



Department of  
**Primary Industries and  
Regional Development**

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## **Fisheries Research Report No. 287**

# **Statewide survey of boat-based recreational fishing in Western Australia 2015/16**

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December 2017

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**Correct citation:**

Ryan KL, Hall NG, Lai EK, Smallwood CB, Taylor SM, Wise BS 2017. Statewide survey of boat-based recreational fishing in Western Australia 2015/16. Fisheries Research Report No. 287, Department of Primary Industries and Regional Development, Western Australia. 205pp.

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ISSN: 1035-4549 (Print)      ISBN: 978-1-921258-00-8 (Print)  
ISSN: 2202-5758 (Online)      ISBN: 978-1-921258-01-5 (Online)

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4874/17

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## Executive Summary

The statewide survey of boat-based recreational fishing includes three components: (i) off-site Phone Surveys (encompassing an initial Screening Survey, a longitudinal Phone-Diary Survey, and Post-Enumeration Surveys); (ii) on-site Boat Ramp Surveys; and (iii) a Remote Camera Survey. The main data collection period was the 12-months from September 2015 to August 2016 inclusive, with the Post-Enumeration Surveys occurring from September to November 2016. This report presents results from the statewide survey in 2015/16 and provides comparisons with the previous statewide surveys in 2013/14 (May 2013 to April 2014) and 2011/12 (March 2011 to February 2012).

A total of 2,931 fishers completed the Phone-Diary Survey with 320,661 individual fish (including invertebrates) caught (kept or released) during the 12 month survey. Fishing activity reported by fishers during the survey included 39,416 boat days, 42,152 fishing events and 123,378 fishing hours, across every day of the survey year and the majority of the State's coastline. Additionally, 3,068 fishers were interviewed in Boat Ramp Surveys with 9,960 individual fish (or invertebrates) measured. Boating activity for more than >160,000 launches (or retrievals) were recorded in the Remote Camera Survey from 11 boat ramps statewide.

A diverse range of species/taxa were caught, including scalefish (182 species/taxa), elasmobranchs (18), crustaceans (7) and molluscs (5). An estimated 2.54 million individual fish (including invertebrates) were caught from boat-based recreational fishing in 2015/16. A similar proportion of the catch was either kept (1.18 million or 46%) or released (1.36 million or 54%). Approximately 55% of the total catch were finfish (1.39 million scalefish or elasmobranchs) in comparison to invertebrates (1.15 million crustaceans or molluscs). A similar proportion of finfish (53%) and invertebrates (55%) were released.

School Whiting (*Sillago bassensis*, *S. vittata* and *S. schomburgkii*) was the most commonly caught finfish species by boat-based recreational fishers (230,052 kept or released statewide by number, or 17% of the finfish catch), followed by Australian Herring (*Arripis georgianus*; 132,844 or 10%), Pink Snapper (*Chrysophrys auratus*; 117,482 or 8%), West Australian Dhufish (*Glaucosoma hebraicum*; 74,981 or 5%), Silver Trevally (*Pseudocaranx* spp. complex; 60,887 or 4%), Black Bream (*Acanthopagrus butcheri*; 61,044 or 4%), King George Whiting (*Sillaginodes punctata*; 47,563 or 3%), Western King Wrasse (*Coris auricularis*; 36,235 or 3%), Breaksea Cod (*Epinephelides armatus*; 28,733 or 2%) and Baldchin Groper (*Choerodon rubescens*; 28,780 or 2%). High release rates were observed for Western King Wrasse (83%), Pink Snapper (76%), Black Bream (74%) and West Australian Dhufish (68%). Release rates were lower for Silver Trevally (46%), Baldchin Groper (42%), Breaksea Cod (41%), King George Whiting (25%), School Whiting (24%) and Australian Herring (21%).

Blue Swimmer Crab (*Portunus armatus*) was the most commonly caught invertebrate species by boat-based recreational fishers (678,269 kept or released statewide by number, or 59% of the invertebrate catch), followed by Western Rock Lobster (*Panulirus cygnus*; 387,458 or 34%), Squid (Order Teuthoidea; 65,025 or 6%) and Mud Crab (*Scylla olivacea* and *S. serrata*;

11,581 or 1%). High release rates were observed for Blue Swimmer Crab (71%) and Mud Crab (58%) compared with Western Rock Lobster (35%) and Squid (4%).

Estimates of catch (by number) were converted to estimates of harvest (by weight) according to average weights for key species, obtained from Boat Ramp Surveys or Tour Operator Returns (Charter Logbooks). An overview of the information required for stock status reporting of major recreational fisheries, based on estimates of harvest and 95% confidence intervals during 2015/16, is provided in this report. At a statewide level, estimates of catch from boat-based recreational fishing were generally consistent across the three statewide surveys. At a bioregion level, comparisons can be made for both the species contributing to the top 10 species in each resource and the estimated harvest for each resource.

The top 10 nearshore and estuarine species (or species groupings) in 2015/16 represented: 83% of the total catch for the suite (kept by numbers) in the North Coast, 91% in the Gascoyne Coast, 93% in the West Coast, and 95% in the South Coast. The estimated recreational harvest ranges for the top 10 nearshore and estuarine species were steady in 2015/16 in the North Coast (95% CI 20–35 tonnes compared with 15–27 in 2013/14 and 20–36 in 2011/12) and Gascoyne Coast (95% CI 6–13 compared with 9–22 in 2013/14 and 8–16 in 2011/12). The estimated recreational harvest range for the top 10 nearshore and estuarine species in the West Coast was steady in 2015/16 (95% CI 58–77) compared with 2013/14 (68–87), but lower than 2011/12 (101–126). The estimated recreational harvest range for the top 10 nearshore and estuarine species in the South Coast was also steady in 2015/16 (95% CI 13–21) compared with 2013/14 (20–31), but lower than 2011/12 (37–52).

The top 10 demersal species (or species groupings, 15 in the West Coast) in 2015/16 represented: 77% of the total catch for the suite (kept by numbers) in the North Coast, 82% in the Gascoyne Coast, 93% in the West Coast and 96% in the South Coast.

The estimated recreational harvest range for the top 10 demersal species in the North Coast was lower in 2015/16 (95% CI 34–47 tonnes compared with 48–69 in 2013/14 and 73–92 in 2011/12). This decrease was consistent with lower estimates of effort by boat-based recreational fishers in the North Coast in 2015/16. Estimated recreational harvests were steady for Blackspot Tuskfish, Coral Trout, Golden Snapper, Grass Emperor, Mangrove Jack, Rankin Cod, Red Emperor and Stripey Snapper. The estimated recreational harvest range for Spangled Emperor was steady in 2015/16 (95% CI 2–5 tonnes) compared with 2013/14 (3–9), but lower than 2011/12 (11–18).

The estimated recreational harvest range for the top 10 demersal species in the Gascoyne Coast was steady in 2015/16 (95% CI 87–118 tonnes) compared with 2013/14 (88–115), but lower than 2011/12 (127–159). The estimated recreational harvest range of: Spangled Emperor was steady in 2015/16 (8–16) compared with 2013/14 (12–22), but lower than 2011/12 (27–45); Grass Emperor was steady in 2015/16 (3–7) compared with 2013/14 (5–14), but lower than 2011/12 (12–20); and Redthroat Emperor was steady in 2015/16 (1–5) compared with 2013/14 (2–4), but lower than 2011/12 (6–11). Estimated recreational harvests were steady for Baldchin Groper, Goldband Snapper, Goldspotted Rockcod, Pink Snapper, Rankin Cod, Red Emperor and Stripey Snapper.

The estimated recreational harvest range for the top 15 demersal species in the West Coast was higher in 2015/16 (95% CI 193–230 tonnes compared with 140–169 in 2013/14 and 146–174 in 2011/12). The estimated recreational harvest range of West Australian Dhufish was higher in 2015/16 (97–129 compared with 69–94 in 2013/14 and 64–87 in 2011/12). The estimated recreational harvest range of Baldchin Groper was higher in 2015/16 (28–42) compared with 2013/14 (17–25), but similar to the harvest range in 2011/12 (24–36). The estimated recreational harvest range of Pink Snapper was steady in 2015/16 (30–42 compared with 25–36 in 2013/14 and 27–38 in 2011/12). Estimated recreational harvests were also steady for Baldchin Groper, Bight Redfish, Blue Morwong, Breaksea Cod, Emperor, Foxfish, Pink Snapper, Sea Sweep and Sergeant Baker.

The estimated recreational harvest range for the top 10 demersal species in the South Coast was steady in 2015/16 (95% CI 38–51 tonnes compared with 30–38 in 2013/14 and 47–63 in 2011/12). Estimated recreational harvests were steady for Bight Redfish, Blue Morwong, Breaksea Cod, Foxfish, Harlequin Fish, Pink Snapper, Sea Sweep, West Australian Dhufish and Swallowtail.

The pelagic resource, as defined by the top 10 pelagic species (or groupings) in the North Coast in 2015/16 represented 99% of the total catch for the suite (kept by numbers). The estimated recreational harvest range for the top 10 pelagic species was steady in 2015/16 (95% CI 21–31 tonnes) compared with 2013/14 (23–41), but lower than 2011/12 (40–61). The estimated recreational harvest range of Spanish Mackerel was steady in 2015/16 (95% CI 12–22) compared with 2013/14 (16–32), but lower than 2011/12 (27–47).

Estimated recreational harvest ranges of crab resources in each bioregion were also compared with previous statewide surveys. The estimated recreational harvest of Mud Crab in the North Coast represented 70% of the statewide catch (kept by numbers) in 2015/16. The estimated recreational harvest range of Mud Crab in the North Coast was lower in 2015/16 (95% CI 2–3 tonnes) compared with 2013/14 (5–10) and 2011/12 (6–10).

The estimated recreational harvest of blue swimmer crab in the West Coast represented 92% of the statewide catch (kept by numbers) in 2015/16. The estimated recreational harvest range for blue swimmer crab in the West Coast was steady in 2015/16 (95% CI 36–50 tonnes) compared with 2013/14 (50–68), but lower than 2011/12 (75–97). The estimated recreational harvest ranges for Blue Swimmer Crab were steady in 2015/16 in the: North Coast (95% CI 1–3 tonnes compared with 2–6 in 2013/14 and 2–5 in 2011/12); Gascoyne Coast (1–2 compared with 1–4 in 2013/14 and 1–8 in 2011/12); and South Coast (0–1 compared with 1–3 in 2013/14 and 1–4 in 2011/12).

There have been significant changes in recreational fishing rules since the previous statewide surveys, including the cessation of harvest tags in Freycinet Estuary and the removal of the maximum size limit for Pink Snapper in Shark Bay, a reduction in the daily bag limit of Australian Herring (from 30 to 12) and an area closure for Southern Garfish (between Lancelin and Myalup).

Data collected from the integrated statewide surveys are extensive, and while this report summarises key findings, further analyses and refinement of analysis methods will continue.

Additional reports will compare estimates of effort and catch from the statewide surveys with previous surveys, as required for management purposes, and investigate the survey design and sample weighting in greater detail to identify any improvements that can be made.

While this report compares estimates from three statewide surveys of boat-based recreational fishing, additional catches from charter-boat recreational fishing (reported in Tour Operator Returns) and shore-based fishing (where available) are used to determine the total catch from the recreational sector. Specific performance indicators, reference levels and catch tolerances will be reported separately, and used to provide trends in total catch to assist in developing, monitoring and refining management arrangements.

# 1 Introduction

## 1.1 Importance of Recreational Fishing in Western Australia

Recreational fishing is a popular activity in Western Australia, providing important social and economic benefits to the State's population. The estimated number of recreational fishers increased from 315,000 in 1989/90 (Lindner and McLeod 1991) to 752,000 in 2015/16 (Department of Fisheries 2016). The participation rate of Western Australian residents is generally above the national average, with an estimated 26.6% of the population (aged 15 years or older) fishing in 1989/90 and 28.5% (aged 5 years or older) fishing in 2000/01 (Lindner and McLeod 1991, Henry and Lyle 2003). The participation rate in recreational fishing was estimated to be 31.1% (95% CI 27.8–34.4%) in 2015/16, and has remained constant for the last five years (Department of Fisheries 2016). The expenditure attributable to recreational fishing in Western Australia has been estimated at \$55–130 million in 1989/90 and \$338 million in 2000/01, with an average fisher expenditure of \$415 and \$706 per year, respectively (Lindner and McLeod 1991, Henry and Lyle 2003), and is likely to be higher now due to CPI and population growth.

Recreational fishers often have important catch-related motives such as fishing to 'obtain a feed' or 'for fresh seafood'. However, there are also significant social benefits from recreational fishing. Recreational fishers in Western Australia also have non-catch related motives (e.g. 'to relax and unwind', 'to be outdoors', 'for solitude', or 'to be with family and friends') as their primary motive for fishing (Henry and Lyle 2003). While most recreational fishers only catch a relatively small number of fish, collectively the recreational catch can be substantial. In 2000/01, the estimated total catch from boat- and shore-based recreational fishing in Western Australia included over 10.4 million finfish (by number) and 3.8 million invertebrates (by number; including crabs, prawns, lobster, and cephalopods) (Henry and Lyle 2003). The estimated total catch from boat-based recreational fishing in 2011/12 included 2.4 million finfish (by number) and 1.4 million invertebrates (Ryan *et al.* 2013), and in 2013/14 included 2.0 million finfish (by number) and 1.4 million invertebrates (Ryan *et al.* 2015) This reports provides an update of the estimated recreational catches from boat-based recreational fishing in 2015/16.

## 1.2 Need for Recreational Fishing Information

An understanding of recreational fishing effort and catch is used to inform stock assessments, resource allocation between fishing sectors, and the development, implementation and review of management plans. Effective management of fish resources requires accurate estimates of the catch taken by all sectors; therefore, a high priority has been placed on the collection of data for key recreational fisheries in Western Australia (Wise and Fletcher 2013, Ryan *et al.* 2016).

Obtaining suitable recreational data in Western Australia is challenging because of the State's large coastline (20,781 km) and ongoing regional development, which is changing the distribution and intensity of recreational fishing activity. In 2015/16, the proportion of days fished (by recall) from the annual Community Survey was highest in the West Coast bioregion

(74%), around the capital city (Perth) and several of the State's large regional centres (Bunbury, Busselton and Geraldton; Department of Fisheries 2016). Recreational fishing effort in marine waters was lower elsewhere, such as in the South Coast (10.8%), Gascoyne Coast (6.0%) and North Coast (3.5%; Department of Fisheries 2016).

Estimating the total recreational catch can be logistically difficult and is often relatively costly. These difficulties are especially apparent where there is no licence available to use as a sampling frame to easily identify recreational fishers. Historically, recreational fishers in Western Australia only required a licence for rock lobster, abalone, marron, freshwater angling and netting. Although the Recreational Fishing from Boat Licence (RFBL) was introduced in March 2010, there is still no licence required for shore-based recreational fishing. As a result, there are no contemporary estimates of the total boat- and shore-based catch. Importantly, in 2000/01, 57% of fishing effort and 54% of the recreational harvest was attributable to shore-based recreational fishing (Henry and Lyle 2003). It is likely that shore-based recreational fishing still represents a substantial component of the total recreational effort and harvest.

Recreational fishing licence fees raised \$7.5 million in 2015/16 (Department of Fisheries 2016). This revenue is invested in initiatives with direct benefit to recreational fishers in Western Australia, including recreational fishing surveys. These surveys provide harvest estimates and socio-economic information to inform management and policy, including Marine Stewardship Council certification and Integrated Fisheries Management (IFM), to ensure fish resources are managed sustainably and shared between fishing sectors (Department of Fisheries 2010, Ryan *et al.* 2016). To date, explicit resource allocations have been developed for: Western Rock Lobster (5% recreational, 95% commercial); metropolitan Roes' Abalone (40t recreational, 36t commercial); and the West Coast Demersal Scalefish Fishery (36% recreational, 64% commercial). The implementation of the new Fisheries Act will require all new Aquatic Resource Management Strategies to have explicit sectoral allocations (Department of Fisheries 2010).

Long-term monitoring of recreational fishing will provide a greater understanding of temporal variability and trends in effort and catch that are essential for the assessment of stocks, resource allocation and management settings within the broad context of Ecologically Sustainable Development and Ecosystem Based Fisheries Management (Department of Fisheries 2016, Fletcher and Santoro 2017).

### **1.3 Recreational Fishing Surveys in Australia**

The spatial resolution of monitoring recreational fishing needs to be matched to the spatial scale at which fisheries are managed. For many jurisdictions, this requires off-site methods appropriate for sampling large geographical areas, with numerous access points to the fishery and many recreational fishers (Pollock *et al.* 1994). The sampling frame used to randomly select recreational fishers for an off-site survey can range from a general population list (e.g. White Pages telephone directories) to specific lists (e.g. licence database). Sampling from the White Pages requires contacting many non-fishing households to locate fishing households and does

not include unlisted (silent or mobile) numbers. Sampling from licence databases has a higher probability of contacting fishers and includes fishers with or without a listed telephone; however, effectiveness is determined by exemptions, data availability and non-compliance (Ryan *et al.* 2009, Hartill *et al.* 2012).

The National Recreational and Indigenous Fishing Survey (NRFS) provided statewide estimates of boat- and shore-based recreational fishing across Australia from 1 May 2000 to 30 April 2001 (Henry and Lyle 2003). This survey used telephone interviews of fishers who were randomly selected from White Pages telephone directories. This methodology has been employed in subsequent statewide surveys in: South Australia from 1 November 2007 to 31 October 2008 (Jones 2009) and 1 December 2013 to 30 November 2014 (Giri and Hall 2015); Tasmania from 1 December 2007 to 30 November 2008 (Lyle *et al.* 2009) and 1 November 2012 to 31 October 2013 (Lyle *et al.* 2014); New South Wales from 1 June 2013 to 31 May 2014 (West *et al.* 2015); Northern Territory from 1 April 2009 to 31 March 2010 (West *et al.* 2012); and Queensland from 1 October 2010 to 30 September 2011 (Taylor *et al.* 2012) and 1 November 2013 to 31 October 2014 (Webley *et al.* 2015).

Licence databases have been used as sampling frames for surveys designed to estimate the total recreational catch for many specialised, low participation, licensed fisheries (e.g. abalone, rock lobster and scallops) in Australia (e.g. Lyle and Tracey 2016, Ryan *et al.* 2009, Ryan *et al.* 2016). The advantages of sampling from a licence database include: reduced costs for the initial screening survey, high response rates (reducing non-response bias), and the ability to use an optimal survey design where avid fishers are oversampled, which can effectively increase the number of fishing events in the sample and improve precision (Ryan *et al.* 2009).

## **1.4 Recreational Fishing Surveys in Western Australia**

This report presents results from the statewide survey for the 12-months from September 2015 to August 2016 and provides comparisons with previous statewide surveys conducted from May 2013 to April 2014 (Ryan *et al.* 2015) and March 2011 to February 2012 (Ryan *et al.* 2013). Prior to these three surveys, large scale surveys of boat-based recreational fishing in Western Australia included the statewide component of the National Recreational and Indigenous Fishing Survey (Henry and Lyle 2003), and Boat Ramp Surveys at a bioregion level. These included 12-month surveys in the West Coast in 1996/97 and 2005/06 (Sumner and Williamson 1999, Sumner *et al.* 2008, Wise and Fletcher 2013); Gascoyne Coast in 1998/99 (Sumner *et al.* 2002, Wise and Fletcher 2013) and 2007/08 (Marriott *et al.* 2012); North Coast in 1999/00 (Williamson *et al.* 2006); and South Coast in 2002/03 (Smallwood and Sumner 2007). The introduction of the Recreational Fishing from Boat Licence (RFBL) provided a suitable sampling frame for a comprehensive statewide survey (both spatially and temporally) to estimate catch from boat-based recreational fishing in Western Australia. An integrated system that obtained data from several survey methods, utilising the RFBL as the basis for sampling recreational fishers, was developed to provide the most robust approach for obtaining annual estimates of

catch from boat-based recreational fishing at both statewide and bioregion levels (Wise and Fletcher 2013).

## 1.5 Statewide Survey of boat-based Recreational Fishing

The statewide survey includes three complementary components: (i) off-site Phone Surveys using the RFBL as a sampling frame, with an initial Screening Survey to recruit respondents for the longitudinal Phone-Diary Survey, followed by Post-Enumeration Surveys to detect differences among licence holders (Wash-Up/Attitudinal, Non-Intending Fisher and Benchmark Surveys); (ii) on-site Boat Ramp Surveys to provide biological information; and (iii) a Remote Camera Survey using video cameras mounted at key boat ramps to monitor 24/7 launches and retrievals. The main period of data collection was the 12-months from September 2015 to August 2016, with the Post-Enumeration Surveys occurring from September to November 2016. Validation and analyses of data generated by these surveys commenced in December 2016 with estimates of effort and catch presented in this report.

## 1.6 Survey Objectives

The overall objectives of this survey were to generate estimates of participation (by number of RFBL holders), effort (boat days and hours fished), and catch for all species (total, kept and released, by number) from boat-based recreational fishing for 12-months at statewide and bioregion levels. These estimates will complement data obtained routinely from the commercial sector. Additional objectives include: estimating recreational fishing effort and reasons for releasing any catch (e.g. size or bag limits, catch and release fishing, or personal preference). Furthermore, the implementation of regular, reliable and cost-effective surveys will provide data that will allow more realistic and rigorous assessments of recreational fisheries.

## 1.7 Report Structure

This report provides statewide and bioregion estimates of effort and catch from boat-based recreational fishing in Western Australia, with complete coverage temporally, spatially and for all recreational fishing methods (including line, pot, net and diving), from September 2015 to August 2016. Where appropriate, comparisons are made with estimates from the previous statewide surveys conducted in 2013/14 and 2011/12.

Each chapter covers specific details or outputs, including:

**Chapter 2 (Survey Design and Analysis)** outlines the survey design and scope for the Phone, Boat Ramp and Camera Surveys. Methods used for the expansion, weighting and analysis of survey data are discussed, along with measures of uncertainty associated with survey estimates.

**Chapter 3 (Participation)** presents estimates of the total number of RFBL holders that fished between September 2014 to August 2015 (Screening Survey) and September 2015 to August 2016 (Benchmark Survey). Participation estimates have been summarised by age, gender, bioregion fished and avidity.



**Chapter 4 (Fishing Effort)** presents estimates of effort from boat-based recreational fishing during the Phone-Diary Survey, including annual effort (boat days and hours fished), statewide and for each bioregion, by habitat, fishing method and month.

**Chapter 5 (Statewide Recreational Catch)** presents estimates of catch from boat-based recreational fishing during the Phone-Diary Survey, including annual catch (total, kept and released, by number), proportions released (release rates) and reasons for release for all species.

**Chapter 6 (Estimates of Catch for Key Species)** summarises estimates of catch from boat-based recreational fishing by bioregion, habitat, fishing method and season for key species, including indicator species within the Resource Assessment Framework.

**Chapter 7 (Bioregion Fisheries)** provides an overview of species composition and estimates of catch from boat-based recreational fishing in each bioregion, including annual catch (total, kept and released, by number) and proportions released for all species.

**Chapter 8 (Small-scale estimates)** provides an overview of species composition and estimates of catch from boat-based recreational fishing for zones within each bioregion, including annual catch (total, kept and released, by number) and proportions released for species where the sample size and relative standard error was considered acceptable (i.e. sample size  $\geq 30$  and relative standard error  $\leq 40\%$ ).

**Chapter 9 (Harvest Weights)** provides an overview of the estimated annual boat-based recreational catch (kept, by number), average weight and estimated harvest (by weight) for the most commonly caught demersal and nearshore species/species groupings in each bioregion.

## 2 Survey Design and Analysis

This section outlines the survey design and scope for the Phone, Boat Ramp and Camera Surveys, methods used for weighting and analysis of survey data, and measures of uncertainty associated with survey estimates. Most aspects were consistent with the previous statewide surveys conducted in 2013/14 and 2011/12, with any differences discussed below.

### 2.1 Survey scope

The integrated survey included three complementary components: (i) off-site Phone Surveys (encompassing an initial Screening Survey, a longitudinal Phone-Diary Survey, followed by post-enumeration Wash-Up/Attitudinal, Non-Intending Fisher and Benchmark Surveys); (ii) on-site Boat Ramp Surveys; and (iii) a Remote Camera Survey. Output specifications are listed in Table 1 to identify what was considered in-scope for each survey.

#### 2.1.1 Who was included in the survey?

Persons in scope included recreational fishers that held a Recreational Fishing from Boat Licence (RFBL), which is required to undertake any general fishing activity from a motorised vessel in Western Australia. Boat-based recreational fishers are required to have a minimum of one RFBL holder on board, and adhere to boat limits according to the number of RFBL holders, and in practice, the number of fishers generally equals the number of RFBL holders on board. In the Phone Surveys, fishers that held their licence in the 12-months prior to each survey component were in scope. An additional criterion for the Phone-Diary Survey was an intention to fish in the next 12-months (either from a boat or the shore). Commercial fishers were considered in scope if they held a RFBL, but any commercial catches by these fishers were not included. Indigenous fishing was not considered to be in the scope of this survey.

Persons in scope were comparable with previous statewide surveys across all survey components, with the exception of an additional sample for the Screening Survey as described here. Consistent with previous Screening Surveys the sample was randomly selected from the RFBL database. This included any licence holders that concurrently held a Rock Lobster (RL) licence. However, approximately 40% of RL licence holders do not have a RFBL; consequently previous statewide surveys have underestimated the recreational catch of Western Rock Lobster. For this reason, the Screening Survey in 2015/16 included an additional sample of 600 who only held RL licences, with subsequent recruitment of intending fishers into the Phone-Diary Survey. This sample provided the appropriate data to estimate the recreational catch of Western Rock Lobster by fishers that only held the species-specific licence for rock lobster.

Only the results from the RFBL sample are presented in this report to maintain consistency and comparability with estimates from previous statewide surveys. Results from the RL only sample will be reported separately (in comparison with results from mail and phone-recall surveys).

A minimum age criterion of 5 years was applied to all surveys. In the Phone Surveys, parents were always a proxy for children aged 5–13 years and parent permission was required for

children aged 14–17 years. No further proxies were allowed, except for nominated individuals within a household where there was language difficulty or illness. No substitution of respondents occurred during the Phone Surveys.

### **2.1.2 What fishing activities were covered?**

Activities in scope were all boat-based recreational fishing methods, including line fishing, diving, netting, potting and spear fishing, as undertaken from a motorised vessel as per recreational fishing rules. Respondents in the Phone-Diary Survey reported the effort and catch for all fishers on the boat, which were standardised by the number of RFBL holders on each boat. Although fishers in the Phone-Diary survey reported catch information from Charter-boat recreational fishing, this information was excluded from analysis because Charter-boat catches are reported through mandatory Tour Operator Returns (Charter Logbooks). Charter-boat recreational fishing was not included in the Boat Ramp Surveys. Unreported illegal (non-compliant) recreational fishing activity was not included in the surveys. The proportion of RFBL holders that fished from the shore was assessed in the Screening and Benchmark Surveys.

Activities in scope were comparable with previous statewide surveys across all survey components, except for the Phone-Diary Survey. Shore-based recreational fishers, and their attributable catch, were not included in the Phone-Diary Surveys in 2013/14 and 2011/12. For this reason, the Phone-Diary Survey in 2015/16 included both boat- and shore-based recreational fishing, with shore-based recreational fishing events reported on an individual basis. It is not known if the sample of RFBL holders is representative of shore-based recreational fishers that do not hold a RFBL, therefore, shore-based recreational fishing data collected in the Phone-Diary Survey in 2015/16 requires subsequent adjustment.

Only the results from boat-based recreational fishing are presented in this report to maintain consistency and comparability with estimates from the previous statewide surveys. Results from shore-based recreational fishing will be reported separately.

### **2.1.3 What species were covered?**

Species in scope included any aquatic (animal) species caught from recreational fishing. This includes both finfish (e.g. scalefish, sharks and rays) and invertebrates (e.g. abalone, cephalopods, crabs, lobsters and prawns). Most catches are reported for individual species, but there are some instances where species have been reported in taxonomic groups (e.g. School Whiting includes Southern School Whiting, Western School Whiting and Yellowfin Whiting, King Snapper includes *Pristipomoides* spp., Whaler Sharks includes Bronze Whaler and Dusky Sharks). Aggregating species at higher-level reporting groups is particularly relevant for species where misidentification can occur, despite attempts to assist fishers in identifying fish. Where species or taxa groups are represented by few records, catches are reported in broad taxonomic categories (e.g. 'Other scalefish'). Species taxonomy follows the Codes for Australian Aquatic Biota (Rees *et al.* 2012, [www.marine.csiro.au/caab/](http://www.marine.csiro.au/caab/)). Consistent with the management of many of the multi-species fisheries in Western Australia, the results were in some instances also reported at the species suite level.

#### **2.1.4 Survey Area**

The geographic scope was fishing activity in Western Australia only. Consistent with the bioregion approach to fisheries management, the spatial strata for boat-based recreational fishing were the four marine bioregions off Western Australia (Figure 1). The Phone Surveys provided statewide coverage from all access points, while the Camera Survey provided statewide coverage as accessible from the boat ramps in the survey design, and the Biological Survey included key boat ramps in the West Coast and South Coast Bioregions. Based on Ecosystem Based Fisheries Management policy, bioregions are divided into broad ecological depth based habitats (Department of Fisheries 2016, Fletcher and Santoro 2017). These were pelagic (surface waters across all depths), offshore demersal (greater than 250m), inshore demersal (20–250m), nearshore (to 20m deep), estuarine (saltwater and ‘brackish’ to river mouth), and freshwater (river, stream, dams) (Figure 2).

#### **2.1.5 Survey Duration**

The 12-months from September 2015 to August 2016 applied to the Phone-Diary, Boat Ramp and Camera Surveys. The Phone Surveys included an initial Screening Survey during the three months prior to the Phone-Diary Survey, and Post-Enumeration Surveys during the three months following the Phone-Diary Survey. The 12-months from September 2015 to August 2016 were different (start and finish) from previous statewide surveys (May 2013 to April 2014 and March 2011 to February 2012). These adjustments were made to transition the commencement of the Phone-Diary Survey to a month with lower fishing activity.

The 12-months from September to August also provides continuous coverage of peak fishing seasons in the West Coast and South Coast (i.e. summer and autumn) and peak fishing seasons in the North Coast and Gascoyne Coast (i.e. autumn and winter) (Ryan *et al.* 2013, Ryan *et al.* 2015). Starting the statewide surveys in September also includes: complete fishing seasons for Western Rock Lobster (south of North West Cape from mid-October to June (i.e. closed season from July to mid-October) and blue swimmer crab in Peel Harvey Estuary from November to August (i.e. closed season from September to October); and most of the fishing season for West Coast Demersal Scalefish (i.e. closed season mid-October to mid-December).

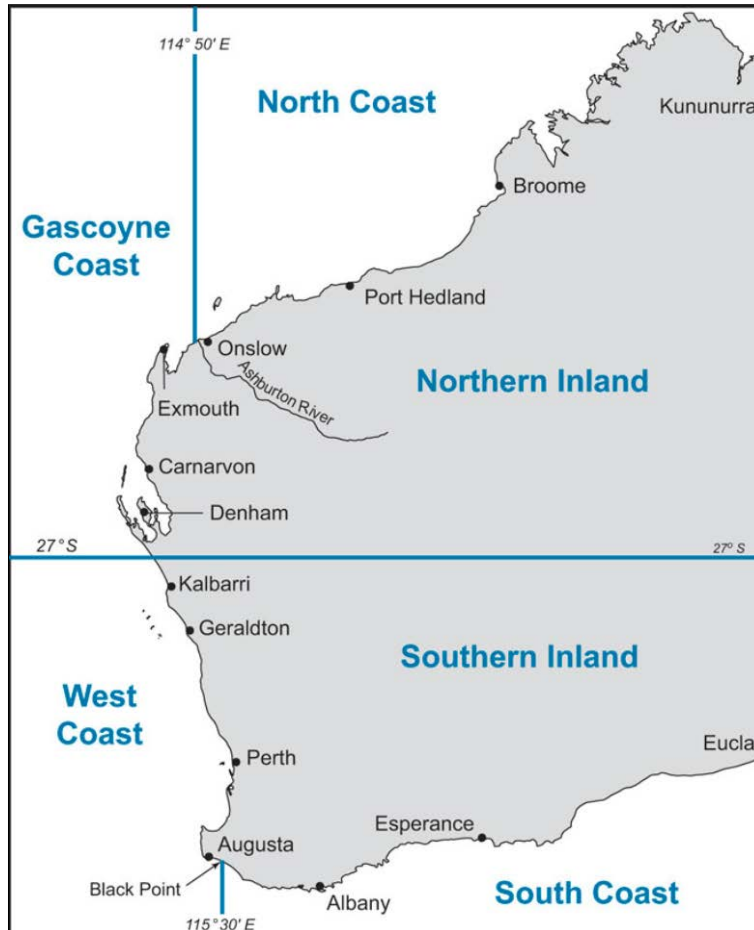
#### **2.1.6 Survey Data Elements**

Inherent differences between off-site (e.g. phone) and on-site (e.g. face-to-face) sampling were considered to ensure consistency (where possible) in the information collected from each survey component. A key difference between off-site and on-site sampling is whether fishing activity is recorded on an event or trip basis. For the Phone-Diary Survey, fishing information was collected on an ‘event’ basis, where separate events were recorded for changes in location, habitat, target species and/or fishing method. For example, line fishing and diving during a single trip would be recorded as separate events. Fishing activity in the Boat Ramp Surveys was recorded on a ‘trip’ or day basis. Where possible, data elements were standardised between surveys, in terms of question wording and responses. Reference tables for data elements (such as boat ramp, species and fishing method) were also standardised among survey components.

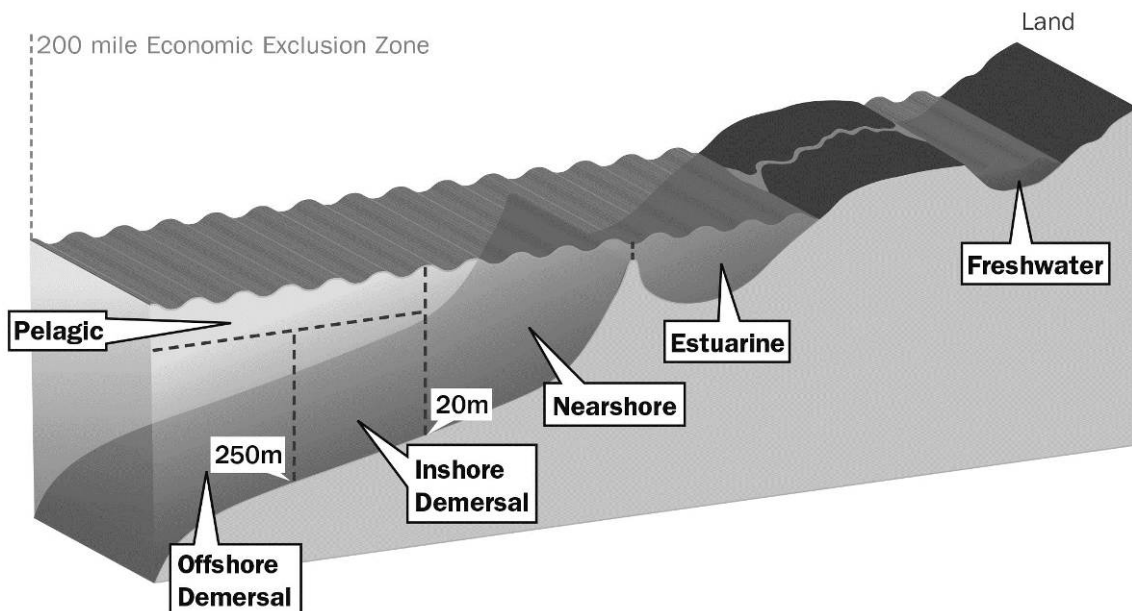
**Table 1.** Output Specifications for each survey component.

Specification	Item	Phone Surveys			Boat Ramp Surveys	Camera Survey
		Screening	Phone-Diary	Benchmark	Biological	
Persons in scope	Residency status	All, including Western Australian residents and interstate visitors			All	n/a
	Age	<5 years excluded			All	n/a
	Sampling frame	RFBL holders			Spatio-temporal frame	
	Sep 2014 to Aug 2015	Sep 2015 to Aug 2016				
Activities	Sectors	Recreational fishing only (traditional/indigenous fishing excluded)				
	Platform	Boat- and shore-based recreational fishing ( <i>by RFBL holders only</i> )			Boat-based recreational fishing only	
	Boat type	All, including private-boat, for-hire and charter-boat*			Private-boat and for-hire fishing (charter-boat excluded)	All, according to camera view at each ramp
	Methods	All methods including line fishing, diving, netting, potting and spearing				
Species	Species	All aquatic (animal) species				N/A
	Catch	Kept and Released			Kept	N/A
Geographic scope	Residency status	Western Australian residents, and interstate visitors			N/A	
	Fishing activity	Bioregion, marine vs freshwater	10x10 nautical mile grids statewide	Bioregion, marine vs freshwater	10x10 nautical mile grids statewide	N/A
	Fishing access	N/A	All, boat ramps (public and private), moorings and marinas	N/A	Key public boat ramps statewide	
Temporal scope	Annual coverage	12-months prior to Screening (by recall)	12-month longitudinal survey	12-months as per Phone-Diary (by recall)	Jan–Apr 2016	12-months as per Phone-Diary
	Day hours	All			Daylight hours	All
	Survey dates	Jun–Aug 2015	1 Sep 2015–31 Aug 2016	Sep–Nov 2016	Mid-Jan to Apr 2016	1 Sep 2015–31 Aug 2016

\* charter-boat recreational fishing (i.e. tour operators) was excluded from analysis in the report



**Figure 1.** Marine bioregions for mangement of fisheries resources in Western Australian.



**Figure 2.** Habitat groups for mangement of fisheries resources in Western Australian.

## 2.2 Survey Components

### 2.2.1 Phone Surveys

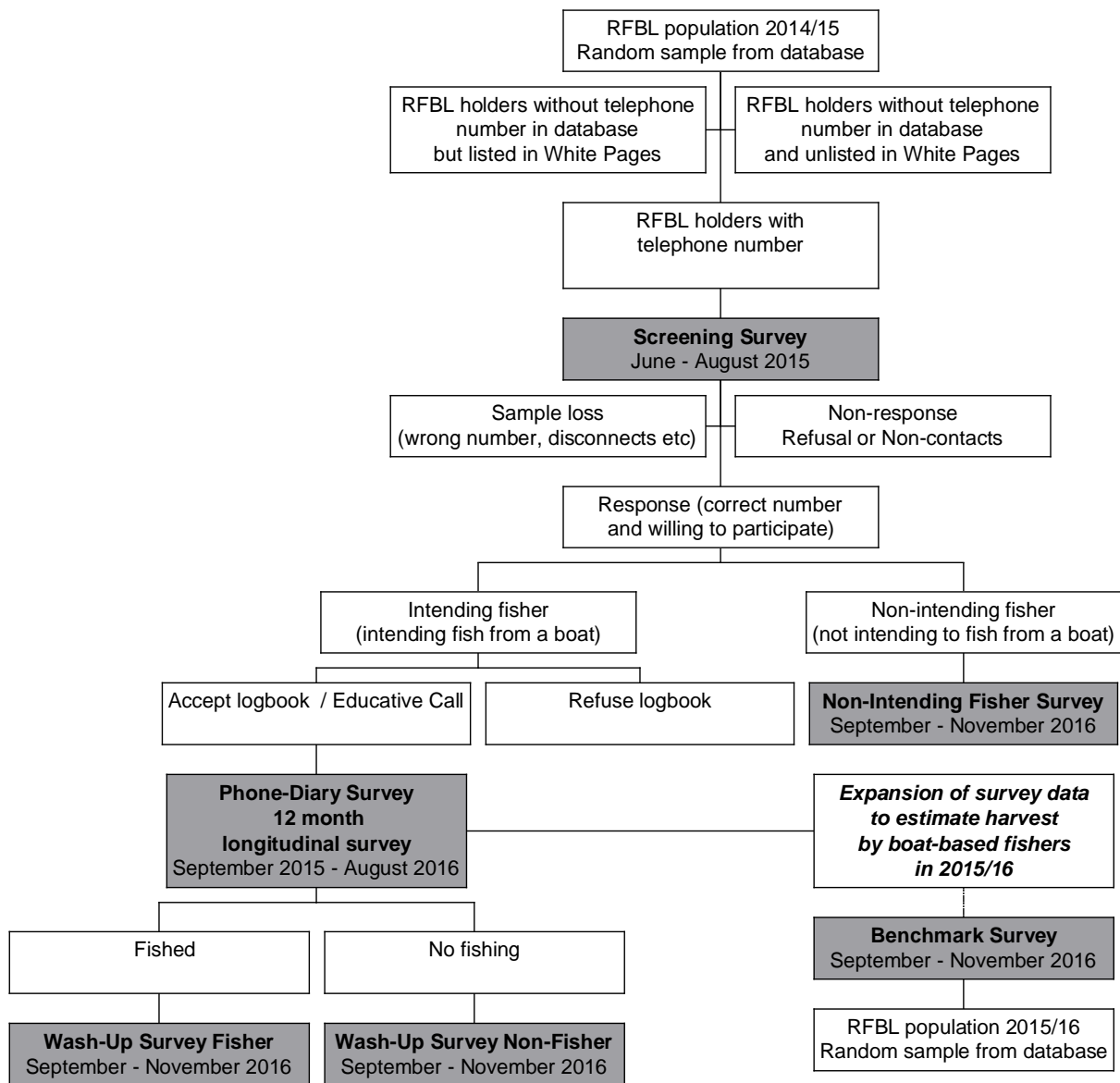
#### Survey Overview

The Phone Surveys were the main component of the integrated survey. This off-site survey was based on the telephone/diary methodology, which has been developed and proven to provide cost-effective data over large spatial scales (i.e. statewide and bioregion). Detailed descriptions of the design philosophy and methodology are provided in Lyle *et al.* (2002) and Henry and Lyle (2003). Key features of this methodology include: (i) tested survey instruments to minimise recall bias (e.g. Diary Card); and (ii) frequent telephone contact by trained interviewers to collect data at consistent standards, reduce potential bias, explain difficult concepts, counter resistance and ensure confidentiality. The combination of the Diary Card and structured interviews is designed to minimise respondent burden, increase response rates and ensure data quality.

