5,899**	**2,500**	44.1
Wrasse	77,172	14,745	23,083	5,405	54,089	12,869	70.1
Scalefish, other	65,916	19,720	27,037	12,677	38,879	13,321	59.0
Small baitfish	***2,730,709***	***2,655,732***	***2,498,388***	***2,643,138***	***232,322***	***219,938***	8.5
Sharks & rays	47,067	10,444	10,245	5,241	36,822	8,117	78.2
Rock lobster	147,157	25,873	78,563	13,867	68,594	15,024	46.6
Crustaceans, other	18,377	6,874	**12,474**	**6,509**	5,903	1,654	32.1
Southern calamari	30,997	9,107	29,473	8,684	**1,523**	**1,122**	4.9
Gould's squid	10,158	3,163	9,903	3,156	+		2.5
Cephalopod, other	***6,264***	***2,624***	+		***5,342***	***2,599***	85.3
Abalone	109,559	32,023	108,059	31,935	**1,500**	**640**	1.4
Scallop	0		-		-		
Bivalve, other	***128,191***	***52,937***	***126,511***	***52,521***	***1,680***	***1,151***	1.3
Other taxa	*43,171*	*15,516*	*37,811*	*14,037*	***5,360***	***4,403***	12.4

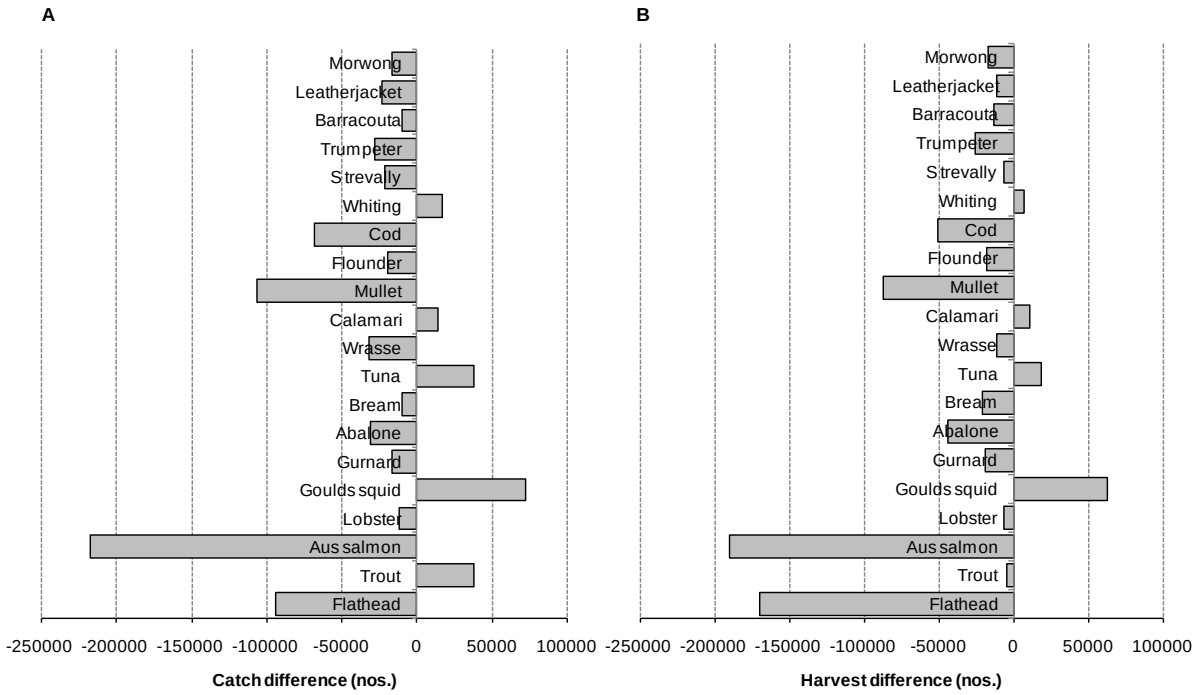

Fig. 42 A) Differences in catch (kept and released), and B) differences in harvest between 2007-08 and 2000-01for Tasmanian residents aged 5 years or older.

Estimates of harvest weights and comparison with commercial production levels during 2000-01 are presented in Appendix 16 and can be compared with estimates for 2007-08 (Table 8). The most conspicuous differences between years relate to the Australian salmon, tuna, trumpeters and barracouta. For barracouta in particular, the magnitude of this difference was heavily influenced by variability in assigned mean weights which, given the limited size information that was available for both years, adds additional uncertainty to the results.

Notwithstanding the important issues and uncertainties that arise when converting numbers to weight, there was underlying consistency between years in terms of the relative significance of the recreational fishery compared with the commercial fishery based on harvest levels. For instance, recreational catches represented an important component of the total harvest (>50%) for species such as flathead, flounder, mullet, cod, barracouta, jackass morwong and silver trevally whereas for species such as Australian salmon, whiting, garfish, and wrasse the recreational sector accounted for a minor share of the total harvest. Such an understanding is important not only for stock assessment but also for management, including the need to implement regulations and when considering issues relating to resource sharing and allocation.

10. Summary and conclusions

This study represents the second comprehensive assessment of recreational fishing in Tasmania and provides important information about participation, and catch and effort against which future trends and developments in the fishery can be assessed. The study utilised the same methodological approach applied in the 2000-01 National Recreational Fishing Survey but incorporated several improvements, in particular in relation to the statistical analysis of the data. However, in the absence of a repeat of the national survey, the current survey was limited to fishing in Tasmania by Tasmanian residents. Although not measured, fishing by interstate visitors in Tasmania was not likely to have been significant given that non-resident fishers accounted for just 3% of the total effort (fisher days) for Tasmania during 2000-01 (Henry and Lyle, 2003).

Information about participation rates and the demographic profile of recreational fishers was derived from a general population telephone survey involving 3451 Tasmanian households. This was followed by a telephone-diary survey involving 1037 households (almost 3000 persons) for which fishing activity was monitored over a 12 month period. Response rates across all facets of the study were exceptionally high, giving considerable confidence to the data quality.

In the 12 months prior to November 2007 over 118,000 Tasmanian residents aged 5 years or older fished at least once, representing an overall participation rate of 26%. By region of residence, residents of the Southern SD had the highest participation rate at 33%, which compared with 24-27% for other Tasmanian regions. Recreational fishing was more popular among males, with a state-wide participation rate of 35%, compared with about 18% for females. Participation rates varied with age, 5-14 year olds having the highest rate of participation (38%) although the greatest numbers of fishers were in the 30-44 years age group. Participation rates generally declined with increasing age, but especially in 45 years and older age groups.

In terms of participation, the number of recreational fishers in Tasmania has remained relatively constant since 2000. However, when population growth is taken into account the actual participation rate has declined significantly from just over 29% in 2000 to 26% in 2007. The decline was experienced in all regions (statistical divisions) and was more pronounced amongst males than females. Participation rates were also lower across all age groups apart from the 60 years plus age group where a slight increase was experienced. In practice, the participation rate in this latter group was low (13% in 2007) by comparison with other age groups so had little influence on the overall participation rate.

When broader demographic trends are taken into account, specifically dominance of the ‘baby-boomer’ generation (mostly 45-59 year olds in 2007) and the sharp decline in participation rates amongst the 45 years and older age groups, our results suggest that overall participation in recreational fishing in Tasmania is likely to decline further. This trend will continue unless there is growth, or at least maintenance, of involvement in fishing amongst the younger age groups. Consistent and significant declines in recreational fishing participation rates have also been observed in Queensland since the mid-1990s, with participation down from 28% (882,000 persons) in 1996 to under 21% (733,000 persons) in 2004 (McInnes, 2006).

While the reasons for the decline are unclear it does highlight the value of on-going assessments to establish trends and the need to identify key factors that influence recreational fishing participation. Such information has application in future management planning and in the identification of potential changes in the socio-economic impacts of recreational fishing. Recent studies in Queensland have focussed on understanding why people cease fishing, with lack of time, loss of interest, and poor fishing quality the most commonly identified reasons (Sutton *et al.*, 2009). Participation alone, however, does not adequately quantify impacts on the fisheries resources and thus there is a need to consider catch and effort information as well.

As this survey was designed to provide a big-picture perspective of the recreational fishery, it is important to recognise that comparatively rare or highly specialised activities may not be well represented. For instance, within the context of the *overall* recreational fishery, activities such as fishing for gamefish, off-shore fishing for striped trumpeter or blue eye trevalla, or regional fisheries, such as fishing in Macquarie Harbour or Georges Bay are relatively minor components. In such instances, estimates of catch and effort tend to be imprecise (high relative standard errors) and alternative, targeted surveys are recommended to provide a more reliable assessment of these activities. For the above reasons, aggregation of some regions and species has been necessary and not all data elements have been reported to the lowest feasible level. This is an important point to consider when interpreting survey findings.