Interviews were conducted by Computer-Assisted Telephone Interview (CATI), which provides a cost-effective and flexible means of recording questionnaire data that is entered directly into survey databases during interviews. It also provides an effective system for ensuring data quality as work stations are networked with a supervisor. Electronic survey data is contained within secure computer networks with appropriate management systems. Interviewers were allocated fishers from a variety of Regional Development Commission Boundaries to reduce the potential for interviewer bias between strata. Where possible and practical, the same interviewer maintained repeat contacts with the same respondent. When required, interviewer notes were made available for alternative interviewers on subsequent follow-up calls.

The primary objectives of the Phone Surveys were to estimate participation (by number of RFBL holders), effort (boat days and hours fished), and catch for all species (total, kept and released, by number) for recreational fishing for 12-months at statewide and bioregion levels.

The Phone Surveys used a multi-phase survey design (Figure 3) with: an initial Screening Survey to recruit fishers to the Phone-Diary Survey; a longitudinal Phone-Diary Survey to provide detailed effort and catch information over 12-months; and Post-Enumeration Surveys (i.e. Wash Up/Attitudinal, Non-Intending Fisher and Benchmark Surveys). These separate Post-Enumeration Surveys were conducted concurrently at the end of the 12-month Phone-Diary Survey to determine and adjust for exceptions outside the distribution of behaviours covered by the Phone-Diary Survey, particularly new licence holders and non-respondents, and to enquire about opinions of RFBL holders for various fishing-related matters.



**Figure 3.** Components for the statewide survey of boat-based recreational fishing in Western Australia 2015/16.



## **Screening Survey**

The Screening Survey (Figure 3) aims to collect profiling information (i.e. avidity, previous and intended fishing activity) from a random sample of RFBL holders and identifies RFBL holders that intended to fish in Western Australia during 2015/16 that were eligible for the Phone-Diary Survey. The Screening Survey was conducted by telephone interview during June to August 2015, therefore, the sampling frame was obtained from a database of fishers who purchased a RFBL between July 2014 and June 2015. The earlier timing of this sample was required to complete the survey before the Phone-Diary Survey (i.e. September 2015), but was considered to represent the population of interest (i.e. September 2014 to August 2015, Figure 4).

## **Phone-Diary Survey**

The Phone-Diary Survey (Figure 3) was conducted from 1 September 2015 to 31 August 2016 to estimate effort (boat days and hours fished), and catch for all species (total, kept and released, by number) for recreational fishing for 12-months at statewide and bioregion levels. Other information was also obtained in terms of public ramp usage, fishing method, fishing location, target species and reasons for release. The Phone-Diary Survey included all (boat- and shore-based) recreational fishing in Western Australia, using all fishing methods (such as line fishing, diving, nets, traps and spearfishing). Fishing activity was classified in terms of bioregion, habitat and fishing location as defined by unique location name, latitude and longitude co-ordinates, or 10 by 10 nautical mile grid blocks (Department of Fisheries 2011).

Respondents received a Diary Kit containing a Welcome Letter, Diary Card, Species Identification Guide (with clear colour images of common species) and Fishing Location Guide. The Diary Card was similar in format to that used previously in other surveys and is designed to be a 'memory jogger' rather than a traditional fishing logbook. Respondents were encouraged to use the Diary Card to record key fishing data that could easily be forgotten (e.g. start and finish times, number of fish kept and released) and were contacted regularly by survey interviewers, who were responsible for collecting this information. Respondents also received a brief Diary Explanation Interview with the survey interviewer after receiving the Diary Kit.

Species Identification Guides (Department of Fisheries 2017) were developed to help respondents identify common species, and enhance consistent and accurate species identification. Interviewers were trained in species identification (throughout the Phone-Diary Survey) and provided with relevant taxonomic references (Hutchins and Swainston 1999, Jones and Morgan 2002, Allen 2009, Rome and Newman 2010).

Fishing information was collected by monthly telephone interviews, even for fishers who indicated they were unlikely to fish in the subsequent month. More regular telephone interviews were made to the more avid fishers to minimise the potential for recall bias to influence fishing information. Some respondents did not actually fish during the Phone-Diary Survey, despite intending to during the Screening Survey. These fishers 'dropped-out' of the fishery, but this was in the range of expected behaviours for the survey.

### **Wash-Up/Attitudinal Surveys**

The Wash-Up/Attitudinal Survey was conducted during September to November 2016 to confirm completion of the survey, assess opinions and attitudes for a range of fisheries related issues, and collect boat-profiling information. Other questions were included to assess respondents' perceptions as to whether they fished '*more, less or about the same*' amount of time in the last 12-months, compared with the prior 12-months. Different Wash-Up/Attitudinal Surveys were different (as appropriate) for respondents that fished, or did not fish, during the Phone-Diary Survey (Figure 3). This attitudinal information will be published separately.

### **Non-Intending Fisher Survey**

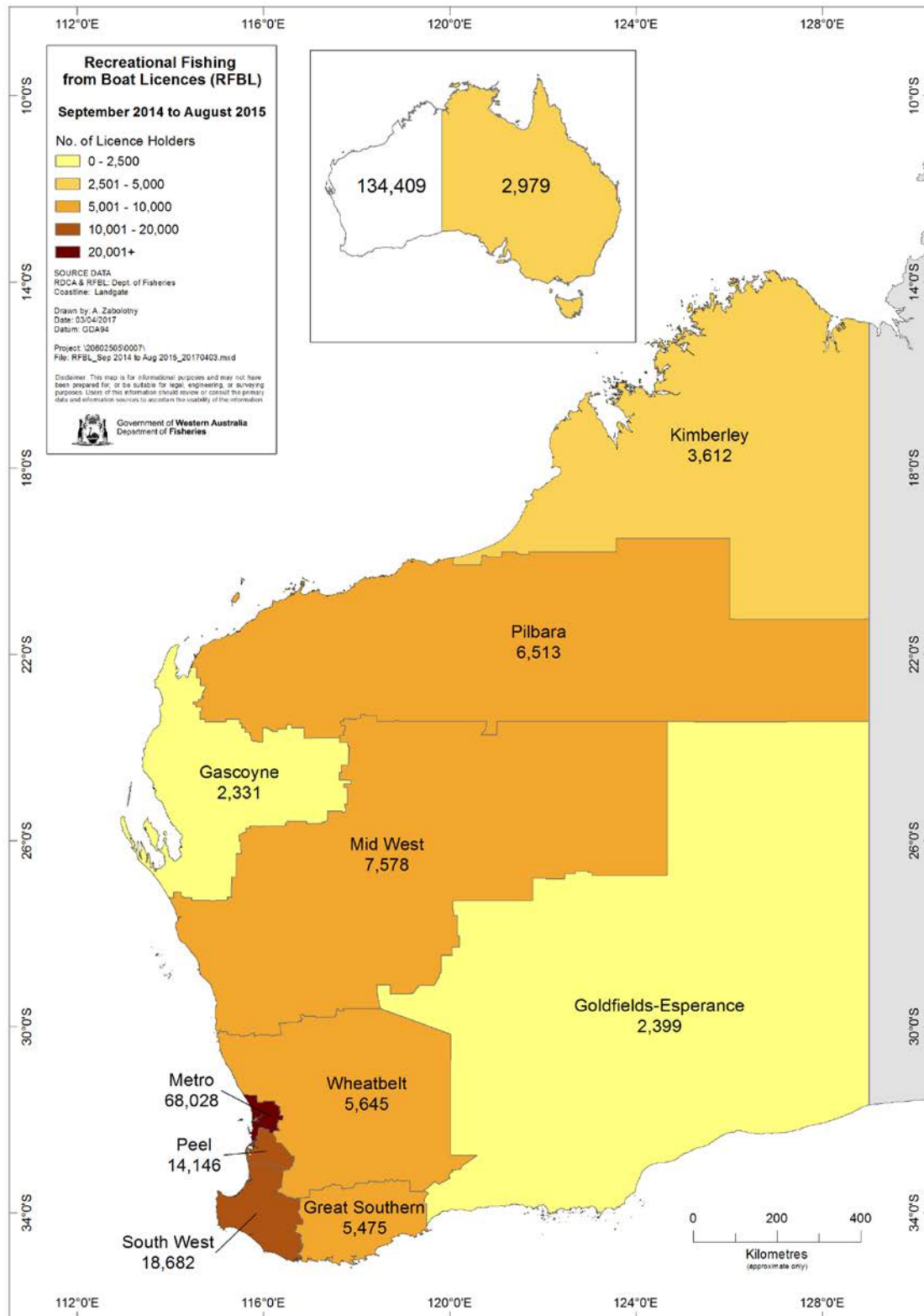
The Non-Intending Fisher Survey (Figure 3) was conducted during September to November 2016 to record the incidence of fishing by RFBL holders sampled in the Screening Survey that were not intending to fish in the next 12-months. These respondents were not eligible for the Phone-Diary Survey, but it was important to identify and account for 'unexpected fishing' that may have occurred during the 12-months. This 'call-back' survey determined the impact of unexpected 'drop-ins' to the fishery.

### **Benchmark Survey**

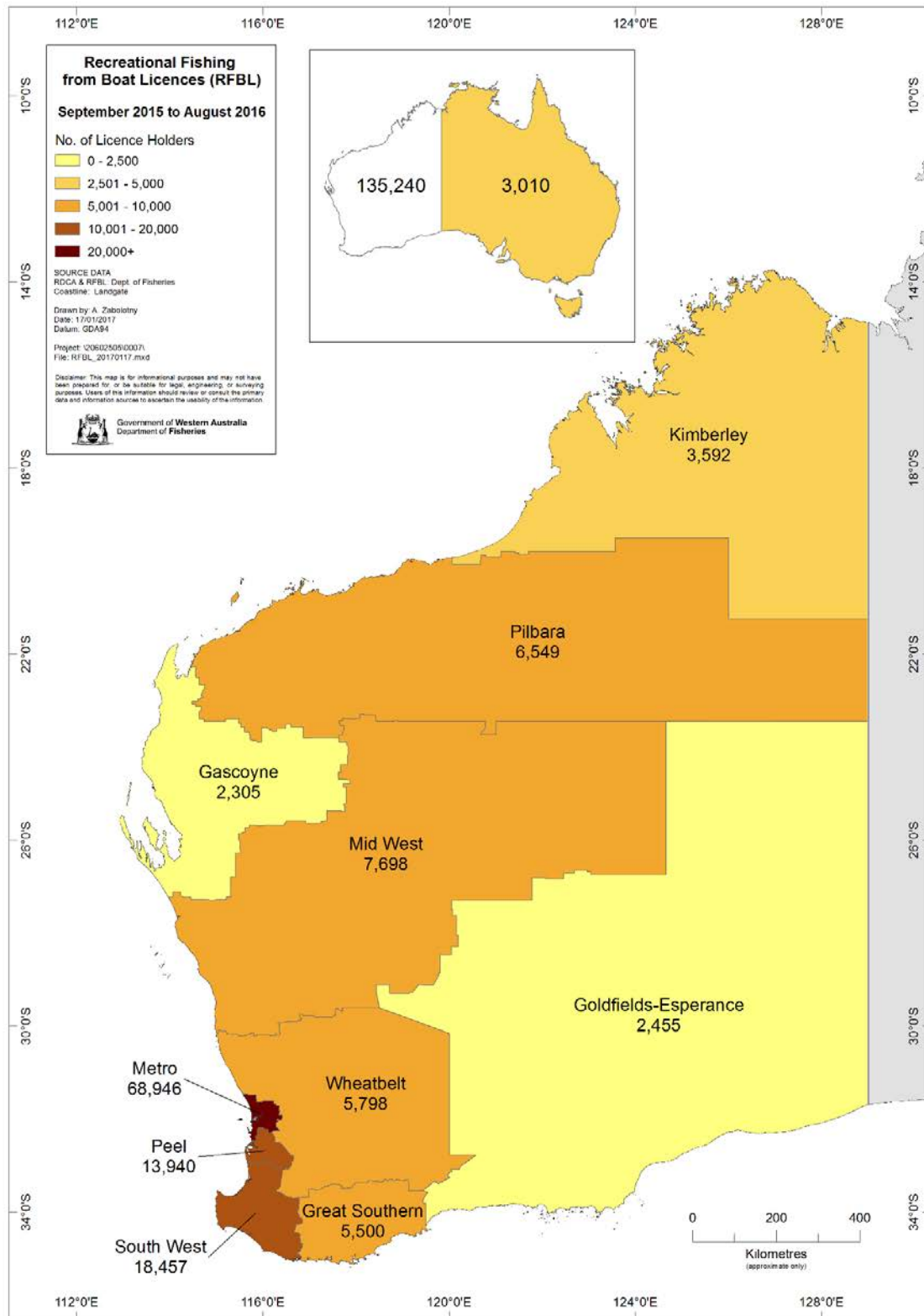
The Benchmark Survey (Figure 3) was conducted during September to November 2016 to identify the impact of additional 'drop-ins' to the fishery, such as RFBL holders who purchased a new licence in 2015/16 after the initial sample was drawn. This survey was essentially a repeat of the Screening Survey, with aims to collect profiling information (i.e. avidity, previous and intended fishing activity) for a random sample of people that purchased a RFBL for 12-months concurrent with the Phone-Diary Survey. Therefore, the sampling frame for the Benchmark Survey was obtained from a database of fishers who purchased a RFBL between September 2015 and August 2016 (Figure 5), but excluding RFBL holders that had been selected for the Screening Survey. Most importantly, the Benchmark Survey provided the necessary information for licence holders from the current RFBL population for calibration and expansion of results from the Phone-Diary Survey.

### **Survey Documentation**

The Phone Survey methodology utilises survey instruments, including questionnaires and interviewer manuals, to facilitate the collection/recording of survey data. These were initially produced following extensive design and testing (Survey Development Working Group 2000), and have been revised with subsequent statewide surveys (in each state). Highly structured questionnaires, with due consideration to question wording, instructions to interviewers and pre-coded answer categories were included in accordance with a range of standardised interviewing conventions. An equivalent approach was employed for all Phone Survey components in the present study, including thorough training and monitoring of interviewers, and development of a comprehensive interviewer manual.



**Figure 4.** Number of RFBL holders within Regional Development Commission Boundaries from September 2014 to August 2015.



**Figure 5.** Number of RFBL holders within Regional Development Commission Boundaries from September 2015 to August 2016.

## Response Profiles

A summary of response profiles relating to the Screening, Phone-Diary and Benchmark Surveys is given in Table 2. The majority (57%) of sample loss in the Screening Survey was from disconnected telephone numbers (3.4% of the gross sample) and from mobile phones being switched off (3.1% of gross sample). Sample loss also occurred where the respondent was not known at the number (1.3% of the gross sample), the respondent had moved and was known, but no new contact details were available (0.9%), the respondent was away for the survey (2.1%), fax/modem numbers (<0.1%), language difficulties (0.1%), duplicate number (0.1%), or respondent incapacitated or deceased (0.4%).

There were 3,441 RFBL holders identified as eligible for the Phone-Diary Survey (i.e. having an intention to fish in Western Australia during September 2015 to August 2016). This represented 81% of the fully responding group from the Screening Survey. Of the eligible RFBL holders, 3,234 (94%) agreed to participate in the Phone-Diary Survey. Subsequently, 2,931 respondents completed the Phone-Diary Survey, representing 98% completion rate among uptake, or 92% among eligible (Table 2). The 303 respondents that failed to complete the Phone-Diary Survey were mainly from sample loss (number no longer connected) and refusals.

The majority (75%) of sample loss in the Benchmark Survey was from disconnected telephone numbers (4.5% of the gross sample) and mobile never on (3.4% of gross sample). Sample loss also occurred where the respondent was not known at the number (0.8% of the gross sample), the respondent was known but no new contact details were available (0.8%), or the respondent was away for the survey (0.4%), language difficulties (<0.1%), duplicate number (0.2%), or respondent incapacitated or deceased (0.5%).

The initial Screening Survey conducted prior to the Phone-Diary Survey was based on a sample of 4,953 RFBL holders, of which 97.1% were fully responding (i.e. completed all required interview questions) (Table 2). The 127 non-responding RFBL holders were either non-contacts (1.5% of the net sample) or refusals (1.4% of the net sample). Similarly, the Benchmark Survey conducted after the Phone-Diary Survey was based on a sample of 5,195 RFBL holders, of which 96.9% were fully responding. The 143 non-responding RFBL holders were non-contacts (1.6% of the net sample) or refusals (1.5% of the net sample).

Non-response in the Screening and Benchmark Surveys were minimised by completing a minimum 20 effective calls to each respondent number, over a range of day times and days of the week, during the survey. Refusal rates were low for both surveys, and could be attributable to the use of experienced interviewers and the fact that relevance of the subject matter strongly correlates with response propensity (i.e. an 'interest' in fishing).

Response rates were relatively consistent across all sampling strata, and with previous statewide surveys (see Ryan *et al.* 2013, Ryan *et al.* 2015). The response rates achieved in all components of this study were very high, which provides confidence in overall data quality and minimises the impact of non-response bias.

**Table 2.** Sample size and response profile for Screening, Phone-Diary and Benchmark Surveys by stratum.

<b>SCREENING SURVEY</b>	<b>Total RFBL Holders</b>	<b>Initial sample</b>	<b>Sample loss</b>	<b>Net sample</b>	<b>Non-response</b>	<b>Full response</b>	<b>Response rate</b>
Kimberley	3,612	250	26	224	12	212	94.64%
Pilbara	6,513	250	40	210	8	202	96.19%
Gascoyne	2,331	250	30	220	8	212	96.36%
Mid West	7,578	250	23	227	5	222	97.80%
Wheat Belt	5,645	250	32	218	9	209	95.87%
Metro	68,028	2,003	252	1,751	45	1,706	97.43%
Peel	14,146	400	41	359	15	344	95.82%
South West	18,682	550	55	495	11	484	97.78%
Great Sth'n	5,475	250	23	227	12	215	94.71%
Gold fields	2,399	250	25	225	1	224	99.56%
Interstate	2,979	250	18	232	1	231	99.57%
<b>TOTAL</b>	<b>137,388</b>	<b>4,953</b>	<b>565</b>	<b>4,388</b>	<b>127</b>	<b>4,261</b>	<b>97.11%</b>

<b>PHONE-DIARY SURVEY</b>	<b>Full response at screening</b>	<b>Eligible for the Diary Survey</b>	<b>Diary Uptake</b>	<b>Diary Survey Completed</b>	<b>Uptake rate among eligible (%)</b>	<b>Completion rate among uptake (%)</b>	<b>Completion rate among eligible (%)</b>
Kimberley	212	194	185	163	95.36%	88.11%	84.02%
Pilbara	202	170	160	145	94.12%	90.63%	85.29%
Gascoyne	212	169	152	137	89.94%	90.13%	81.07%
Mid West	222	180	167	149	92.78%	89.22%	82.78%
Wheatbelt	209	162	152	142	93.83%	93.42%	87.65%
Metro	1,706	1,387	1,315	1,189	94.81%	90.42%	85.72%
Peel	344	290	269	243	92.76%	90.33%	83.79%
South West	484	422	399	363	94.55%	90.98%	86.02%
Great Sth'n	215	193	184	170	95.34%	92.39%	88.08%
Goldfields	224	183	174	159	95.08%	91.38%	86.89%
Interstate	231	91	77	71	84.62%	92.21%	78.02%
<b>TOTAL</b>	<b>4,261</b>	<b>3,441</b>	<b>3,234</b>	<b>2,931</b>	<b>93.98%</b>	<b>90.63%</b>	<b>85.18%</b>

<b>BENCHMARK SURVEY</b>	<b>Total RFBL Holders</b>	<b>Initial sample</b>	<b>Sample loss</b>	<b>Net sample</b>	<b>Non-response</b>	<b>Full response</b>	<b>Response rate</b>
Kimberley	3,592	261	38	223	4	219	98.21%
Pilbara	6,549	290	36	254	10	244	96.06%
Gascoyne	2,305	255	31	224	12	212	94.64%
Mid West	7,698	307	41	266	7	259	97.37%
Wheatbelt	5,798	265	26	239	3	236	98.74%
Metro	68,946	2,038	191	1,847	55	1,792	97.02%
Peel	13,940	442	49	393	13	380	96.69%
South West	18,457	558	57	501	23	478	95.41%
Great Sth'n	5,500	252	25	227	4	223	98.24%
Goldfields	2,455	263	25	238	8	230	96.64%
Interstate	3,010	264	26	238	4	234	98.32%
<b>TOTAL</b>	<b>138,250</b>	<b>5,195</b>	<b>545</b>	<b>4,650</b>	<b>143</b>	<b>4,507</b>	<b>96.92%</b>

### 2.2.2 Boat Ramp Surveys

In 2015/16, on-site surveys were completed at 23 boat ramps from January to April 2016 in the West Coast and South Coast to obtain length and weight information that would allow estimates of catch (by number) from the Phone-Diary Survey to be converted to catch (by weight). This enables direct comparison of recreational harvest estimates to commercial fishery information, which is routinely recorded as weights. Data were collected from 3,068 boat-based recreational fishing parties in the West Coast and South Coast, with over 9,960 fish and other aquatic organisms measured. Due to the limited availability of resources, data were not collected in the Gascoyne Coast and North Coast.

The target population included boat-based recreational fishers who retrieved from the key boat ramps where research staff conducted face-to-face interviews with recreational fishers. The Biological Survey in 2015/16 was based on a targeted design informed by data collected during the Boat Ramp and Remote Camera Surveys in 2011/12 (Ryan *et al.* 2013) and 2013/14 (Ryan *et al.* 2015). By targeting key boat ramps at peak times of fishing activity (i.e. season, day type and time of day) the surveys aimed to maximise the collection of biological information. The primary sampling unit was sample day and the secondary sampling unit was fishing party, which could include both RFBL holders and non-licensed fishers.

Spatial stratification for the Biological Survey in 2015/16 included marine bioregions, regions and zones, within which 23 boat ramps were sampled, including: 19 ramps in the West Coast (4 ramps in the North zone, 10 in the Metro zone, 5 ramps in the South zone); and 4 ramps in the South Coast (2 ramps in the Albany region and 2 ramps in the Esperance region).

The temporal stratification of the Biological Survey varied for each bioregion, depending on factors that are known to influence boating activity (Table 3). In the West Coast, the aim was to collect the same number of fish measurements as the previous Biological Surveys in 2013/14 and 2011/12 and, as a result, 1–2 surveys per week were scheduled at each ramp, with equal allocation across month, day type and time of day (Table 3). Sample days were approximately 4 hours duration and confined to daylight hours only. In the South Coast, it was aimed to maximise the number of fish measured and surveys were completed up to 5 days per week.

Prior to the commencement of the surveys in each bioregion, interviewers were provided with training in interview techniques, survey instruments and species identification as well as documentation relating to interviewer guidelines, forms and questionnaires.

Summaries of average weight of species (whole weight) collected from the West Coast and South Coast during the Boat Ramp Surveys in 2015/16 are given in Appendix 1 and includes the number of weight measurements recorded, average weight (measured in grams where >10 measurements were obtained statewide) and standard error. Summaries of average weight are also provided for the North Coast and Gascoyne Coast average weight by aggregating data collected from the Boat Ramp Surveys in 2013/14 and 2011/12. Statewide summaries were determined by aggregating data from Boat Ramp Surveys in 2015/16, 2013/14 and 2011/12.

Additional results from the three Biological Surveys are provided in a separate report (Smallwood *et al.* 2017).

**Table 3:** Temporal stratification in each bioregion and zone for the Biological Survey in 2015/16.

Bioregion	Zone	Months	Key factor/s determining shift time
West Coast	Mid West	Mid-January to April	Day type and time of day
	Metropolitan		Day type and time of day
	South West		Day type and time of day
South Coast	Albany		Time of day
	Esperance		Time of day

### 2.2.3 Remote Camera Survey

The Remote Camera Survey monitors recreational boating activity via video cameras at key boat ramps to assist with the corroboration and validation of estimated effort (from the Phone-Diary Survey) and determining levels of boating activity between statewide surveys. Eleven boat ramps were selected for comparison with the Phone-Diary Survey: Dampier in the North Coast; Denham and Monkey Mia in the Gascoyne Coast; Mindarie, Ocean Reef, Hillarys, Leeuwin, Woodman Point (public and private) and Point Peron in the West Coast; and Albany in the South Coast. The position of cameras at each boat ramp was determined by the available infrastructure and logistics of transmitting information (Blight and Smallwood 2015). Camera data was aggregated to provide the number of powerboat launches and retrievals over 24-hours for 12-months concurrent with the Phone-Diary Survey.

Although remote cameras are expected to operate continuously, outages occurred as a result of technological failure and extreme weather (e.g. power loss and cyclones). Methods have been established to accommodate short-term data loss by extrapolating the temporal distribution of activity for the missing time (see Wise and Fletcher 2013). Extended loss of data can also occur; e.g. data for the camera at Denham were not recorded between July and August 2016. The total activity reported for Denham, therefore, only represents values for available monthly data over the survey (i.e. 10 months) rather than estimates of total activity over 12-months.

Summaries of total launches and retrievals of power boats during 2015/16, by year, month and hourly (within month), are given in Appendix 2, along with the ramp location and any data loss during the 12-months. Estimates provided in this report are the best that are currently available, but may be revised as a result of refinement of the methods used for reading and analysing camera footage. A framework for integration of Remote Camera Surveys with recreational fishing surveys is provided in a separate report (Steffe *et al.* 2017).



### 2.3 Phone-Diary Survey Expansion, Weighting and Analysis

The Phone Surveys design incorporate stratified random sampling with samples divided into homogenous units to reduce sampling variance (Cochran 1977, Pollock *et al.* 1994, Lohr 2010, Särndal *et al.* 2003). These strata related to Regional Development Commission Boundaries in Western Australia. The number of samples within each stratum were selected proportionally to the size of the stratum. A single residential stratum applied to interstate RFBL holders (<2% of all RFBL holders). Overseas RFBL holders (<0.02% of all RFBL holders) were excluded from the Phone Surveys. Exclusions from the sampling frame occurred before sample selection where currency of address information was invalid or fishers were identified as having multiple licences. All sampling was done without replacement.

Data from Phone Surveys that use the White Pages as a sampling frame can be expanded to the total population using profiles from the Australian Bureau of Statistics, based on household structure, age and gender (Giri and Hall 2015, Lyle *et al.* 2014, Webley *et al.* 2015, West *et al.* 2012, West *et al.* 2015). However, a different approach is required for surveys that use licence sampling frames, particularly if the database is constantly changing. Analysis of the RFBL database (in 2013/14 and 2011/12 compared with 2015/16) indicates approximately 25% RFBL holders do not renew their licence (i.e. ‘drop-out’), while approximately 25% RFBL holders take up a new licence (i.e. ‘drop-in’), each year. Samples were taken prior to each Screening Survey for all licence holders eligible to fish in the previous 12 months and the Phone-Diary Survey did not progressively sample and recruit new entrants to the RFBL population during the survey.

The Benchmark and Non-Intending Fisher Surveys were designed to assist in matching respondents from the Phone-Diary Survey (sampled from the RFBL population in 14/15) to the RFBL population in 2015/16 (i.e. people that had a licence) during the Phone-Diary Survey. Calculation of weighting factors requires counter-parting respondents in the Phone-Diary Survey (based on actual days fished) with respondents in the Benchmark Survey (based on recalled days fished). This process accounts for behavioural differences that result from the dynamic nature of the RFBL population. Counter-parting was based on recall and actual effort collected during the Phone-Diary Survey to account for a likely overestimate of recalled effort in the Benchmark Survey. The sample weight (or expansion factor) for a given subsample was determined by the inverse of the fraction it represented in the population, according to the following equation, where  $\alpha_{hi}$  = weight for RFBL holder  $i$  in stratum  $h$ ,  $N_h$  = total number of RFBL holders in stratum  $h$ ,  $n_h$  = number of RFBL holders sampled in stratum  $h$ .

$$\alpha_{hi} = \frac{N_h}{n_h}$$

The total catch of species in each stratum over the Phone-Diary Survey was calculated by multiplying the weighted catch for all respondents in each stratum by the number of RFBL holders in each stratum for the relevant RFBL population, as determined by the Benchmark Survey. This approach accounts for: fishers that unexpectedly ‘drop-out’ from the Phone-Diary Survey (i.e. respondents that intended to fish, but did not); fishers that unexpectedly ‘drop-in’

during the Phone-Diary Survey (i.e. respondents in the Screening Survey that did not intend to fish during the Phone-Diary Survey, but actually did); and additional ‘drop-in’ fishers (i.e. fishers who were not eligible for sample selection for the Screening Survey, but purchased a RFBL during the Phone-Diary Survey).

Raw data collected from respondents have been initially expanded by the number of RFBL holders in the residential stratum divided by the number of RFBL holders sampled in residential stratum. Future estimates may be based on adjustment of weighting factors to account for avidity bias and non-intending fishing and will be reported separately (as required). Parameter estimates in this report are based on expanded data, scaled-up to represent the appropriate stratum population. Estimates were determined for participation (by number of RFBL holders), effort (boat days and hours fished) and catch for all species (total, kept and released, by number). Estimates of average weight were obtained from Boat Ramp Surveys or Tour Operator Returns. Expansion of Phone Survey data to population estimates was undertaken using the *survey* package (Lumley 2004, 2010) in the statistical computing language *R* (R Core Team 2016). Detailed descriptions of the *survey* and *recsurvey* packages are given in Lumley (2010) and Lyle *et al.* (2010) respectively.

## 2.4 Uncertainty

The integrated surveys provide catch estimates in a cost-effective manner; however, they are still surveys, and as such, cannot be expected to provide the level of precision that would be available from a total census. As such, three measures of uncertainty are used:

- i. Standard error indicates the difference between the estimate (obtained from a sample) and the true value (of the population). The standard error of the estimate is calculated from the standard deviation of the sample divided by the sample size.
- ii. Relative standard error indicates the uncertainty expressed as a percentage of the estimate (or as decimal values from 0.00 to 1.00), allowing comparisons between estimates that accounts for differences in the magnitude of estimates. The relative standard error of the estimate is calculated from the standard error of the sample divided by the estimate.
- iii. Confidence intervals represent the range in which the population value is likely to occur as determined by the estimate and associated standard error. The 95% confidence intervals are equal to the estimate plus or minus 1.96 multiplied by the standard error. This indicates the chance of the population value occurring within approximately two standard errors of the estimate. Confidence intervals are most frequently used to determine statistical significance where the difference between two estimates is considered statistically significant if the probability that they are different is at least 95%.

Interpretation of estimates requires consideration of both the number of fishers that contributed to the estimate and the magnitude of the relative standard error. Where required, estimates in tables have been highlighted to identify sample size <30 fishers and relative standard error >40% (or 0.40) (Lyle *et al.* 2014, Ryan *et al.* 2015, Webley *et al.* 2015, West *et al.* 2015). For estimates

of catch, the sample size refers to the number of fishers reporting a catch of that species (either kept or released). These cautions indicate that estimates may not be robust.

## 2.5 Reporting Notes

Estimates include uncertainty, with associated standard errors provided in all tables and figures, although these are not routinely cited in text. The tables also provide an indication of whether estimates are considered robust (i.e. sample size  $\geq 30$  and relative standard error  $\leq 0.40$ ). Estimates from the current statewide survey are compared with previous statewide surveys in 2013/14 and 2011/12, as appropriate.

Recreational fishers that did not hold a RFBL (including many shore-based only recreational fishers) and RFBL holders that intended to fish only in freshwater were out of scope for the Phone-Diary Survey. Therefore, estimates of catch for inland, estuarine and nearshore species provided in this report, particularly those harvested with high proportions of shore-based effort, will be underestimated. Additionally, catch estimates for Western Rock Lobster, which can be harvested by fishers with only a Rock Lobster licence, will also be underestimated.

This report presents estimates for boat-based recreational fishing to maintain consistency and comparability with estimates from previous statewide surveys. Estimates for shore-based recreational fishing and Rock Lobster will be reported separately.

Confidence intervals are used to determine statistical significance between annual estimates. If the 95% confidence intervals overlap, then there is no statistical difference, and this is described in this report as “*steady*”. If the 95% confidence intervals do not overlap, then there is a statistical difference (i.e. the probability that they are different is at least 95%), which is described in this report as “*increasing*” (if the latest estimate is higher than previous) or “*decreasing*” (if the latest estimate is lower than previous).

While this report compares estimates from three statewide surveys of boat-based recreational fishing, additional catches from charter-boat recreational fishing (reported in Tour Operator Returns) and shore-based fishing (where available) are used to determine the total catch from the recreational sector. Specific performance indicators, reference levels and catch tolerances will be reported separately, and used to provide trends in total catch to assist in developing, monitoring and refining management arrangements.

### 3 Participation

This section presents results from the Screening and Benchmark Surveys. These cross sectional, recall surveys were based on respondents that held a Recreational Fishing from Boat Licence (RFBL) between September 2014 to August 2015 (Screening) and September 2015 to August 2016 (Benchmark). These results are highly comparable to those from the previous statewide surveys conducted in 2013/14 (Ryan *et al.* 2015) and 2011/12 (Ryan *et al.* 2013).

#### 3.1 Fishing Participation

From the population of 137,388 RFBL holders that held a licence in the 12 months prior to September 2015 (2014/15; Figure 4) an estimated 117,023 (85%) RFBL holders fished at least once, and an estimated 20,366 (15%) did not fish (Figure 6a). Similarly, from the population of 138,250 RFBL holders in the 12 months prior to September 2016 (2015/16; Figure 5) an estimated 109,380 (79%) RFBL holders fished at least once, and an estimated 28,870 (21%) did not fish.

Higher participation occurred for boat-based recreational fishing compared with both (boat- and shore-based) (Figure 6b) and in marine water compared with freshwater and both (salt- and freshwater) (Figure 6c); however, participation in shore-based and freshwater-only recreational fishing may be lower for RFBL holders than for shore-based fishers (i.e. non-RFBL holders).

Most RFBL holders were male in the 12-months prior to September 2015 (85% of all RFBL holders in 2014/15) and the 12-months prior to September 2016 (85% of all RFBL holders in 2015/16). Females accounted for 15% of RFBL holders in 2014/15 and 2015/16 (Figure 6d).

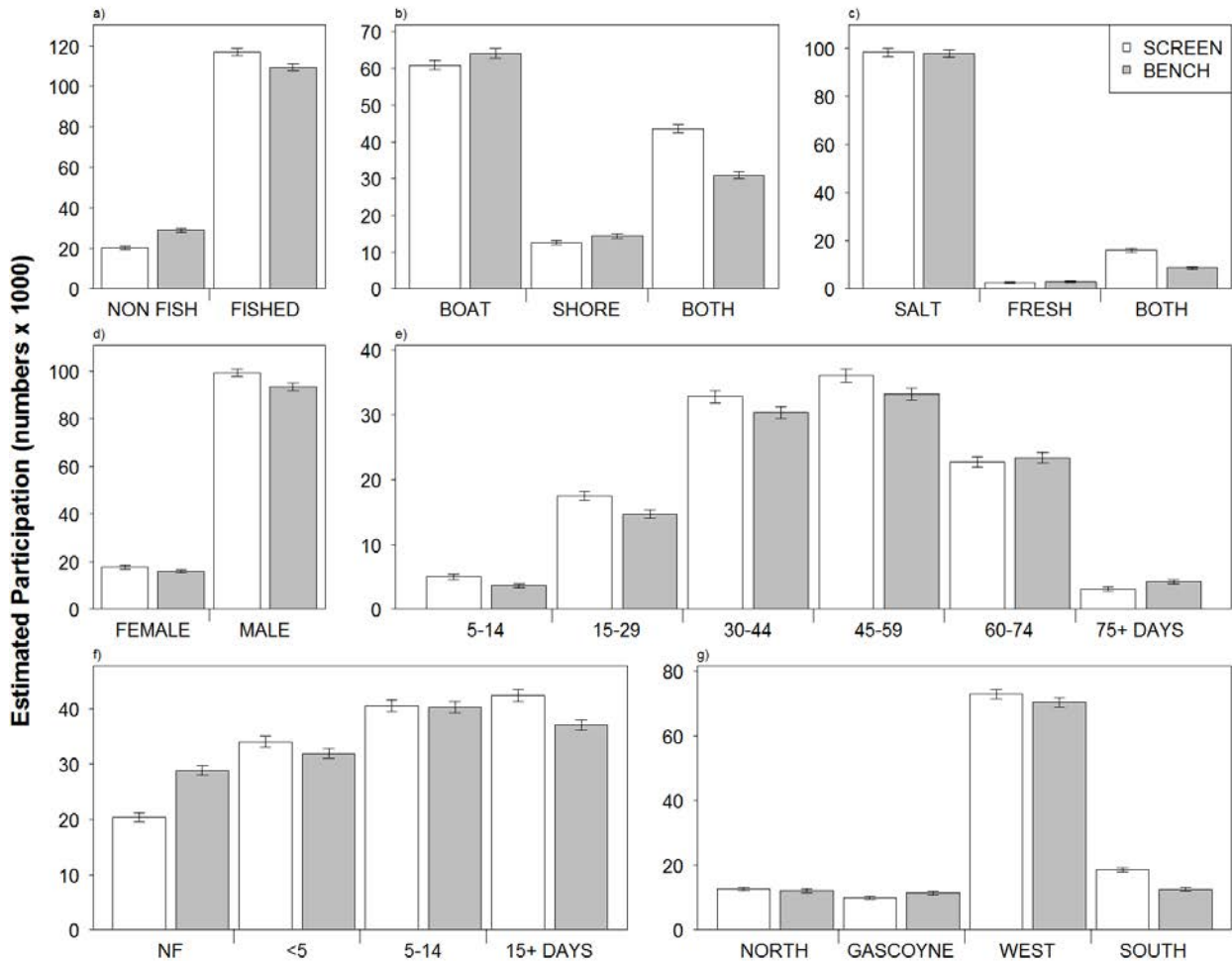
The highest numbers of RFBL holders that fished were in the 45 to 59-year age group (31% of all RFBL holders that fished in 2014/15 and 30% in 2015/16), followed by the 30 to 44-year age group (28% in 2014/15 and 2015/16; Figure 6e), the 15 to 29-year age group (15% in 2014/15 and 14% in 2015/16), and the 60 to 74-year age group (19% in 2014/15 and 21% in 2015/16). The lowest numbers of RFBL holders that fished were in the 5 to 14-year age group (4% in 2014/15 and 3% in 2015/16) and the 75 year or older group (3% in 2014/15 and 4% in 2015/16).

The number of days fished (by recall) in the 12-months prior to each survey is a measure of the fishing avidity. RFBL holders were equally likely to recall fishing 5 to 14 days (35% in 2014/15 and 37% in 2015/16) or 15 days or more (36% in 2014/15 and 34% in 2015/16; Figure 6f). Lower proportions of RFBL holders (29% in 2014/15 and 2015/16) recalled fishing less than 5 days during each 12-months.

RFBL holders were most likely to recall fishing in the West Coast (64% in 2014/15 and 66% in 2015/16; Figure 6g). Lower proportions of RFBL holders recalled fishing in the South Coast (16% in 2014/15 and 12% in 2015/16); North Coast (11% in 2014/15 and 2015/16); and Gascoyne Coast (9% in 2014/15 and 11% in 2015/16).

Similar statewide trends were observed in estimated participation for the 12-months prior to March 2011, March 2012, May 2013 and May 2014 (see Ryan *et al.* 2013, Ryan *et al.* 2015).

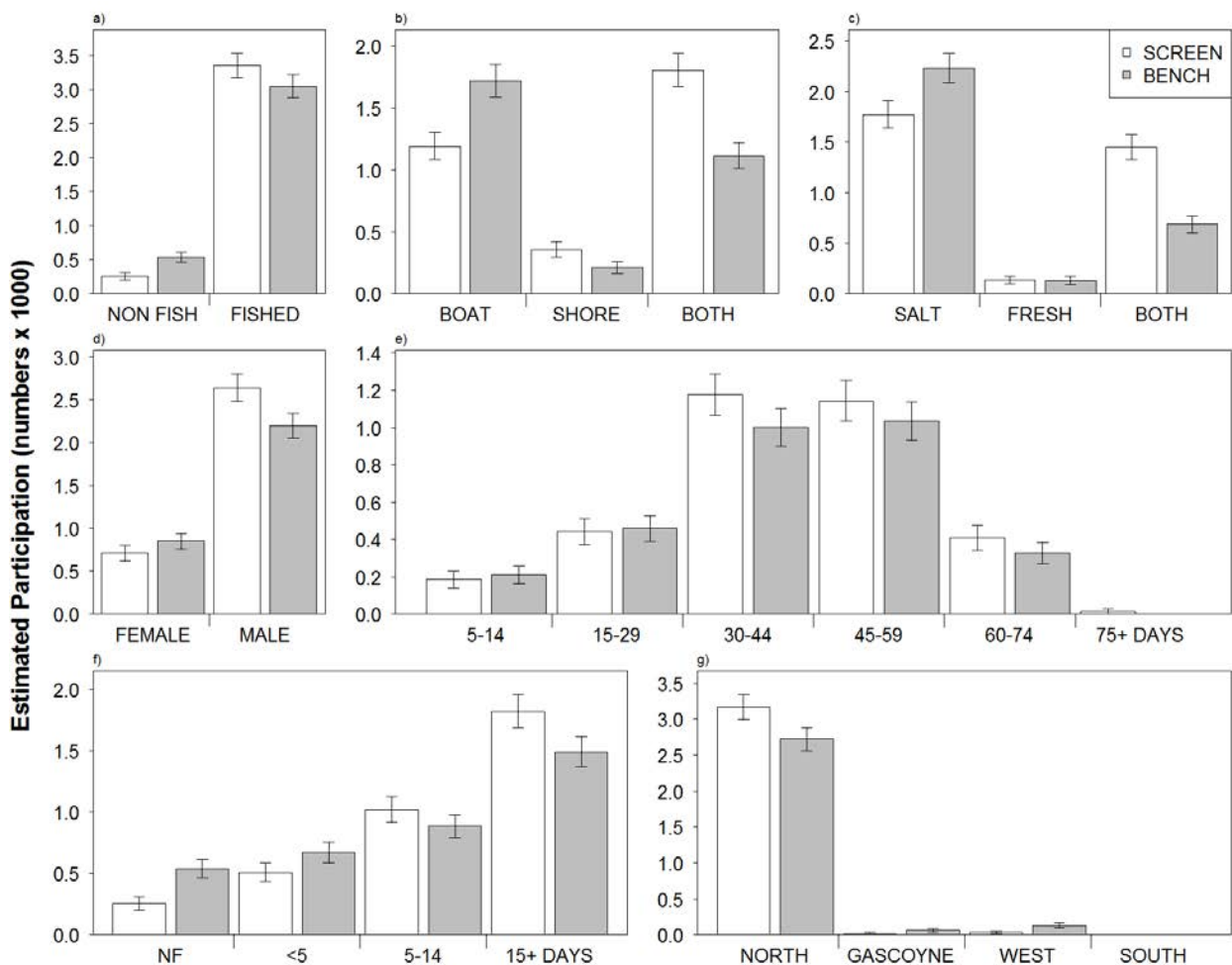
However, differences in estimated participation occurred according to residence (Perth Metropolitan, Regional Development Commissions, and Interstate), which are discussed in the remainder of this chapter. Notably, RFBL holders were most likely to fish in the bioregion closest to their home residence (e.g. residents from the Kimberley and Pilbara were most likely to fish in the North Coast). However, many RFBL holders travel throughout the state (e.g. residents from the Mid West, Metro and Peel fished in the South Coast, and residents from the Kimberley, Pilbara and Gascoyne fished in the West Coast).



**Figure 6.** Estimated number of RFBL holders aged five years and older who fished recreationally in the 12-months prior to September 2015 (white bars, SCREEN) and September 2016 (grey bars, BENCH); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.2 Kimberley

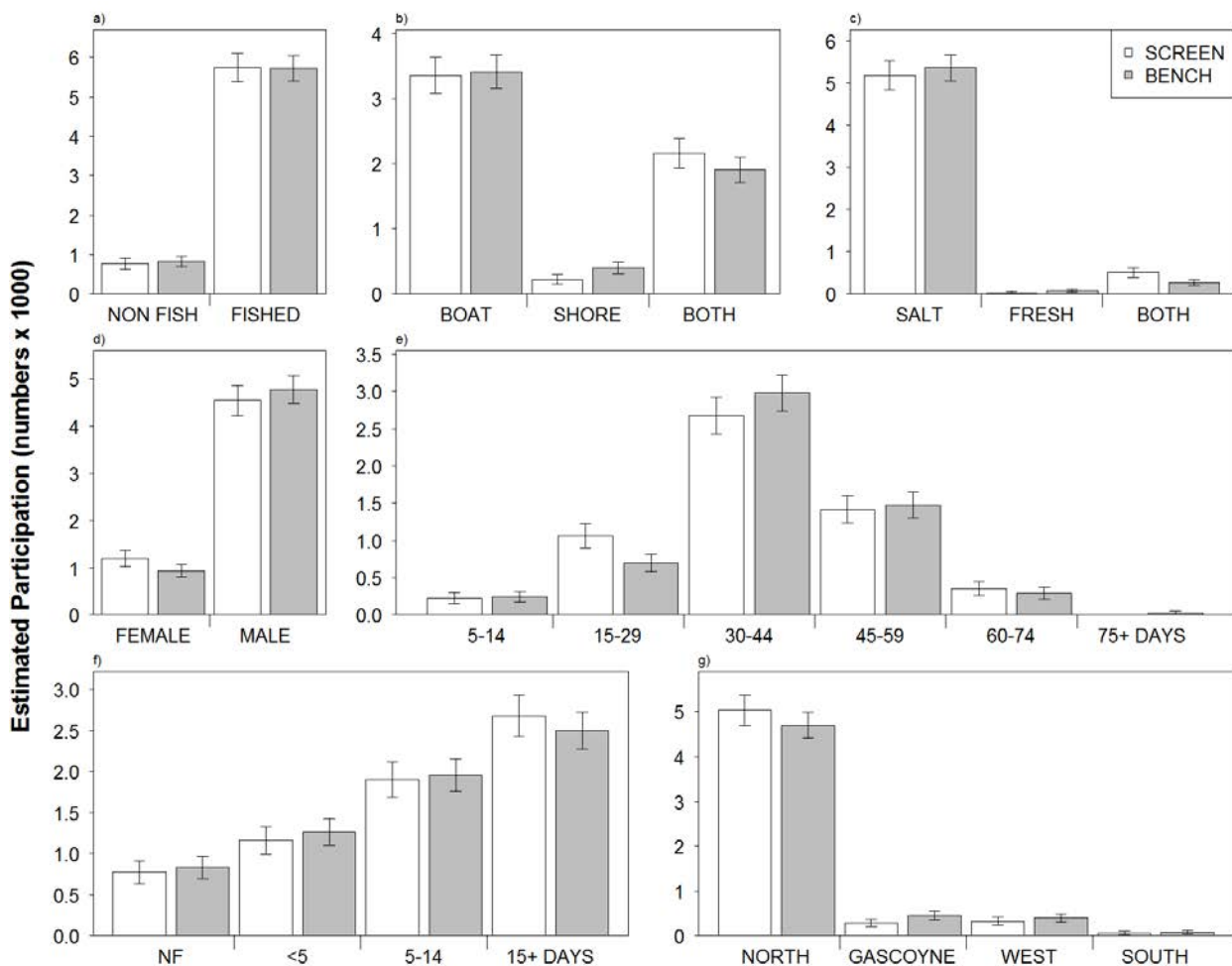
A total of 3,612 residents in the Kimberley RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 3,356 (93%) fishing at least once in 2014/15; Figure 7a). Similarly, 3,592 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 3,051 (85%) fishing at least once in 2015/16. Most RFBL holders were male (79% in 2014/15 and 72% in 2015/16), and higher proportions of females participated in fishing (21% in 2014/15 and 28% in 2015/16; Figure 7d) compared with statewide estimates. The majority of RFBL holders that fished were in the 30 to 44-year age group (35% in 2014/15) or the 45 to 59-year age group (34% in 2015/16; Figure 7e). Most RFBL holders recalled fishing 15 days or more (54% in 2014/15 and 49% in 2015/16; Figure 7f) and fished in the North Coast (98% in 2014/15 and 93% in 2015/16; Figure 7g).



**Figure 7.** Estimated number of Kimberley RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.3 Pilbara

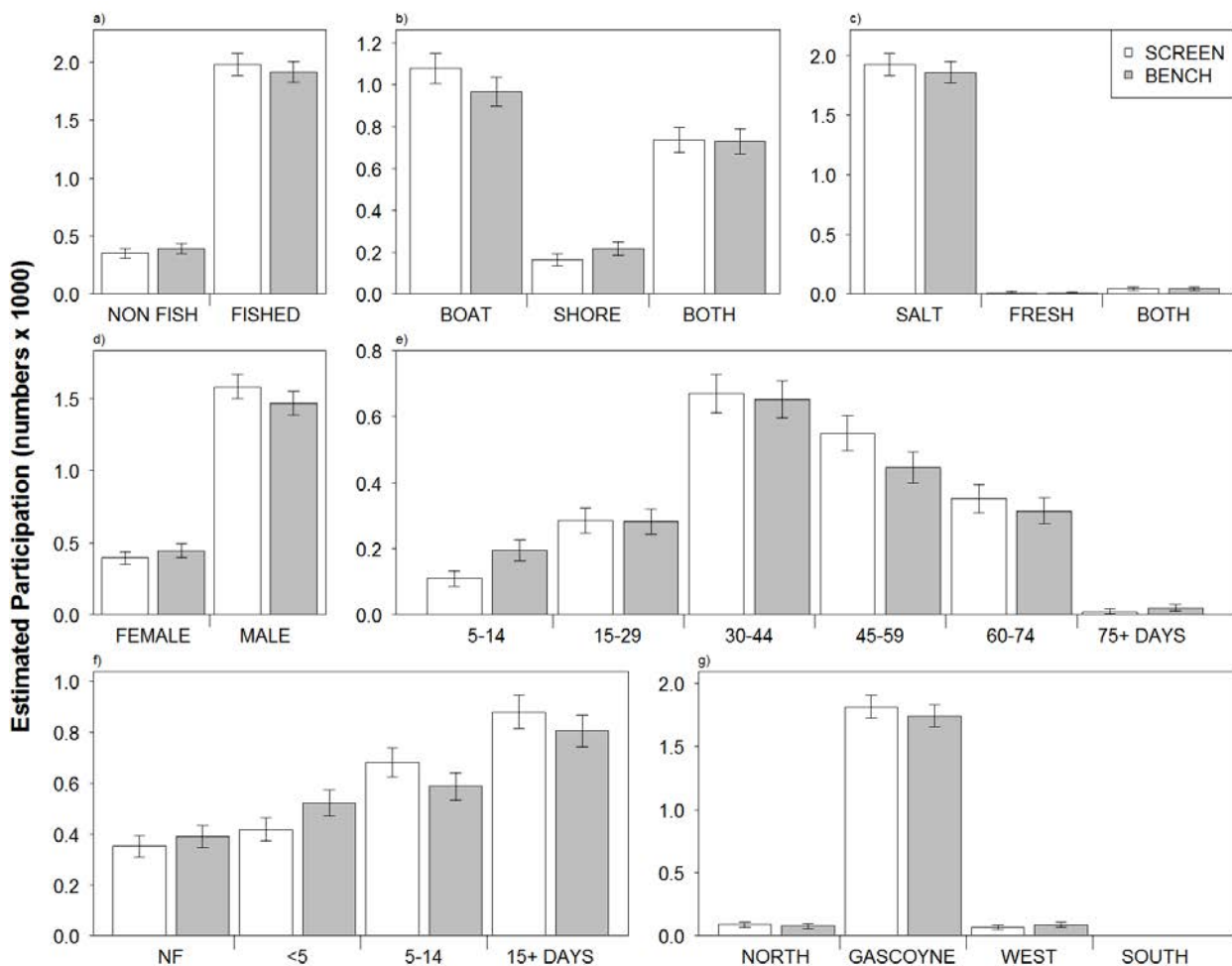
A total of 6,513 residents in the Pilbara RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 5,739 (88%) fishing at least once in 2014/15 (Figure 8a). Similarly, 6,549 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 5,717 (87%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (79% in 2014/15 and 84% in 2015/16), and higher proportions of females participated in fishing (21% in 2014/15 and 16% in 2015/16; Figure 8d) compared with statewide estimates. Most RFBL holders that fished were in the 30 to 44-year age group (47% in 2014/15 and 52% in 2015/16; Figure 8e), recalled fishing 15 days or more (47% in 2014/15 and 44% in 2015/16; Figure 8f), and fished in the North Coast (88% in 2014/15 and 83% in 2015/16; Figure 8g).



**Figure 8.** Estimated number of Pilbara RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.4 Gascoyne

A total of 2,331 residents in the Gascoyne RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 1,979 (85%) fishing at least once in 2014/15 (Figure 9a). Similarly, 2,305 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 1,914 (83%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (80% in 2014/15 and 77% in 2015/16), and higher proportions of females participated in fishing (20% in 2014/15 and 23% in 2015/16; Figure 9d) compared with statewide estimates. Most RFBL holders were in the 30 to 44-year age group (34% in 2014/15 and 2015/16; Figure 9e). RFBL holders were most likely to recall fishing 15 days or more (44% in 2014/15 and 42% in 2015/16; Figure 9f), and most likely to fish in the Gascoyne Coast (92% in 2014/15 and 91% in 2015/16; Figure 9g).

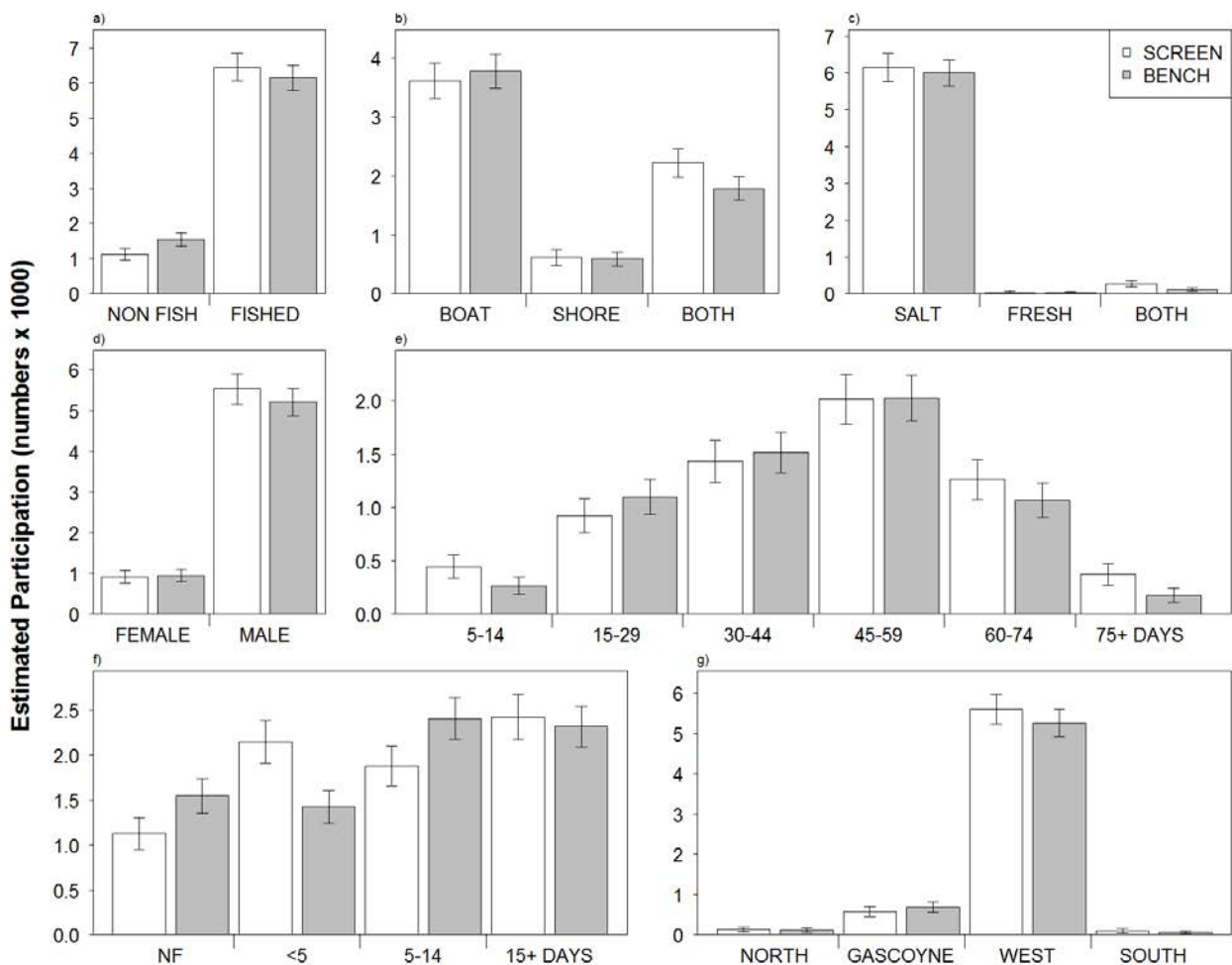


**Figure 9.** Estimated number of Gascoyne RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.



### 3.5 Mid West

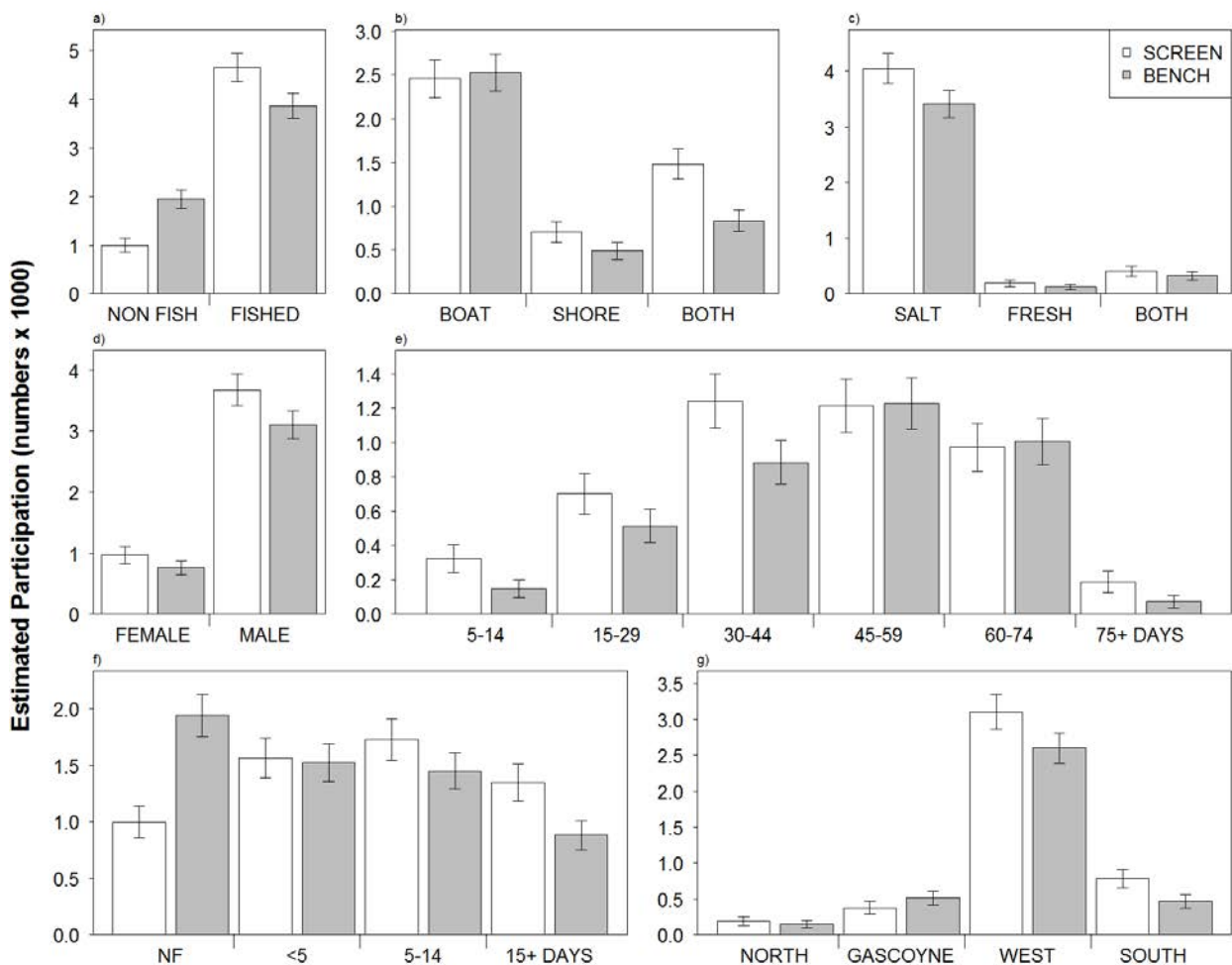
A total of 7,578 residents in the Mid West RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an 6,452 (85%) fishing at least once in 2014/15 (Figure 10a). Similarly, 7,698 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 6,152 (80%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (86% in 2014/15 and 85% in 2015/16), and lower proportions of females participated in fishing (14% in 2014/15 and 15% in 2015/16; Figure 10d) consistent with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (31% in 2014/15 and 33% in 2015/16; Figure 10e); recalled fishing 5 to 14 days (39% in 2014/15) or 15 days or more (36% in 2015/16; Figure 10f); and most likely to recall fishing in the West Coast (87% in 2014/15 and 86% in 2015/16; Figure 10g).



**Figure 10.** Estimated number of Mid West RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.6 Wheatbelt

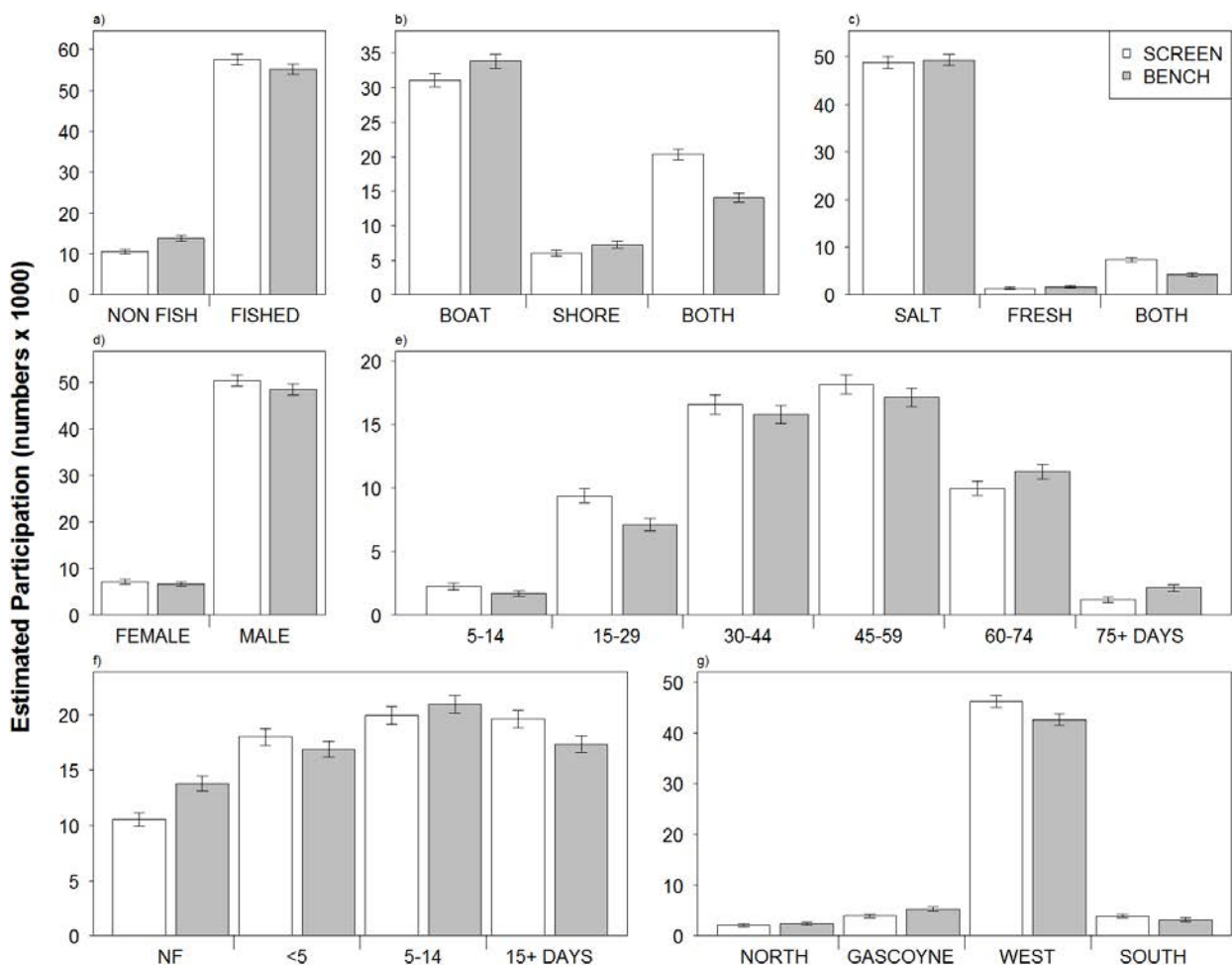
A total of 5,645 residents in the Wheatbelt RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 4,646 (82%) fishing at least once in 2014/15 (Figure 11a). Similarly, 5,798 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 3,857 (67%) fishing at least once in 2015/16. Most fishers were male (79% in 2014/15 and 80% in 2015/16), and higher proportions of females fished (21% in 2014/15 and 20% in 2015/16; Figure 11d) compared with statewide estimates. Most RFBL holders were in the 30 to 44 age group (27% in 2014/15), or the 45 to 59-year age group (26% in 2014/15 and 32% in 2015/16; Figure 11e). Most RFBL holders recalled fishing less than 5 days (39% in 2015/16) or 5 to 14 days (37% in 2014/15 and 38% in 2015/16; Figure 11f), and fished in the West Coast (70% in 2014/15 and 2015/16; Figure 11g).



**Figure 11.** Estimated number Wheatbelt RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.7 Perth Metropolitan

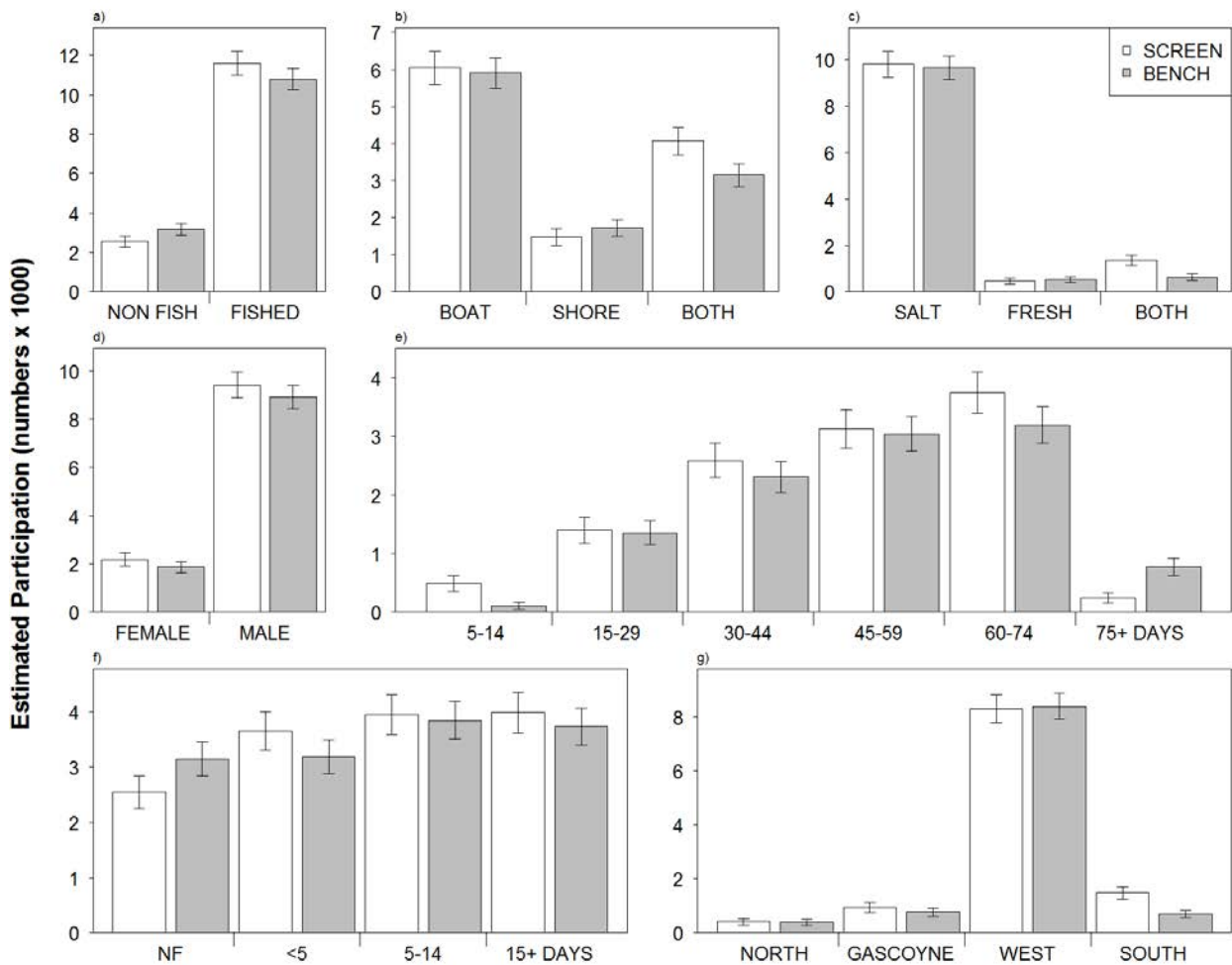
A total of 68,028 residents in Perth Metropolitan held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 57,501 (85%) fishing at least once in 2014/15 (Figure 12a). Similarly, 68,946 residents in Perth Metropolitan held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 55,134 (80%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (87% in 2014/15 and 88% in 2015/16), and lower proportions of females participated in fishing (13% in 2014/15 and 12% in 2015/16, Figure 12d) consistent with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (31% in 2014/15 and 2015/16; Figure 12e). RFBL holders were most likely to recall fishing 5 to 14 days (35% in 2014/15 and 38% in 2015/16) or 15 days or more (35% in 2014/15; Figure 12f). RFBL holders were most likely to recall fishing in the West Coast (82% in 2014/15 and 80% in 2015/16; Figure 12g).



**Figure 12.** Estimated number of Perth Metropolitan residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.8 Peel

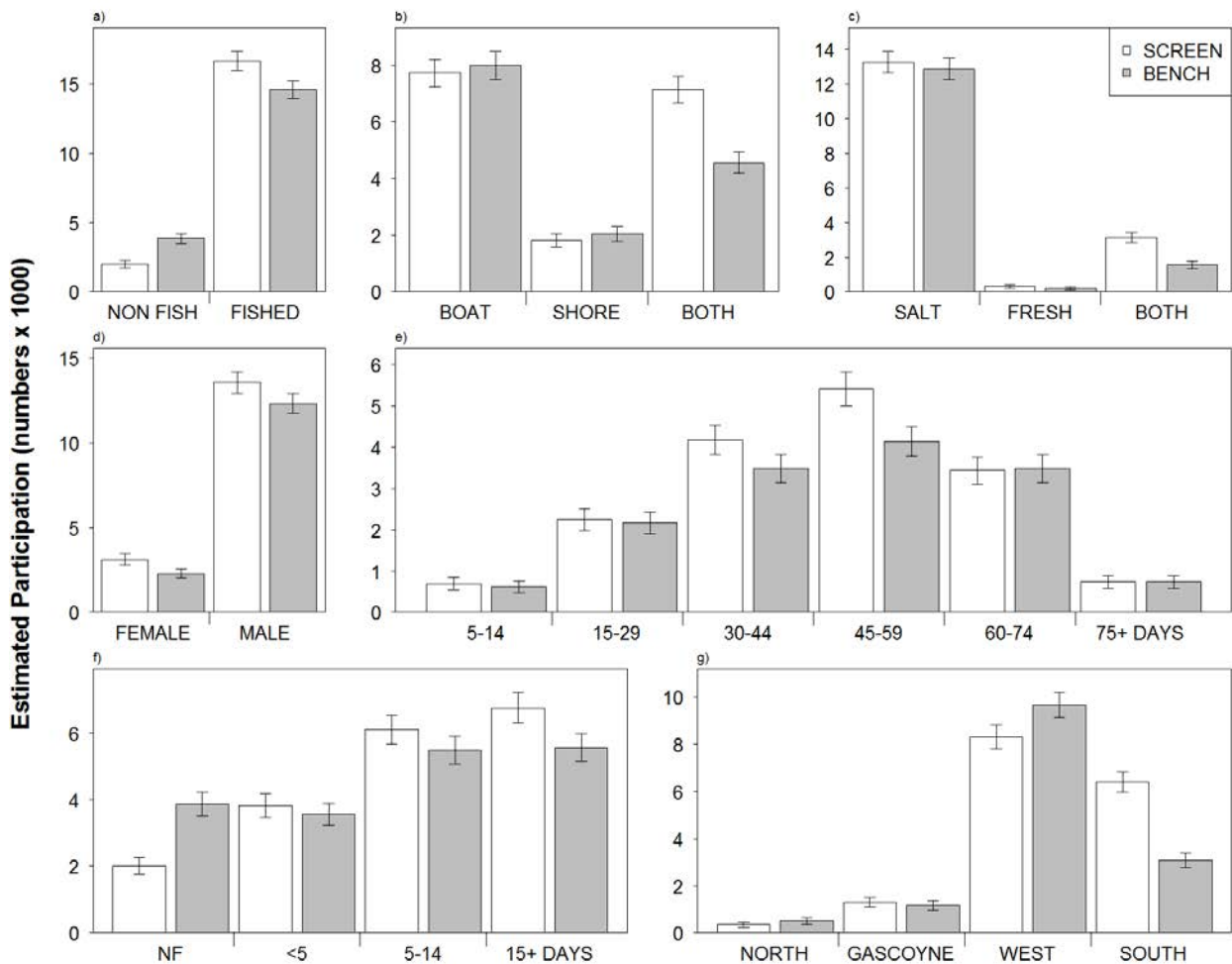
A total of 14,146 residents in the Peel RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 11,596 (82%) fishing at least once in 2014/15 (Figure 13a). Similarly, 13,940 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 10,785 (77%) fishing at least once in 2015/16. Most RFBL holders were male (81% in 2014/15 and 83% in 2015/16), and higher proportions of females participated in fishing (19 % in 2014/15 and 17% in 2015/16; Figure 13d) compared with statewide estimates. Most RFBL holders were in the 60 to 74-year age group (32% in 2014/15 and 30% in 2015/16; Figure 13e). RFBL holders were most likely to recall fishing 5 to 14 days (34% in 2014/15) or 15 days or more (34% in 2014/15 and 36% in 2015/16; Figure 13f), and most likely to recall fishing in the West Coast (75% in 2014/15 and 82% in 2015/16; Figure 13g).



**Figure 13.** Estimated number of Peel RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.9 South West

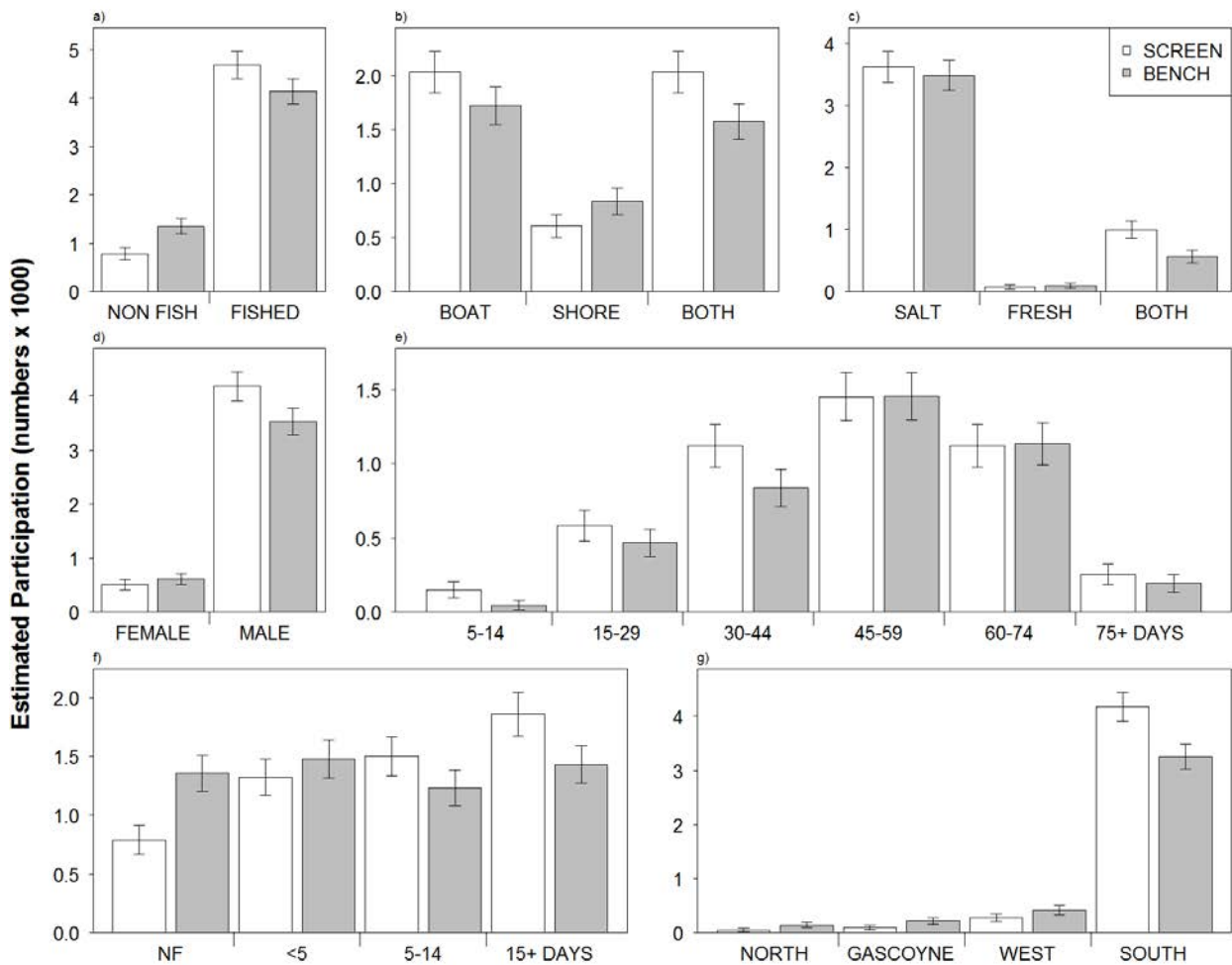
A total of 18,682 residents in the South West RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 16,675 (89%) fishing at least once in 2014/15 (Figure 14a). Similarly, 18,457 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 14,596 (79%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (81% in 2014/15 and 84% in 2015/16), and higher proportions of females participated in fishing (19% in 2014/15 and 16% in 2015/16; Figure 14d) compared with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (32% in 2014/15 and 28% in 2015/16; Figure 14e). RFBL holders were most likely to recall fishing 5 to 14 days (37% in 2014/15 and 38% in 2015/16) or 15 days or more (41% in 2014/15 and 38% in 2015/16; Figure 14f), and fished in the West Coast (51% in 2014/15 and 67% in 2015/16), followed by the South Coast (39% in 2014/15 and 21% in 2015/16; Figure 14g).