Information about fishing effort and catch of recreational fishers was monitored over a 12-month period between December 2007 and November 2008. Almost 128,000 Tasmanian residents were estimated to have actually fished in Tasmania during this period, slightly more than during the previous 12 months. These fishers accounted for about 0.64 million fisher days of effort. The median number of days fished in Tasmania by Tasmanians was 5 days per fisher. The distribution of effort between fishers was highly skewed, with just 20% of fishers contributing 56% of the total effort or conversely, 80% fishers accounting for less than half of the effort.

Overall, 26% of fishers fished at least once in freshwater while 88% fished at least once in saltwater, implying that about half of the freshwater fishers also fished in saltwater. About one quarter of the total effort occurred in freshwater, saltwater fishing (including estuaries) accounted for the remainder. Freshwater fishing in lakes and dams accounted for about three times the effort in rivers while the majority of the saltwater fishing occurred in inshore coastal waters, with estuarine fishing of secondary importance. Fishing in offshore waters (>5 km off the coast) was a comparatively minor activity.

Line fishing was the dominant activity undertaken, pursued on 87% of all days fished; that is almost 0.56 million fisher days or 1.8 million hours of effort. This was followed by pot fishing (8%), dive harvesting (5%) and the use of gillnets (3%). A range of other fishing methods were also reported, including the use of spears, seine or bait nets and hand collection but these were of minor importance by comparison.

A wide variety of fish species were caught by recreational fishers during 2007-08, with a total of 1.62 million finfish (excluding small baitfish) retained and 1.24 million finfish released or discarded. Flathead (mainly sand flathead) represented almost two-thirds of the total finfish catch numbers, with an estimated 1.07 million kept and 0.74 million released. Other finfish species or species groups of significance included trout (157,000

kept and 105,000 released), Australian salmon (110,000 kept and 78,000 released), gurnard (13,000 kept and 67,000 released), and black bream (13,000 kept and 35,000 released).

Overall, 43% of all finfish captured were released or discarded; with low rates of release (<10%) for species such as blue warehou and flounder; intermediate rates (10-30%) for garfish, trumpeters, Atlantic salmon and jack mackerel; moderate rates (31-50%) for flathead, trout, Australian salmon, tuna, mullet, barracouta, silver trevally, jackass morwong, eels, river blackfish and redfin; and high rates (>50%) for black bream, wrasse, gurnard, sharks and rays, whiting, cod, pike and leatherjackets. Reasons for release were varied, with size (under legal size or too small) being an important factor for species such as flathead, Australian salmon, silver trevally, mullet and jackass morwong; poor eating qualities were identified as a important factor for release for barracouta, redfin, cod, wrasse, leatherjackets and gurnard; while catch and release (sport) fishing was important for black bream, trout and tuna. Sharks and rays tended to be released or discarded because of poor eating qualities (e.g. dogfish, draughtboard shark) and/or due to regulation (prohibition on taking shark from shark refuge areas).

There was a high level of fishery specialisation for species such as tuna, trout, flounder, rock lobster and scallops, with these species taken almost exclusively by targeted effort rather than incidental capture. Other species that tended to be caught primarily as a result of targeted effort included black bream, flathead, garfish and abalone, also implying a level of fishery specialisation for these species. By contrast, jackass morwong, jack mackerel, leatherjackets, wrasse, gurnard, cod and eels were virtually never targeted, which for several of these species is consistent with the fact that they are held in low esteem by fishers.

Recreational fishers also caught a variety of shellfish and other invertebrate species. Comparatively high catches of squid, namely Gould's squid (73,000 kept) and southern calamari (40,000 kept), were taken along with rock lobster (72,000 kept), abalone (64,000 kept) and scallops (397,000 kept). Amongst these taxa, rates of release were low for the squids, scallops and abalone and moderate for rock lobster.

By applying average weights it was possible to approximate harvest weights and compare recreational and commercial fisheries production. The annual recreational harvest of flathead was estimated at 292 tonnes, four times greater than the commercial flathead catch taken from state fishing waters. By weight, other species of importance included tuna (145 tonnes), Australian salmon (48 tonnes), southern calamari (45 tonnes), Gould's squid (37 tonnes) and the trumpeters combined (bastard and striped trumpeter) (19 tonnes). As a contributor to total harvest, the share taken by the recreational sector was similar or larger than that taken by the Tasmanian commercial scalefish fishery for flathead, flounder, mullet, cod, barracouta, silver trevally, jackass morwong, and Gould's squid. Conversely,the recreational harvest represented a minor component (<15%) of the total catch for species such as Australian salmon, whiting, garfish, wrasse and jack mackerel.

Catch composition was influenced by many factors, including the water body fished and the fishing method. Trout dominated finfish catches (kept and released numbers) in freshwater (>80%), with redfin, Atlantic salmon and blackfish of secondary importance in the lake and dam fisheries, and redfin and blackfish in the river fisheries. Flathead and

Australian salmon dominated estuarine and inshore coastal catches (collectively >75%), with black bream and flounder of secondary importance in the estuarine fishery, and gurnard and wrasse in the inshore coastal fishery. Tuna, flathead and gurnard (mostly ocean perch) were the main species taken in the offshore fishery.

The finfish catch taken by line fishing was dominated by flathead (66% of total numbers), followed by trout (10%), Australian salmon (7%), gurnard (3%) and bream (2%). By contrast, trumpeter (mainly bastard trumpeter) (27%), blue warehou (10%), sharks and rays (9%), mullet (9%) and Atlantic salmon (7%) were the main species caught by gillnets, and flounder were mainly taken by spear. Gould's squid and southern calamari were mostly taken by line methods whereas rock lobster were caught using pots, dive collection and rings, with abalone and scallops more or less exclusively harvested by dive collection.

Catch and effort data for the key species were examined in detail (based on region, method, platform, water body and seasonality) and the regional fisheries characterised (effort by where fishers resided and by platform, and catch composition). The east and south-east coasts of Tasmania were a particularly significant for flathead, black bream, tuna, Gould's squid, southern calamari, rock lobster and abalone, with the south east especially important for flounder. By contrast, Australian salmon and mullet catches were concentrated off northern Tasmania. The inland trout fishery was focused largely in the Central Plateau lakes, especially Arthurs Lake and Great Lake, with catches from rivers of secondary importance. Trout catches from the other inland regions were similar in magnitude.

Catches of many of the key species were peaked during summer and autumn (December-March); they included flathead, trout, Australian salmon, black bream, mullet, Gould's squid, southern calamari, rock lobster and abalone. Tuna catches were restricted to summer-autumn, with a strong peak in February-March, while flounder catches peaked in late autumn (April-May). Catches of the major species tended to be relatively low during winter and early spring, reflecting the comparatively low fishing activity during that period.

Shore-based activity accounted for most of the fishing effort off western and northern Tasmania, with flathead, Australian salmon and mullet amongst the top three species caught off northern Tasmania. Australian salmon, rock lobster, abalone and trumpeter dominated west coast catches. Off eastern Tasmania, boat-based fishing was more prevalent than shore-based activity and flathead was by far the most commonly caught species throughout the broader region. While Australian salmon were among the top three species taken off the North East, Gould's squid was an important component of the fishery off the Central East, South East, Derwent and D'Entrecasteaux Channel regions. Whiting and flounder were relatively important components of the Norfolk-Frederick Henry Bay and Derwent fisheries.

Generally, fishers residing in areas adjacent to the fishing location accounted for the greatest portion of the fishing effort, though there was evidence in some areas that fishers travelling from outside of the region contributed significantly to the effort. For instance, Greater Hobart residents accounted for over one quarter of the fishing effort in the Central Plateau, 15% in the North East and over 40% in the Central East coast regions. Similarly, as well as being major contributors to fishing effort in the western regions of Tasmania,

Mersey-Lyell residents generally represented around 15% of the effort in the Tamar, East North and North East regions.

When compared with 2000-01, it was evident that there were considerable similarities but also several differences in the Tasmanian recreational fishery. Differences undoubtedly reflect a combination of inter-annual variability in the availability of some species and/or underlying changes in the nature of the fishery. Further studies will be necessary to differentiate between the roles that different drivers have in shaping the future of the fishery.

Overall effort (fisher days) was 14% lower in 2007-08; this decline was exclusively due to substantially reduced shore-based fishing effort in 2007-08. The most marked declines were experienced in the Eastern inland, West North coast and Derwent regions, mainly due to low levels of shore-based fishing activity. While factors contributing to these declines were not solicited, the drought experienced by Tasmania during the period is likely to have been a factor for the inland fishery, especially in the smaller rivers and lakes. Recent closures of wharf access to recreational fishers, particularly in ports off northern Tasmania, may have had some role in the sharp decline in shore-based fishing activity. The reason for the decline in fishing effort in the Derwent was unclear but appeared to have been offset to some extent by increased activity in the adjacent sheltered waters of the D'Entrecasteaux Channel and Norfolk-Frederick Henry Bay. During 2008, the recreational scallop fishery attracted considerable effort to the D'Entrecasteaux Channel, a fishery that was not accessible during 2001 due to closure.

Recreational gillnet effort was significantly lower in 2007-08, about 40% of that in 2000-01, despite the actual number of recreational gillnets licences having remained constant over the period (10,761 licences in 2000-01 and 10,180 in 2007-08). There is considerable anecdotal evidence to suggest that changes in management, especially the prohibition of overnight netting in most areas (introduced in late 2004), has been a major factor in reducing effort. Low abundances of key gillnet species, namely bastard trumpeter and blue warehou (Ziegler and Lyle, 2009), may have also contributed to this decline.

Finfish catch numbers (kept plus released) in 2007-08 were about 81% of the equivalent estimate for 2000-01. While the catch composition and relative importance of the key species was generally consistent between years, there was variability in catch levels for many species, linked in part to differences in effort, changes in fishing practices and species availability. Flathead catches were very stable (within 5%) between surveys while there was a moderate increase (17%) in the trout catch. By contrast, the catch of Australian salmon in 2007-08 was estimated at less than half that for 2000-01. Other species exhibiting substantial catch declines included mullet and cod. There were a number of other species that also declined, though in most instances the variability was not statistically significant. Catch increases were experienced for tuna and Gould's squid, both linked to greater availability during 2007-08. Minor, but non-significant increases were also evident for southern calamari and whiting, the former possibly linked to increased popularity of the species amongst recreational fishers.

Generally, release rates for most species were higher in 2007-08, which for species such as trout, black bream and tuna is consistent with a trend towards increased catch and release (sport rather than consumptive) fishing, whereas for others this change may reflect

improved adherence to size limits (potentially flathead, compare Lyle *et al*., 2002b and Fig. 11) and/or a response to decreased bag limits that have been implemented since 2001.

Recreational fishers in Australia and globally are becoming more conscious of the need for resource conservation and ethical fishing practices. Voluntary catch and release fishing is a manifestation of this, as has the implementation (and acceptance) of increasingly restrictive size and bag limits. In 2001, there were relatively few restrictions on recreational catches but following major fishery management reviews in late 2001 and 2004, bag limits and revised size limits have been implemented for many finfish species to reduce the impacts on the harvested stocks. These measures have been accompanied by education programs aimed at encouraging fishers to take only what they need for a feed. It is likely that, in combination, these factors may have contributed to the general increase in release rates.

Species for which release rates remained unchanged can be categorised broadly as those for which consumption is a primary motivation and few undersized individuals tend to be captured or no size limits exist (e.g. blue warehou, flounder, Gould's squid, southern calamari) and those species which are held in low esteem in terms of their edibility (e.g. wrasse and several shark species).

In summary, this study has highlighted the complex and dynamic nature of the recreational fishery and emphasises the need for managers, stakeholders and fisheries scientists to consider management, research and planning issues at appropriate regional and temporal scales. This survey represents a significant step towards achieving this goal, providing an important baseline against which future developments and trends can be evaluated.

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Appendices

Appendix 1 Species groupings by capture method as reported by recreational fishers in Tasmania during 2007-08.

Capture methods and relative catch (kept & released) numbers are indicated.+ <1000; ++ 1000-9,999; +++ 10,000-49,999; ++++ 50,000-99,999, +++++ 100,000 plus

			Line				Lobster	Other			
Reporting group	**Common name**	**Scientific name(s)**	**Line**	**Set line**	**Gillnet**	**Dive**	**Pot**	**Seine**	**Spear**	**Ring**	**Other**
Trout	Brown trout	*Salmo trutta*	+++++		+						
	Rainbow trout	*Oncorhynchus mykiss*	+++								
	Trout, unspec.	Salmonidae	++		+						
Atlantic salmon	Atlantic salmon	*Salmo salar*	++		++						
River blackfish	River blackfish	*Gadopsis marmoratus*	++								
Redfin	Redfin	*Perca fluviatilis*	+++								++
Australian salmon	Australian salmon	*Arripis* spp	+++++		++			+			+
Barracouta	Barracouta	*Thyrsites atun*	+++								
Black bream	Black bream	*Acanthopagrus butcheri*	+++		++						
Blue warehou	Blue warehou	*Seriolella brama*	++		++						
Cod	Cod	Moridae	+++		++				+		
Eel	Eel	*Conger* spp & Anguilliformes	++	+			+				+
Flathead	Southern sand flathead	*Platycephalus bassensis*	+++++	+	+	+			++		
	Tiger flathead	*Neoplatycephalus richardsoni*	++++		+						
	Flathead, unspec.	Platycephalidae	+++		+						
Flounder	Flounder	Bothidae & *Pleuronectidae* spp	++		+			+	+++		

Appendix 1 continued

			Line				Lobster	Other			
Reporting group	**Common name**	**Scientific name(s)**	**Line**	**Set line**	**Gillnet**	**Dive**	**Pot**	**Seine**	**Spear**	**Ring**	**Other**
Garfish	Garfish	*Hyporhamphus melanochir*	+++		+			+	+		++
Gurnard	Gurnard	Triglidae & Scorpaenidae	++++	+	+		+				
	Ocean perch	*Helicolenus* spp.	+++	++	++						
Jack mackerel	Jack mackerel	*Trachurus declivis*	++					+			
Leatherjacket	Leatherjacket	Monacanthidae	+++		++			+			
Pike	Pike	*Dinolestes lewin*i & *Sphyraena* spp	++		+						+
Jackass morwong	Jackass morwong	*Nemadactylus macropterus*	+++		++						
Mullet	Mullet	Mugilidae (incl *Aldrichetta forsteri* & *Mugil cephalus*)	+++		++	+		++	+		++
Silver trevally	Silver trevally	*Pseudocaranx dentex*	+++		++						++
Trumpeter	Bastard trumpeter	*Latridopsis forsteri*	+		+++	+					
	Striped trumpeter	*Latris lineata*	++	+							
Tuna	Albacore	*Thunnus alalunga*	+++								
	Skipjack tuna	*Katsuwonus pelamis*	+++								
	Southern bluefin tuna	*Thunnus maccoyii*	++								
	Yellowfin tuna	*Thunnus albacares*	+								
Whiting	Whiting	Sillaginidae (incl *Sillago bassensis* & *Sillaginodes punctata*)	+++						+		
Wrasse	Wrasse	Labridae (incl *Notolabrus tetricus* & *N. fucicola*)	+++		++	+	+		+		

Appendix 1 continued

			Line				Lobster	Other			
Reporting group	**Common name**	**Scientific name(s)**	**Line**	**Set line**	**Gillnet**	**Dive**	**Pot**	**Seine**	**Spear**	**Ring**	**Other**
Scalefish, other	Banded morwong	*Cheilodactylus spectabilis*			++	++					
	Magpie perch	*Cheilodactylus nigripes*			+						
	Morwong, other	Cheilodactylidae	+								
	Blueeye trevalla	*Hyperoglyphe antarctica*	++	++							
	Blue mackerel	*Scomber australasicus*	++		+						
	Boarfish	Pentacerotidae	+		+						
	Dory	Zeidae			+						
	Gemfish	*Rexea solandri*	++								
	Hapuku	*Polyprion oxygeneios*	+	+							
	Latchet	*Pterygotrigla polyommata*	+								
	Ling	*Genypterus* spp	+								+
	Luderick	*Girella* spp	+		+	+					
	Marblefish	*Aplodactylus arctidens*	+		+	+					
	Red Mullet	Mullidae	+								
	Sergeant baker	*Aulopus purpurissatus*	+								
	Snapper	*Pagrus auratus*	++								
	Stargazer	Uranoscopidae			+						
	Sweep	Scorpididae	+			+					
	Roach	*Rutilus rutilus*	+								

Appendix 1 continued

			Line				Lobster	Other			
Reporting group	**Common name**	**Scientific name(s)**	**Line**	**Set line**	**Gillnet**	**Dive**	**Pot**	**Seine**	**Spear**	**Ring**	**Other**
Scalefish, other	Tailor	*Pomatomus saltatrix*	++								
	Toad/pufferfish	Various families	++		+						
	Yellowtail kingfish	*Seriola lalandi*	+								
	Other scalefish	Various families	++		+						
Small baitfish	Small baitfish	Several families						+++			+++
	Whitebait	*Lavettia* & *Galaxias* spp.	++								+++
Sharks & rays	Gummy shark	*Mustelus antarcticus*	+++	++	++				+		
	School shark	*Galeorhinus galeus*	++	+							
	Dogfish	*Squalus* spp	++				+				
	Draughtboard shark	*Cephaloscyllium laticeps*	++	+	+		++				
	Elephantfish	*Callorhinchus milii*	+		++						
	Shark, other	Various families	++		++		+				
	Shark, unspec.	Various families	+	+							
	Skates/Rays	Various families	++		+			+	+		
Rocklobster	Southern rocklobster	*Jasus edwardsii*				+++	++++			+	
Crustaceans, other	Crab	Brachyura	+		+	++	++				+
	Prawns	Penaeidea							++		++
Gould's squid	Gould's squid	*Nototodarus gouldi*	++++				+		+		
Southern calamari	Southern calamari	*Sepioteuthis australis*	+++		+	+		+	+		+

Appendix 1 continued

			Line				Lobster	Other			
Reporting group	**Common name**	**Scientific name(s)**	**Line**	**Set line**	**Gillnet**	**Dive**	**Pot**	**Seine**	**Spear**	**Ring**	**Other**
Cephalopod, other	Cuttlefish	*Sepia* spp	++								
	Octopus	Octopodidae	++		+		+				
Abalone	Blacklip abalone	*Haliotis rubra*				++++					+
	Greenlip abalone	*Haliotis laevigata*				++					
Scallop	Scallop	Pectinidae	+			+++++					
Bivalve, other	Mussels	*Maccullochella peelii*				++					++
	Oysters	Ostreidae & *Pteriidae* spp	+								+++
	Bivalve, other	Various families									+++
Other taxa	Sea Urchin	Class Echinoidea				+++					

Appendix 2 Estimated number of persons and proportion of the Tasmanian resident population aged five years or older who fished recreationally in the 12 months prior to Nov 2007.