**Figure 14.** Estimated number of South West RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.10 Great Southern

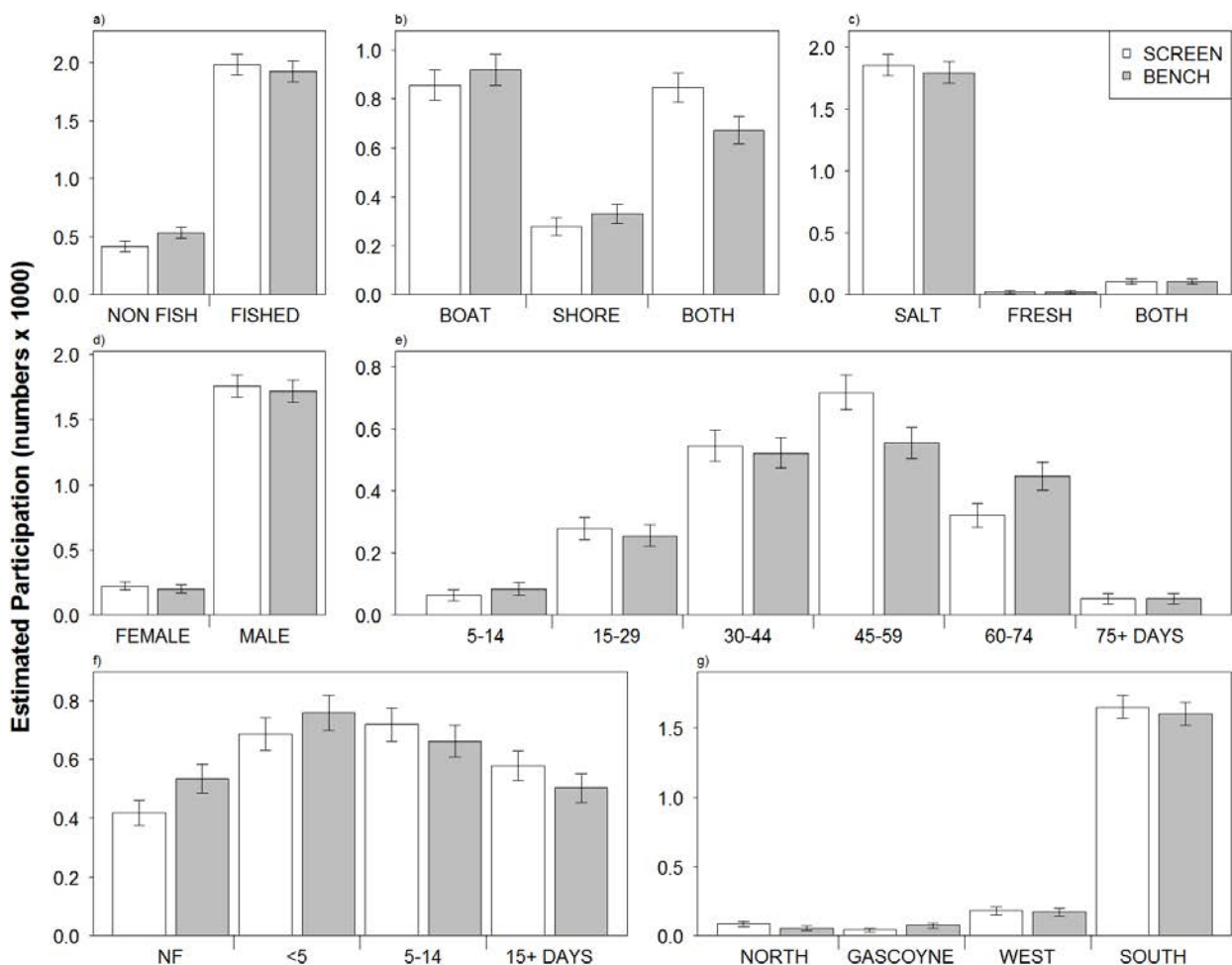
A total of 5,475 residents in the Great Southern RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 4,686 (86%) fishing at least once in 2014/15 (Figure 15a). Similarly, 5,500 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 4,144 (75%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (89% in 2014/15 and 85% in 2015/16), and lower proportions of females participated in fishing (11% in 2014/15 and 15% in 2015/16; Figure 15d) consistent with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (31% in 2014/15 and 35% in 2015/16; Figure 15e). RFBL holders were most likely to recall fishing 15 days or more (40% in 2014/15 and 35% in 2015/16; Figure 15f), and most likely to recall fishing in the South Coast (91 % in 2014/15 and 80% in 2015/16; Figure 15g).



**Figure 15.** Estimated number of Great Southern RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.11 Goldfields-Esperance

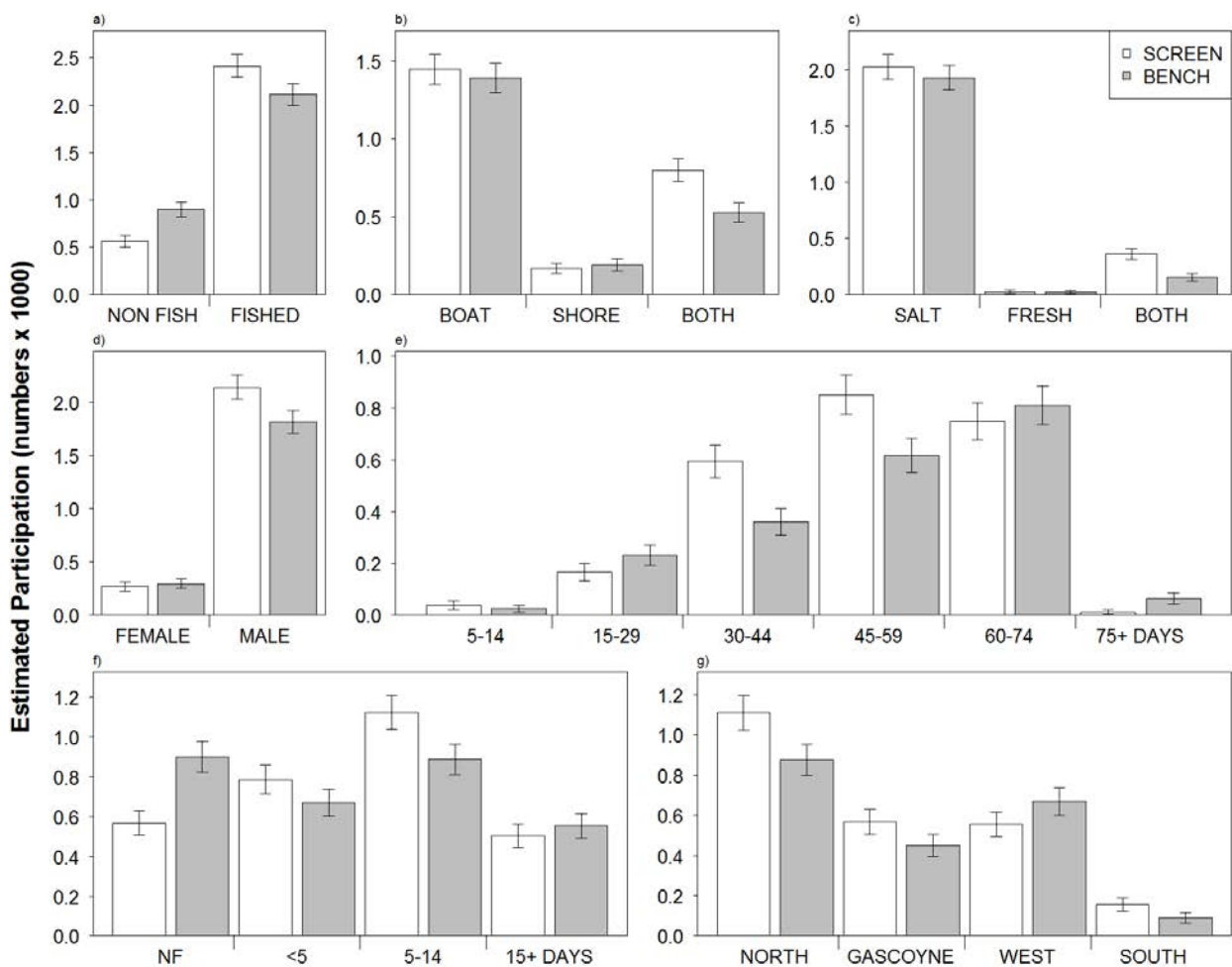
A total of 2,399 residents in the Goldfields-Esperance RDC held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 1,981 (83%) fishing at least once in 2014/15 (Figure 16a). Similarly, 2,455 residents held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 1,921 (78%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders (89% in 2014/15 and 2015/16), and lower proportions of females participated in fishing (11% in 2014/15 and 2015/16; Figure 16d) compared with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (36% in 2014/15 and 29% in 2015/16; Figure 16e). RFBL holders most likely to recall fishing less than 5 days (35% in 2014/15 and 39% in 2015/16) or 5 to 14 days (36% in 2014/15 and 34% in 2015/16; Figure 16f). RFBL holders were most likely to recall fishing in the South Coast (84% in 2014/15 and 2015/16; Figure 16g).



**Figure 16.** Estimated number of Goldfields-Esperance RDC residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.

### 3.12 Interstate

A total of 2,979 interstate visitors held a RFBL in the 12 months prior to September 2015 (Figure 4), with an estimated 2,412 (81%) fishing at least once in 2014/15 (Figure 17a). Similarly, 3,010 Interstate visitors held a RFBL in the 12 months prior to September 2016 (Figure 5), with an estimated 2,110 (70%) fishing at least once in 2015/16. Males accounted for the majority of RFBL holders in 2014/15 and 2015/16 (89% and 86% respectively), and lower proportions of females participated in fishing in 2014/15 and 2015/16 (11% and 14% respectively; Figure 17d) compared with statewide estimates. Most RFBL holders were in the 45 to 59-year age group (35% in 2014/15), or the 60 to 74-year age group (38% in 2015/16; Figure 17e). Interstate RFBL holders were most likely to recall fishing 5 to 14 days in 2014/15 and 2015/16 (47% and 42% respectively; Figure 17f), and most likely to recall fishing in the North Coast (46% in 2014/15 and 42% in 2015/16; (Figure 17g).



**Figure 17.** Estimated number of Interstate residents (RFBL holders aged five years and older) who fished recreationally in the 12-months prior to September 2015 (white bars) and September 2016 (grey bars); a) non-fishers and fishers; b) boat-based and both (including shore-based); c) marine and freshwater; d) gender; e) age (years); f) avidity (days fished per year); and g) bioregion fished.



## 4 Fishing Effort

This section presents estimates of effort from boat-based recreational fishing for the 12-months from September 2015 to August 2016. Estimates are summarised by habitat, fishing method and month, statewide (Figure 18) and for each bioregion: North Coast (Figure 19), Gascoyne Coast (Figure 20), West Coast (Figure 21) and South Coast (Figure 22).

Estimates of effort are measured in boat days (separate days in which fishing occurred on a ‘boat party’ basis, regardless of the number of fishers or RFBL holders on board) and number of fishing events, which accounts for multiple events during a boat day (i.e. events where fishing method or location changed during the boat day).

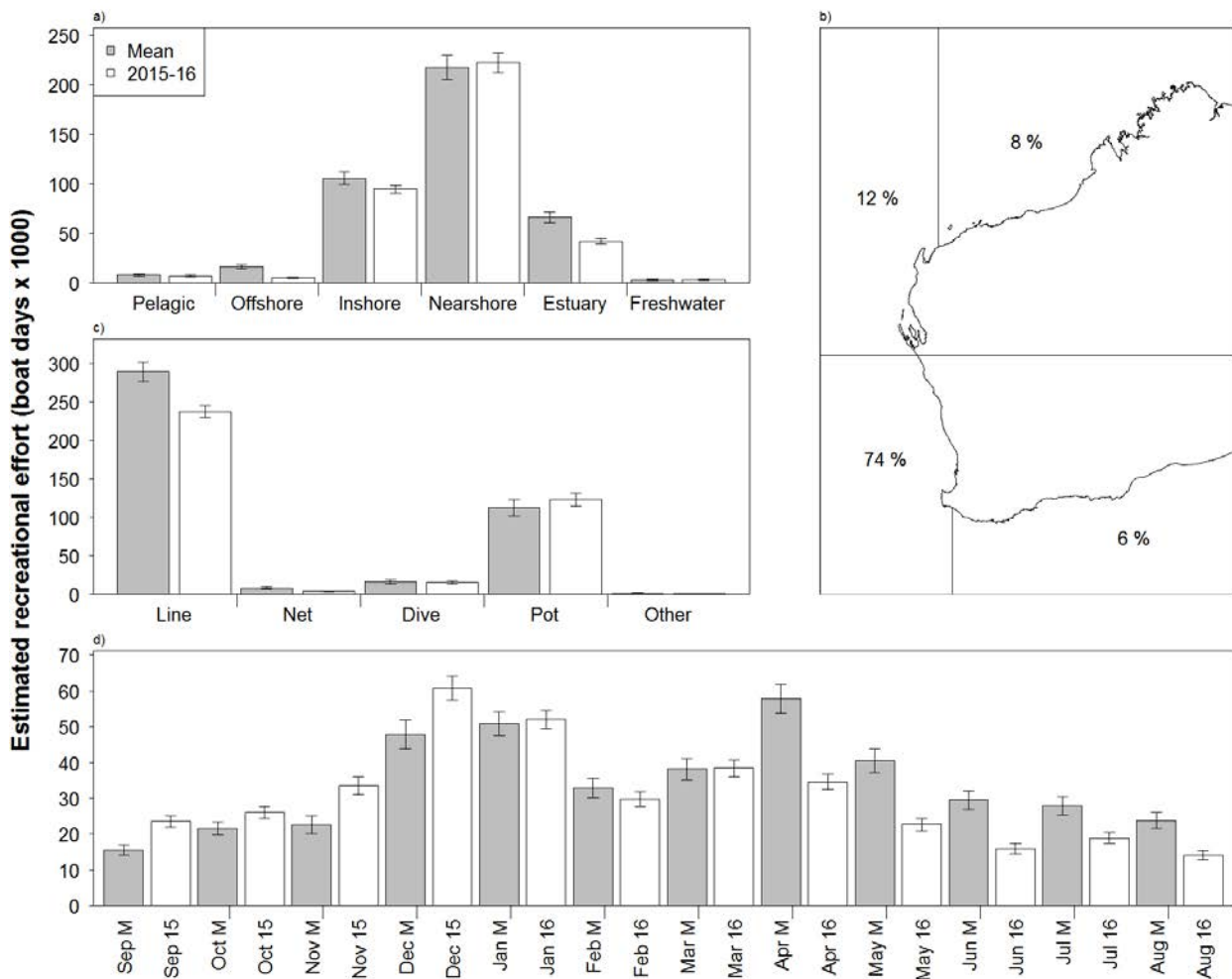
The boat-based recreational fishing effort for the 12-months from September 2015 to August 2016 was estimated to be 370,368 boat days, with 387,707 separate fishing events (Table 4). Fishers undertook an average of 1.05 events per fisher day statewide. The estimated total time spent boat-based recreational fishing was 1,112,579 hours. Approximately three quarters of the statewide estimated total effort (in boat days, fishing events and hours fished) was reported from the West Coast. While statewide effort has declined again in 2015/16, there was an increase in proportion of fishing effort in the West Coast which was consistent with results from the annual Community Survey (Department of Fisheries 2016), where the proportion of days fished in 2015/16 (74%) was higher than 2013/14 (62%).

**Table 4.** Annual fishing effort, expressed as boat days and fishing events, for boat-based recreational fishing in Western Australia during 2011/12, 2013/14 and 2015/16 (se=standard error).

Bioregion	Boat Days	se	Fishing Events	se	Hours Fished	se
<b>2011/12</b>						
North Coast	47,721	3,778	51,175	4,306	187,112	14,105
Gascoyne Coast	58,123	3,672	61,616	3,895	253,930	17,245
West Coast	293,112	10,688	317,543	11,972	820,693	31,111
South Coast	40,073	3,354	41,897	3,556	136,771	12,505
<b>State-wide Total</b>	<b>439,029</b>	<b>11,160</b>	<b>472,232</b>	<b>12,521</b>	<b>1,400,150</b>	<b>41,700</b>
<b>2013/14</b>						
North Coast	45,604	3,603	47,836	3,757	188,744	15,536
Gascoyne Coast	53,832	3,603	56,334	3,849	211,967	15,671
West Coast	249,719	10,563	267,664	11,561	716,722	31,145
South Coast	28,277	2,323	29,831	2,497	91,640	7,447
<b>State-wide Total</b>	<b>383,107</b>	<b>12,385</b>	<b>401,730</b>	<b>13,197</b>	<b>1,209,263</b>	<b>40,279</b>
<b>2015/16</b>						
North Coast	31,375	2,414	33,046	2,520	122,192	9,748
Gascoyne Coast	43,237	3,152	44,407	3,234	169,312	12,914
West Coast	271,311	11,032	285,157	11,672	740,815	28,047
South Coast	24,444	2,042	25,097	2,100	80,260	6,762
<b>Statewide Total</b>	<b>370,368</b>	<b>11,567</b>	<b>387,707</b>	<b>12,191</b>	<b>1,112,579</b>	<b>32,731</b>

## 4.1 Statewide effort

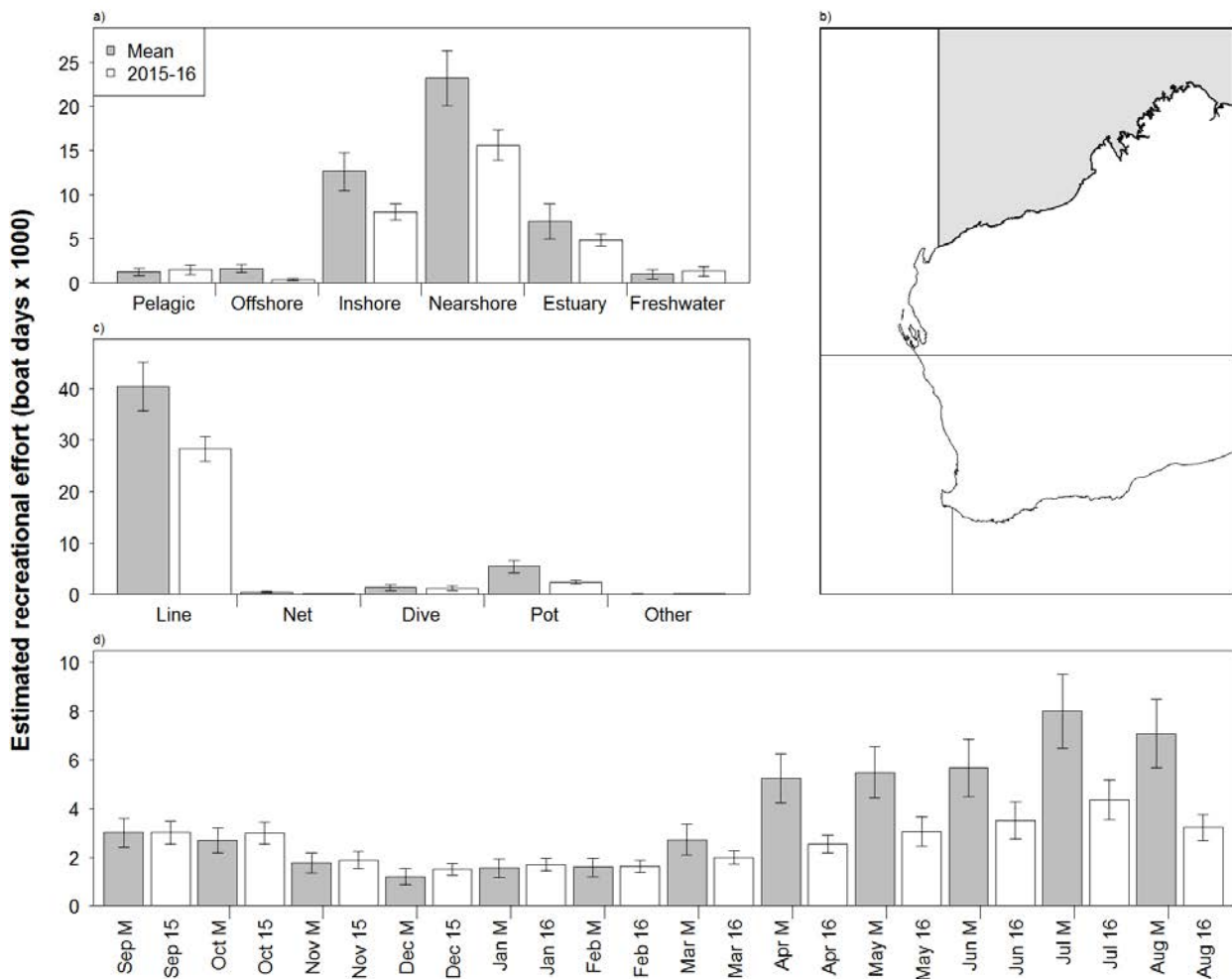
At a statewide level, most boat-based recreational fishing effort (boat days) during 2015/16 occurred in the West Coast (74%), with lower proportions in the North Coast (8%), Gascoyne Coast (12%) and South Coast (6%; Figure 18b). Most boat-based recreational fishing effort occurred in nearshore habitat (60%), followed by inshore demersal (25%) and estuary (11%), with lowest proportions in pelagic (2%), offshore demersal (1%) and freshwater (1%; Figure 18a). Most boat-based recreational fishing effort was attributed to line fishing (62%) and pots (32%), with lower proportions from diving (4%), nets (1%) and other (<1%; Figure 18c). Most boat-based recreational fishing effort occurred during summer (39%) and autumn (26%), with effort highest in December 2015 (16%) and lowest in August 2016 (4%; Figure 18d). Estimated boat-based recreational fishing effort in 2015/16 was higher in the West Coast compared with previous statewide surveys, but lower in the North Coast, Gascoyne Coast and South Coast.



**Figure 18.** Boat-based recreational fishing effort (boat days x 1000 ± standard errors) in Western Australia during 2015/16 (white bars) compared with mean from 2011/12 and 2013/14 (grey bars); a) effort by habitat; b) map of the proportion (%; 15/16 only) of the effort by fishing bioregion; c) effort by fishing method; and d) effort by month.

## 4.2 North Coast

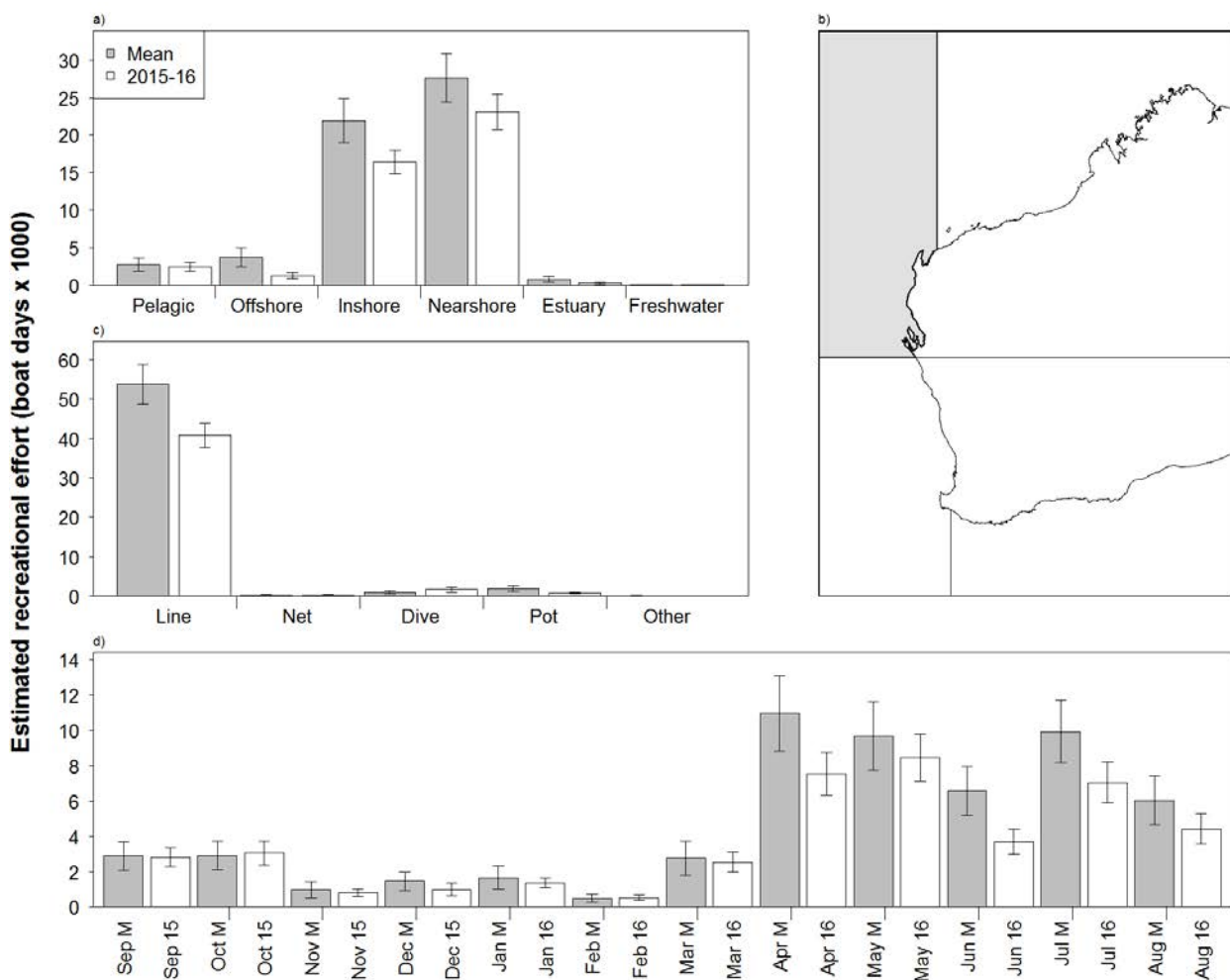
The majority of boat-based recreational fishing effort (boat days) during September 2015 to August 2016 in the North Coast occurred in nearshore habitat (50%), followed by inshore demersal (25%) and estuary (15%), with lower proportions of fishing effort in pelagic (5%), freshwater (4%) and offshore demersal (1%; Figure 19a). The majority of boat-based recreational fishing effort was attributed to line fishing (88%), with lower proportions of fishing effort from pots (7%), diving (4%), nets (<1%) and other (<1%; Figure 19b). The majority of boat-based recreational fishing effort occurred during winter (36%), followed by spring (25%), autumn (24%) and summer (15%). In 2015/16, fishing effort was highest in July 2016 (14%) and lowest in December 2015 (5%; Figure 19c). Estimated boat-based recreational fishing effort was lower in the North Coast in 2015/16 compared with previous statewide surveys, notably for line fishing, inshore and nearshore habitats, and from March to August.



**Figure 19.** Boat-based recreational fishing effort (boat days x 1000 ± standard errors) in the North Coast during 2015/16 (white bars) compared with mean from 2011/12 and 2013/14 (grey bars); a) effort by habitat; b) map of the bioregion; c) effort by fishing method; and d) effort by month.

### 4.3 Gascoyne Coast

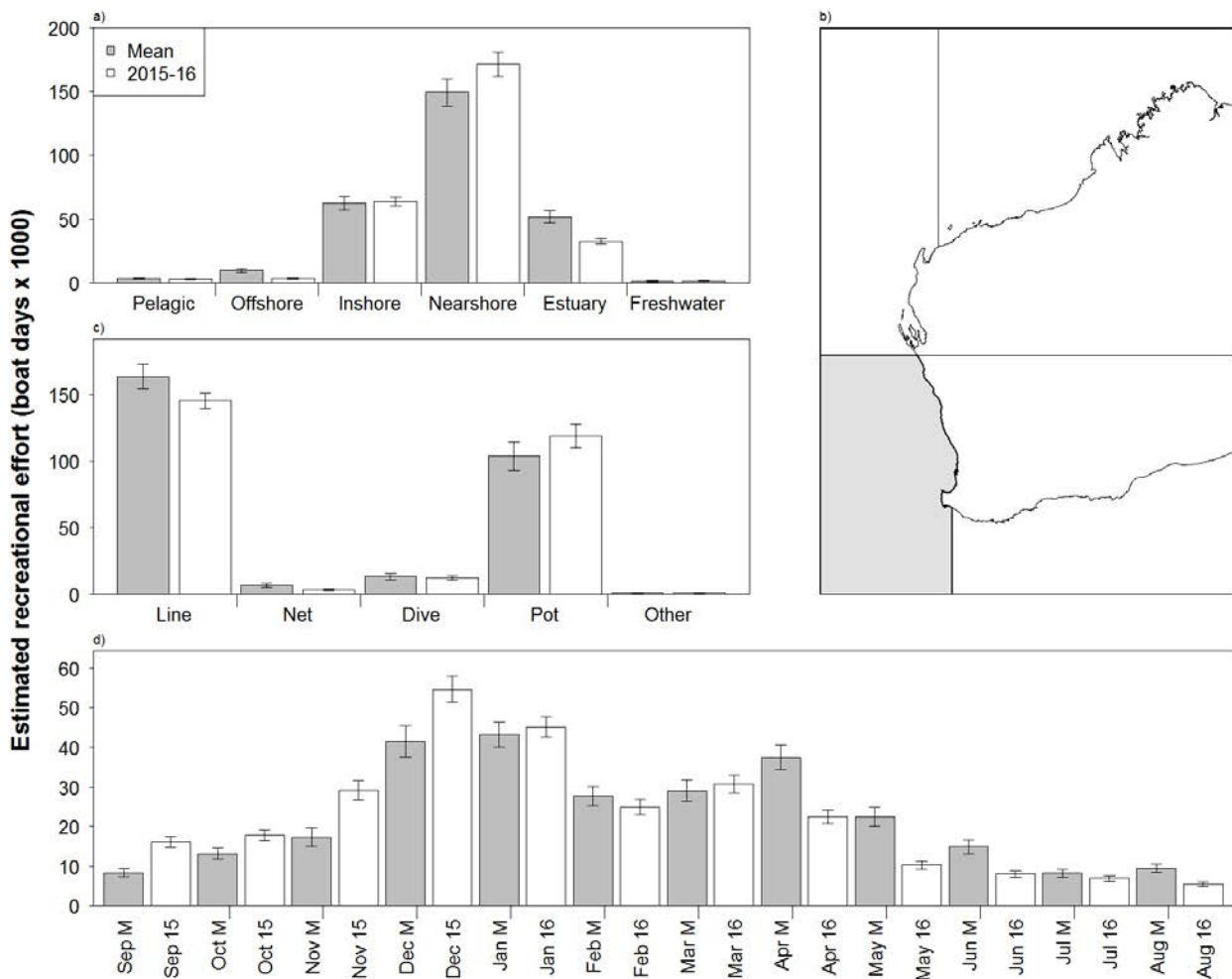
The majority of boat-based recreational fishing effort (boat days) during September 2015 to August 2016 in the Gascoyne Coast occurred in nearshore (53%) and inshore demersal (38%) habitats, with lower proportions of fishing effort in pelagic (6%), offshore demersal (1%), estuary (<1%) and freshwater (<1%; Figure 20a). The majority of boat-based recreational fishing effort was attributed to line fishing (94%), with lower proportions of fishing effort from diving (4%), pots (2%), nets (<1%) and other (<1%; Figure 20b). The majority of boat-based recreational fishing effort occurred during autumn (43%) and winter (35%) and was lowest in spring (15%) and summer (7%). In 2015/16, fishing effort was highest in May 2016 (20%) and lowest in February 2016 (1%; Figure 20c). Estimated boat-based recreational fishing effort was lower in the Gascoyne Coast in 2015/16 compared with previous statewide surveys, notably for line fishing, inshore habitat, from April to August.



**Figure 20.** Boat-based recreational fishing effort (boat days x 1000 ± standard errors) in the Gascoyne Coast during 2015/16 (white bars) compared with mean from 2011/12 and 2013/14 (grey bars); a) effort by habitat; b) map of the bioregion; c) effort by fishing method; and d) effort by month.

## 4.4 West Coast

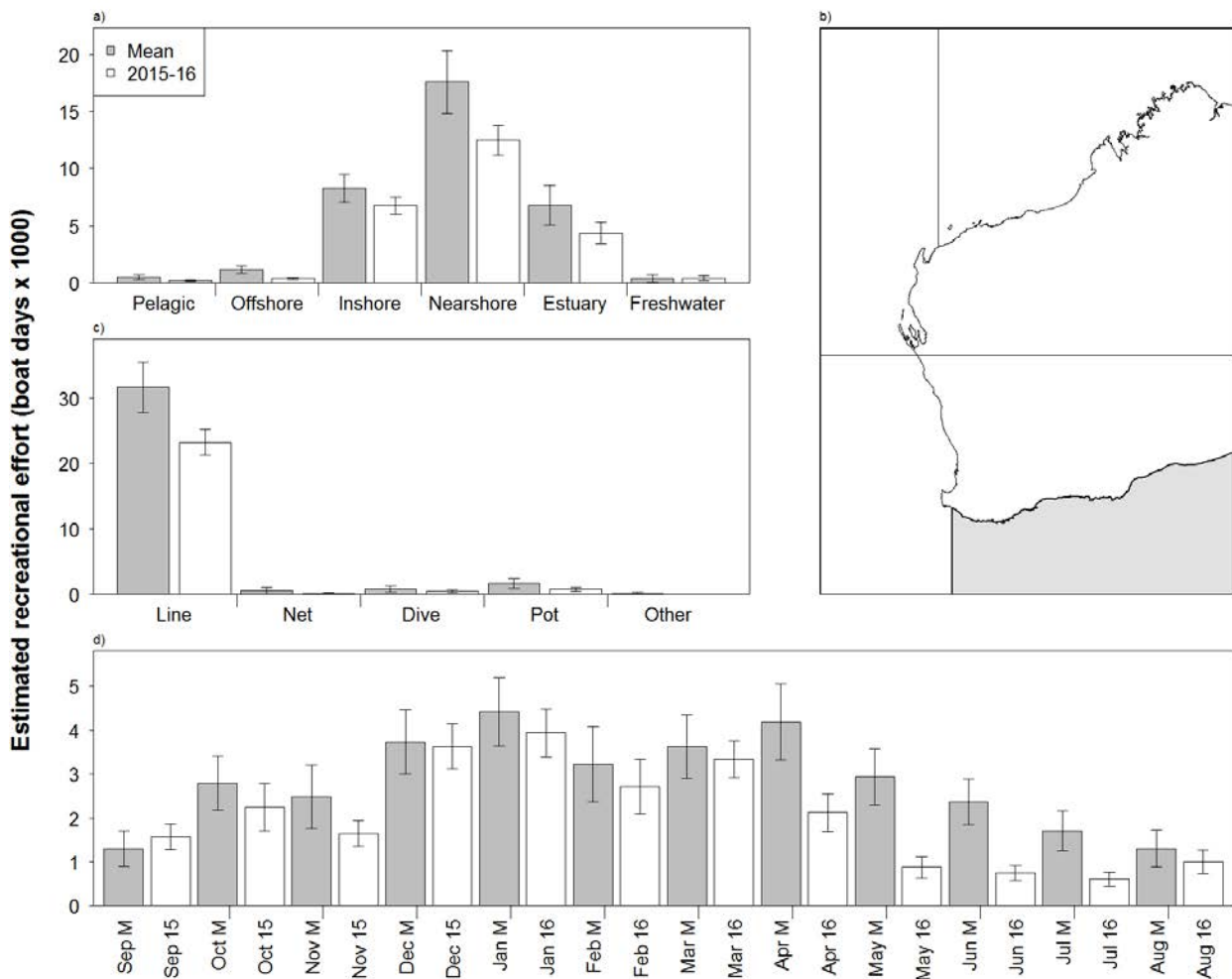
The majority of boat-based recreational fishing effort (boat days) during September 2015 to August 2016 in the West Coast occurred in nearshore habitat (62%), followed by inshore demersal (23%) and estuary (12%), with lower proportions of fishing effort in offshore demersal (1%), pelagic (<1%) and freshwater (<1%; Figure 21a). The majority of boat-based recreational fishing effort was attributed to line fishing (52%) and pots (42%), with lower proportions of fishing effort from diving (4%), nets (1%) and other (<1%; Figure 21b). The majority of boat-based recreational fishing effort occurred during summer (46%), autumn (23%) and spring (23%) and was lowest in winter (8%). In 2015/16, fishing effort was highest in December 2015 (20%) and lowest in August 2016 (2%); Figure 21c). Estimated boat-based recreational fishing effort in the West Coast in 2015/16 was generally consistent with previous statewide surveys, with higher fishing effort for potting, nearshore habitat, and from November to December.



**Figure 21.** Boat-based recreational fishing effort (boat days x 1000 ± standard errors) in the West Coast during 2015/16 (white bars) compared with mean from 2011/12 and 2013/14 (grey bars); a) effort by habitat; b) map of the bioregion; c) effort by fishing method; and d) effort by month.

## 4.5 South Coast

The majority of boat-based recreational fishing effort (boat days) during September 2015 to August 2016 in the South Coast occurred in nearshore habitat (51%), followed by inshore demersal (28%) and estuary (18%), with lower proportions of fishing effort in freshwater (2%), offshore demersal (1%) and pelagic (<1%; Figure 22a). The majority of boat-based recreational fishing effort was attributed to line fishing (94%), with lower proportions of fishing effort from pots (3%), diving (2%), nets (<1%) and other (<1%; Figure 22b). The majority of boat-based recreational fishing effort occurred during summer (42%), followed by autumn (26%) and spring (22%) and was lowest in winter (10%). In 2015/16, fishing effort was highest in January 2016 (16%) and lowest in July 2016 (2%; Figure 22c). Estimated boat-based recreational fishing effort was lower in the South Coast in 2015/16 compared with previous statewide surveys, notably for line fishing, inshore and nearshore habitats, and throughout the year.



**Figure 22.** Boat-based recreational fishing effort (boat days x 1000 ± standard errors) in the South Coast during 2015/16 (white bars) compared with mean (11/12 and 13/14) (grey bars); a) effort by habitat; b) map of the bioregion; c) effort by fishing method; and d) effort by month.

## 5 Statewide Estimates of Recreational Catch

This section presents estimates of boat-based recreational catch for the 12-months from September 2015 to August 2016. Estimates presented for all species include: annual catch (total, kept and released, by number), proportions released (% released) and reasons for release.

### 5.1 Annual Catch (total, kept and released numbers)

The estimated annual catch (total, kept and released numbers) and proportion released for the 12-months from September 2015 to August 2016 is given in Table 5. A diverse range of species/taxa were caught, including scalefish (182 species/taxa), elasmobranchs (18), crustaceans (seven) and molluscs (five). A total of 2.54 million individual species/taxa were caught. A similar proportion of the catch was either kept (approx. 1.18 million or 46%) or released (approx. 1.36 million or 54%). Approximately 55% of the recreational catch comprised finfish (1.39 million) in comparison to invertebrates (1.15 million). A similar proportion of finfish (53%) and invertebrates (55%) were released.

School Whiting (*Sillago bassensis*, *S. vittata* and *S. schomburgkii*) were the most commonly caught finfish species statewide with (230,052 kept or released statewide by number, or 17% of the finfish catch), followed by Australian Herring (*Arripis georgianus*) (132,844 or 10%), Pink Snapper (*Chrysophrys auratus*) (117,482 or 8%), West Australian Dhufish (*Glaucosoma hebraicum*) (74,981 or 5%), Silver Trevally (*Pseudocaranx* spp. complex) (60,887 or 4%), Black Bream (*Acanthopagrus butcheri*) (61,044 or 4%), King George Whiting (*Sillaginodes punctata*) (47,563 or 3%), Western King Wrasse (*Coris auricularis*) (36,235 or 3%), Breaksea Cod (*Epinephelides armatus*) (28,733 or 2%) and Baldchin Groper (*Choerodon rubescens*) (28,780 or 2%). High release rates were observed for many of these species, including Western King Wrasse (83%), Pink Snapper (76%), Black Bream (74%) and West Australian Dhufish (68%). Release rates were lower for Silver Trevally (46%), Baldchin Groper (42%), Breaksea Cod (41%), King George Whiting (25%), School Whiting (24%) and Australian Herring (21%).

Blue Swimmer Crab (*Portunus armatus*) was the most commonly caught invertebrate species (678,269 kept or released statewide by number, or 59% of the invertebrate catch), followed by Western Rock Lobster (*Panulirus cygnus*) (387,458 or 34%), Squid (Order Teuthoidea) (65,025 or 6%) and Mud Crab (*Scylla olivacea* and *S. serrata*) (11,581 or 1%). High release rates were observed for Blue Swimmer Crab (71%) and Mud Crab (58%) compared with Western Rock Lobster (35%) and Squid (4%).

### 5.2 Release Rates

A summary of release rates for species released by fishers during 2015/16 by RFBL holders aged five years or older is given Table 6. Lowest release rates were observed for Squid (4%), Blue Morwong (15%), Octopus (16%), Harlequin Fish (19%), Southern Bluefin Tuna (21%), Australian Herring (21%), Goldband Snapper (21%) and School Whiting (24%).