SE is standard error, RSE is relative standard error.

	Population	Recreational fishers			Participation rate	
Statistical division	**Number**	**Number**	**SE**	**RSE**	**(%)**	**SE**
Greater Hobart	190,122	51,071	2,430	4.8	26.9	1.3
Southern	33,514	11,012	815	7.4	32.9	2.4
Northern	128,871	32,239	1,664	5.2	25.0	1.3
Mersey-Lyell	101,436	24,078	1,405	5.8	23.7	1.4
Total	**453,943**	**118,399**	**3,363**	**2.8**	**26.1**	**0.7**

Appendix 3 Estimated number of persons and proportion of the Tasmanian resident population aged five years or older by age, gender and statistical division who fished recreationally in the 12 months prior to November 2007.

Statistical division	Age class	Male			Female			Total		
		Pop'n	Fishers	% fishers	Pop'n	Fishers	% fishers	Pop'n	Fishers	% fishers
Greater Hobart										
	5 to 14	13,365	6,376	47.7	12,856	3,904	30.4	26,221	10,281	39.2
	15 to 29	20,652	7,535	36.5	20,679	5,359	25.9	41,331	12,894	31.2
	30 to 44	19,680	8,179	41.6	21,254	5,044	23.7	40,934	13,223	32.3
	45 to 59	20,857	6,884	33.0	22,287	3,033	13.6	43,144	9,916	23.0
	60+	17,622	3,851	21.9	20,870	905	4.3	38,492	4,756	12.4
	Total	**92,176**	**32,825**	**35.6**	**97,946**	**18,246**	**18.6**	**190,122**	**51,071**	**26.9**
Southern		-			-			-		
	5 to 14	2,540	1,408	55.4	2,401	808	33.7	4,941	2,216	44.8
	15 to 29	2,683	1,192	44.4	2,468	747	30.3	5,151	1,938	37.6
	30 to 44	3,487	1,400	40.2	3,543	843	23.8	7,030	2,243	31.9
	45 to 59	4,611	2,160	46.8	4,344	1,060	24.4	8,955	3,220	36.0
	60+	4,040	982	24.3	3,397	412	12.1	7,437	1,394	18.7
	Total	**17,361**	**7,142**	**41.1**	**16,153**	**3,870**	**24.0**	**33,514**	**11,012**	**32.9**
Northern		-			-			-		
	5 to 14	9,866	3,902	39.6	9,168	2,841	31.0	19,034	6,743	35.4
	15 to 29	13,022	4,680	35.9	12,725	2,355	18.5	25,747	7,035	27.3
	30 to 44	13,252	5,347	40.3	13,777	2,450	17.8	27,029	7,797	28.8
	45 to 59	14,591	4,766	32.7	14,699	2,309	15.7	29,290	7,076	24.2
	60+	13,085	2,847	21.8	14,686	741	5.0	27,771	3,588	12.9
	Total	**63,816**	**21,543**	**33.8**	**65,055**	**10,696**	**16.4**	**128,871**	**32,239**	**25.0**
Mersey Lyell -		-			-			-		
	5 to 14	7,954	3,465	43.6	7,430	2,045	27.5	15,384	5,510	35.8
	15 to 29	9,440	3,005	31.8	9,376	1,561	16.6	18,816	4,566	24.3
	30 to 44	10,471	4,618	44.1	10,827	2,448	22.6	21,298	7,067	33.2
	45 to 59	11,535	3,400	29.5	11,658	972	8.3	23,193	4,372	18.8
	60+	11,015	2,179	19.8	11,730	385	3.3	22,745	2,564	11.3
	Total	**50,415**	**16,667**	**33.1**	**51,021**	**7,411**	**14.5**	**101,436**	**24,078**	**23.7**
Tasmania										
	5 to 14	33,725	15,151	44.9	31,855	9,598	30.1	65,580	24,749	37.7
	15 to 29	45,797	16,411	35.8	45,248	10,022	22.1	91,045	26,433	29.0
	30 to 44	46,890	19,545	41.7	49,401	10,785	21.8	96,291	30,330	31.5
	45 to 59	51,594	17,210	33.4	52,988	7,374	13.9	104,582	24,584	23.5
	60+	45,762	9,860	21.5	50,683	2,443	4.8	96,445	12,303	12.8
	Total	**223,768**	**78,177**	**34.9**	**230,175**	**40,222**	**17.5**	**453,943**	**118,399**	**26.1**

Appendix 4 Annual recreational catch (kept and released numbers) of key species by targeted and non-targeted effort during 2007-08 based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000;values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Non-targeted		Targeted		%
Species	**Number**	**SE**	**Number**	**SE**	**targeted**
Trout	8,292	2,720	253,642	35,303	96.8
Atlantic salmon	**5,777**	**2,366**	4,521	1,423	43.9
Redfin	12,260	3,609	**3,527**	**2,778**	22.3
River blackfish	***2,399***	***1,129***	***5,677***	***2,425***	*70.3*
Australian salmon	69,970	10,322	118,256	16,942	62.8
Barracouta	16,321	3,968	**3,286**	**1,303**	16.8
Black bream	6,568	2,283	**41,502**	**19,981**	86.3
Blue warehou	***6,106***	***3,049***	*2,708*	*928*	*30.7*
Cod	29,075	4,985	**2,791**	**1,344**	8.8
Eel	4,766	1,156	+		8.1
Flathead	426,501	43,954	1,384,732	120,679	76.5
Flounder	**2,385**	**1,021**	31,539	11,499	93.0
Garfish	**4,175**	**1,944**	**12,178**	**5,112**	74.5
Gurnard	80,228	*12,290*			-
Jack mackerel	**6,573**	***2,949***	+		*5.4*
Jackass morwong	17,796	*4,015*	***1,168***	***610***	*6.2*
Leatherjacket	18,582	*4,566*	+		*2.4*
Mullet	29,585	*4,917*	*8,271*	*2,364*	*21.8*
Pike	3,012	*892*	+		*20.6*
Silver trevally	13,533	*2,430*	***7,755***	***3,495***	*36.4*
Trumpeter	10,390	*2,937*	*9,477*	*2,519*	*47.7*
Tuna	+		*45,326*	*11,340*	*99.5*
Whiting	24,343	*8,326*	***6,222***	***5,225***	*20.4*
Wrasse	44,564	*6,589*	+		*1.1*
Small baitfish	+		***63,441***	***29,178***	*99.7*
Sharks & rays	33,742	*5,482*	*7,157*	*1,990*	*17.5*
Rock lobster	**1,168**	***500***	*134,116*	*17,713*	*99.1*
Crustaceans, other	*11,820*	*3,980*	***1,864***	***1,374***	*13.6*
Southern calamari	18,038	*4,548*	*26,851*	*7,674*	*59.8*
Gould's squid	42,242	*6,611*	*40,027*	*8,985*	*48.7*
Cephalopod, other	*5,605*	*1,843*			-
Abalone	**12,854**	***8,567***	*65,651*	*12,697*	*83.6*
Scallop	+		*401,801*	*93,618*	*100.0*
Bivalve, other	***4,044***	***2,666***	***69,225***	***30,764***	*94.5*
Other taxa	**10,170**	***7,402***			-

Appendix 5 Annual recreational harvest (kept numbers) of key species by targeted and non-targeted effort during 2007-08 based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000;values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Non-targeted		Targeted		%
Species	**Number**	**SE**	**Number**	**SE**	**targeted**
Trout	6,197	2,353	151,087	22,400	96.1
Atlantic salmon	4,137	1,451	4,262	1,379	50.7
Redfin	8,979	3,050	+		9.2
River blackfish	***1,916***	***998***	***3,702***	***1,631***	*65.9*
Australian salmon	33,011	4,948	77,301	12,372	70.1
Barracouta	9,725	3,536	**1,852**	**860**	16.0
Black bream	**3,058**	**1,551**	10,076	2,993	76.7
Blue warehou	***6,049***	***3,048***	*2,675*	*918*	*30.7*
Cod	12,005	2,765	**2,258**	**1,156**	15.8
Eel	2,218	794	+		14.7
Flathead	231,920	25,877	834,373	72,488	78.2
Flounder	**1,765**	**996**	30,671	11,429	94.6
Garfish	**3,215**	**1,584**	**11,353**	**4,850**	77.9
Gurnard	13,186	3,313			-
Jack mackerel	**4,937**	**2,834**	+		5.3
Jackass morwong	9,162	2,162	+		8.2
Leatherjacket	7,465	2,660	+		2.0
Mullet	18,526	4,022	5,625	2,067	23.3
Pike	1,441	556	+		11.4
Silver trevally	7,537	1,710	**3,099**	**1,531**	29.1
Trumpeter	8,407	2,440	8,914	2,256	51.5
Tuna	+		26,593	5,845	99.2
Whiting	**11,952**	**5,610**	**3,040**	**2,224**	20.3
Wrasse	11,334	2,517	+		2.6
Small baitfish			**60,686**	**29,091**	100.0
Sharks & rays	5,360	1,302	3,633	1,092	40.4
Rock lobster	**1,019**	**437**	70,946	9,315	98.6
Crustaceans, other	***4,342***	***2,740***	***1,614***	***1,352***	*27.1*
Southern calamari	14,819	3,388	25,706	7,373	63.4
Gould's squid	35,820	5,809	37,416	8,713	51.1
Cephalopod, other	***1,149***	***489***			-
Abalone	**11,608**	**7,791**	52,813	10,624	82.0
Scallop			396,685	92,996	100.0
Bivalve, other	***4,044***	***2,666***	***69,035***	***30,757***	*94.5*
Other taxa	**10,170**	**7,402**			-

Appendix 6 Annual recreational effort (fisher days and numbers of fishers) and catch (kept and released numbers) of key species by water body type during 2007-08 based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000;values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Lake		River		Estuary		Inshore		Offshore	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort										
Fishers	24,725	2,019	15,453	1,477	47,764	2,931	96,006	3,763	6,542	997
Fisher days	109,739	10,952	40,389	4,542	131,497	10,460	355,648	20,187	10,861	1,831
Catch										
Trout	198,335	30,158	60,950	11,492	*2,038*	*757*	+			
Atlantic salmon	***5,020***	***2,286***	+		***1,108***	***496***	*3,927*	*1,511*		
Redfin	*9,106*	*3,309*	***6,682***	***3,124***						
River blackfish	***4,591***	***2,211***	***3,485***	***1,610***						
Australian salmon			***1,285***	***1,210***	104,162	16,044	80,103	10,121	***2,676***	***2,637***
Barracouta					*2,504*	*996*	15,465	3,977	***1,639***	***955***
Black bream			+		**29,386**	**12,814**	***18,347***	***8,027***		
Blue warehou					*2,056*	*783*	***6,758***	***3,238***		
Cod					11,180	2,662	19,826	4,296	+	
Eel	***1,184***	***509***	*2,286*	*773*	+		+			
Flathead			+		293,642	47,191	1,494,388	124,773	*23,146*	*7,896*
Flounder					***21,281***	***11,071***	12,643	3,194		
Garfish					+		*15,620*	*6,021*		
Gurnard					*2,305*	*692*	68,164	10,872	*9,759*	*3,414*
Jack mackerel					***3,461***	***2,213***	*3,405*	*1,101*	+	
Jackass morwong					***1,475***	***924***	15,952	3,546	***1,537***	***1,135***
Leatherjacket					***2,744***	***1,734***	16,302	4,248		
Mullet					16,384	3,357	21,472	4,354		
Pike					+		*3,458*	*1,001*	+	
Silver trevally					9,163	2,794	12,124	3,281		
Trumpeter					***1,549***	***1,129***	17,548	4,149	+	
Tuna							20,163	5,405	25,375	7,559
Whiting					***4,506***	***1,843***	26,060	8,783		
Wrasse					***9,584***	***3,966***	35,317	5,288	+	
Scalefish, other			+		7,756	2,142	19,691	3,508	***1,869***	***867***
Small baitfish			***29,563***	***15,292***	***23,816***	***22,823***	***10,150***	***9,857***		
Sharks & rays					*4,851*	*1,321*	30,021	4,123	**6,028**	**3,713**
Rock lobster					*4,370*	*1,651*	128,420	17,250	***2,494***	***1,644***
Crustaceans, other					+		*13,229*	*4,198*		
Southern calamari					*12,226*	*4,636*	30,840	6,928	***1,823***	***1,155***
Gould's squid					*12,620*	*4,510*	69,177	10,561	+	
Cephalopod, other					+		*4,721*	*1,764*	+	
Abalone					***3,503***	***1,962***	74,398	16,013	+	
Scallop					**33,087**	**15,134**	368,777	92,317		
Bivalve, other					***33,990***	***19,105***	***39,280***	***22,312***		
Other taxa							***10,170***	***7,402***		

Appendix 7 Annual recreational harvest (kept numbers) of key species by water body type during 2007-08 based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000;values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Lake		River		Estuary		Inshore		Offshore	
Species	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Trout	128,501	21,734	27,197	5,641	*1,070*	*416*	+			
Atlantic salmon	*3,312*	*1,302*	+		***1,108***	***496***	*3,854*	*1,509*		
Redfin	*5,032*	*1,586*	***4,858***	***2,669***						
River blackfish	***2,992***	***1,530***	***2,625***	***1,314***						
Australian salmon			+		57,937	10,772	52,317	7,358		
Barracouta					***1,261***	***676***	9,397	3,535	+	
Black bream					7,242	2,121	*5,892*	*2,244*		
Blue warehou					*2,056*	*783*	***6,667***	***3,233***		
Cod					*4,324*	*1,269*	9,883	2,724	+	
Eel	+		*1,297*	*488*	+		+			
Flathead					*137,174*	*26,031*	912,697	75,820	*16,422*	*6,152*
Flounder					***20,960***	***11,062***	11,476	2,991		
Garfish					+		*13,993*	*5,544*		
Gurnard					+		11,251	3,130	***1,792***	***1,034***
Jackmackerel					***2,634***	***2,135***	*2,542*	*974*	+	
Jackass morwong					+		8,533	1,889	+	
Leatherjacket					***1,252***	***868***	6,367	2,505		
Mullet					8,393	2,365	15,759	3,874		
Pike					+		*1,500*	*574*		
Silver trevally					2,977	1,024	7,660	2,142		
Trumpeter					***1,549***	***1,129***	15,002	3,626	+	
Tuna							13,436	3,558	13,369	3,541
Whiting					***2,932***	***1,511***	**12,060**	**4,833**		
Wrasse					***2,763***	***1,609***	8,877	1,942		
Scalefish, other			+		2,528	939	9,274	2,444	***1,869***	***867***
Small baitfish			***26,719***	***15,124***	***23,816***	***22,823***	***10,150***	***9,857***		
Sharks & rays					+		6,536	1,277	***1,696***	***1,018***
Rock lobster					***3,188***	***1,309***	67,715	9,193	***1,062***	***815***
Crustaceans, other					+		***5,755***	***3,046***		
Southern calamari					*9,306*	*3,374*	29,435	6,730	***1,784***	***1,120***
Gould's squid					*11,077*	*3,922*	61,686	9,888	+	
Cephalopod, other					+		+			
Abalone					***3,503***	***1,962***	60,314	13,923	+	
Scallop					***33,087***	***15,134***	363,597	91,683		
Bivalve, other					***33,799***	***19,093***	***39,280***	***22,312***		
Other taxa							***10,170***	***7,402***		

Appendix 8 Annual recreational effort (fisher days and hours) and catch (kept and released numbers) of key species by fishing method during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error ; *na* is not applicable (passive fishing methods); + indicates value <1000, values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Line		Gillnet		Dive		Lobster pot		Other	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort										
Fisher days	556,826	25,273	17,451	2,483	33,880	6,911	52,128	6,756	14,432	2,539
Hours	1,817,522	97,778	*na*		61,787	19,888	*na*		*na*	
Catch										
Trout	261,818	35,828	+							
Atlantic salmon	6,154	2,338	*4,144*	*1,512*						
Redfin	13,007	3,639							***2,781***	***2,740***
River blackfish	*8,076*	*3,101*								
Australian salmon	185,669	21,241	***2,055***	***1,282***					+	
Barracouta	19,608	4,231								
Black bream	**46,743**	**20,114**	***1,327***	***1,175***						
Blue warehou	*3,085*	*1,029*	***5,730***	***3,168***						
Cod	30,057	5,002	***1,733***	***1,244***					+	
Eel	*4,730*	*1,158*					+		+	
Flathead	1,808,240	137,921	+		+				*2,122*	*734*
Flounder	***1,991***	***1,610***	+						31,114	10,335
Garfish	***11,741***	***5,073***	+						***4,207***	***3,137***
Gurnard	78,699	12,146	***1,516***	***869***			+			
Jack mackerel	***6,827***	***2,969***							+	
Jackass morwong	17,598	3,995	***1,366***	***772***						
Leatherjacket	15,268	4,506	*3,635*	*1,082*					+	
Mullet	27,358	4,310	***5,455***	***2,189***	+				***4,961***	***2,436***
Pike	*3,293*	*918*	+						+	
Silver trevally	18,440	4,124	*1,544*	*577*					***1,304***	***1,267***
Trumpeter	*3,764*	*1,320*	15,897	4,076	+					
Tuna	45,538	11,405								
Whiting	30,446	9,777							+	
Wrasse	40,448	6,477	*3,869*	*917*	+		+		+	
Scalefish, other	24,009	4,215	*3,934*	*1,026*	***1,421***	***1,120***			+	
Small baitfish	***1,460***	***1,282***							***62,159***	***29,160***
Sharks & rays	33,236	5,271	*5,623*	*1,775*			*1,791*	*698*	+	
Rock lobster					38,084	7,931	96,202	15,321	+	
Crustaceans, other	+		+		***1,056***	***825***	***7,162***	***2,903***	***4,684***	***2,924***
Southern calamari	44,306	9,030	+		+				+	
Gould's squid	82,196	11,517					+		+	
Cephalopod, other	*5,396*	*1,838*	+				+			
Abalone					78,260	16,270			+	
Scallop	+				401,801	93,618				
Bivalve, other	+				***2,049***	***2,009***			***71,015***	***31,375***
Other taxa					***10,170***	***7,402***				