Highest release rates were observed for Tarwhine (81%), Southern Maori Wrasse (82%), Yellowtail Flathead (82%), Western King Wrasse (83%), Leatherjacket (84%), Samsonfish (84%), Dusky Whaler (84%), Blacktip Reef Shark (85%), Southern Bluespotted Flathead (86%), Bighead Gurnard Perch (86%), Queenfish (89%), Western Striped Grunter (91%), Gurnard (92%), Sea Trumpeter (92%), Port Jackson Shark (96%) and Giant Sea Catfish (98%).

### **5.3 Reasons for Release**

A summary of the proportions for common reasons for release during 2015/16 is given in Table 7. The most common reasons for release were: “Too Small” (personal preference), “Undersize” (below legal limit), “Too Many” (personal preference), “Over Limit” (Above legal bag limit), “Catch Release” (sport fishing) and “Other”, which includes protected females and species.

“Too Small” includes catches that are too small in terms of personal preference, not related to regulations. This reason for release occurred in proportions of 40% or more for Australian Herring, Bluespotted Emperor, Goldband Snapper, Golden Snapper, Saddletail Snapper, School Mackerel, School Whiting, Southern Garfish and Squid.

“Under Size” includes catches below the legal size. This reason for release occurred in proportions of 60% or more for Baldchin Groper, Blue Swimmer Crab, Blue Tuskfish, Breaksea Cod, Brown Mud Crab, Grass Emperor, Green Mud Crab, King George Whiting, Painted Sweetlips, Pink Snapper, Roe's Abalone, Southern Bluespotted Flathead, West Australian Dhufish and Western Rock Lobster.

“Too Many” includes catches the fisher did not want/need anymore/any, had enough, not wanted, not targeted, no preference. This reason for release occurred in proportions of 40% or more for Bludger Trevally, Cuttlefish, Shark Mackerel, Snook, Yellowspotted Rockcod and Yellowtail Flathead.

“Over Limit” includes catches above the legal bag limit. This reason for release did not occur in proportions greater than 20%, except Chinaman Rockcod (29%) and King Threadfin (35%). “Over Limit” catches generally occurred in proportions of 10–20% for Bight Redfish, Blue Morwong, Blue Tuskfish, Coral Trout, Foxfish, Grass Emperor, Harlequin Fish, Redthroat Emperor, Spangled Emperor and West Australian Dhufish.

“Catch Release” fishing includes sport fishing, where fish are not tagged before release. This reason for release only occurred in proportions of 30% or more for Western Australian Salmon (46%). “Catch Release” catches generally occurred in proportions of 20–30% for Black Bream, Coral Trout, Giant Trevally, Golden Trevally, Mangrove Jack, Mulloway, Queenfish and Samsonfish.

“Other” reasons for release included greater than legal limit, too big, too few (not enough for a meal/dinner/all of us), tag & release, conservation (other than legally protected species), sick (fish has signs of disease), damaged, deformed (not sick or damaged), dangerous, female (berried, eggs, setose, tar spot), poor eating quality (don't taste good, not nice to eat, slimy, hard to clean, many bones, too much effort to cook, perceived or known), species unknown (not sure



about species, eating quality or taste), poisonous (flesh or spines), did not have tag to keep (e.g. Pink Snapper), protected species (e.g. sawfish), mistake (caught but got away, nothing to store fish in) or depredated (taken or damaged by another animal either below or at the surface). Collectively, these “Other” reasons for release occurred in proportions of 60% or more for Bighead Gurnard Perch, Dusky Whaler, Giant Sea Catfish, Leatherjacket, Lizardfish Grinners, Sea Trumpeter and Western King Wrasse.

**Table 5.** Estimated annual catch (total, kept and released numbers) and proportion released during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); values in italics indicate <30 respondents recorded catches of the species).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Abalone	Roe's Abalone	<i>Haliotis roei</i>	4,074	1,519	<b>12</b>	<b>12</b>	4,087	1,519	0%
Abalone	Greenlip Abalone	<i>Haliotis laevigata</i>	<b>904</b>	<b>593</b>	0	0	<b>904</b>	<b>593</b>	0%
Cephalopod	Cuttlefish	<i>Sepia</i> spp.	1,963	338	704	198	2,667	401	26%
Cephalopod	Octopus	Octopodidae - undifferentiated	1,159	264	220	67	1,379	278	16%
Cephalopod	Squid	Order Teuthoidea - undifferentiated	62,173	6,102	2,852	854	65,025	6,374	4%
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	250,337	20,217	137,121	15,985	387,458	33,348	35%
Lobster	Southern Rock Lobster	<i>Jasus edwardsii</i>	<b>608</b>	<b>330</b>	<b>44</b>	<b>37</b>	<b>652</b>	<b>341</b>	7%
Lobster	Painted Rock Lobster	<i>Panulirus versicolor</i>	795	239	<b>197</b>	<b>110</b>	992	289	20%
Lobster	Ornate Rock Lobster	<i>Panulirus ornatus</i>	<b>140</b>	<b>68</b>	<b>9</b>	<b>8</b>	<b>149</b>	<b>68</b>	6%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	197,050	15,197	481,219	39,583	678,269	51,693	71%
Crab	Green Mud Crab	<i>Scylla serrata</i>	2,232	753	<b>4,022</b>	<b>1,778</b>	6,254	2,314	64%
Crab	Brown Mud Crab	<i>Scylla olivacea</i>	2,644	656	2,683	817	5,327	1,379	50%
Sharks	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	207	77	1,212	251	1,419	273	85%
Sharks	Bronze Whaler	<i>Carcharhinus brachyurus</i>	354	87	881	232	1,235	251	71%
Sharks	Dusky Whaler	<i>Carcharhinus obscurus</i>	<b>230</b>	<b>94</b>	<b>1,237</b>	<b>555</b>	1,467	573	84%
Sharks	Grey Nurse Shark	<i>Carcharias taurus</i>	0	0	<b>27</b>	<b>20</b>	<b>27</b>	<b>20</b>	100%
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	521	129	413	154	934	204	44%
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	<b>53</b>	<b>33</b>	161	47	214	57	75%
Sharks	Lemon Shark	<i>Negaprion acutidens</i>	0	0	<b>146</b>	<b>61</b>	<b>146</b>	<b>61</b>	100%
Sharks	Port Jackson Shark	<i>Heterodontus portusjacksoni</i>	<b>37</b>	<b>36</b>	1,011	207	1,047	210	96%
Sharks	Sandbar Shark	<i>Carcharhinus plumbeus</i>	0	0	<b>108</b>	<b>54</b>	<b>108</b>	<b>54</b>	100%
Sharks	Tiger Shark	<i>Galeocerdo cuvier</i>	0	0	199	75	199	75	100%
Sharks	Whiskery Shark	<i>Furgaleus macki</i>	180	62	<b>199</b>	<b>100</b>	379	143	52%
Sharks	Whitetip Reef Shark	<i>Triaenodon obesus</i>	<b>43</b>	<b>25</b>	<b>496</b>	<b>235</b>	<b>539</b>	<b>240</b>	92%
Sharks	Wobbegong	Orectolobidae - undifferentiated	99	37	561	163	660	167	85%
Sharks	Other Whaler	Carcharhinidae, Hemigaleidae - undiff	<b>65</b>	<b>34</b>	<b>300</b>	<b>186</b>	<b>366</b>	<b>192</b>	82%
Sharks	Other Shark	Sharks - undifferentiated	389	153	2,350	480	2,739	519	86%
Rays	Sawfishes	Pristidae - undifferentiated	0	0	<b>90</b>	<b>42</b>	<b>90</b>	<b>42</b>	100%
Rays	Western Shovelnose Ray	<i>Aptychotrema vincentiana</i>	0	0	288	76	288	76	100%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	<b>38</b>	<b>37</b>	2,203	362	2,241	364	98%
Billfish	Black Marlin	<i>Makaira indica</i>	<b>57</b>	<b>40</b>	709	254	765	257	93%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Billfish	Blue Marlin	<i>Makaira nigricans</i>	0	0	102	42	102	42	100%
Billfish	Sailfish	<i>Istiophorus platypterus</i>	78	42	314	92	392	122	80%
Billfish	Striped Marlin	<i>Tetrapturus audax</i>	0	0	30	21	30	21	100%
Bonito	Bonito	<i>Sarda australis</i> & <i>Cybiosarda elegans</i>	351	104	412	150	763	217	54%
Bonito	Oriental Bonito	<i>Sarda orientalis</i>	218	90	125	80	343	122	36%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	15,979	5,160	45,065	8,028	61,044	12,005	74%
Bream	Frypan Bream	<i>Argyrops spinifer</i>	50	26	135	67	185	81	73%
Bream	Northwest Black Bream	<i>Acanthopagrus palmaris</i>	77	33	884	284	962	299	92%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	28,030	2,340	89,453	8,780	117,482	10,286	76%
Bream	Tarwhine	<i>Rhabdosargus sarba</i>	1,624	489	7,149	1,887	8,772	2,030	81%
Bream	Western Yellowfin Bream	<i>Acanthopagrus morrisoni</i>	265	151	1,478	549	1,744	578	85%
Bream	Other Bream	Sparidae - undifferentiated	25	23	176	90	201	103	88%
Catfish	Eeltail Catfishes	Plotosidae - undifferentiated	0	0	249	113	249	113	100%
Catfish	Estuary Cobbler	<i>Cnidoglanis macrocephalus</i>	681	375	73	56	754	380	10%
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	130	49	5,457	1,072	5,587	1,076	98%
Catfish	Silver Cobbler	<i>Neoarius midgleyi</i>	0	0	941	513	941	513	100%
Catfish	Other Catfish	Ariidae - undifferentiated	201	186	2,008	511	2,209	543	91%
Cobia	Cobia	<i>Rachycentron canadum</i>	1,644	284	716	231	2,360	417	30%
Cod	Barramundi Cod	<i>Chromileptes altivelis</i>	80	60	76	39	156	91	49%
Cod	Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	1,537	294	4,930	1,056	6,468	1,131	76%
Cod	Blacktip Rockcod	<i>Epinephelus fasciatus</i>	16	14	206	186	222	187	93%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	16,963	1,481	11,769	1,398	28,733	2,493	41%
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	6,092	2,051	13,193	4,588	19,285	6,262	68%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	617	224	75	36	692	231	11%
Cod	Frostback Rockcod	<i>Epinephelus bilobatus</i>	11	9	95	49	106	50	90%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	2,697	629	2,885	488	5,582	870	52%
Cod	Harlequin Fish	<i>Othos dentex</i>	2,246	280	510	119	2,757	320	19%
Cod	Potato Rockcod	<i>Epinephelus tukula</i>	46	37	84	37	130	56	65%
Cod	Queensland Grouper	<i>Epinephelus lanceolatus</i>	55	53	66	33	121	63	55%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	4,479	540	2,351	427	6,831	788	34%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	691	154	3,005	715	3,696	743	81%
Cod	Tomato Rockcod	<i>Cephalopholis sonnerati</i>	0	0	47	31	47	31	100%
Cod	Yellowspotted Rockcod	<i>Epinephelus areolatus</i>	461	145	1,832	728	2,293	750	80%
Coral Trout	Coral Trout	<i>Plectropomus maculatus</i> & <i>leopardus</i>	4,827	580	4,501	1,293	9,329	1,562	48%
Coral Trout	Yellowedge Coronation Trout	<i>Variola louti</i>	141	52	245	133	386	148	63%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Emperor	Bluespotted Emperor	<i>Lethrinus punctulatus</i>	1,711	447	1,826	505	3,537	883	52%
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	9,659	1,547	15,725	3,356	25,384	4,311	62%
Emperor	Longnose Emperor	<i>Lethrinus olivaceus</i>	<b>411</b>	<b>257</b>	<b>132</b>	<b>70</b>	<b>543</b>	<b>323</b>	24%
Emperor	Redspot Emperor	<i>Lethrinus lentjan</i>	<b>12</b>	<b>12</b>	<b>3</b>	<b>2</b>	<b>15</b>	<b>12</b>	18%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	5,412	1,191	10,443	2,360	15,855	3,316	66%
Emperor	Robinsons' Seabream	<i>Gymnocranius grandoculis</i>	702	189	<b>240</b>	<b>186</b>	942	291	25%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	8,310	1,092	13,231	2,044	21,541	2,697	61%
Emperor	Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	<b>129</b>	<b>80</b>	<b>430</b>	<b>191</b>	<b>559</b>	<b>245</b>	77%
Emperor	Other Emperor	Lethrinidae - undifferentiated	593	180	1,305	514	1,897	619	69%
Flathead	Northern Sand Flathead	<i>Platycephalus endrachtensis</i>	<b>156</b>	<b>104</b>	<b>105</b>	<b>51</b>	<b>261</b>	<b>116</b>	40%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	4,718	1,115	27,942	8,212	32,661	8,663	86%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	1,459	465	6,678	2,202	8,138	2,359	82%
Flounder	Smalltooth Flounder	<i>Pseudorhombus jenynsii</i>	342	91	230	82	572	124	40%
Flounder	Other Flatfish	Bothidae, Psettodidae & Pleuronectidae	<b>116</b>	<b>52</b>	<b>44</b>	<b>29</b>	160	60	27%
Garfish	Southern Garfish	<i>Hyporhamphus melanochir</i>	<b>2,267</b>	<b>1,005</b>	<b>229</b>	<b>125</b>	<b>2,497</b>	<b>1,021</b>	9%
Garfish	Three-by-two Garfish	<i>Hemiramphus robustus</i>	<b>33</b>	<b>28</b>	<b>58</b>	<b>56</b>	<b>90</b>	<b>62</b>	64%
Garfish	Other Garfish	Hemiramphidae - undifferentiated	<b>250</b>	<b>208</b>	<b>158</b>	<b>108</b>	<b>408</b>	<b>248</b>	39%
Giant Perch	Barramundi	<i>Lates calcarifer</i>	1,425	294	<b>3,412</b>	<b>1,462</b>	4,837	1,651	71%
Giant Perch	Sand Bass	<i>Psammoperca waigiensis</i>	0	0	<b>77</b>	<b>52</b>	<b>77</b>	<b>52</b>	100%
Goatfish	Bluespotted Goatfish	<i>Upeneichthys vlamingii</i>	<b>478</b>	<b>202</b>	1,688	478	2,167	577	78%
Grunter	Sea Trumpeter	<i>Pelsartia humeralis</i>	<b>700</b>	<b>434</b>	<b>8,322</b>	<b>3,370</b>	9,022	3,405	92%
Grunter	Western Sooty Grunter	<i>Hephaestus jenkinsi</i>	<b>197</b>	<b>178</b>	<b>1,134</b>	<b>800</b>	<b>1,331</b>	<b>839</b>	85%
Grunter	Western Striped Grunter	<i>Pelates octolineatus</i>	<b>634</b>	<b>392</b>	6,634	1,814	7,268	1,922	91%
Grunter	Striped Grunter	Terapontidae - undifferentiated	0	0	<b>585</b>	<b>236</b>	<b>585</b>	<b>236</b>	100%
Grunter Bream	Painted Sweetlips	<i>Diagramma labiosum</i>	733	176	1,017	280	1,749	365	58%
Grunter Bream	Barred Javelin	<i>Pomadasys kaakan</i>	276	95	743	293	1,019	360	73%
Grunter Bream	Blotched Javelin	<i>Pomadasys maculatus</i>	<b>60</b>	<b>40</b>	<b>210</b>	<b>147</b>	<b>270</b>	<b>154</b>	78%
Grunter Bream	Grunter Bream	Haemulidae - undifferentiated	0	0	<b>53</b>	<b>37</b>	<b>53</b>	<b>37</b>	100%
Gurnard	Bighead Gurnard Perch	<i>Neosebastes pandus</i>	<b>401</b>	<b>172</b>	2,465	623	2,866	656	86%
Gurnard	Gurnard	Neosebastidae - undifferentiated	320	101	3,715	776	4,035	790	92%
Jewfish	Black Jewfish	<i>Protonibea diacanthus</i>	227	62	769	293	996	312	77%
Jewfish	Mulloway	<i>Argyrosomus japonicus</i>	709	223	1,164	352	1,873	507	62%
King Snapper	Goldband Snapper	<i>Pristipomoides multidens</i>	3,716	973	<b>1,014</b>	<b>745</b>	4,729	1,566	21%
King Snapper	Rosy Snapper	<i>Pristipomoides filamentosus</i>	<b>253</b>	<b>158</b>	<b>13</b>	<b>12</b>	<b>266</b>	<b>169</b>	5%
King Snapper	Sharptooth Snapper	<i>Pristipomoides typus</i>	<b>282</b>	<b>242</b>	<b>66</b>	<b>63</b>	<b>348</b>	<b>250</b>	19%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Leatherjacket	Horseshoe Leatherjacket	<i>Meuschenia hippocrepis</i>	415	141	869	254	1,284	321	68%
Leatherjacket	Sixspine Leatherjacket	<i>Meuschenia freycineti</i>	66	42	186	61	252	83	74%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	538	156	2,759	657	3,297	680	84%
Lizardfish	Lizardfish Grinners	Bathysauridae, Synodontidae - undiff	449	214	1,181	728	1,629	823	72%
Longtom	Longtom	Belonidae - undifferentiated	0	0	210	119	210	119	100%
Mackerel	Blue Mackerel	<i>Scomber australasicus</i>	77	74	810	708	887	782	91%
Mackerel	Grey Mackerel	<i>Scomberomorus semifasciatus</i>	98	68	132	64	230	118	57%
Mackerel	School Mackerel	<i>Scomberomorus queenslandicus</i>	1,853	569	2,597	1,598	4,449	2,104	58%
Mackerel	Shark Mackerel	<i>Grammatorcynus bicarinatus</i>	470	98	998	335	1,468	358	68%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	4,788	503	3,515	654	8,303	1,000	42%
Mackerel	Spotted Mackerel	<i>Scomberomorus munroi</i>	351	124	303	111	654	190	46%
Mackerel	Wahoo	<i>Acanthocybium solandri</i>	226	94	60	40	287	109	21%
Mackerel	Other Mackerel & Tuna	Scombridae - undifferentiated	500	127	258	115	758	182	34%
Mahi Mahi	Mahi Mahi	<i>Coryphaena</i> spp.	463	141	72	40	535	158	13%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	5,308	769	907	241	6,214	826	15%
Morwong	Dusky Morwong	<i>Dactylophora nigricans</i>	49	34	0	0	49	34	0%
Mullet	Bluetail Mullet	<i>Valamugil buchanani</i>	208	167	0	0	208	167	0%
Mullet	Greenback Mullet	<i>Liza subviridis</i>	68	58	0	0	68	58	0%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	3,969	1,479	245	150	4,214	1,487	6%
Mullet	Yelloweye Mullet	<i>Aldrichetta forsteri</i>	7,292	6,061	0	0	7,292	6,061	0%
Mullet	Other Mullet	Mugilidae - undifferentiated	2,801	2,163	378	201	3,179	2,202	12%
Pearl Perch	Northern Pearl Perch	<i>Glaucosoma buergeri</i>	681	207	540	179	1,221	296	44%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	23,818	1,640	51,164	4,159	74,981	5,563	68%
Pike	Great Barracuda	<i>Sphyaena barracuda</i>	8	7	708	235	716	235	99%
Pike	Snook	<i>Sphyaena novaehollandiae</i>	1,820	574	1,381	638	3,200	947	43%
Pike	Yellowtail Barracuda	<i>Sphyaena obtusata</i>	774	257	584	196	1,358	328	43%
Pike	Other Pike	Sphyaenidae - undifferentiated	335	106	38	37	374	113	10%
Queenfish	Queenfish	<i>Scomberoides</i> spp.	202	73	1,653	501	1,855	546	89%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	11,592	1,535	6,634	1,655	18,226	2,809	36%
Redfish	Swallowtail	<i>Centroberyx lineatus</i>	2,402	693	1,274	359	3,675	1,010	35%
Redfish	Yelloweye Redfish	<i>Centroberyx australis</i>	0	0	10	9	10	9	100%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	104,468	12,573	28,376	5,141	132,844	15,309	21%
Salmon Herring	Western Australian Salmon	<i>Arripis truttaceus</i>	4,568	733	17,287	3,767	21,855	4,167	79%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	2,784	684	5,364	708	8,148	1,135	66%
Small Baitfish	Herrings & Ilishas	Clupeidae, Pristigasteridae - undiff	793	634	303	156	1,097	653	28%

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Sweep	Banded Sweep	<i>Scorpiis georgiana</i>	803	268	1,252	280	2,055	403	61%
Sweep	Sea Sweep	<i>Scorpiis aequipinnis</i>	2,069	356	1,089	345	3,157	509	34%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	8,215	1,626	5,668	1,223	13,883	2,498	41%
Threadfin	Blue Threadfin	<i>Eleutheronema tetradactylum</i>	2,061	424	1,228	334	3,289	632	37%
Threadfin	King Threadfin	<i>Polydactylus macrochir</i>	1,501	525	876	284	2,376	785	37%
Threadfin Bream	Rosy Threadfin Bream	<i>Nemipterus furcosus</i>	<b>96</b>	<b>49</b>	<b>7</b>	<b>7</b>	<b>103</b>	<b>50</b>	<b>7%</b>
Threadfin Bream	Western Butterfish	<i>Pentapodus vitta</i>	6,660	1,775	21,454	5,799	28,114	6,593	76%
Trevalla	Blue-Eye Trevalla	<i>Hyperoglyphe antarctica</i>	<b>163</b>	<b>94</b>	<b>4</b>	<b>4</b>	<b>168</b>	<b>94</b>	<b>3%</b>
Trevally	Amberjack	<i>Seriola dumerili</i>	<b>102</b>	<b>73</b>	<b>516</b>	<b>266</b>	<b>618</b>	<b>285</b>	<b>83%</b>
Trevally	Bludger Trevally	<i>Carangoides gymnostethus</i>	602	185	1,976	561	2,579	663	77%
Trevally	Common Dart	<i>Trachinotus botla</i>	<b>39</b>	<b>26</b>	<b>96</b>	<b>56</b>	<b>135</b>	<b>72</b>	<b>71%</b>
Trevally	Giant Trevally	<i>Caranx ignobilis</i>	<b>571</b>	<b>249</b>	1,842	438	2,413	511	76%
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	1,205	186	2,825	498	4,030	588	70%
Trevally	Rainbow Runner	<i>Elagatis bipinnulata</i>	<b>27</b>	<b>25</b>	<b>91</b>	<b>59</b>	<b>118</b>	<b>73</b>	<b>77%</b>
Trevally	Samsonfish	<i>Seriola hippos</i>	1,962	258	10,533	1,876	12,495	1,971	84%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	32,776	3,850	28,111	6,539	60,887	9,288	46%
Trevally	Turrum	<i>Carangoides fulvoguttatus</i>	<b>77</b>	<b>55</b>	<b>129</b>	<b>74</b>	<b>206</b>	<b>93</b>	<b>63%</b>
Trevally	Yellowtail Kingfish	<i>Seriola lalandi</i>	1,167	261	938	266	2,105	454	45%
Trevally	Yellowtail Scad	<i>Trachurus novaezelandiae</i>	<b>1,176</b>	<b>614</b>	<b>822</b>	<b>347</b>	<b>1,998</b>	<b>923</b>	<b>41%</b>
Trevally	Other Trevally	Carangidae - undifferentiated	<b>1,464</b>	<b>757</b>	<b>1,964</b>	<b>912</b>	<b>3,428</b>	<b>1,628</b>	<b>57%</b>
Tripletail	Tripletail	<i>Lobotes surinamensis</i>	101	36	<b>45</b>	<b>29</b>	146	51	31%
Tropical Snapper	Brownstripe Snapper	<i>Lutjanus vitta</i>	<b>27</b>	<b>17</b>	<b>410</b>	<b>356</b>	<b>437</b>	<b>370</b>	<b>94%</b>
Tropical Snapper	Chinamanfish	<i>Symphorus nematophorus</i>	301	101	<b>572</b>	<b>279</b>	873	301	66%
Tropical Snapper	Crimson Snapper	<i>Lutjanus erythropterus</i>	1,065	203	1,743	455	2,808	586	62%
Tropical Snapper	Darktail Snapper	<i>Lutjanus lemniscatus</i>	<b>94</b>	<b>47</b>	<b>98</b>	<b>55</b>	<b>192</b>	<b>80</b>	<b>51%</b>
Tropical Snapper	Flame Snapper	<i>Etelis coruscans</i>	0	0	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>100%</b>
Tropical Snapper	Golden Snapper	<i>Lutjanus johnii</i>	2,133	575	2,403	699	4,535	1,221	53%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	2,336	437	2,754	620	5,090	929	54%
Tropical Snapper	Moses' Snapper	<i>Lutjanus russellii</i>	344	91	<b>962</b>	<b>513</b>	<b>1,307</b>	<b>551</b>	<b>74%</b>
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	5,831	908	6,098	1,310	11,929	2,023	51%
Tropical Snapper	Ruby Snapper	<i>Etelis carbunculus</i>	1,067	322	<b>93</b>	<b>43</b>	1,159	357	8%
Tropical Snapper	Saddletail Snapper	<i>Lutjanus malabaricus</i>	781	210	<b>886</b>	<b>550</b>	1,667	641	53%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	4,965	1,321	12,063	2,297	17,028	3,329	71%
Tropical Snapper	Other Snapper	Lutjanidae - undifferentiated	264	106	357	117	621	176	57%
Tuna	Dogtooth Tuna	<i>Gymnosarda unicolor</i>	0	0	<b>30</b>	<b>19</b>	<b>30</b>	<b>19</b>	<b>100%</b>

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Tuna	Longtail Tuna	<i>Thunnus tonggol</i>	484	137	482	177	966	235	50%
Tuna	Mackerel Tuna	<i>Euthynnus affinis</i>	583	139	858	245	1,441	307	60%
Tuna	Skipjack Tuna	<i>Katsuwonus pelamis</i>	<b>629</b>	<b>280</b>	<b>192</b>	<b>108</b>	822	305	23%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	2,009	344	524	159	2,533	442	21%
Tuna	Yellowfin Tuna	<i>Thunnus albacares</i>	442	101	<b>714</b>	<b>504</b>	<b>1,156</b>	<b>566</b>	62%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	16,612	1,537	12,167	1,831	28,780	2,893	42%
Tuskfish Wrasse	Blackspot Tuskfish	<i>Choerodon schoenleinii</i>	1,584	313	2,585	689	4,170	827	62%
Tuskfish Wrasse	Blue Tuskfish	<i>Choerodon cyanodus</i>	1,563	321	2,815	756	4,378	934	64%
Tuskfish Wrasse	Bluebarred Parrotfish	<i>Scarus ghobban</i> spp. complex	<b>675</b>	<b>318</b>	1,875	507	2,551	620	74%
Tuskfish Wrasse	Bluespotted Tuskfish	<i>Choerodon cauteroma</i>	<b>6</b>	<b>6</b>	<b>83</b>	<b>53</b>	<b>89</b>	<b>53</b>	93%
Tuskfish Wrasse	Brownspotted Wrasse	<i>Notolabrus parilus</i>	4,431	1,180	14,269	1,688	18,700	2,183	76%
Tuskfish Wrasse	Foxfish	<i>Bodianus frenchii</i>	1,777	300	1,303	341	3,080	586	42%
Tuskfish Wrasse	Goldspot Pigfish	<i>Bodianus perditio</i>	<b>42</b>	<b>21</b>	0	0	<b>42</b>	<b>21</b>	0%
Tuskfish Wrasse	Humphead Maori Wrasse	<i>Cheilinus undulatus</i>	<b>37</b>	<b>36</b>	<b>18</b>	<b>18</b>	<b>55</b>	<b>53</b>	33%
Tuskfish Wrasse	Purple Tuskfish	<i>Choerodon cephalotes</i>	<b>183</b>	<b>74</b>	<b>939</b>	<b>607</b>	<b>1,122</b>	<b>618</b>	84%
Tuskfish Wrasse	Southern Maori Wrasse	<i>Ophthalmolepis lineolatus</i>	1,110	394	4,994	992	6,104	1,142	82%
Tuskfish Wrasse	Western Blue Groper	<i>Achoerodus gouldii</i>	590	186	<b>53</b>	<b>22</b>	644	190	8%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	6,317	1,300	29,917	3,385	36,235	3,820	83%
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	<b>778</b>	<b>552</b>	1,752	637	2,531	844	69%
Tuskfish Wrasse	Other Tuskfish	<i>Choerodon</i> spp.	167	61	<b>5</b>	<b>5</b>	173	61	3%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	<b>725</b>	<b>484</b>	2,777	768	3,502	913	79%
Western Blue Devil	Western Blue Devil	<i>Paraplesiops sinclairi</i>	<b>101</b>	<b>59</b>	669	212	770	234	87%
Whiting	Goldenline Whiting	<i>Sillago analis</i>	<b>178</b>	<b>106</b>	<b>199</b>	<b>144</b>	<b>377</b>	<b>243</b>	53%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	35,820	4,665	11,743	2,477	47,563	6,367	25%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	173,989	24,811	56,063	18,445	230,052	39,348	24%
Whiting	Western Trumpeter Whiting	<i>Sillago burrus</i>	<b>500</b>	<b>250</b>	3,555	1,025	4,055	1,064	88%
Whiting	Other Whiting	Sillaginidae - undifferentiated	<b>74</b>	<b>72</b>	<b>141</b>	<b>105</b>	<b>215</b>	<b>143</b>	65%
Wreckfish	Bass Groper	<i>Polyprion americanus</i>	<b>26</b>	<b>15</b>	<b>17</b>	<b>11</b>	<b>43</b>	<b>21</b>	40%
Wreckfish	Hapuku	<i>Polyprion oxygeneios</i>	310	113	<b>37</b>	<b>34</b>	347	124	11%
Finfish Other	Archerfishes	Toxotidae - undifferentiated	0	0	<b>25</b>	<b>21</b>	<b>25</b>	<b>21</b>	100%
Finfish Other	Butterfish	Stromateidae - undifferentiated	0	0	<b>611</b>	<b>281</b>	<b>611</b>	<b>281</b>	100%
Finfish Other	Dory	Zeidae - undifferentiated	<b>32</b>	<b>22</b>	<b>13</b>	<b>12</b>	<b>45</b>	<b>25</b>	29%
Finfish Other	Conger Eel	Congridae, Colocongridae - undiff	0	0	<b>96</b>	<b>77</b>	<b>96</b>	<b>77</b>	100%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	0	0	<b>196</b>	<b>86</b>	<b>196</b>	<b>86</b>	100%
Finfish Other	Moonfish Batfish	Ehippidae, Drepaneidae - undifferentiated	<b>40</b>	<b>28</b>	<b>147</b>	<b>70</b>	<b>187</b>	<b>75</b>	79%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Finfish Other	Silver Toadfish	<i>Lagocephalus sceleratus</i>	0	0	2,940	594	2,940	594	100%
Finfish Other	Weeping Toadfish	<i>Torquigener pleurogramma</i>	0	0	1,798	473	1,798	473	100%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	<b>39</b>	<b>37</b>	10,656	3,108	10,694	3,110	100%
Finfish Other	Other Boxfish	Ostraciidae - undifferentiated	<b>8</b>	<b>8</b>	<b>38</b>	<b>37</b>	<b>47</b>	<b>38</b>	82%
Finfish Other	Other Boarfish	Pentacerotidae - undifferentiated	<b>51</b>	<b>29</b>	0	0	<b>51</b>	<b>29</b>	0%



**Table 6.** Summary of release rates for selected species during 2015/16 by RFBL holders aged five years or older.

0 to 24%	25 to 39%	40 to 59%	60 to 74%	75 to 89%	90 to 100%
Squid	King George Whiting	Tailor	Mackerel Tuna	Pink Snapper	Western Striped Grunter
Blue Morwong	Cuttlefish	Breaksea Cod	Banded Sweep	Blackspotted Rockcod	Gurnard
Octopus	Cobia	Baldchin Groper	Spangled Emperor	Brownspotted Wrasse	Sea Trumpeter
Harlequin Fish	Rankin Cod	Foxfish	Yellowfin Tuna	Western Butterfish	Port Jackson Shark
Southern Bluefin Tuna	Sea Sweep	Spanish Mackerel	Grass Emperor	Giant Trevally	Giant Sea Catfish
Australian Herring	Swallowtail	Yellowtail Barracuda	Blackspot Tuskfish	Bludger Trevally	
Goldband Snapper	Western Rock Lobster	Snook	Crimson Snapper	Bluespotted Goatfish	
School Whiting	Bight Redfish	Northern Pearl Perch	Mulloway	Western Australian Salmon	
	King Threadfin	Gummy Sharks	Blue Tuskfish	Tarwhine	
	Blue Threadfin	Yellowtail Kingfish	Green Mud Crab	Southern Maori Wrasse	
		Silver Trevally	Sergeant Baker	Yellowtail Flathead	
		Coral Trout	Redthroat Emperor	Western King Wrasse	
		Brown Mud Crab	Shark Mackerel	Leatherjacket	
		Red Emperor	West Australian Dhufish	Samsonfish	
		Goldspotted Rockcod	Chinaman Rockcod	Dusky Whaler	
		Golden Snapper	Golden Trevally	Blacktip Reef Shark	
		Mangrove Jack	Barramundi	Sthn Bluespotted Flathead	
		Painted Sweetlips	Stripey Snapper	Bighead Gurnard Perch	
		School Mackerel	Blue Swimmer Crab	Queenfish	
			Bronze Whaler		
			Bluebarred Parrotfish		
			Black Bream		

**Table 7.** Proportion released by specified reasons during 2015/16 by RFBL holders aged five years or older (values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Abalone	Roe's Abalone	<i>Haliotis roei</i>	0%	<b>100%</b>	0%	0%	0%	0%
Cephalopod	Cuttlefish	<i>Sepia</i> spp.	<b>18%</b>	<b>5%</b>	41%	0%	0%	<b>36%</b>
Cephalopod	Octopus	Octopodidae - undifferentiated	<b>19%</b>	<b>7%</b>	<b>38%</b>	0%	0%	<b>37%</b>
Cephalopod	Squid	Order Teuthoidea - undifferentiated	<b>54%</b>	<b>9%</b>	<b>24%</b>	<b>7%</b>	<b>3%</b>	<b>2%</b>
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	<b>1%</b>	67%	2%	9%	0%	21%
Lobster	Southern Rock Lobster	<i>Jasus edwardsii</i>	0%	<b>100%</b>	0%	0%	0%	0%
Lobster	Painted Rock Lobster	<i>Panulirus versicolor</i>	<b>2%</b>	<b>27%</b>	<b>2%</b>	0%	0%	<b>68%</b>
Lobster	Ornate Rock Lobster	<i>Panulirus ornatus</i>	0%	0%	0%	0%	0%	<b>100%</b>
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	3%	88%	<b>1%</b>	<b>0%</b>	<b>0%</b>	9%
Crab	Green Mud Crab	<i>Scylla serrata</i>	<b>11%</b>	<b>83%</b>	<b>5%</b>	0%	0%	<b>1%</b>
Crab	Brown Mud Crab	<i>Scylla olivacea</i>	<b>1%</b>	89%	0%	<b>1%</b>	<b>0%</b>	<b>9%</b>
Sharks	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	<b>5%</b>	<b>8%</b>	39%	0%	<b>15%</b>	34%
Sharks	Bronze Whaler	<i>Carcharhinus brachyurus</i>	<b>2%</b>	<b>2%</b>	35%	<b>6%</b>	<b>28%</b>	<b>27%</b>
Sharks	Dusky Whaler	<i>Carcharhinus obscurus</i>	0%	0%	23%	0%	<b>14%</b>	<b>62%</b>
Sharks	Grey nurse Shark	<i>Carcharias taurus</i>	0%	0%	<b>70%</b>	0%	0%	<b>30%</b>
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	<b>36%</b>	0%	<b>24%</b>	0%	<b>26%</b>	<b>15%</b>
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	0%	<b>12%</b>	<b>60%</b>	0%	<b>8%</b>	<b>20%</b>
Sharks	Lemon Shark	<i>Negaprion acutidens</i>	0%	0%	<b>31%</b>	0%	<b>47%</b>	<b>22%</b>
Sharks	Port Jackson Shark	<i>Heterodontus portusjacksoni</i>	0%	0%	49%	0%	<b>12%</b>	39%
Sharks	Sandbar Shark	<i>Carcharhinus plumbeus</i>	0%	0%	<b>88%</b>	0%	<b>12%</b>	0%
Sharks	Tiger Shark	<i>Galeocerdo cuvier</i>	0%	0%	<b>34%</b>	0%	0%	<b>66%</b>
Sharks	Whiskery Shark	<i>Furgaleus macki</i>	0%	0%	<b>71%</b>	0%	<b>10%</b>	<b>19%</b>
Sharks	Whitetip Reef Shark	<i>Triaenodon obesus</i>	<b>48%</b>	0%	<b>32%</b>	0%	<b>3%</b>	<b>17%</b>
Sharks	Wobbegong	Orectolobidae - undifferentiated	<b>9%</b>	<b>5%</b>	<b>43%</b>	0%	0%	<b>43%</b>
Sharks	Other Whaler	Carcharhinidae, Hemigaleidae - undiff	<b>9%</b>	0%	<b>91%</b>	0%	0%	0%
Sharks	Other Shark	Sharks - undifferentiated	<b>4%</b>	<b>2%</b>	24%	0%	<b>14%</b>	56%
Rays	Sawfishes	Pristidae - undifferentiated	0%	0%	<b>18%</b>	0%	0%	<b>82%</b>
Rays	Western Shovelnose Ray	<i>Aptychotrema vincentiana</i>	0%	0%	68%	0%	0%	<b>32%</b>
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	<b>4%</b>	<b>3%</b>	27%	0%	<b>1%</b>	65%
Billfish	Black Marlin	<i>Makaira indica</i>	0%	0%	0%	0%	<b>59%</b>	<b>41%</b>
Billfish	Blue Marlin	<i>Makaira nigricans</i>	0%	<b>36%</b>	0%	0%	<b>24%</b>	<b>40%</b>
Billfish	Sailfish	<i>Istiophorus platypterus</i>	<b>12%</b>	<b>20%</b>	<b>2%</b>	0%	<b>38%</b>	<b>28%</b>

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Billfish	Striped Marlin	<i>Tetrapturus audax</i>	0%	0%	0%	0%	70%	30%
Bonito	Bonito	<i>Sarda australis</i> & <i>Cybiosarda elegans</i>	0%	17%	48%	0%	18%	17%
Bonito	Oriental Bonito	<i>Sarda orientalis</i>	20%	62%	9%	0%	0%	10%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	15%	46%	13%	3%	20%	3%
Bream	Frypan Bream	<i>Argyrops spinifer</i>	29%	29%	14%	0%	0%	29%
Bream	Northwest Black Bream	<i>Acanthopagrus palmaris</i>	17%	11%	29%	0%	23%	20%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	6%	76%	3%	6%	2%	7%
Bream	Tarwhine	<i>Rhabdosargus sarba</i>	13%	47%	12%	0%	4%	24%
Bream	Western Yellowfin Bream	<i>Acanthopagrus morrisoni</i>	23%	60%	13%	0%	5%	0%
Bream	Other Bream	Sparidae - undifferentiated	0%	0%	74%	0%	0%	26%
Catfish	Eeltail Catfishes	Plotosidae - undifferentiated	0%	0%	35%	0%	0%	65%
Catfish	Estuary Cobbler	<i>Cnidoglanis macrocephalus</i>	0%	0%	25%	0%	0%	75%
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	5%	1%	19%	0%	11%	63%
Catfish	Silver Cobbler	<i>Neoarius midgleyi</i>	5%	0%	0%	0%	0%	95%
Catfish	Other Catfish	Ariidae - undifferentiated	11%	0%	9%	0%	1%	79%
Cobia	Cobia	<i>Rachycentron canadum</i>	15%	39%	39%	0%	8%	0%
Cod	Barramundi Cod	<i>Chromileptes altivelis</i>	0%	65%	0%	35%	0%	0%
Cod	Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	24%	26%	28%	1%	7%	14%
Cod	Blacktip Rockcod	<i>Epinephelus fasciatus</i>	0%	100%	0%	0%	0%	0%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	16%	65%	5%	7%	4%	2%
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	15%	16%	23%	29%	1%	16%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	33%	54%	0%	0%	13%	0%
Cod	Frostback Rockcod	<i>Epinephelus bilobatus</i>	40%	11%	28%	0%	20%	0%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	19%	32%	23%	0%	5%	20%
Cod	Harlequin Fish	<i>Othos dentex</i>	25%	39%	15%	10%	7%	4%
Cod	Potato Rockcod	<i>Epinephelus tukula</i>	0%	20%	0%	0%	37%	43%
Cod	Queensland Grouper	<i>Epinephelus lanceolatus</i>	0%	0%	0%	0%	16%	84%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	31%	43%	16%	1%	7%	3%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	31%	13%	42%	0%	0%	14%
Cod	Tomato Rockcod	<i>Cephalopholis sonnerati</i>	0%	57%	43%	0%	0%	0%
Cod	Yellowspotted Rockcod	<i>Epinephelus areolatus</i>	11%	43%	42%	0%	1%	3%
Coral Trout	Coral Trout	<i>Plectropomus maculatus</i> & <i>leopardus</i>	10%	42%	10%	12%	24%	2%
Coral Trout	Yellowedge Coronation Trout	<i>Variola louti</i>	78%	12%	0%	0%	0%	10%
Emperor	Bluespotted Emperor	<i>Lethrinus punctulatus</i>	48%	45%	2%	5%	0%	0%