Appendix 9 Annual recreational harvest (kept numbers) of key species by fishing method during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000, values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Line		Gillnet		Dive		Lobster pot		Other	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Trout	157,168	22,910	+							
Atlantic salmon	4,255	1,386	*4,144*	*1,512*						
Redfin	9,334	3,062							+	
River blackfish	***5,618***	***2,343***								
Australian salmon	107,798	14,313	***2,011***	***1,282***					+	
Barracouta	11,577	3,691								
Black bream	11,808	3,199	***1,327***	***1,175***						
Blue warehou	*2,994*	*1,015*	***5,730***	***3,168***						
Cod	13,743	2,966	+						+	
Eel	*2,348*	*813*					+			
Flathead	1,063,556	83,450	+		+				*2,122*	*734*
Flounder	**1,765**	**1,604**	+						30,219	10,257
Garfish	***10,246***	***4,676***	+						***3,918***	***2,859***
Gurnard	11,937	3,198	***1,249***	***861***						
Jack mackerel	***5,098***	***2,845***							+	
Jackass morwong	8,741	2,095	***1,238***	***751***						
Leatherjacket	6,822	2,642	+						+	
Mullet	14,542	3,126	***4,823***	***1,987***	+				***4,704***	***2,421***
Pike	*1,127*	*373*	+						+	
Silver trevally	7,843	1,975	*1,490*	*574*					***1,304***	***1,267***
Trumpeter	*2,939*	*883*	14,176	3,671	+					
Tuna	26,805	5,891								
Whiting	**14,873**	**6,003**							+	
Wrasse	10,541	2,436	+		+					
Scalefish, other	10,219	2,755	*1,976*	*747*	***1,421***	***1,120***			+	
Small baitfish	***1,460***	***1,282***							***59,404***	***29,073***
Sharks & rays	8,164	1,704	+				+		+	
Rock lobster					28,017	6,208	43,565	6,389	+	
Crustaceans, other	+				+		+		***4,433***	***2,915***
Southern calamari	39,942	8,247	+		+				+	
Gould's squid	73,190	10,697							+	
Cephalopod, other	***1,093***	***479***					+			
Abalone					64,176	14,217			+	
Scallop					396,685	92,996				
Bivalve, other	+				***2,049***	***2,009***			***70,824***	***31,368***
Other taxa					***10,170***	***7,402***				

Appendix 10 Annual recreational catch (kept and released numbers) of key species by fishing platform during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Boat		Shore		Both		%
Species	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**boat**
Trout	126,861	24,181	132,192	20,975	***2,882***	***1,499***	48.4
Atlantic salmon	*5,733*	*1,732*	***4,565***	***2,050***			55.7
Redfin	***5,711***	***2,666***	*9,783*	*3,657*	+		36.2
River blackfish			*8,076*	*3,101*			0.0
Australian salmon	99,145	16,131	88,994	13,128	+		52.7
Barracouta	17,063	4,116	*2,474*	*987*	+		87.0
Black bream	***35,926***	***19,795***	12,104	3,339	+		74.7
Blue warehou	***7,636***	***3,206***	***1,179***	***554***			86.6
Cod	15,028	3,175	16,838	4,166			47.2
Eel	+		*4,689*	*1,162*			9.6
Flathead	1,679,018	136,209	130,128	19,496	***2,086***	***1,482***	92.7
Flounder	*4,668*	*1,553*	29,256	11,339			13.8
Garfish	***11,990***	***5,176***	***4,362***	***3,149***			*73.3*
Gurnard	77,899	12,288	*2,329*	*874*			97.1
Jackmackerel	*2,538*	*871*	***4,406***	***2,832***			*36.6*
Jackass morwong	16,629	3,718	***2,336***	***1,727***			87.7
Leatherjacket	14,206	4,028	***4,839***	***2,094***			74.6
Mullet	12,838	3,523	25,018	4,057			33.9
Pike	*2,072*	*637*	***1,720***	***796***			*54.6*
Silver trevally	8,463	2,879	12,749	3,254	+		39.8
Trumpeter	19,463	4,280	+				98.0
Tuna	45,538	11,405					100.0
Whiting	23,135	8,787	***7,431***	***4,282***			75.7
Wrasse	27,804	4,202	17,240	4,660			61.7
Scalefish, other	18,076	3,685	11,433	2,537			61.3
Small baitfish	***10,150***	***9,857***	***53,470***	***27,472***			*16.0*
Sharks & rays	32,769	5,514	8,049	1,656	+		80.1
Rock lobster	129,717	17,636	*5,567*	*2,090*			95.9
Crustaceans, other	*10,844*	*3,961*	***2,840***	***14,428***			*79.0*
Southern calamari	23,176	5,944	21,479	5,457	+		51.6
Gould's squid	75,470	11,293	*6,741*	*2,281*	+		91.7
Cephalopod, other	*5,367*	*1,831*	+				95.8
Abalone	55,213	14,216	23,204	6,127	+		70.3
Scallop	395,253	93,471	***6,612***	***6,420***			98.4
Bivalve, other	***2,255***	***2,018***	***71,015***	***31,375***			3.1
Other taxa			***10,170***	***7,402***			0.0

Appendix 11 Annual recreational harvest (numbers) for key species by fishing platform during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Boat		Shore		Both		%
Species	**Number**	**SE**	**Number**	**SE**	**Number**	**se SE**	**boat**
Trout	90,490	19,597	65,101	9,831	***1,693***	***863***	57.5
Atlantic salmon	*5,542*	*1,726*	*2,857*	*836*			66.0
Redfin	***4,434***	***2,581***	*5,162*	*1,661*	+		44.8
River blackfish			***5,618***	***2,343***			0.0
Australian salmon	71,154	12,398	39,128	7,083	+		64.5
Barracouta	10,179	3,628	***1,328***	***681***	+		87.9
Black bream	*8,269*	*2,968*	4,826	1,668	+		63.0
Blue warehou	***7,602***	***3,203***	***1,121***	***546***			87.1
Cod	7,772	2,034	6,492	2,243			54.5
Eel	+		*2,202*	*807*			15.3
Flathead	1,013,279	82,934	51,153	8,065	***1,860***	***1,301***	95.0
Flounder	*4,304*	*1,525*	**28,132**	**11,280**			13.3
Garfish	***10,563***	***4,771***	***4,005***	***2,872***			*72.5*
Gurnard	12,699	3,301	+				96.3
Jack mackerel	***1,452***	***628***	***3,764***	***2,769***			*27.8*
Jackass morwong	8,813	2,060	***1,166***	***839***			88.3
Leatherjacket	**5,798**	**2,484**	***1,822***	***952***			76.1
Mullet	9,871	3,076	14,281	3,252			40.9
Pike	*1,017*	*373*	+				*62.5*
Silver trevally	5,537	1,663	5,023	1,742	+		52.1
Trumpeter	16,964	3,771	+				97.9
Tuna	26,805	5,891					100.0
Whiting	**12,937**	**5,962**	*2,055*	*694*			86.3
Wrasse	6,640	1,627	5,000	1,840			57.0
Scalefish, other	10,325	2,897	3,435	1,037			75.0
Small baitfish	***10,150***	***9,857***	***50,536***	***27,379***			*16.7*
Sharks & rays	7,186	1,696	1,784	557	+		79.9
Rock lobster	68,880	9,378	3,085	1,062			95.7
Crustaceans, other	***3,934***	***2,730***	***2,021***	***1,372***			*65.8*
Southern calamari	22,342	5,792	17,950	4,393	+		55.1
Gould's squid	67,216	10,481	*5,962*	*2,146*	+		91.8
Cephalopod, other	***1,129***	***489***	+				98.3
Abalone	47,804	13,035	16,530	4,401	+		74.2
Scallop	390,136	92,847	***6,548***	***6,420***			98.3
Bivalve, other	***2,255***	***2,018***	***70,824***	***31,368***			3.1
Other taxa			***10,170***	***7,402***			0.0

Appendix 12. Annual recreational effort (number of fishers and fisher days) and catch (kept and released numbers) for key species by fishing region during 2007-08, based on Tasmanian residents aged five years or older.

SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Western		Central Plateau		Eastern		West coast		West north coast		Tamar		East north coast	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort														
Fishers	13,570	1,536	15,484	1,508	13,275	1,305	5,905	1,023	18,939	1,616	14,329	1,608	13,595	1,433
Fisher days	40,436	5,456	74,771	9,206	34,627	4,004	17,281	4,438	65,719	7,551	36,562	5,263	35,471	5,279
Trout	45,670	10,938	166,077	28,327	47,539	9,646	+		+				+	
Atlantic salmon	**4,025**	**2,254**	+		+		+				+			
Redfin	+		2,872	1,099	11,974	4,313								
River blackfish	***4,223***	***1,849***	+		***3,764***	***2,485***								
Australian salmon					**1,285**	**1,210**	19,715	7,091	75,779	14,490	14,475	4,400	17,792	6,608
Barracouta							+		**5,540**	**3,366**	+		**1,251**	**580**
Black bream	+				+				+		+		**1,278**	**1,173**
Blue warehou									***1,377***	***697***	***1,490***	***742***		
Cod							**2,577**	**2,460**	1,859	600	6,669	2,389	+	
Eel	1,158	428	+		**1,945**	**893**	+		+					
Flathead					+		**2,055**	**1,192**	109,177	27,982	74,931	14,331	56,456	11,557
Flounder							**1,909**	**887**	**1,490**	**1,126**	**1,509**	**905**	+	
Garfish									**3,376**	**3,099**	+		+	
Gurnard							+		**12,066**	**5,389**	**1,673**	**768**	**4,606**	**1,908**
Jack mackerel									+		+		+	
Jackass morwong									+				+	
Leatherjacket									1,093	424	+		**2,006**	**1,094**
Mullet							**1,552**	**1,176**	15,851	3,696	7,215	2,244	**5,763**	**2,557**
Pike									**1,376**	**576**	+		**1,212**	**660**
Silver trevally							+		11,335	3,789	**1,792**	**1,326**	+	
Trumpeter							**4,170**	**2,710**	+				+	

Appendix 12 continued

	Western		Central Plateau		Eastern		West coast		West north coast		Tamar		East north coast	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Tuna													+	
Whiting									+		+		**4,398**	**4,148**
Wrasse							+		10,552	3,613	1,947	666	**4,700**	**1,946**
Scalefish, other	+						+		5,190	1,636	**3,327**	**1,826**	**3,554**	**1,497**
Small baitifsh	***16,601***	***9,977***			***13,052***	***11,588***								
Sharks & rays							**1,166**	**476**	12,441	4,486	**1,572**	**837**	2,883	922
Rock lobster							18,128	5,747	**2,267**	**1,246**			7,728	3,011
Crustaceans, other							+		+		***2,631***	***2,577***		
Southern calamari									2,994	907	**7,577**	**3,566**	**4,327**	**2,559**
Gould's squid									**5,376**	**2,293**	+		**2,934**	**1,345**
Cephalopod, other									***1,808***	***1,338***			+	
Abalone							**7,963**	**3,299**	**3,941**	**1,852**			**4,718**	**2,048**
Scallop														
Bivalve, other														
Other taxa														

Appendix 12 continued

	North east coast		Central east coast		South east coast		NFHB		Derwent		DEC	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Effort												
Fishers	14,885	1,693	20,138	1,933	19,061	1,787	19,838	2,013	11,000	1,545	31,093	2,489
Fisher days	52,525	7,296	63,165	7,950	59,590	8,074	50,552	6,924	23,611	3,908	91,867	10,256
Catch												
Trout	+						+		**1,328**	**700**	+	
Atlantic salmon					**2,693**	**1,437**	+		+		1,786	613
Redfin												
River blackfish												
Australian salmon	31,071	7,815	10,675	2,988	**2,234**	**1,298**	5,100	1,689	**4,985**	**2,828**	**5,118**	**2,331**
Barracouta	**1,071**	**864**	**3,057**	**1,337**	4,428	1,519	+		+		2,403	951
Black bream	**23,884**	**13,481**	14,767	5,355					**5,052**	**3,224**	**1,628**	**811**
Blue warehou	+				***1,625***	***1,084***	***3,017***	***2,850***	+		+	
Cod	+		**4,834**	**2,042**	3,059	1,028	**1,813**	**935**	**1,536**	**1,053**	8,915	2,707
Eel	+		+		+		+				+	
Flathead	69,321	19,267	358,866	63,665	219,252	36,323	423,449	64,119	65,804	18,160	431,864	62,939
Flounder	+		+				**6,375**	**2,697**	**17,891**	**10,576**	**3,405**	**1,536**
Garfish	**9,509**	**4,727**			+		**2,224**	**2,081**	+			
Gurnard	5,996	2,009	28,889	8,451	19,320	4,898	1,893	610	+		4,968	1,432
Jack mackerel	**1,168**	**627**	+		+				**2,801**	**2,716**	+	
Jackass morwong	4,202	1,656	**3,617**	**1,843**	4,824	1,857	+		**1,958**	**1,708**	**2,788**	**1,821**
Leatherjacket	**9,134**	**4,170**	+		2,079	831	**1,754**	**989**	+		**1,442**	**729**
Mullet	**3,646**	**1,577**	+		+		**1,195**	**516**	**1,152**	**1,077**	+	
Pike	+		+		+				+		+	

Appendix 12 continued

	North east coast		Central east coast		South east coast		NFHB		Derwent		DEC	
	Number	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**	**Number**	**SE**
Silver trevally	4,696	1,259	**1,507**	**821**	+						+	
Trumpeter	+		**2,345**	**1,156**	6,920	2,122	+		**1,689**	**1,506**	**3,630**	**1,573**
Tuna	**21,272**	**8,748**	6,185	2,392	17,478	6,692	+					
Whiting	**2,217**	**967**	**1,735**	**1,297**	+		**15,318**	**6,698**	**5,379**	**2,637**	+	
Wrasse	2,931	1,069	5,361	1,580	7,184	2,376	**1,142**	**551**	**4,888**	**3,413**	5,880	1,730
Scalefish, other	5,065	1,658	**2,952**	**1,799**	5,059	1,616	+		+		2,316	875
Small baitifsh	***2,003***	***1,983***	***31,963***	***23,056***								
Sharks & rays	2,344	889	5,970	1,723	6,223	2,464	1,566	437	1,482	489	5,254	1,661
Rock lobster	6,240	2,474	23,565	6,951	51,549	11,286	**6,096**	**2,696**	**2,001**	**1,091**	17,710	5,692
Crustaceans, other	***2,961***	***1,681***	***3,344***	***1,838***	***3,454***	***2,087***	+		+		+	
Southern calamari	**3,127**	**1,297**	**7,410**	**3,515**	**10,903**	**6,358**	+		**2,330**	**1,891**	5,278	2,033
Gould's squid	**2,393**	**1,167**	18,216	4,220	27,415	8,821	**3,393**	**1,557**	**5,714**	**3,525**	16,396	3,904
Cephalopod, other	+		+		+		+		+		***2,892***	***1,229***
Abalone	**3,037**	**1,566**	22,240	8,002	**23,203**	**9,950**	**3,821**	**2,575**	+		**9,207**	**4,246**
Scallop											401,864	93,617
Bivalve, other	***39,385***	***22,597***	***4,126***	***2,859***	+		***2,676***	***2,637***	***1,335***	***1,298***	***24,865***	***14,176***
Other taxa			***10,170***	***7,402***								

Appendix 13. Annual recreational harvest (numbers) for key species by fishing region during 2007-08, based on Tasmanian residents aged five years or older.
SE is standard error; + indicates value <1000; values in bold indicate relative standard error >40%, values in italics indicate that fewer than 30 households recorded catches of the species/species group.

	Western		**Central Plateau**		**Eastern**		**West coast**		**West north coast**		**Tamar**		**East north coast**	
	No.kept	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**
Trout	22,572	4,051	106,053	20,213	27,073	6,209	+		+				+	
Atlantic salmon	**2,317**	**1,245**	+		+		+				+			
Redfin	+		**2,095**	**933**	7,250	2,877								
River blackfish	***3,272***	***1,495***	+		***2,257***	***1,801***								
Australian salmon					+		**10,561**	**5,024**	41,194	10,109	9,422	3,398	10,140	3,911
Barracouta							+		**4,280**	**3,274**	+		+	
Black bream									+		+		**1,198**	**1,171**
Blue warehou									***1,377***	***697***	***1,456***	***729***		
Cod							**1,882**	**1,804**	+		2,358	901		
Eel	+		+		**1,494**	**742**								
Flathead							**1,120**	**669**	62,479	19,477	25,171	4,997	48,815	10,605
Flounder							**1,698**	**877**	**1,113**	**874**	**1,463**	**901**	+	
Garfish									**3,086**	**2,818**	+		+	
Gurnard									**1,388**	**704**	+		+	
Jack mackerel									+		+		+	
Jackass morwong									+				+	
Leatherjacket									+		+		+	
Mullet							**1,485**	**1,174**	8,483	3,052	4,526	1,646	**4,587**	**2,349**
Pike									+				+	
Silver trevally							+		**3,918**	**1,881**	**1,171**	**913**	+	
Trumpeter							**4,088**	**2,699**	+				+	
Tuna													+	
Whiting									+		+		+	
Wrasse							+		2,786	1,108	+		**1,683**	**815**

Appendix 13 continued.

	Western		Central Plateau		Eastern		West coast		West north coast		Tamar		East north coast	
	No.kept	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**	**No.kept**	**SE**
Scalefish, other	+						+		**1,078**	**437**	+		**1,718**	**813**
Small baitfish					***13,052***	***11,588***	+		+					
Sharks & rays							+		3,719	1,382	+		**1,499**	**697**
Rock lobster							8,590	2,596	**1,977**	**1,090**			6,541	2,523
Crustaceans, other							+		+		***2,619***	***2,577***		
Southern calamari									2,722	838	**5,356**	**2,311**	**4,095**	**2,361**
Gould's squid									**5,156**	**2,288**	+		**2,552**	**1,306**
Cephalopod, other									+				+	
Abalone							**7,433**	**3,127**	**3,419**	**1,777**			**4,024**	**1,768**
Scallop														
Bivalve, other														
Other taxa														

Appendix 13 continued.

	North east coast		Central east coast		South east coast		NFHB		Derwent		DEC	
	No. kept	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**
Trout							+		+			
Atlantic salmon					**2,620**	**1,435**	+		+		1,786	613
Redfin												
River blackfish												
Australian salmon	20,692	5,792	7,161	2,364	**1,952**	**1,281**	4,463	1,630	**3,002**	**1,767**	1,668	543
Barracouta	+		**1,056**	**682**	**2,918**	**1,225**	+		+		**1,256**	**633**
Black bream	**4,254**	**1,842**	**5,240**	**2,307**					**1,427**	**1,070**	+	
Blue warehou	+				***1,625***	***1,084***	***2,959***	***2,849***	+		+	
Cod	+		**1,588**	**971**	**1,981**	**928**	+		+		4,333	1,516
Eel	+		+		+						+	
Flathead	49,474	12,884	254,993	46,118	126,720	22,426	250,355	38,949	35,037	10,623	212,128	30,878
Flounder	+		+				**6,251**	**2,672**	**17,891**	**10,576**	**2,830**	**1,177**
Garfish	**8,513**	**4,407**					**1,960**	**1,820**	+			
Gurnard	+		**4,514**	**2,652**	5,191	1,619	+		+		+	
Jack mackerel	+		+		+				**2,738**	**2,715**	+	
Jackass morwong	**2,462**	**1,026**	**1,652**	**795**	3,613	1,306	+		+		+	
Leatherjacket	**5,370**	**2,597**	+		+		+		+			
Mullet	1,889	723	+		+		+		**1,114**	**1,076**	+	
Pike	+										+	
Silver trevally	2,869	873	+		+						+	
Trumpeter	+		1,710	652	5,640	1,608	+		**1,208**	**1,033**	**3,630**	**1,573**
Tuna	10,475	3,476	**4,377**	**1,906**	11,556	4,198	+					
Whiting	**1,208**	**726**	**1,151**	**1,133**	+		**7,734**	**3,611**	**3,765**	**2,176**	+	
Wrasse	+		**1,414**	**655**	**1,124**	**497**			**1,895**	**1,570**	**1,674**	**887**

Appendix 13 continued.

	North east coast		Central east coast		South east coast		NFHB		Derwent		DEC	
	No. kept	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**	**No. kept**	**SE**
Scalefish, other	2,941	1,169	**2,481**	**1,788**	**3,071**	**1,286**	+		+		+	
Small baitfish	***2,003***	***1,983***	***31,963***	***23,056***								
Sharks & rays	+		**1,178**	**559**	+		+		+		+	
Rock lobster	4,686	1,782	15,154	4,555	23,867	5,258	**2,761**	**1,155**	**1,142**	**735**	7,247	1,970
Crustaceans, other	***1,814***	***1,367***	+						+		+	
Southern calamari	**3,068**	**1,296**	**6,962**	**3,496**	**10,504**	**6,090**	+		**1,760**	**1,347**	5,114	2,025
Gould's squid	**2,393**	**1,167**	15,919	3,922	24,368	8,240	**3,263**	**1,531**	**5,290**	**3,142**	13,862	3,361
Cephalopod, other	+		+		+		+				+	
Abalone	**2,979**	**1,524**	15,262	5,759	**19,630**	**9,291**	**3,075**	**2,076**	+		**8,225**	**3,704**
Scallop											396,685	92,996
Bivalve, other	***39,385***	***22,597***	***4,126***	***2,859***	+		***2,676***	***2,637***	***1,144***	***1,113***	***24,865***	***14,176***
Other taxa			***10,170***	***7,402***								

Appendix 14 Estimated number of persons and proportion of the Tasmanian resident population aged five years or older who fished recreationally in the 12 months prior to May 2000.

SE is standard error, RSE is relative standard error.

	Population	Recreational fishers			Participation rate	
Statistical division	**Number**	**Number**	**SE**	**RSE**	**(%)**	**SE**
Greater Hobart	176,120	49,448	2,280	4.6	28.1	1.3
Southern	31,617	12,307	626	5.1	38.9	2.0
Northern	119,985	35,629	2,129	6.0	29.7	1.8
Mersey-Lyell	98,071	27,635	1,607	5.8	28.2	1.6
Total	**425,793**	**125,018**	**3,565**	**2.9**	**29.4**	**0.8**

Appendix 15. Annual recreational effort (number of fishers and fisher days) by fishing region during 2000-01, based on Tasmanian residents aged five years or older.

SE is standard error; values in italics indicate that fewer than 30 households recorded catches of the species/species group.

Region	**Fishers**	**SE**	**Fisher days**	**SE**
Western	13,989	1,718	40,416	6,815
Central	13,089	1,672	64,532	8,704
Eastern	19,609	2,130	75,534	11,959
West coast	3,959	897	30,820	15,643
West north coast	21,724	2,149	94,990	14,469
Tamar	14,523	2,010	45,301	8,172
East north coast	12,884	1,940	44,755	13,024
North east coast	13,345	1,789	59,499	12,890
Central east coast	21,395	2,483	72,665	12,067
South east coast	13,747	1,737	54,069	10,959
NFHB	18,153	2,001	42,993	6,546
Derwent	19,787	2,282	54,361	10,168
DEC	22,883	2,216	73,815	8,556

Appendix 16 Annual harvest (numbers), average weight and estimated harvest weight for key species taken by recreational fishers in Tasmania during 2000-01, based on Tasmanian residents aged five years or older, compared with commercial production in Tasmania. Commercial finfish catch data are based on General Fishing logbook returns for May 2000-April 2001, inclusive.

na not available; [A] based on limited data; [B] based on 1997-98 creel survey data; [C] other data sources ulitised.

	Recreational					
Species	Harvest (No.)	Av. weight (kg)	Estimated harvest (tonnes)	Commercial catch (tonnes)	Combined catch (tonnes)	% recreational
Flathead	1,236,675	0.26	321.5	63.4	384.9	83.5
Australian salmon	300,456	0.35	105.2	485	590.2	17.8
Trout	161,575	na		-		na
Mullet	111,025	0.27	30.0	13.7	43.7	68.6
Cod	65,115	0.47	30.6	4	34.6	88.4
Flounder	50,582	0.30[B]	15.2	10.5	25.7	59.1
Black bream	34,336	0.64	22.0	0	22.0	100.0
Gurnard	32,182	na		7.8		
Bastard trumpeter	29,130	1.27	37.0	26.2	63.2	58.5
Jackass morwong	27,041	1.18	31.9	13.7	45.6	70.0
Barracouta	24,320	1.93	46.9	15.1	62.0	75.7
Wrasse	23,083	0.59	13.6	88.4	102.0	13.3
Leatherjackets	18,706	0.44	8.2	16.7	24.9	33.0
Silver trevally	16,812	0.28[A]	4.7	1.6	6.3	74.6
Blue warehou	16,359	0.89	14.6	36.3	50.9	28.6
Jack mackerel	15,770	0.20	3.2	8.6	11.8	26.8
Garfish	15,669	0.12[A]	1.9	81.4	83.3	2.3
Atlantic salmon	14,402	na				
Striped trumpeter	13,450	2.20[B]	29.6	49.6	79.2	37.4
Redfin	10,543	na		-		
Sharks & rays	10,245	na		na		
Pike	10,109	na		12.5		
Tuna	7,964	3.56[A]	28.4	na		
Whiting	7,480	0.11	0.8	42.5	43.3	1.9
Eels	6,601	na				
River blackfish	6,149	na		-		
Southern calamari	29,473	0.60	17.7	76.6	94.3	18.8
Gould's squid	9,903	0.50 [C]	5.0	39.7	44.7	11.1