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	9%	68%	6%	12%	2%	4%
Emperor	Longnose Emperor	<i>Lethrinus olivaceus</i>	44%	37%	15%	0%	0%	4%
Emperor	Redspot Emperor	<i>Lethrinus lentjan</i>	0%	100%	0%	0%	0%	0%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	22%	30%	17%	15%	3%	13%
Emperor	Robinsons' Seabream	<i>Gymnocranius grandoculis</i>	6%	86%	8%	0%	0%	0%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	10%	56%	11%	12%	2%	8%
Emperor	Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	0%	70%	22%	0%	9%	0%
Emperor	Other Emperor	Lethrinidae - undifferentiated	5%	67%	0%	0%	1%	27%
Flathead	Northern Sand Flathead	<i>Platycephalus endrachtensis</i>	0%	59%	4%	0%	37%	0%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	16%	61%	14%	0%	0%	8%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	7%	31%	56%	0%	3%	4%
Flounder	Smalltooth Flounder	<i>Pseudorhombus jenynsii</i>	0%	34%	39%	0%	27%	0%
Flounder	Other Flatfish	Bothidae, Psettodidae & Pleuronectidae	0%	44%	56%	0%	0%	0%
Garfish	Southern Garfish	<i>Hyporhamphus melanochir</i>	92%	4%	0%	0%	0%	4%
Garfish	Three-by-two Garfish	<i>Hemiramphus robustus</i>	0%	100%	0%	0%	0%	0%
Garfish	Other Garfish	Hemiramphidae - undifferentiated	0%	0%	39%	0%	0%	61%
Giant Perch	Barramundi	<i>Lates calcarifer</i>	4%	35%	10%	6%	14%	33%
Giant Perch	Sand Bass	<i>Psammoperca waigiensis</i>	0%	0%	100%	0%	0%	0%
Goatfish	Bluespotted Goatfish	<i>Upeneichthys vlamingii</i>	28%	7%	31%	3%	4%	28%
Grunter	Sea Trumpeter	<i>Pelsartia humeralis</i>	3%	2%	6%	0%	2%	87%
Grunter	Western Sooty Grunter	<i>Hephaestus jenkinsi</i>	20%	66%	1%	0%	5%	8%
Grunter	Western Striped Grunter	<i>Pelates octolineatus</i>	0%	15%	31%	0%	5%	49%
Grunter	Striped Grunter	Terapontidae - undifferentiated	20%	0%	7%	0%	0%	74%
Grunter Bream	Painted Sweetlips	<i>Diagramma labiosum</i>	10%	60%	18%	0%	1%	11%
Grunter Bream	Barred Javelin	<i>Pomadasys kaakan</i>	14%	61%	23%	0%	2%	0%
Grunter Bream	Blotched Javelin	<i>Pomadasys maculatus</i>	13%	0%	17%	0%	0%	70%
Grunter Bream	Grunter Bream	Haemulidae - undifferentiated	46%	54%	0%	0%	0%	0%
Gurnard	Bighead Gurnard Perch	<i>Neosebastes pandus</i>	5%	14%	12%	0%	0%	69%
Gurnard	Gurnard	Neosebastidae - undifferentiated	4%	24%	15%	0%	1%	55%
Jewfish	Black Jewfish	<i>Protonibea diacanthus</i>	15%	37%	44%	0%	3%	1%
Jewfish	Mulloway	<i>Argyrosomus japonicus</i>	6%	54%	12%	0%	25%	4%
King Snapper	Goldband Snapper	<i>Pristipomoides multidens</i>	80%	5%	1%	1%	6%	7%
King Snapper	Rosy Snapper	<i>Pristipomoides filamentosus</i>	0%	0%	0%	100%	0%	0%
King Snapper	Sharptooth Snapper	<i>Pristipomoides typus</i>	0%	100%	0%	0%	0%	0%

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Leatherjacket	Horseshoe Leatherjacket	<i>Meuschenia hippocrepis</i>	5%	29%	13%	0%	0%	53%
Leatherjacket	Sixspine Leatherjacket	<i>Meuschenia freycineti</i>	9%	26%	38%	0%	7%	21%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	16%	13%	8%	0%	0%	63%
Lizardfish	Lizardfish Grinners	Bathysauridae, Synodontidae - undiff	0%	0%	13%	0%	0%	87%
Longtom	Longtom	Belonidae - undifferentiated	0%	6%	0%	0%	47%	47%
Mackerel	Blue Mackerel	<i>Scomber australasicus</i>	90%	5%	0%	0%	0%	5%
Mackerel	Grey Mackerel	<i>Scomberomorus semifasciatus</i>	22%	42%	36%	0%	0%	0%
Mackerel	School Mackerel	<i>Scomberomorus queenslandicus</i>	64%	7%	7%	2%	3%	18%
Mackerel	Shark Mackerel	<i>Grammatorcynus bicarinatus</i>	19%	9%	49%	0%	5%	18%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	12%	30%	26%	9%	9%	13%
Mackerel	Spotted Mackerel	<i>Scomberomorus munroi</i>	19%	22%	27%	0%	21%	11%
Mackerel	Wahoo	<i>Acanthocybium solandri</i>	53%	0%	11%	0%	14%	22%
Mackerel	Other Mackerel & Tuna	Scomberidae - undifferentiated	10%	11%	30%	0%	0%	49%
Mahi Mahi	Mahi Mahi	<i>Coryphaena</i> spp.	0%	0%	36%	0%	0%	64%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	7%	55%	16%	11%	0%	11%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	7%	60%	22%	0%	11%	0%
Mullet	Other Mullet	Mugilidae - undifferentiated	1%	49%	33%	0%	17%	0%
Pearl Perch	Northern Pearl Perch	<i>Glaucosoma buergeri</i>	0%	72%	7%	0%	21%	1%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	5%	78%	4%	12%	1%	1%
Pike	Great Barracuda	<i>Sphyræna barracuda</i>	2%	2%	29%	0%	9%	59%
Pike	Snook	<i>Sphyræna novaehollandiae</i>	6%	23%	60%	0%	0%	11%
Pike	Yellowtail Barracuda	<i>Sphyræna obtusata</i>	1%	25%	21%	0%	12%	41%
Pike	Other Pike	Sphyrænidae - undifferentiated	0%	0%	0%	0%	0%	100%
Queenfish	Queenfish	<i>Scomberoides</i> spp.	35%	5%	2%	0%	29%	30%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	38%	35%	12%	12%	0%	2%
Redfish	Swallowtail	<i>Centroberyx lineatus</i>	35%	46%	18%	0%	0%	1%
Redfish	Yelloweye Redfish	<i>Centroberyx australis</i>	0%	0%	0%	0%	100%	0%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	40%	21%	32%	3%	2%	3%
Salmon Herring	Western Australian Salmon	<i>Arripis truttaceus</i>	0%	17%	27%	3%	46%	6%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	6%	13%	28%	0%	0%	52%
Small Baitfish	Herrings & Ilishas	Clupeidae, Pristigasteridae - undiff	24%	11%	0%	0%	57%	9%
Sweep	Banded Sweep	<i>Scorpius georgiana</i>	5%	17%	32%	0%	0%	45%
Sweep	Sea Sweep	<i>Scorpius aequipinnis</i>	0%	33%	25%	0%	3%	39%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	24%	58%	3%	0%	11%	4%

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Threadfin	Blue Threadfin	<i>Eleutheronema tetradactylum</i>	14%	39%	37%	3%	0%	7%
Threadfin	King Threadfin	<i>Polydactylus macrochir</i>	11%	33%	9%	35%	0%	13%
Threadfin Bream	Rosy Threadfin Bream	<i>Nemipterus furcosus</i>	0%	100%	0%	0%	0%	0%
Threadfin Bream	Western Butterfish	<i>Pentapodus vitta</i>	15%	6%	35%	0%	6%	37%
Trevalla	Blue-Eye Trevalla	<i>Hyperoglyphe antarctica</i>	0%	0%	100%	0%	0%	0%
Trevally	Amberjack	<i>Seriola dumerili</i>	57%	18%	14%	0%	0%	10%
Trevally	Bludger Trevally	<i>Carangoides gymnostethus</i>	16%	21%	40%	0%	3%	20%
Trevally	Common Dart	<i>Trachinotus botla</i>	0%	60%	0%	0%	0%	40%
Trevally	Giant Trevally	<i>Caranx ignobilis</i>	18%	36%	5%	3%	27%	12%
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	11%	24%	25%	0%	29%	10%
Trevally	Rainbow Runner	<i>Elagatis bipinnulata</i>	0%	6%	0%	30%	0%	65%
Trevally	Samsonfish	<i>Seriola hippos</i>	2%	16%	18%	5%	24%	34%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	21%	34%	35%	2%	5%	3%
Trevally	Turrum	<i>Carangoides fulvoguttatus</i>	18%	25%	0%	0%	0%	56%
Trevally	Yellowtail Kingfish	<i>Seriola lalandi</i>	10%	41%	35%	0%	12%	3%
Trevally	Yellowtail Scad	<i>Trachurus novaezelandiae</i>	33%	0%	39%	0%	0%	28%
Trevally	Other Trevally	Carangidae - undifferentiated	6%	16%	44%	13%	0%	21%
Tripletail	Tripletail	<i>Lobotes surinamensis</i>	43%	0%	57%	0%	0%	0%
Tropical Snapper	Brownstripe Snapper	<i>Lutjanus vitta</i>	0%	80%	0%	0%	0%	20%
Tropical Snapper	Chinamanfish	<i>Symphorus nematophorus</i>	18%	8%	56%	9%	9%	0%
Tropical Snapper	Crimson Snapper	<i>Lutjanus erythropterus</i>	21%	42%	23%	2%	3%	8%
Tropical Snapper	Darktail Snapper	<i>Lutjanus lemniscatus</i>	45%	0%	55%	0%	0%	0%
Tropical Snapper	Flame Snapper	<i>Etelis coruscans</i>	0%	100%	0%	0%	0%	0%
Tropical Snapper	Golden Snapper	<i>Lutjanus johnii</i>	41%	33%	18%	4%	3%	1%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	5%	45%	13%	5%	27%	5%
Tropical Snapper	Moses' Snapper	<i>Lutjanus russellii</i>	28%	29%	40%	0%	2%	0%
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	18%	60%	13%	6%	2%	1%
Tropical Snapper	Ruby Snapper	<i>Etelis carbunculus</i>	0%	32%	0%	26%	0%	41%
Tropical Snapper	Saddletail Snapper	<i>Lutjanus malabaricus</i>	64%	31%	0%	3%	2%	0%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	10%	52%	14%	1%	9%	13%
Tropical Snapper	Other Snapper	Lutjanidae - undifferentiated	23%	49%	21%	0%	0%	8%
Tuna	Dogtooth Tuna	<i>Gymnosarda unicolor</i>	0%	0%	55%	0%	0%	45%
Tuna	Longtail Tuna	<i>Thunnus tonggol</i>	8%	28%	16%	0%	48%	0%
Tuna	Mackerel Tuna	<i>Euthynnus affinis</i>	4%	5%	19%	17%	21%	33%

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Tuna	Skipjack Tuna	<i>Katsuwonus pelamis</i>	0%	50%	10%	0%	0%	40%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	38%	28%	14%	4%	14%	2%
Tuna	Yellowfin Tuna	<i>Thunnus albacares</i>	7%	34%	44%	0%	12%	3%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	10%	76%	6%	7%	1%	0%
Tuskfish Wrasse	Blackspot Tuskfish	<i>Choerodon schoenleinii</i>	28%	52%	15%	4%	2%	1%
Tuskfish Wrasse	Blue Tuskfish	<i>Choerodon cyanodus</i>	8%	67%	5%	17%	0%	3%
Tuskfish Wrasse	Bluebarred Parrotfish	<i>Scarus ghobban</i> spp. complex	7%	15%	31%	0%	0%	47%
Tuskfish Wrasse	Bluespotted Tuskfish	<i>Choerodon cauteroma</i>	40%	4%	0%	0%	57%	0%
Tuskfish Wrasse	Brownspotted Wrasse	<i>Notolabrus parilus</i>	11%	6%	20%	0%	4%	59%
Tuskfish Wrasse	Foxfish	<i>Bodianus frenchii</i>	10%	36%	24%	17%	1%	13%
Tuskfish Wrasse	Humphead Maori Wrasse	<i>Cheilinus undulatus</i>	0%	0%	0%	0%	0%	100%
Tuskfish Wrasse	Purple Tuskfish	<i>Choerodon cephalotes</i>	10%	79%	4%	0%	3%	5%
Tuskfish Wrasse	Southern Maori Wrasse	<i>Ophthalmolepis lineolatus</i>	7%	21%	14%	0%	3%	55%
Tuskfish Wrasse	Western Blue Groper	<i>Achoerodus gouldii</i>	41%	44%	0%	15%	0%	0%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	8%	4%	24%	0%	4%	60%
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	0%	0%	10%	0%	0%	90%
Tuskfish Wrasse	Other Tuskfish	<i>Choerodon</i> spp.	100%	0%	0%	0%	0%	0%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	2%	6%	14%	0%	0%	79%
Western Blue Devil	Western Blue Devil	<i>Paraplesiops sinclairi</i>	6%	3%	22%	0%	20%	50%
Whiting	Goldenline Whiting	<i>Sillago analis</i>	74%	0%	26%	0%	0%	0%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	19%	66%	8%	3%	4%	0%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	44%	44%	8%	0%	1%	2%
Whiting	Western Trumpeter Whiting	<i>Sillago burrus</i>	14%	47%	2%	0%	11%	26%
Whiting	Other Whiting	Sillaginidae - undifferentiated	5%	21%	0%	0%	0%	74%
Wreckfish	Bass Groper	<i>Polyprion americanus</i>	39%	0%	0%	0%	0%	61%
Wreckfish	Hapuku	<i>Polyprion oxygeneios</i>	0%	100%	0%	0%	0%	0%
Finfish Other	Archerfishes	Toxotidae - undifferentiated	0%	0%	0%	0%	0%	100%
Finfish Other	Butterfish	Stromateidae - undifferentiated	0%	0%	0%	0%	2%	98%
Finfish Other	Dory	Zeidae - undifferentiated	0%	100%	0%	0%	0%	0%
Finfish Other	Conger Eel	Congridae, Colocongridae - undiff	100%	0%	0%	0%	0%	0%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	7%	0%	20%	0%	0%	74%
Finfish Other	Moonfish Batfish	Ephippidae, Drepaneidae - undifferentiated	39%	7%	54%	0%	0%	0%
Finfish Other	Silver Toadfish	<i>Lagocephalus sceleratus</i>	0%	1%	0%	1%	0%	98%
Finfish Other	Weeping Toadfish	<i>Torquigener pleurogramma</i>	0%	0%	0%	0%	0%	100%

Reporting Group	Common Name	Scientific Name	Too Small	Under Size	Too Many	Over Limit	Catch Release	Other
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	1%	0%	1%	0%	4%	94%
Finfish Other	Other Boxfish	Ostraciidae - undifferentiated	0%	0%	0%	0%	0%	100%



## 6 Estimates of Catch for Key Species

This section presents estimates of boat-based recreational catch (kept, released and total, by number) for the 12-months from September 2015 to August 2016. Estimates are summarised by habitat, fishing method and month for key species.

Summaries are provided by bioregion, habitat, fishing method and season for priority species identified on the basis of reported catches and importance for management. Key Species have been allocated to habitat types according to the Resource Assessment Framework (RAF) (Department of Fisheries 2011). However, the following RAF indicator species were caught in low numbers and are not included in this section: Blue-eye Trevalla (*Hyperoglyphe antarctica*); Perth Herring (*Nematalosa vlaminghi*); Pilchard (*Sardinops sagax*); Sandbar Shark (*Carcharhinus plumbeus*); Western Blue Groper (*Achoerodus gouldii*); Whiskery Shark (*Furgaleus macki*); Whitebait (*Hyperlophus vittatus*); and Silver Cobbler (*Neoarius midgleyi*).

Estimates of recreational catch for key species are presented by habitat type. This includes:

- 5 species/taxa for estuarine; Barramundi (*Lates calcarifer*), Black Bream (*Acanthopagrus butcheri*), Estuary Cobbler (*Cnidoglanis macrocephalus*), Yellowtail Flathead (*Platycephalus westraliae*), and Southern Bluespotted Flathead (*Platycephalus speculator*).
- 17 species/taxa for nearshore; Australian Herring (*Arripis georgianus*), Western Australian Salmon (*Arripis truttaceus*), Garfish (*Hyporhamphus melanochir* and *Hemiramphus robustus*), Sea Mullet (*Mugil cephalus*), Tailor (*Pomatomus saltatrix*), Blue Threadfin (*Eleutheronema tetradactylum*), King Threadfin (*Polydactylus macrochir*), King George Whiting (*Sillaginodes punctata*), School Whiting (*Sillago bassensis*, *vittata* and *schomburgkii*), Western Trumpeter Whiting (*Sillago burrus*), Mangrove Jack (*Lutjanus argentimaculatus*), Silver Trevally (*Pseudocaranx* spp. complex), Western Butterfish (*Pentapodus vitta*), Western Yellowfin Bream (*Acanthopagrus morrisoni*), Western King Wrasse (*Coris auricularis*), Brownspotted Wrasse (*Notolabrus parilus*) and Yellowtail Scad (*Trachurus novaezelandiae*).
- 17 species/taxa for inshore demersal; Baldchin Groper (*Choerodon rubescens*), Bight Redfish (*Centroberyx gerrardi*), Blue Morwong (*Nemadactylus valenciennesi*), Bluespotted Emperor (*Lethrinus punctulatus*), Brownstripe Snapper (*Lutjanus vitta*), Goldband Snapper (*Pristipomoides multidens*), Pink Snapper (*Chrysophrys auratus*), Rankin Cod (*Epinephelus multinotatus*), Red Emperor (*Lutjanus sebae*), Spangled Emperor (*Lethrinus nebulosus*), West Australian Dhufish (*Glaucosoma hebraicum*), Barcheek Coral Trout (*Plectropomus maculatus*), Common Coral Trout (*Plectropomus leopardus*), Breaksea Cod (*Epinephelides armatus*), Grass Emperor (*Lethrinus laticaudis*), Redthroat Emperor (*Lethrinus miniatus*) and Stripey Snapper (*Lutjanus carponotatus*).
- 3 species/taxa for offshore demersal; Eightbar Grouper (*Hyporthodus octofasciatus*), Hapuku (*Polyprion oxygeneios*) and Ruby Snapper (*Etelis carbunculus*)

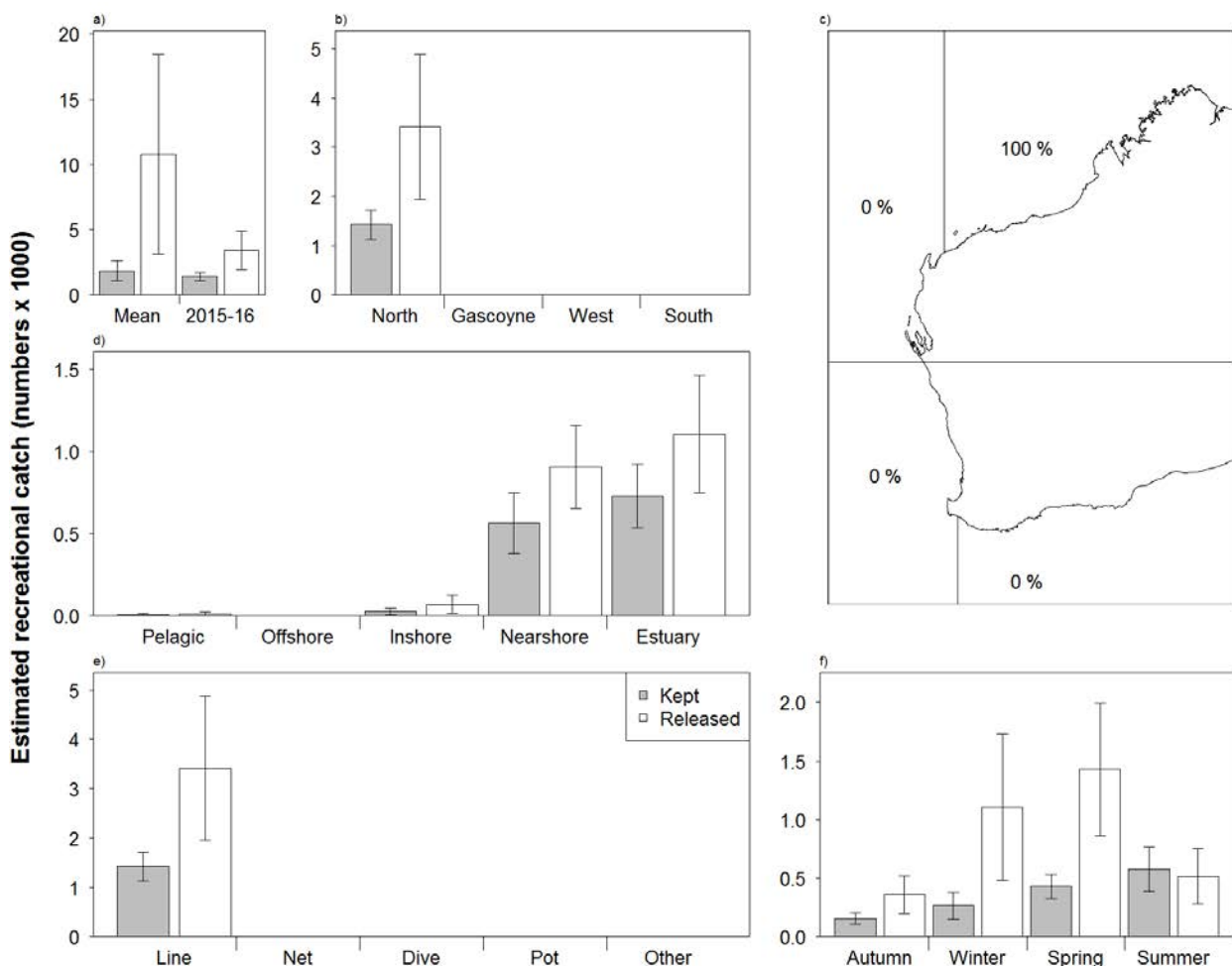
- 6 species/taxa for pelagic; Spanish Mackerel (*Scomberomorus commerson*), Samsonfish (*Seriola hippos*), Grey Mackerel (*Scomberomorus semifasciatus*), Blue Mackerel (*Scomber australasicus*), Billfish and Southern Bluefin Tuna (*Thunnus maccoyii*).
- 4 species/taxa for sharks; Whaler Sharks (Family Carcharhinidae), Gummy Sharks (*Mustelus antarcticus* and *M. stevensi*), Port Jackson Shark (*Heterodontus portusjacksoni*) and Wobbegong (Family Orectolobidae).
- 3 species/taxa for crustaceans; Western Rock Lobster (*Panulirus cygnus*), Mud Crab (*Scylla olivacea* and *S. serrata*) and Blue Swimmer Crab (*Portunus armatus*).
- 1 species/taxa for molluscs; Abalone (*Haliotis* spp.).
- 3 species/taxa for cephalopods; Cuttlefish (Order Sepiidae), Squid (Order Teuthoidea) and Octopus (Order Octopodidae).

## 6.1 Estuarine

Estimates of catches for estuarine species will be underestimated as shore-based recreational fishers were out of scope of the survey.

### 6.1.1 Barramundi (*Lates calcarifer*)

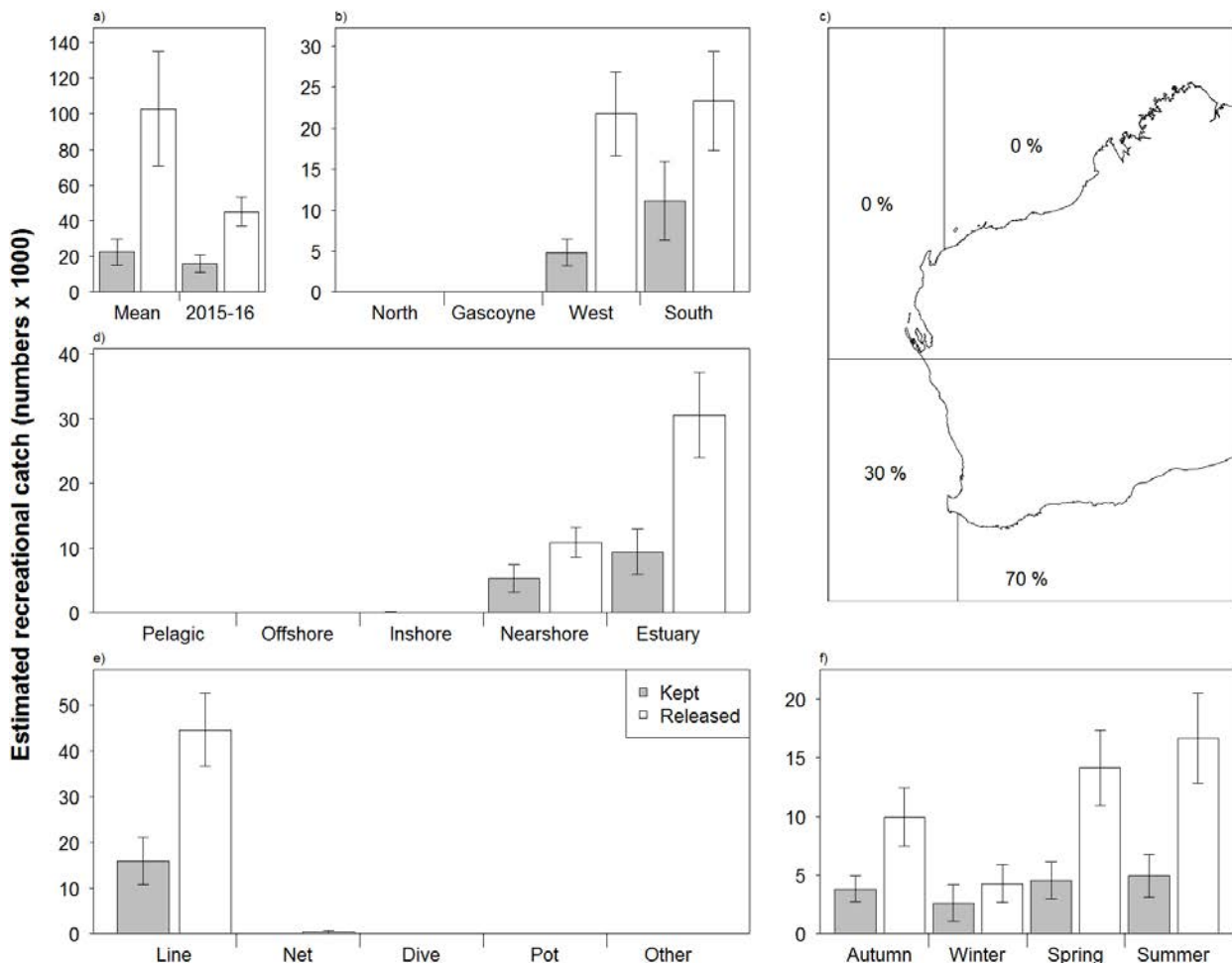
Barramundi is an indicator species in the North Coast bioregion. All boat-based recreational catches of Barramundi occurred in the North Coast (kept only, Figure 23b and c). The majority of catches were released (71%; Table 5, Figure 23a) and attributed to “Too Many” and “Other” (Table 7). Catches were taken predominantly from estuary habitat (38%), nearshore (30%; Figure 23d) and freshwater (29%, not shown). Barramundi were harvested throughout the year, with highest catches in spring (38%), followed by winter (28%) and summer (23%; Figure 23f). All catches were taken by line fishing (Figure 23e). The estimated kept recreational catch of Barramundi in 2015/16 was similar with previous statewide surveys (Figure 23a, Table 5).



**Figure 23.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Barramundi in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14) ; b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.1.2 Black Bream (*Acanthopagrus butcheri*)

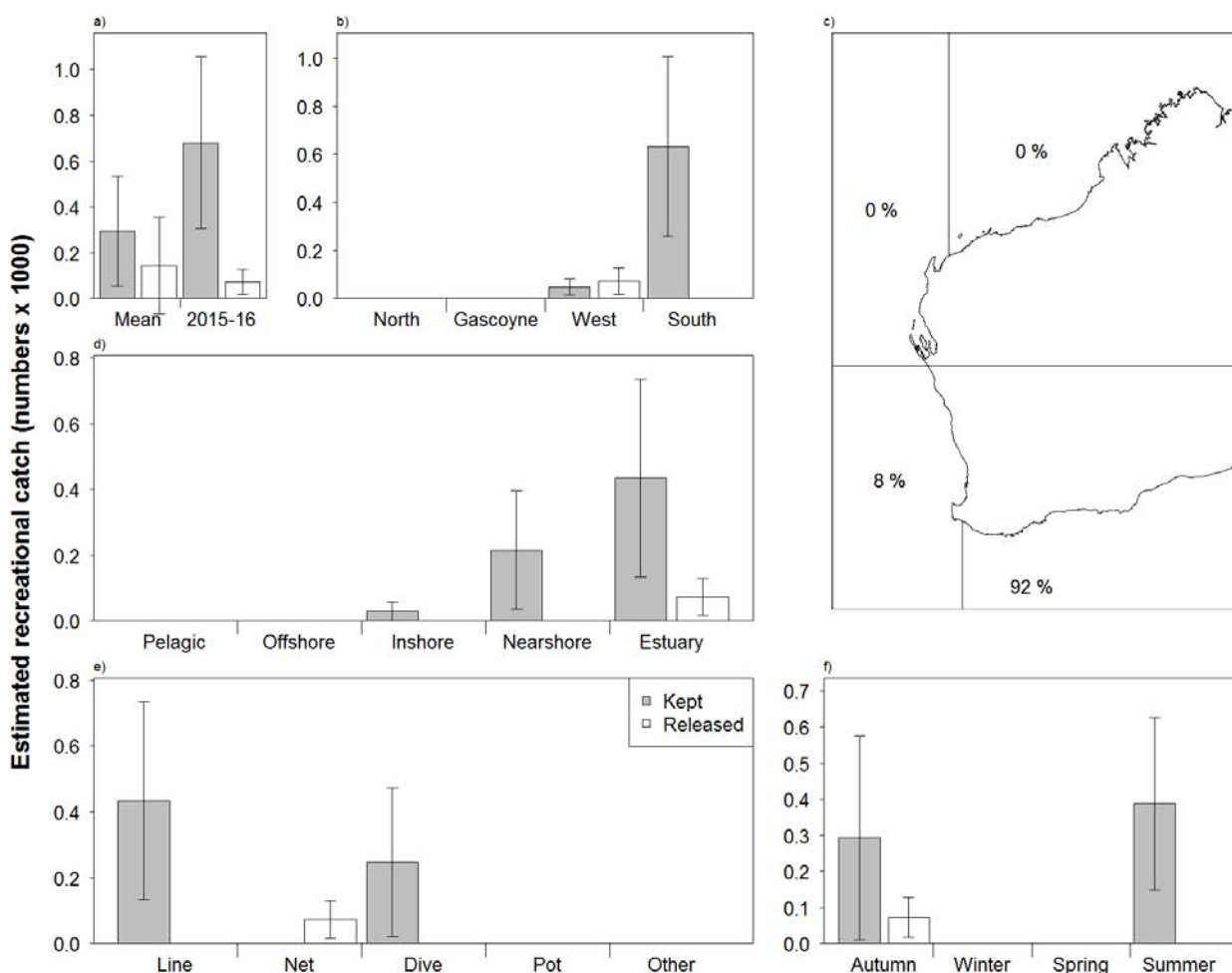
Black Bream is an indicator species in the West Coast and South Coast bioregions. Most boat-based recreational catches of Black Bream occurred in the South Coast, followed by the West Coast (kept only, Figure 24b and c). The majority of catches were released (74%; Table 5, Figure 24a) and attributed to “Under Size” (Table 7). Catches were taken predominantly from estuary habitat (66%), nearshore (27%; Figure 24d) and freshwater (8%, not shown). Black Bream were harvested throughout the year, with higher catches in spring (31%) and summer (35%) compared with autumn (23%) and winter (11%; Figure 24f). Most catches were taken by line fishing (99%; Figure 24e). The estimated kept recreational catch of Black Bream in 2015/16 was similar with previous statewide surveys, although the estimated released recreational catch was lower in 2015/16 (Figure 24a, Table 5).



**Figure 24.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Black Bream in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.1.3 Estuary Cobbler (*Cnidoglanis macrocephalus*)

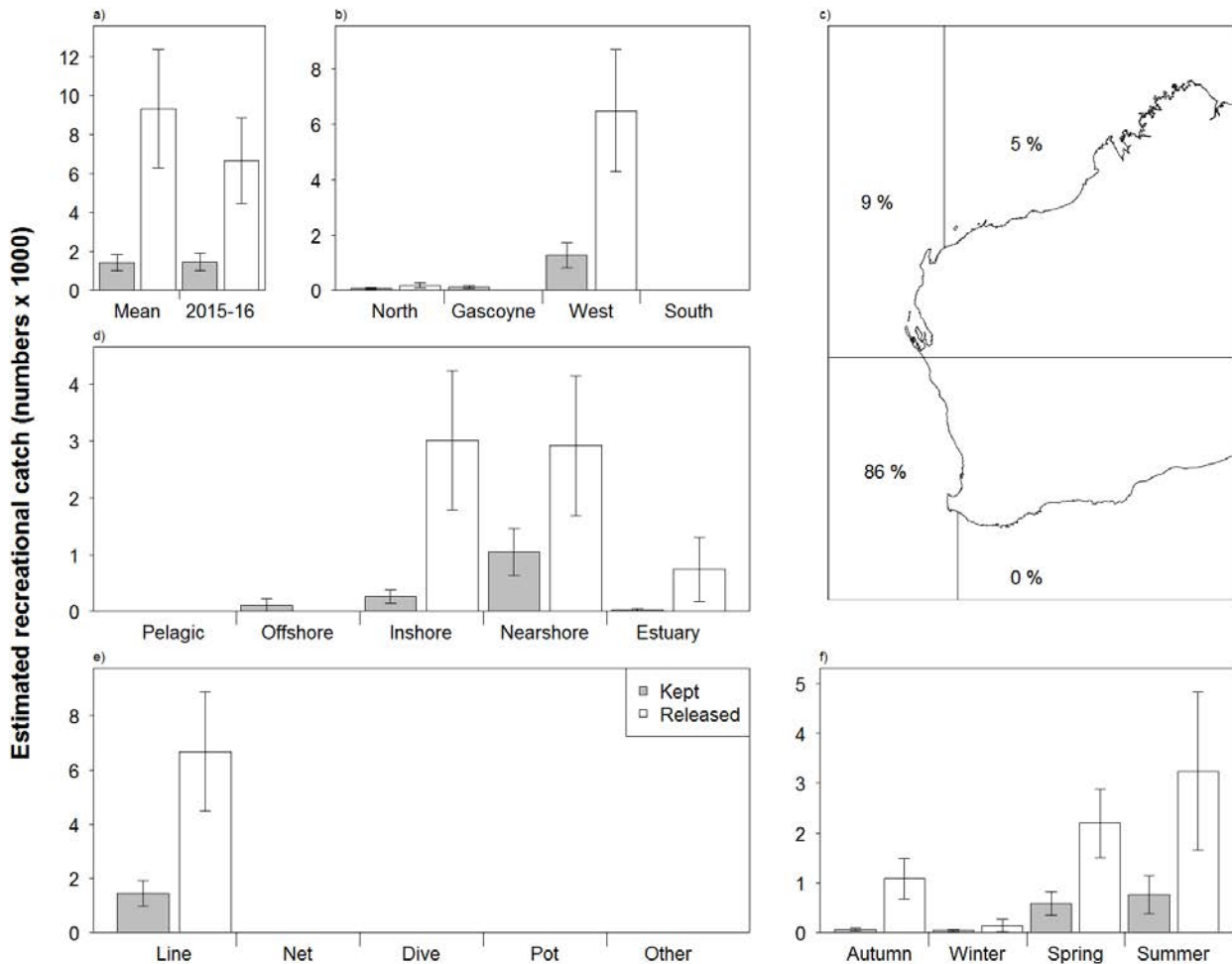
Estuary Cobbler is an indicator species in the West Coast and South Coast bioregions. Most boat-based recreational catches of Estuary Cobbler occurred in the South Coast, with some catches in the West Coast (kept only, Figure 25b and c). The majority of catches were retained (10% released; Table 5, Figure 25a) with most releases attributed to “Other” (Table 7). Catches were taken predominantly from estuary habitat (67%) and nearshore (29%; Figure 25d). Estuary Cobsler were harvested in summer (51%) and autumn (49%; Figure 25f). Most catches were taken by line fishing (58%), with some fishing from diving (32%) and nets (10%; Figure 25e). The estimated kept recreational catch of Estuary Cobbler was higher in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 25a, Table 5).



**Figure 25.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Estuary Cobbler in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.1.4 Yellowtail Flathead (*Platycephalus westraliae*)

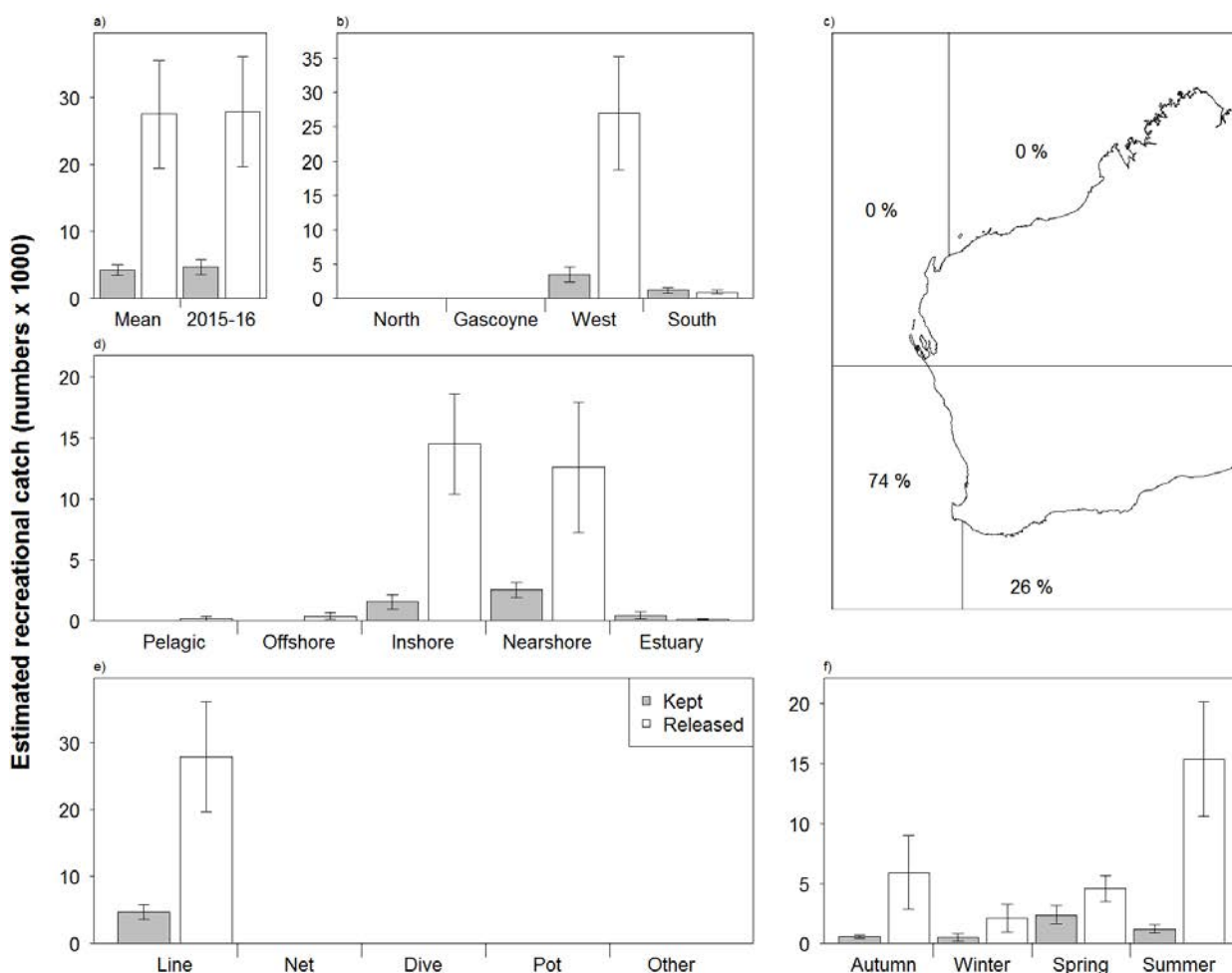
Most boat-based recreational catches of Yellowtail Flathead occurred in the West Coast, with some catches in the North Coast and Gascoyne Coast (kept only, Figure 26b and c). The majority of catches were released (82%; Table 5, Figure 26a) and attributed to “Too Many” (Table 7). Catches were taken predominantly from nearshore (49%; Figure 26d). Yellowtail Flathead were harvested throughout the year, with higher catches in spring (34%) and summer (49%) compared with autumn (14%) and winter (2%; Figure 26f). All catches were taken by line fishing (Figure 26e). The estimated kept and released recreational catches of Yellowtail Flathead in 2015/16 were similar with previous statewide surveys (Figure 26a, Table 5).



**Figure 26.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Yellowtail Flathead in Western Australia during 2015/16 a) kept and released; b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.1.5 Southern Bluespotted Flathead (*Platycephalus speculator*)

Most boat-based recreational catches of Southern Bluespotted Flathead occurred in the West Coast, followed by the South Coast (kept only, Figure 27b and c). The majority of catches were released (86%; Table 5, Figure 27a) and attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore and inshore demersal (Figure 27d). Southern Bluespotted Flathead were harvested throughout the year, with higher catches in summer (51%) compared with spring (21%), autumn (20%) and winter (8%; Figure 27f). All catches were taken by line fishing (Figure 27e). The estimated kept and released recreational catches of Southern Bluespotted Flathead in 2015/16 were similar with previous statewide surveys (Figure 27a, Table 5).



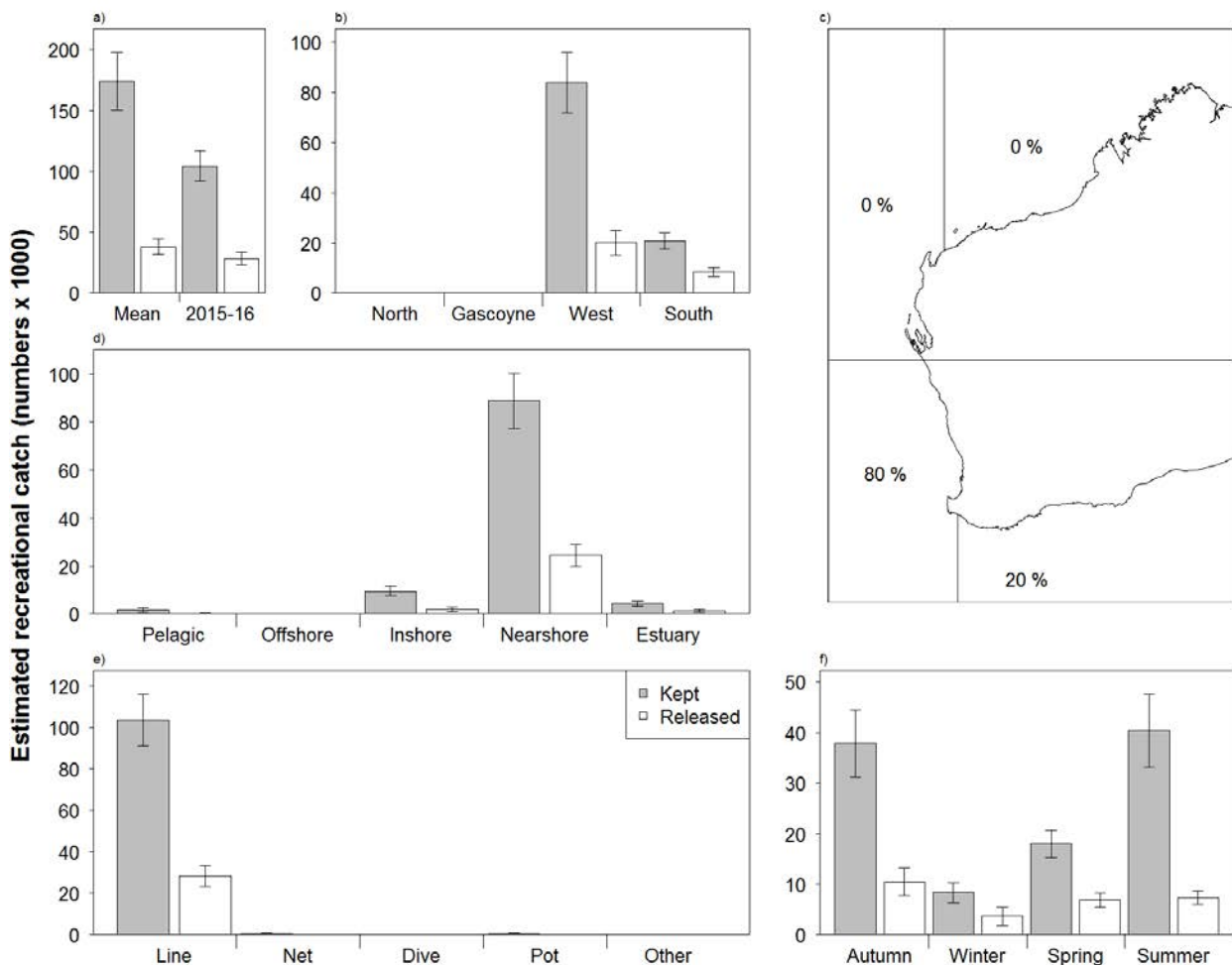
**Figure 27.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Southern Bluespotted Flathead in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.2 Nearshore

Estimates of catch for nearshore species provided in this report, particularly those harvested with high proportions of shore-based effort, will be underestimated.

### 6.2.1 Australian Herring (*Arripis georgianus*)

Australian Herring is an indicator species in the West Coast and South Coast bioregions. Most boat-based recreational catches of Australian Herring occurred in the West Coast, followed by the South Coast (kept only, Figure 28b and c). The majority of catches were retained (21% released; Table 5, Figure 28a) with most releases attributed to “Too Small” and “Too Many” (Table 7). Catches were taken from nearshore (85%; Figure 28d) by line fishing (Figure 28e). Australian Herring were harvested throughout the year, with higher catches in summer (36%) and autumn (36%; Figure 28f). The estimated kept recreational catch was lower in 2015/16 compared with previous statewide surveys, although the released recreational catches were similar (Figure 28a, Table 5).

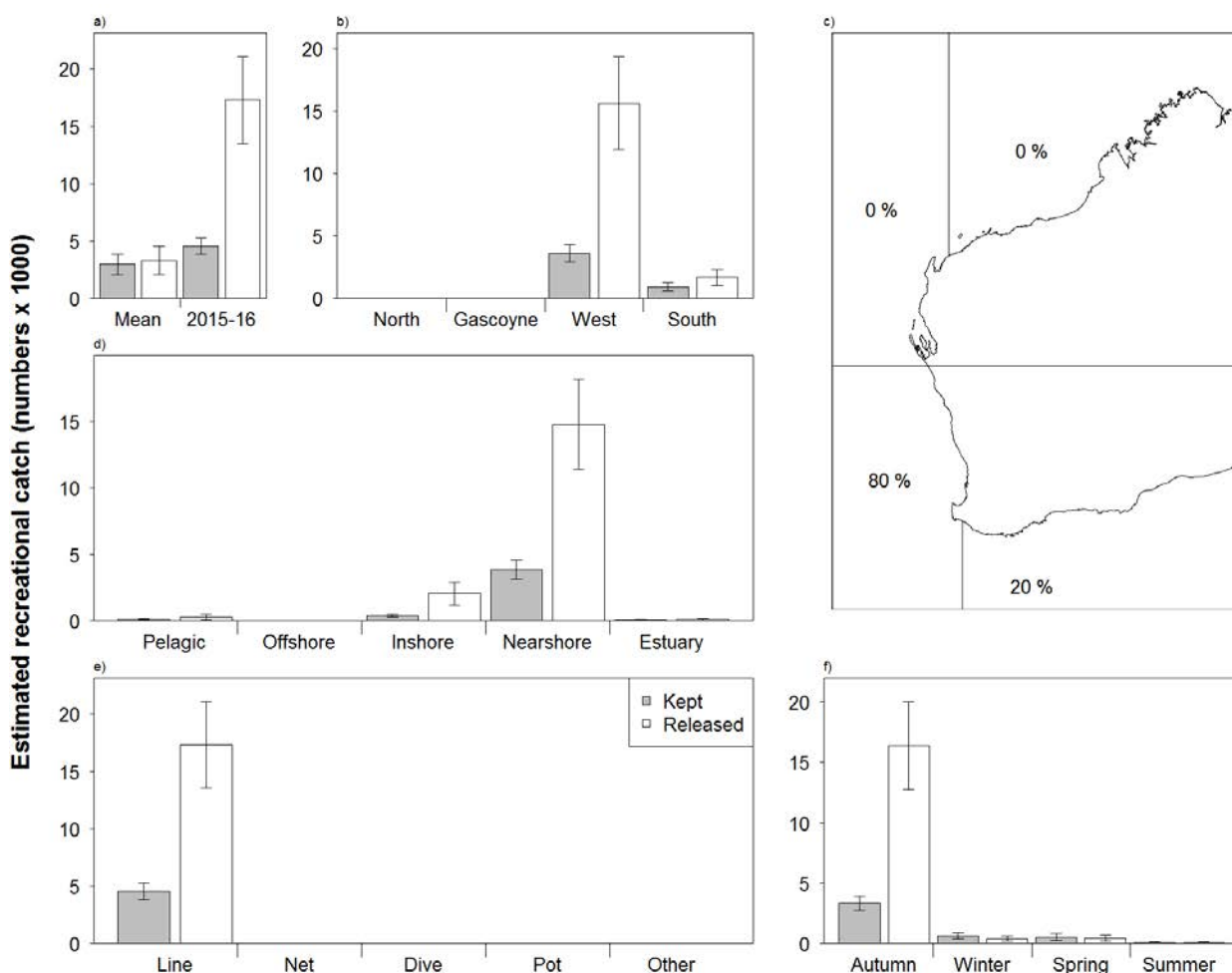


**Figure 28.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Australian Herring in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



## 6.2.2 Western Australian Salmon (*Arripis truttaceus*)

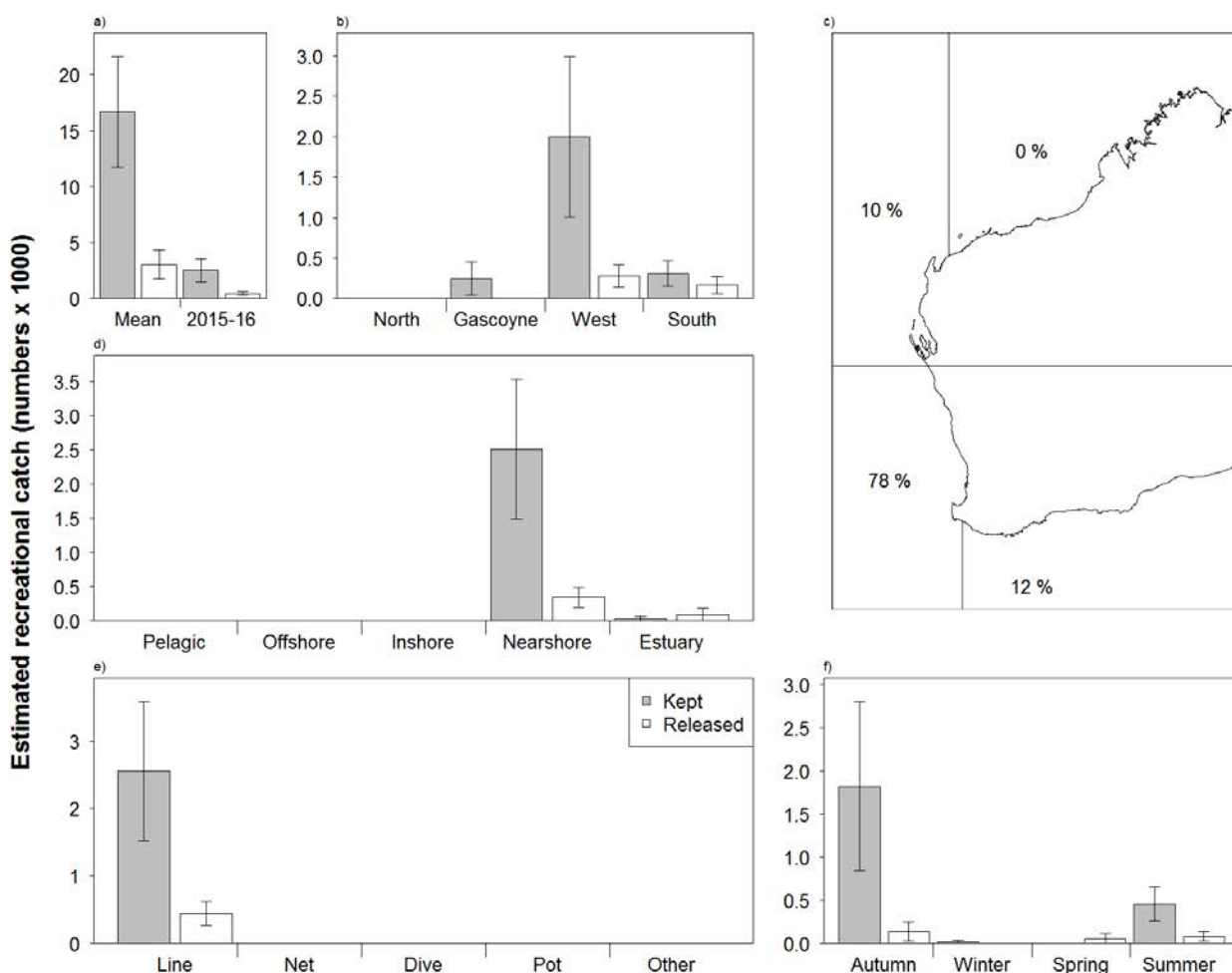
Western Australian Salmon is an indicator species in the South Coast bioregion. Most boat-based recreational catches of Western Australian Salmon occurred in the West Coast, followed by the South Coast (kept only, Figure 29b and c). The majority of catches were released (79%; Table 5, Figure 29a) and attributed to “Catch and Release” and “Too Many” (Table 7). Catches were taken predominantly from nearshore (86%; Figure 29d). The majority of catches were in autumn (90%; Figure 29f). All catches were taken by line fishing (Figure 29e). The estimated kept recreational catch of Western Australian Salmon was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was higher (Figure 29a, Table 5).



**Figure 29.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western Australian Salmon in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.3 Garfish (*Hyporhamphus melanochir* and *Hemiramphus robustus*)

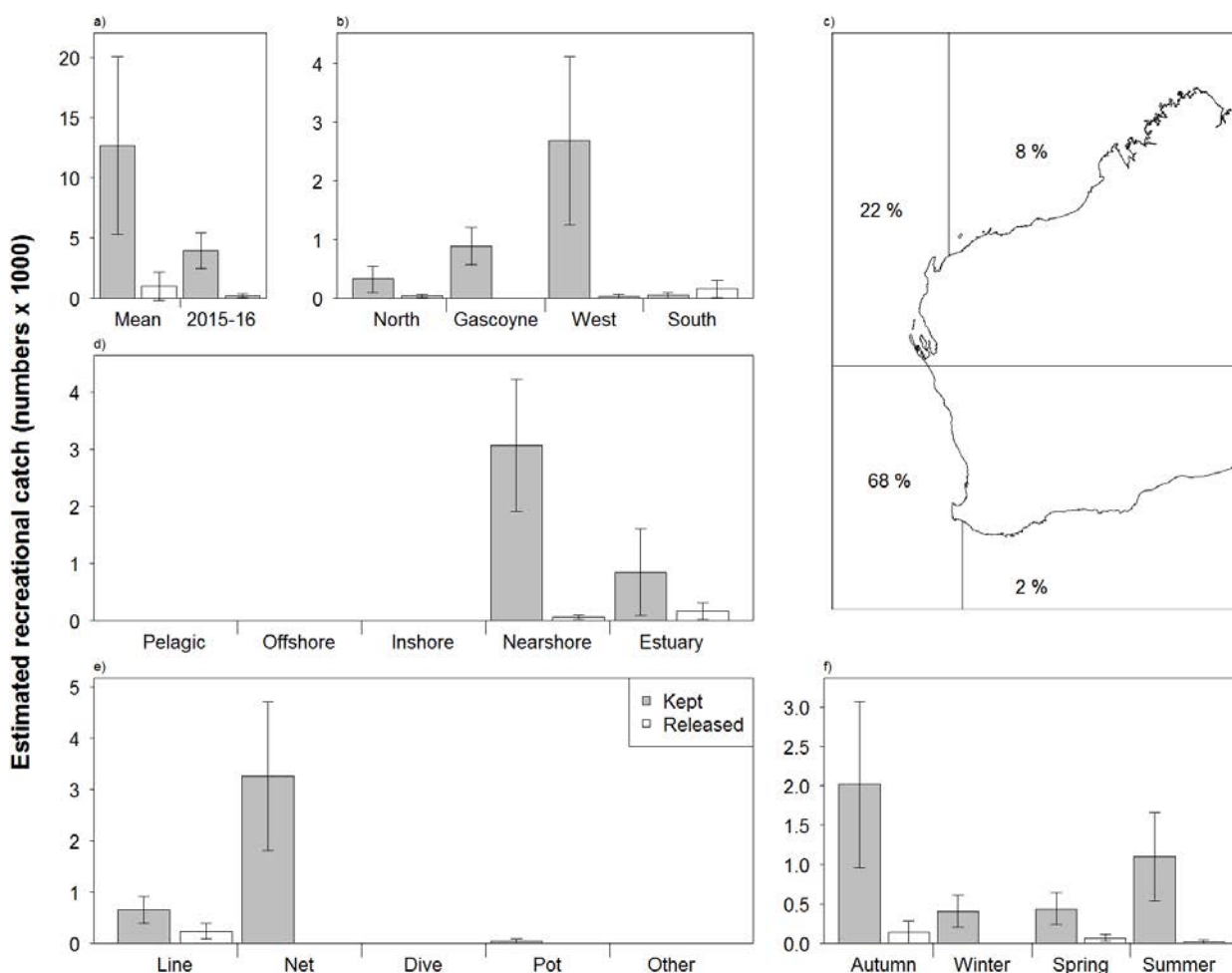
Garfish species include Southern Garfish (*Hyporhamphus melanochir*), three-by-two Garfish (*Hemiramphus robustus*) and Other Garfish (Hemiramphidae - undifferentiated). Garfish is an indicator species in the West Coast bioregion. Most boat-based recreational catches of Garfish occurred in the West Coast, with some catches in the Gascoyne Coast and South Coast (kept only, Figure 30b and c). The majority of catches of Southern Garfish were retained (9% released; Table 5, Figure 30a) with most releases attributed to "Too Small" (Table 7). Catches were taken predominantly from nearshore (95%; Figure 30d). Garfish were mostly harvested in autumn (76%; Figure 30f). All catches were taken by line fishing (Figure 30e). The estimated recreational catches of Garfish were lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 30a, Table 5).



**Figure 30.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Garfish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.2.4 Sea Mullet (*Mugil cephalus*)

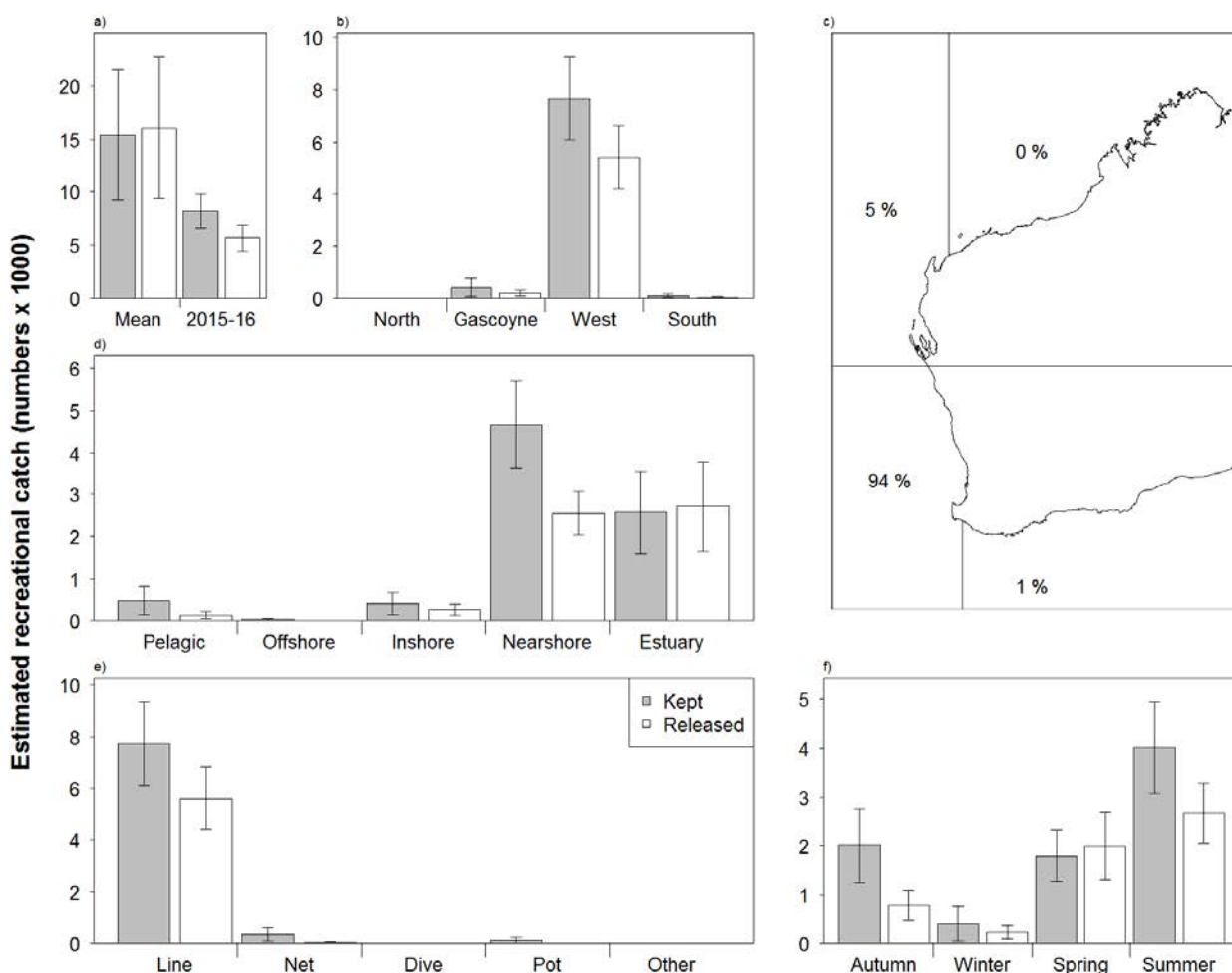
Sea Mullet is an indicator species in the Gascoyne, West and South Coast bioregions. Most boat-based recreational catches of Sea Mullet occurred in the West Coast, with some catches in the North Coast, Gascoyne Coast and South Coast (kept only, Figure 31b and c). The majority of catches were retained (6% released; Table 5, Figure 31a) with most releases attributed to "Under Size" (Table 7). Catches were taken predominantly from nearshore (74%; Figure 31d). Sea Mullet were harvested throughout the year, with higher catches in autumn (51%) compared with summer (27%), winter (10%) and spring (12%; Figure 31f). Catches were mostly taken by netting (77%), followed by line fishing (21%; Figure 31e). The estimated recreational catches of Sea Mullet were lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 31a, Table 5).



**Figure 31.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Sea Mullet in Western Australia during 2015/16 a) kept and released; b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.5 Tailor (*Pomatomus saltatrix*)

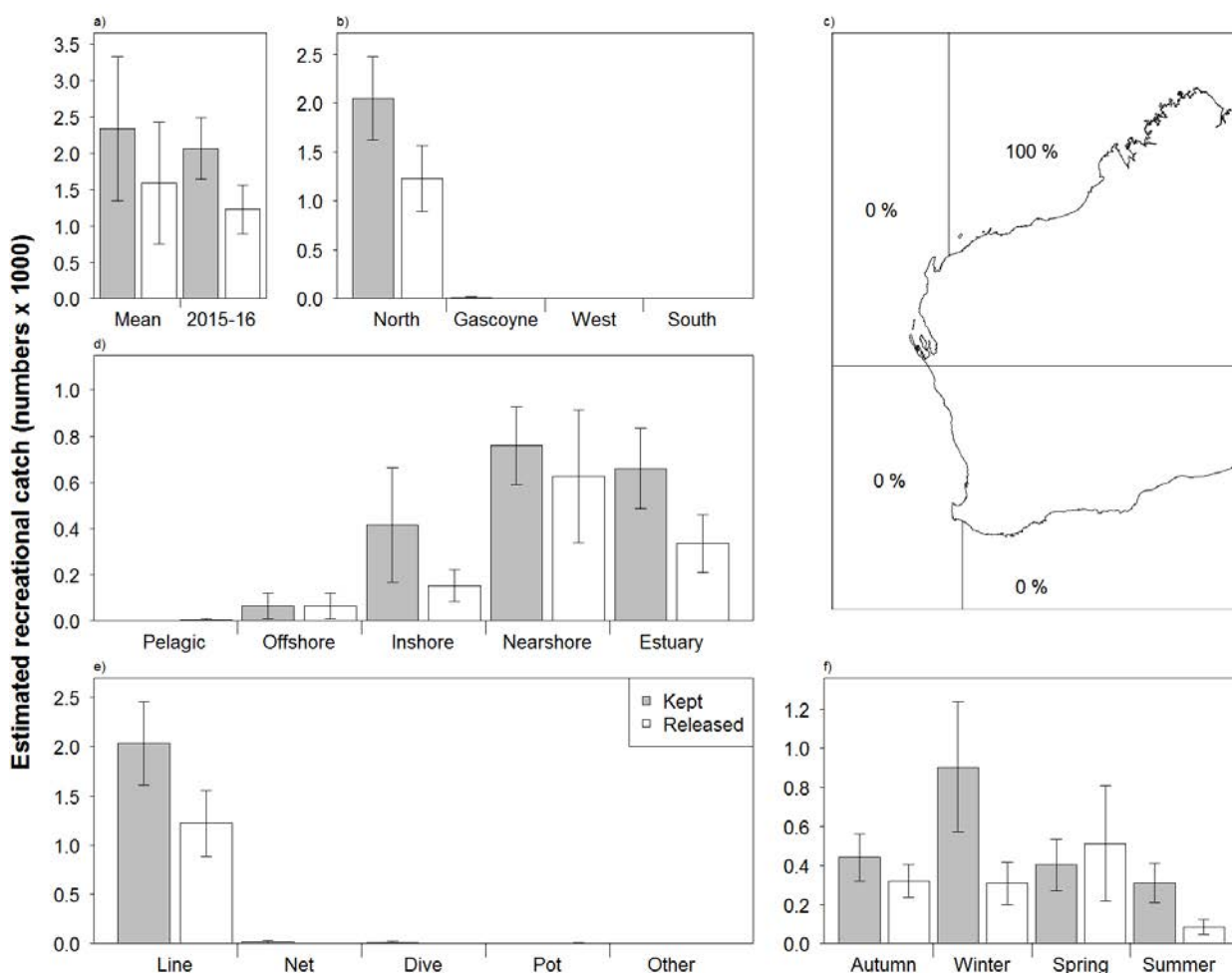
Tailor is an indicator species in the Gascoyne Coast and West Coast bioregions. Most boat-based recreational catches of Tailor occurred in the West Coast, with some catches in the Gascoyne Coast and South Coast (kept only, Figure 32b and c). The majority of catches were retained (41% released; Table 5, Figure 32a) with most releases attributed to "Under Size" (Table 7). Catches were taken predominantly from nearshore (52%; Figure 32d). Tailor were harvested throughout the year, with higher catches in summer (48%) compared with spring (27%), autumn (20%) and winter (5%; Figure 32f). Catches were mostly taken by line fishing (96%; Figure 32e). The estimated kept and released recreational catches of Tailor were lower in 2015/16 compared with previous statewide surveys (Figure 32a, Table 5).



**Figure 32.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Tailor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.6 Blue Threadfin (*Eleutheronema tetradactylum*)

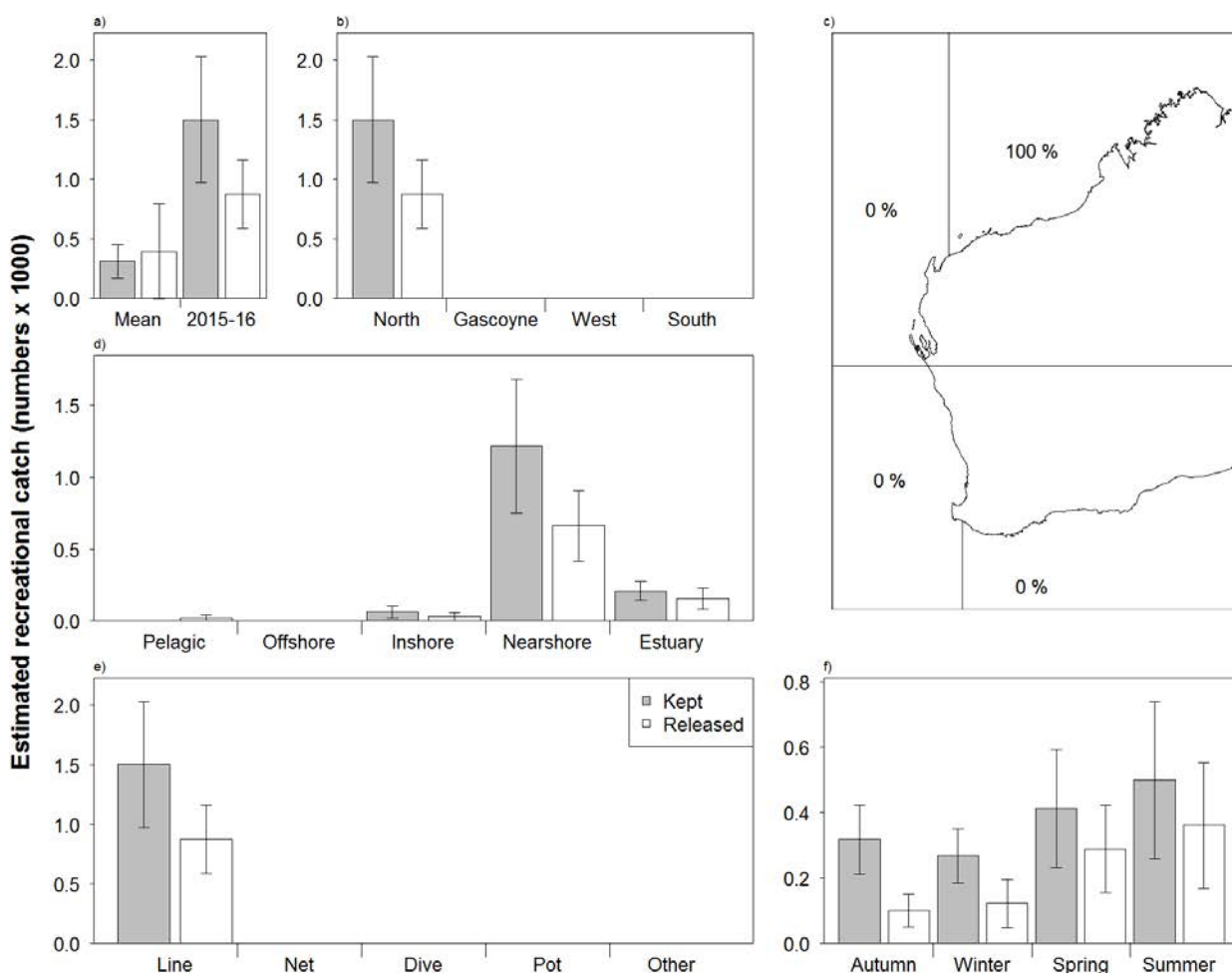
Blue Threadfin is an indicator species in the North Coast bioregion. Most boat-based recreational catches of Blue Threadfin occurred in the North Coast (kept only, Figure 33b and c). The majority of catches were retained (37% released; Table 5, Figure 33a) with most releases attributed to "Under Size" and "Over Limit" (Table 7). Catches were taken predominantly from nearshore (42%) and estuary (30%; Figure 33d). Blue Threadfin were harvested throughout the year, with higher catches in winter (37%) compared with spring (28%), autumn (23%) and summer (12%; Figure 33f). All catches were taken by line fishing (Figure 33e). The estimated kept and released recreational catches of Blue Threadfin were similar in 2015/16 compared with previous statewide surveys (Figure 33a, Table 5).



**Figure 33.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Blue Threadfin in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.7 King Threadfin (*Polydactylus macrochir*)

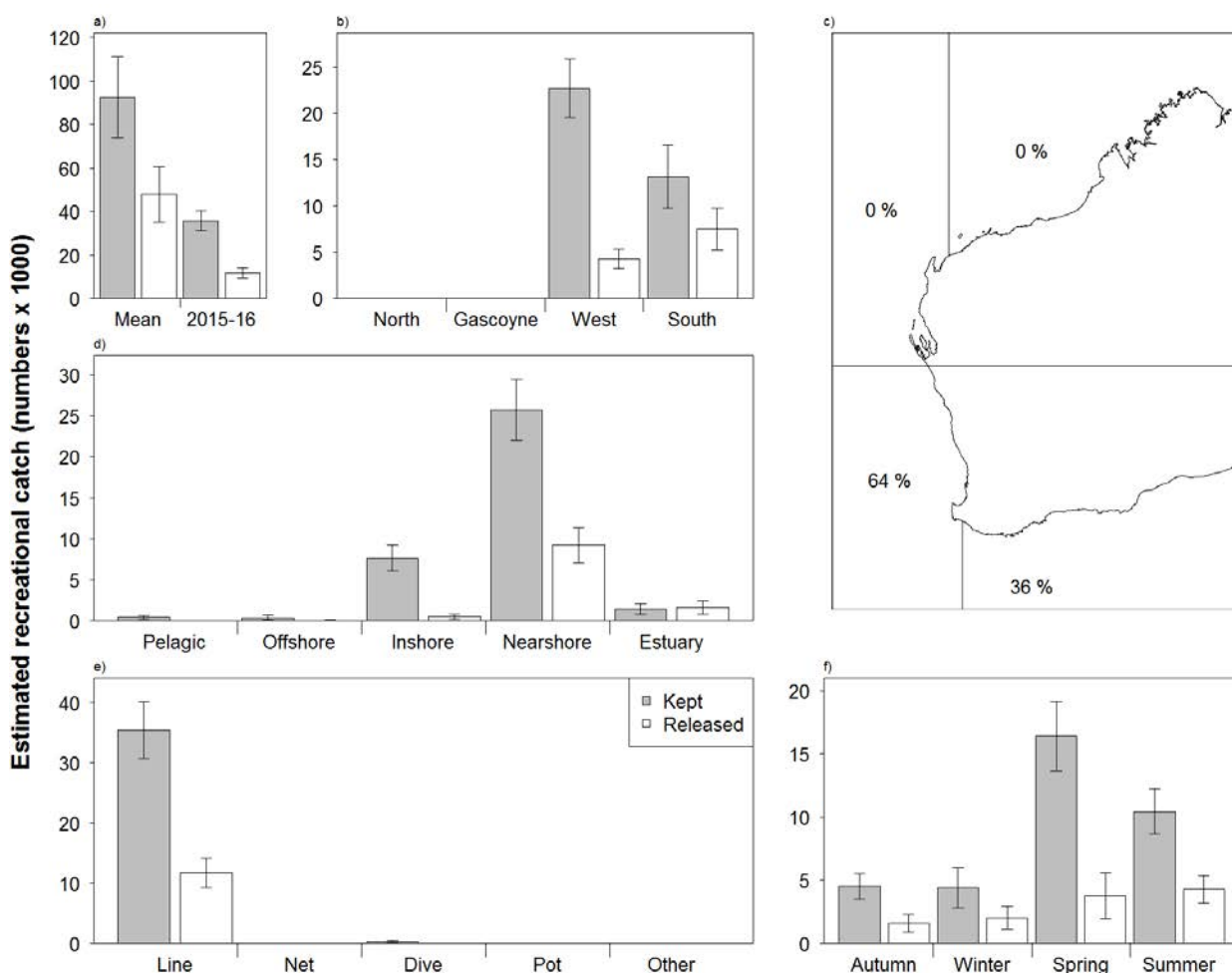
King Threadfin is an indicator species in the North Coast bioregion. All boat-based recreational catches of King Threadfin occurred in the North Coast (kept only, Figure 34b and c). The majority of catches were retained (37% released; Table 5, Figure 34a) with most releases attributed to "Under Size" (Table 7). Catches were taken predominantly from nearshore (79%; Figure 34d). King Threadfin were harvested throughout the year, with higher catches in spring (30%) and summer (36%) compared with autumn (18%) and winter (16%; Figure 34f). All catches were taken by line fishing (Figure 34e). The estimated kept and released recreational catches of King Threadfin were higher in 2015/16 compared with previous statewide surveys (Figure 34a, Table 5).



**Figure 34.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of King Threadfin in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.2.8 King George Whiting (*Sillaginodes punctata*)

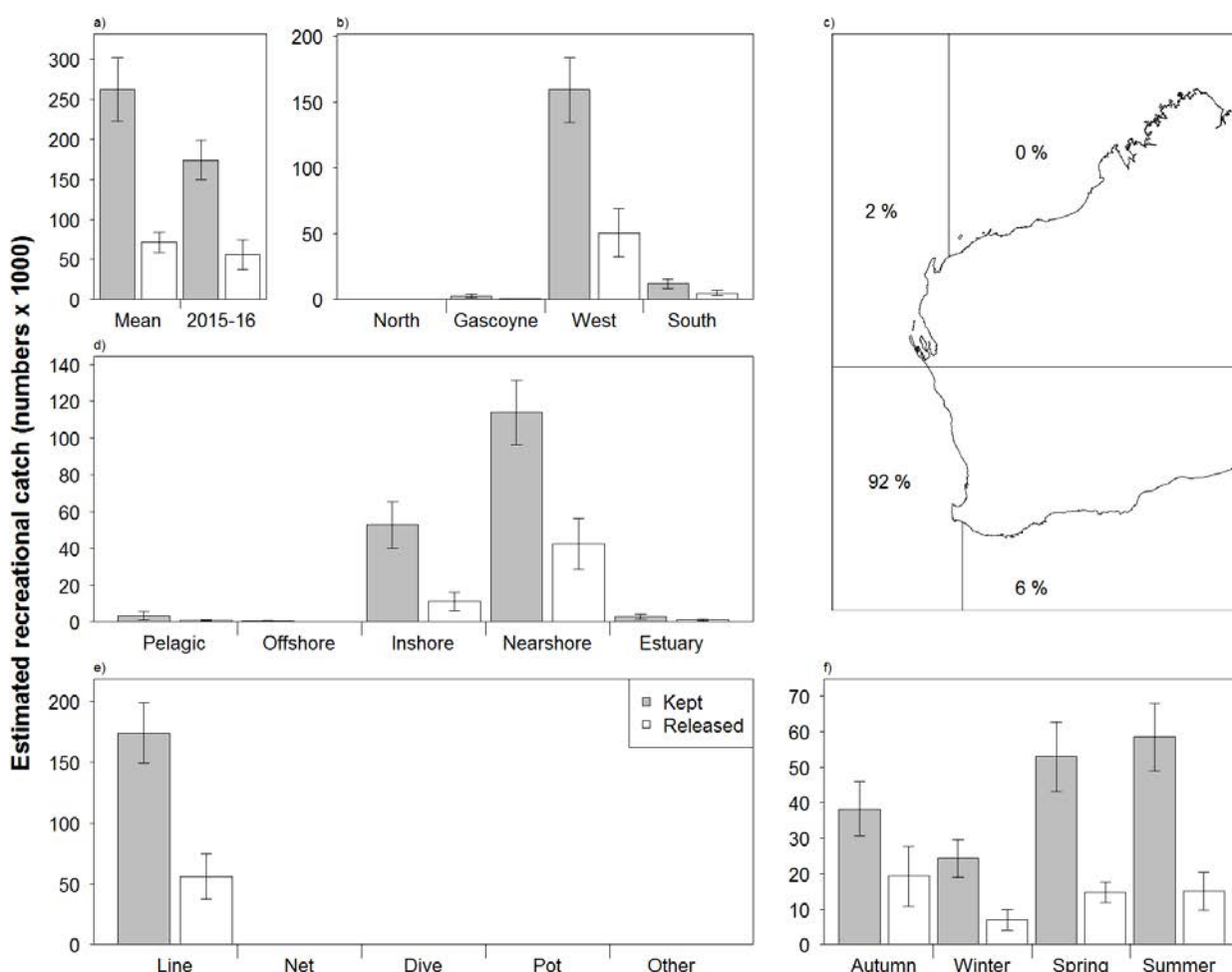
Whiting species, including King George Whiting, are indicator species in the Gascoyne Coast, South Coast and West Coast bioregions. Most boat-based recreational catches of King George Whiting occurred in the West Coast, followed by the South Coast (kept only, Figure 35b and c). The majority of catches were retained (25% released; Table 5, Figure 35a) with most releases attributed to "Under Size" (Table 7). Catches were taken predominantly from nearshore (74%; Figure 35d). King George Whiting were harvested throughout the year, with higher catches in spring (42%) and summer (31%) compared with autumn (13%) and winter (14% Figure 35f). All catches were taken by line fishing (Figure 35e). The estimated kept and released recreational catches of King George Whiting were lower in 2015/16 compared with previous statewide surveys (Figure 35a, Table 5).



**Figure 35.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of King George Whiting in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.9 School Whiting (*Sillago bassensis*, *vittata* and *schomburgkii*)

Whiting species, including School and Yellowfin Whiting, are indicator species in the Gascoyne Coast, South Coast and West Coast bioregions. School Whiting includes Southern School Whiting (*Sillago bassensis*), Western School Whiting (*S. vittata*) and Yellowfin Whiting (*S. schomburgkii*). Most boat-based recreational catches of School Whiting occurred in the West Coast, with some catches in the Gascoyne Coast and South Coast (kept only, Figure 36b and c). The majority of catches were retained (24% released; Table 5, Figure 36a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Catches were taken predominantly from nearshore (68%; Figure 36d). School Whiting were harvested throughout the year, with higher catches in spring (29%), summer (32%) and autumn (25%) compared with winter (14%; Figure 36f). All catches were taken by line fishing (Figure 36e). The estimated kept recreational catch of School Whiting was lower in 2015/16 compared with previous statewide surveys, although the estimated released recreational catches were similar (Figure 36a, Table 5).

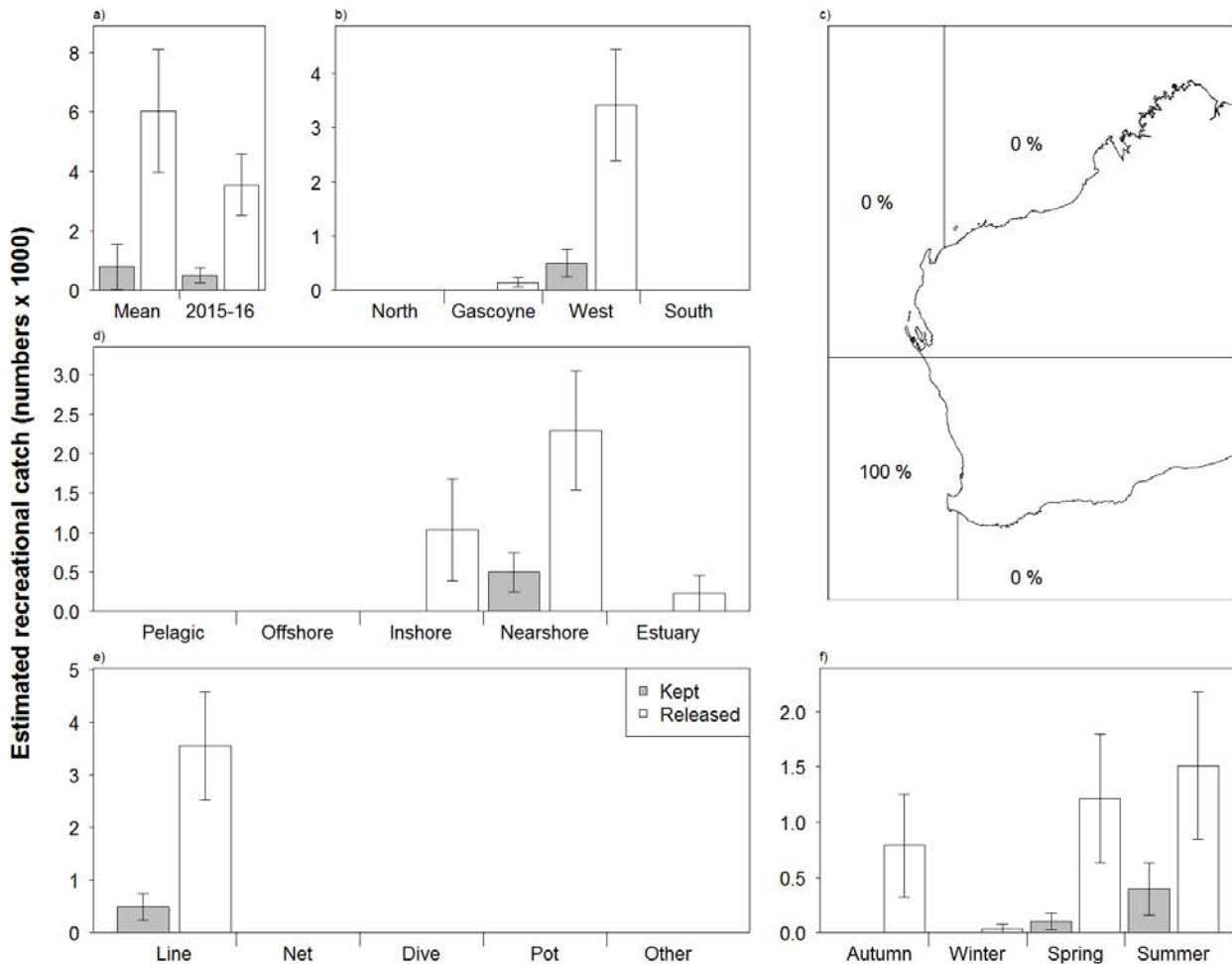


**Figure 36.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of School Whiting in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



### 6.2.10 Western Trumpeter Whiting (*Sillago berrus*)

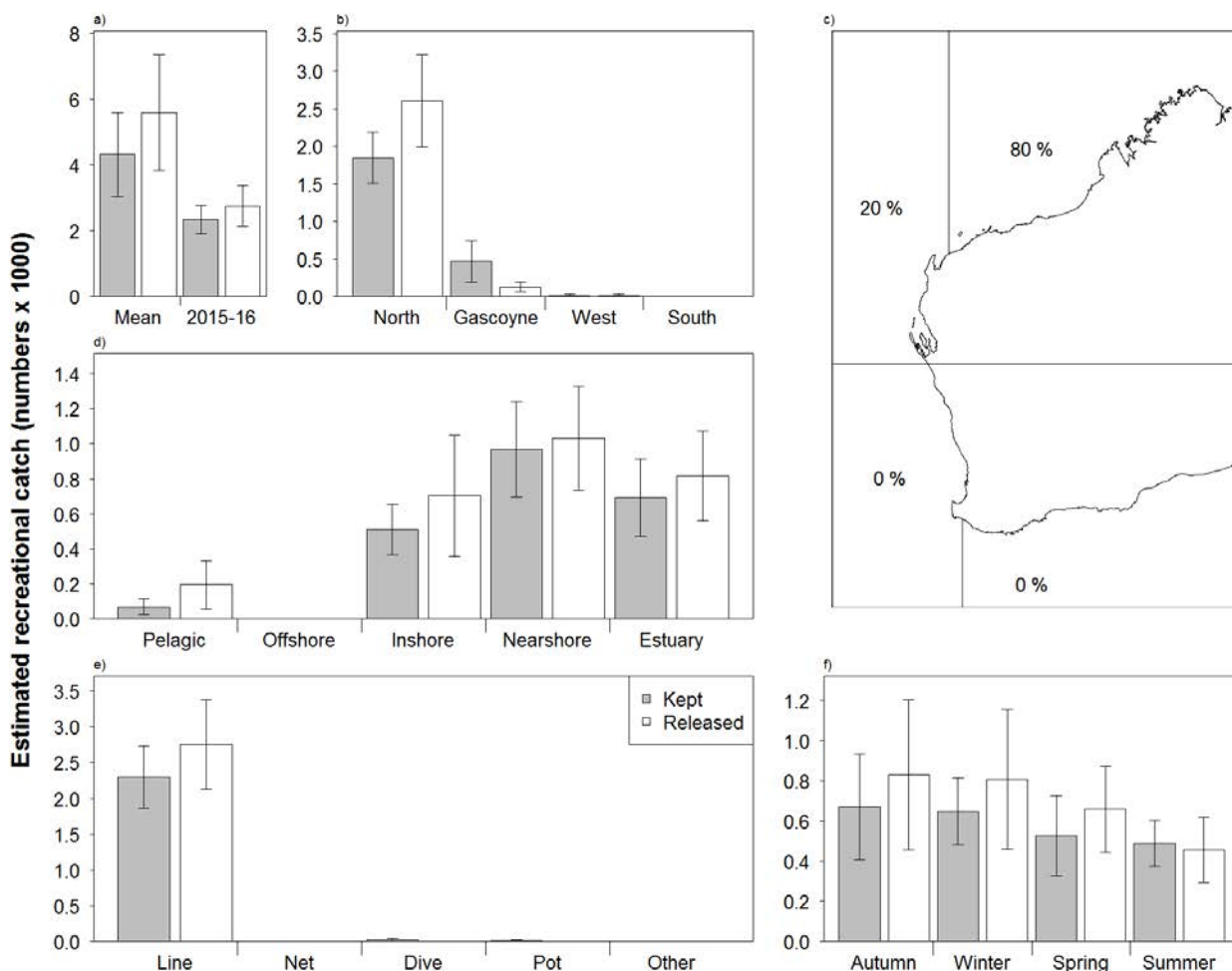
Most boat-based recreational catches of Western Trumpeter Whiting occurred in the West Coast (kept only, Figure 37b and c). The majority of catches were released (88%; Table 5, Figure 37a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (69%; Figure 37d). Western Trumpeter Whiting were mostly harvested in summer (47%), followed by spring (32%) and autumn (20%; Figure 37f). All catches were taken by line fishing (Figure 37e). The estimated kept and released recreational catches of Western Trumpeter Whiting were similar in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 37a, Table 5).



**Figure 37.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western Trumpeter Whiting in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.11 Mangrove Jack (*Lutjanus argentimaculatus*)

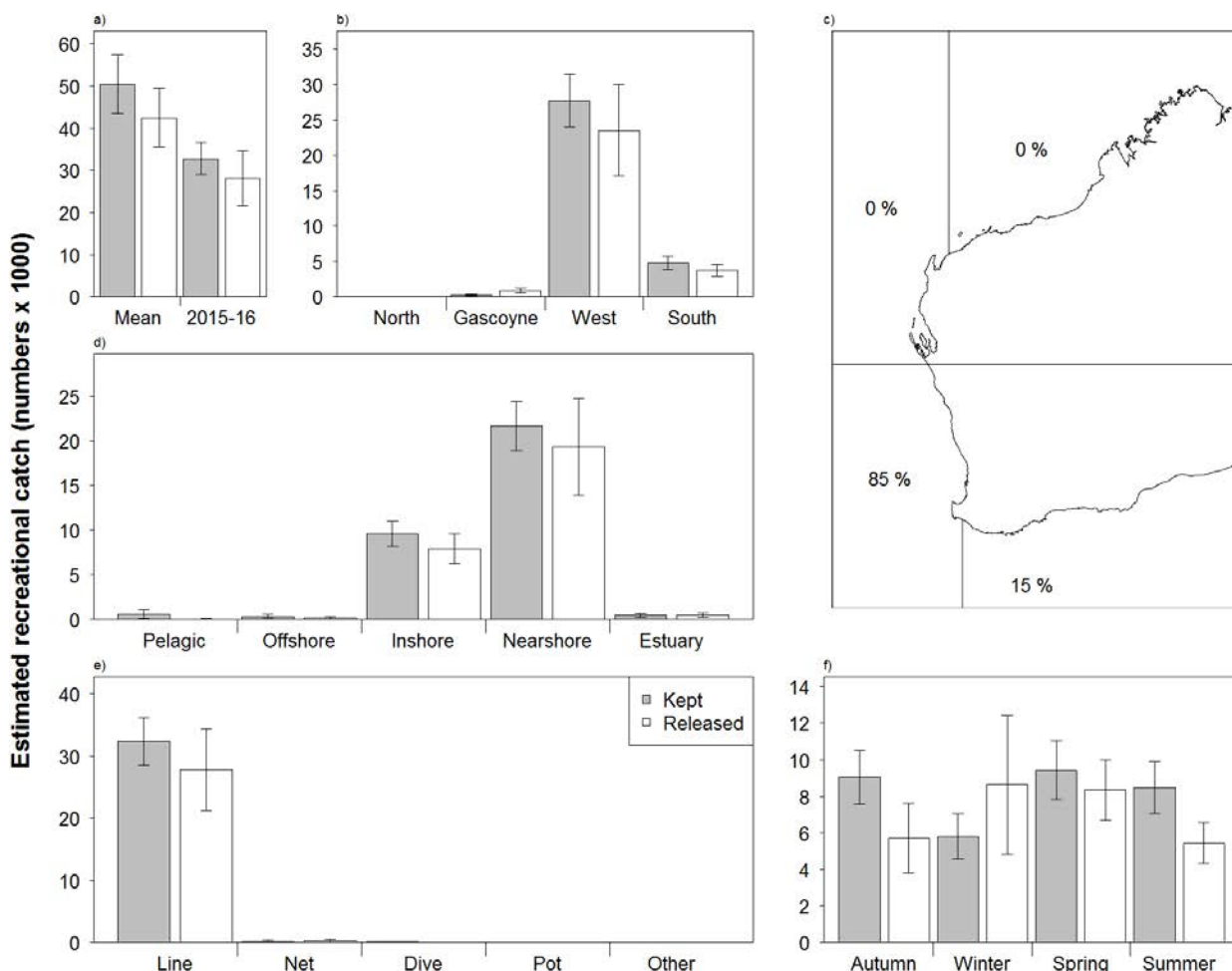
Mangrove Jack is an indicator species in the North Coast bioregion. Most boat-based recreational catches of Mangrove Jack occurred in the North Coast, with some catches in the Gascoyne Coast (kept only, Figure 38b and c). Almost half of all catches were retained (54% released; Table 5, Figure 38a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (39%) and estuary (30%; Figure 38d). Mangrove Jack were harvested throughout the year, with higher catches in autumn (29%), winter (29%) and spring (23%) compared with summer (19%; Figure 38f). Most catches were taken by line fishing (99%; Figure 38e). The estimated kept and released recreational catches of Mangrove Jack were lower in 2015/16 compared with previous statewide surveys (Figure 38a, Table 5).



**Figure 38.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Mangrove Jack in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.12 Silver Trevally (*Pseudocaranx* spp. complex)

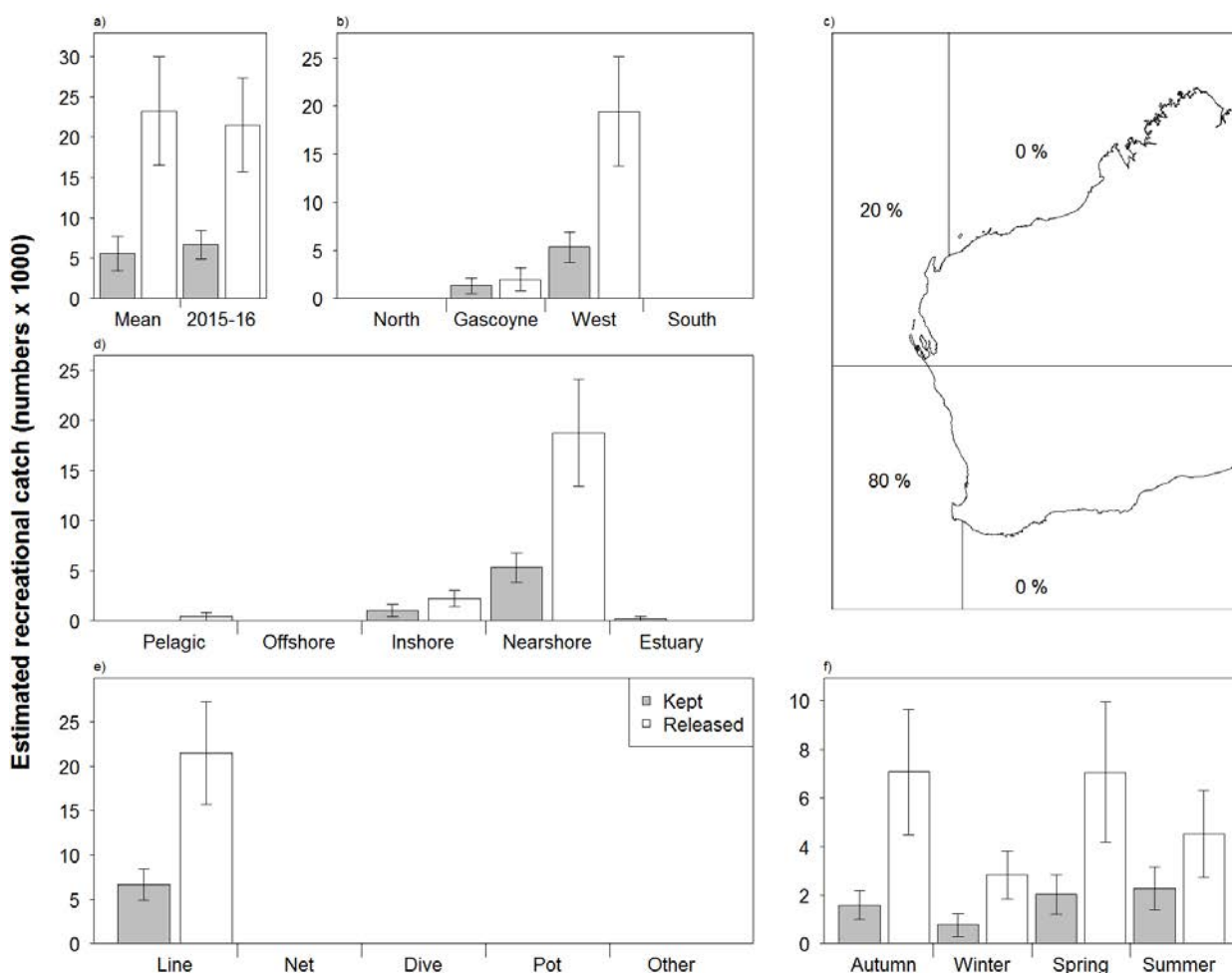
Most boat-based recreational catches of Silver Trevally occurred in the West Coast, with some catches in the South Coast (kept only, Figure 39b and c). More than half of all catches were kept (46% released; Table 5, Figure 39a) with most releases attributed to “Too Many” (Table 7). Catches were taken predominantly from nearshore (67%; Figure 39d). Silver Trevally were harvested throughout the year, with similar catches in spring (29%), summer (23%), autumn (24%) and winter (24%; Figure 39f). Catches were mostly taken by line fishing (99%; Figure 39e). The estimated kept and released recreational catches of Silver Trevally were lower in 2015/16 compared with previous statewide surveys (Figure 39a, Table 5).



**Figure 39.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Silver Trevally in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.13 Western Butterfish (*Pentapodus vitta*)

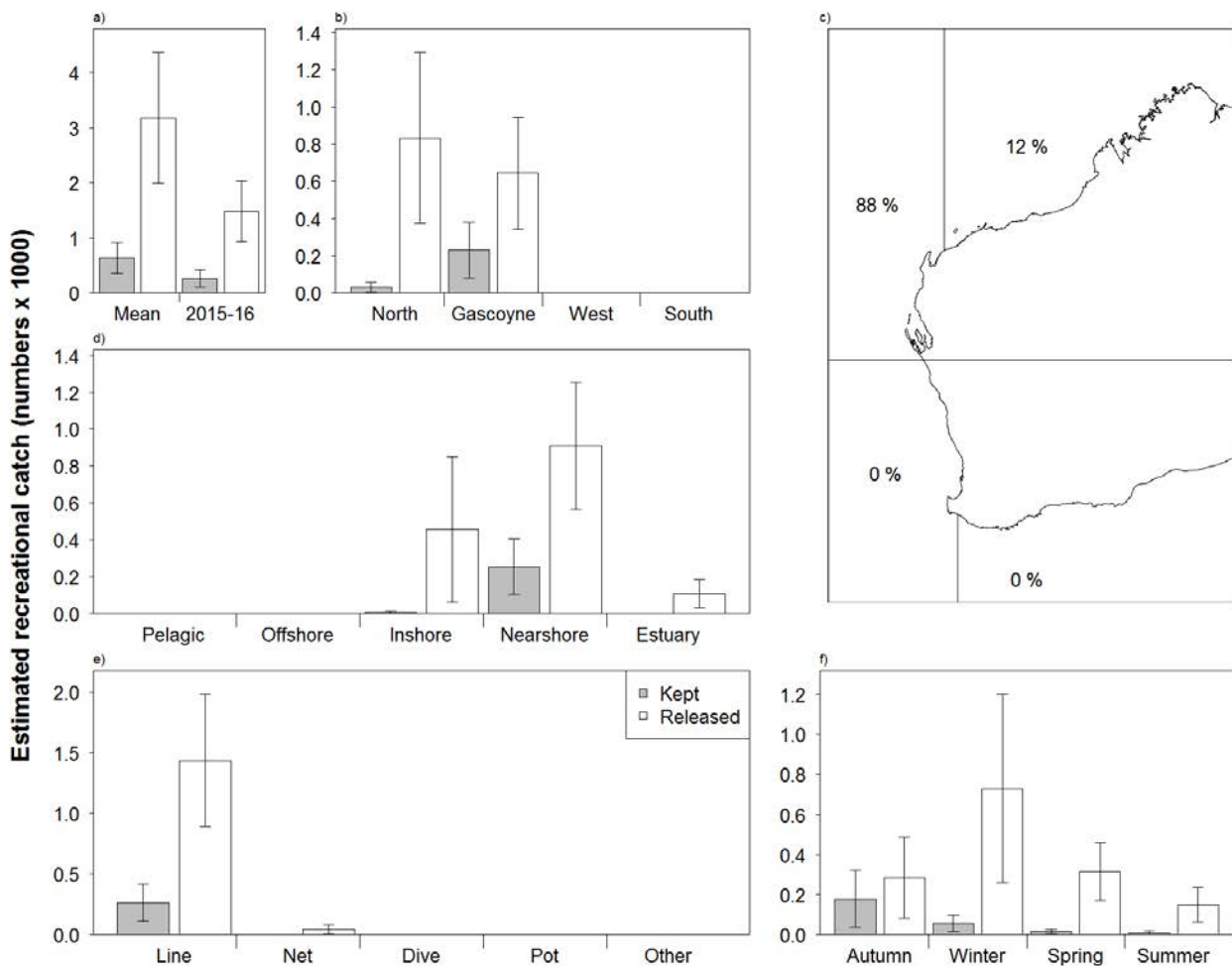
Most boat-based recreational catches of Western Butterfish occurred in the West Coast, with some catches in the Gascoyne Coast (kept only, Figure 40b and c). The majority of catches were released (76%; Table 5, Figure 40a) with most releases attributed to “Other” and “Too Many” (Table 7). Catches were taken predominantly from nearshore (86%; Figure 40d). Western Butterfish were harvested throughout the year, with higher catches in spring (32%), summer (24%) and autumn (31%) compared with winter (13%; Figure 40f). All catches were taken by line fishing (Figure 40e). The estimated kept and released recreational catches of Western Butterfish were similar in 2015/16 compared with previous statewide surveys (Figure 40a, Table 5).



**Figure 40.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western Butterfish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.14 Western Yellowfin Bream (*Acanthopagrus morrisoni*)

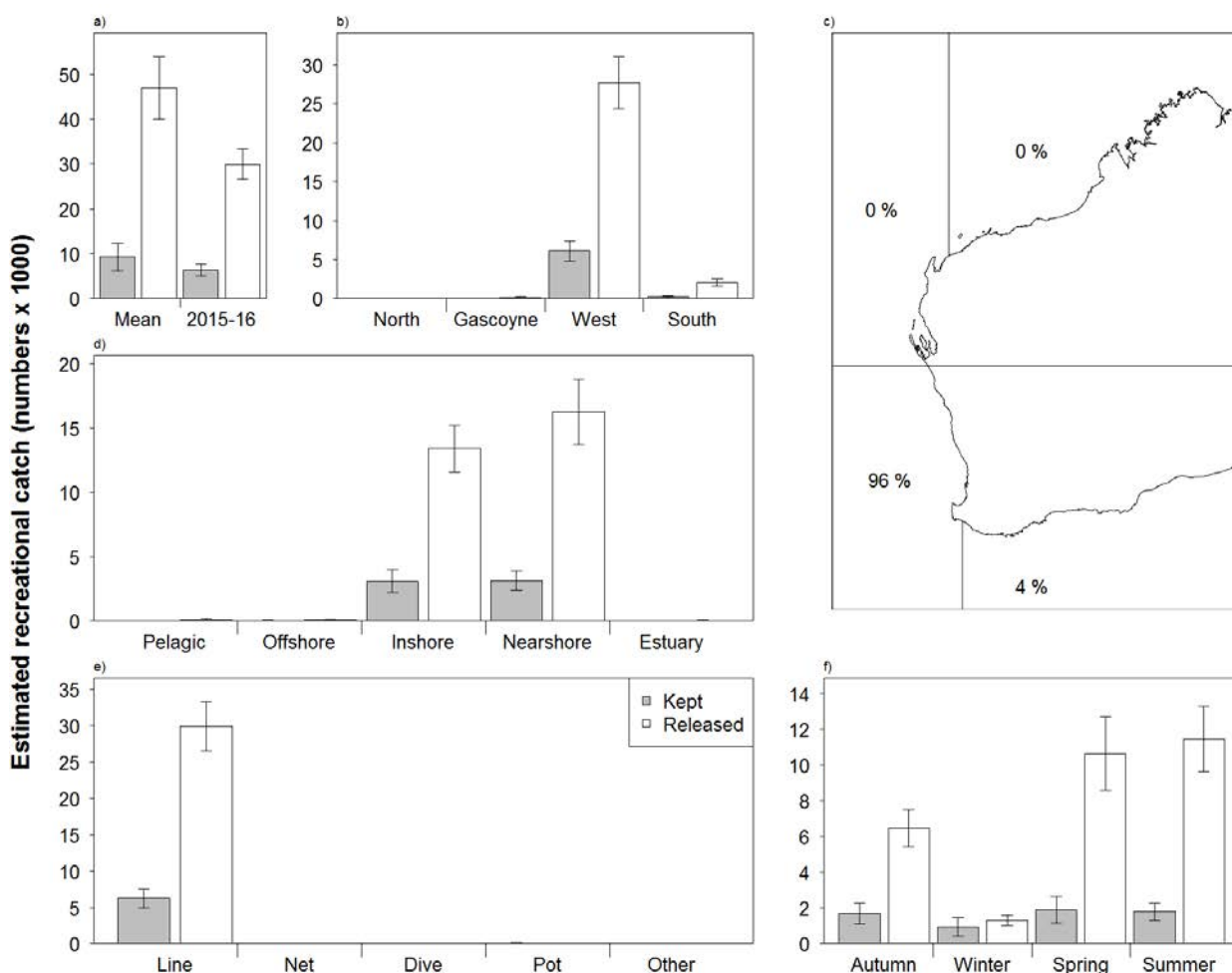
Most boat-based recreational catches of Western Yellowfin Bream occurred in the Gascoyne Coast, with some catches in the North Coast (kept only, Figure 41b and c). The majority of catches were released (85%; Table 5, Figure 41a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (67%; Figure 41d). Western Yellowfin Bream were harvested throughout the year, with higher catches in winter (45%) compared with autumn (27%), spring (19%) and summer (9%; Figure 41f). Most catches were taken by line fishing (98%; Figure 41e). The estimated kept and released recreational catches of Western Yellowfin Bream were lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 41a, Table 5).



**Figure 41.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western Yellowfin Bream in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.15 Western King Wrasse (*Coris auricularis*)

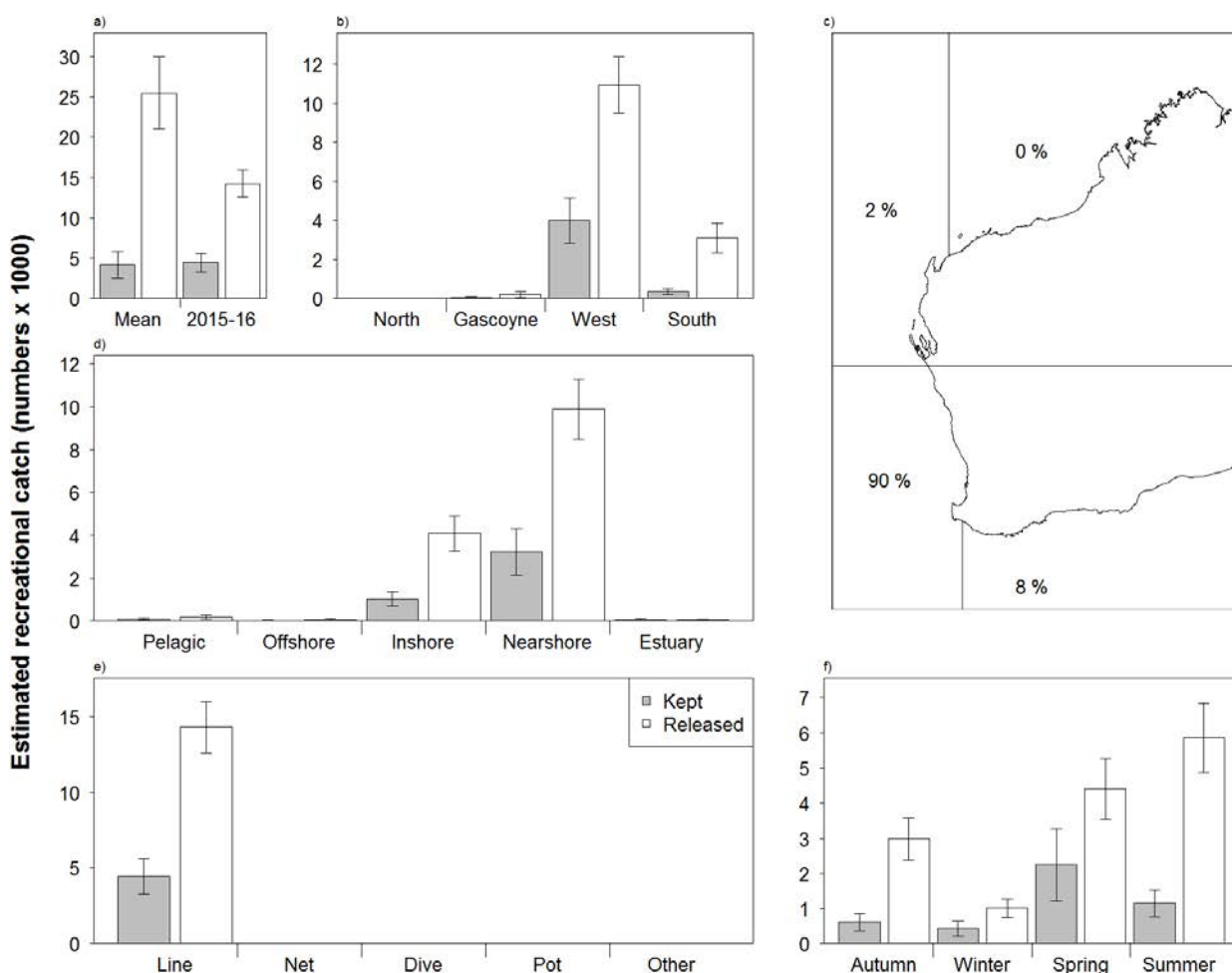
Most boat-based recreational catches of Western King Wrasse occurred in the West Coast, with some catches in the South Coast (kept only, Figure 42b and c). The majority of catches were released (83%; Table 5, Figure 42a) with most releases attributed to “Other” (Table 7). Catches were taken predominantly from nearshore (54%) and inshore demersal (46%; Figure 42d). Western King Wrasse were harvested throughout the year, with higher catches in spring (35%), summer (37%) and autumn (23%) compared with winter (6%; Figure 42f). All catches were taken by line fishing (Figure 42e). The estimated kept recreational catch of Western King Wrasse was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 42a, Table 5).



**Figure 42.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western King Wrasse in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.2.16 Brownspotted Wrasse (*Notolabrus parilus*)

Most boat-based recreational catches of Brownspotted Wrasse occurred in the West Coast, with some catches in the Gascoyne Coast and South Coast (kept only, Figure 43b and c). The majority of catches were released (76%; Table 5, Figure 43a) with most releases attributed to “Other” (Table 7). Catches were taken predominantly from nearshore (70%; Figure 43d). Brownspotted Wrasse were harvested throughout the year, with higher catches in spring (36%) and summer (37%) compared with autumn (19%) and winter (8%; Figure 43f). The estimated kept recreational catch of Brownspotted Wrasse was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 43a, Table 5).

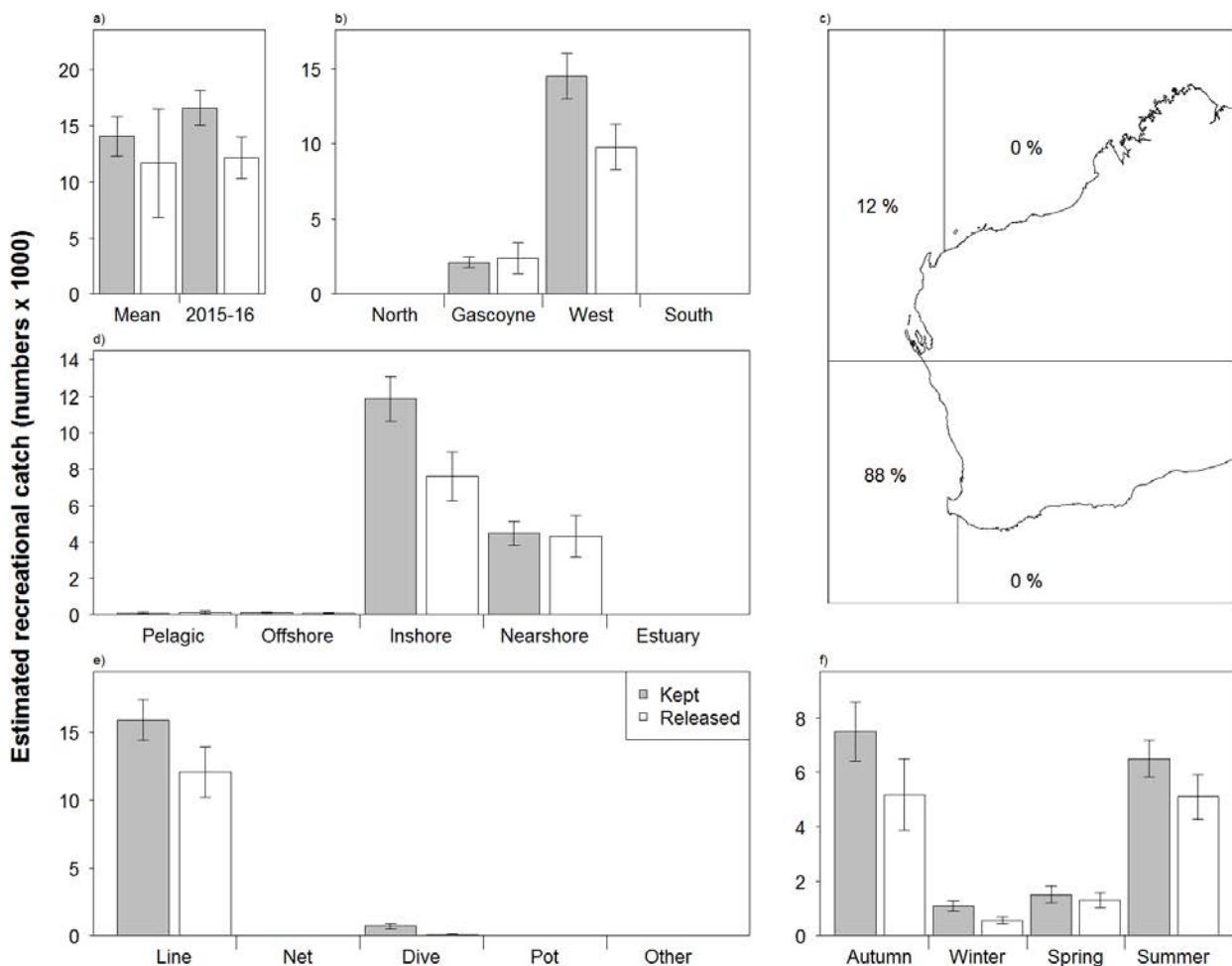


**Figure 43.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Brownspotted Wrasse in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.3 Inshore Demersal

### 6.3.1 Baldchin Groper (*Choerodon rubescens*)

Baldchin Groper is an indicator species in the West Coast bioregion. Most boat-based recreational catches of Baldchin Groper occurred in the West Coast, with some catches in the Gascoyne Coast (kept only, Figure 44b and c). The majority of catches were retained (42% released; Table 5, Figure 44a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (68%; Figure 44d). Baldchin Groper were harvested throughout the year, with higher catches in summer (41%) and autumn (44%) compared with spring (10%) and winter (6%; Figure 44f). Most catches were taken by line fishing (97%; Figure 44e). The estimated kept and released recreational catches of Baldchin Groper were similar in 2015/16 compared with previous statewide surveys (Figure 44a, Table 5).

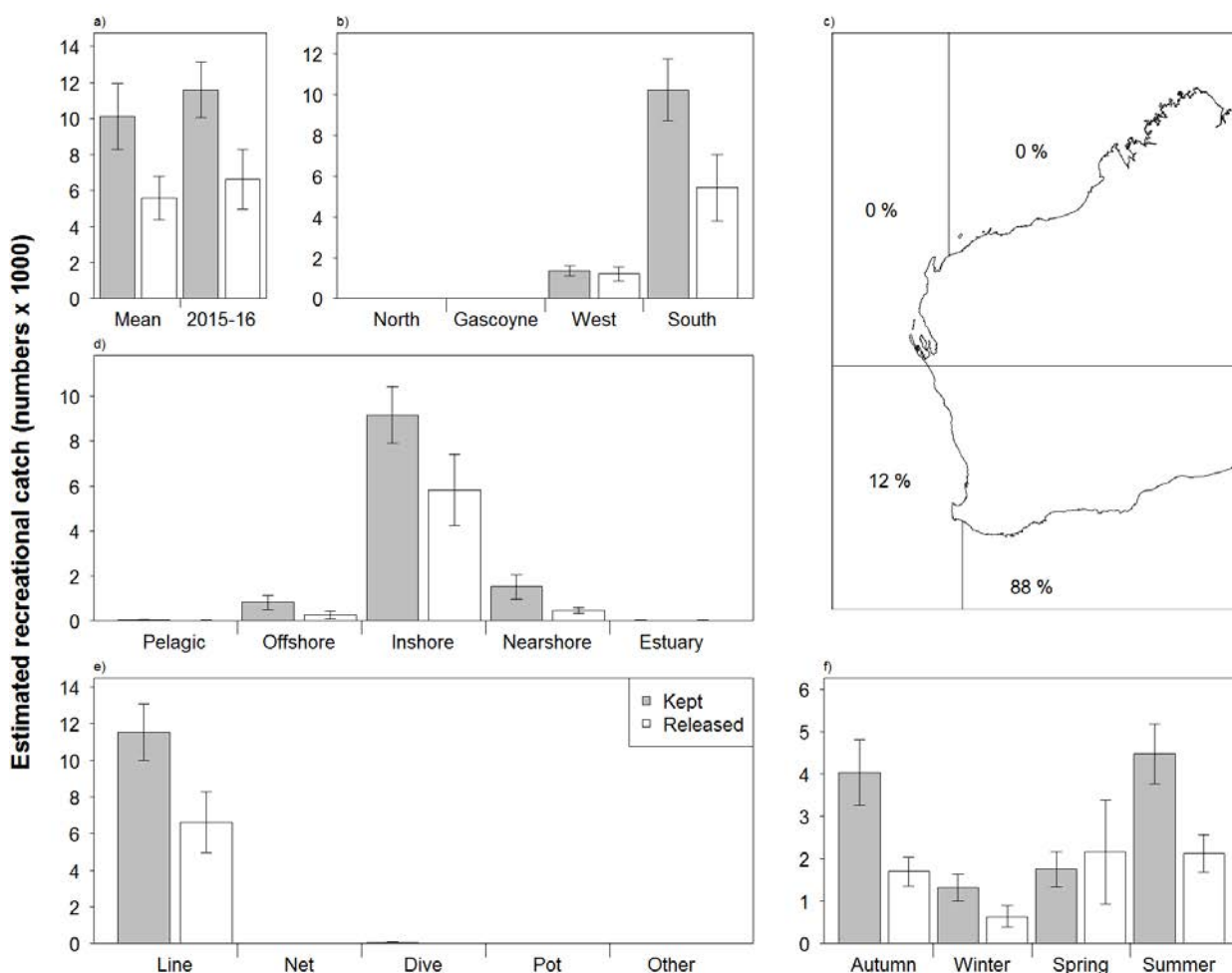


**Figure 44.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Baldchin Groper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



### 6.3.2 Bight Redfish (*Centroberyx gerrardi*)

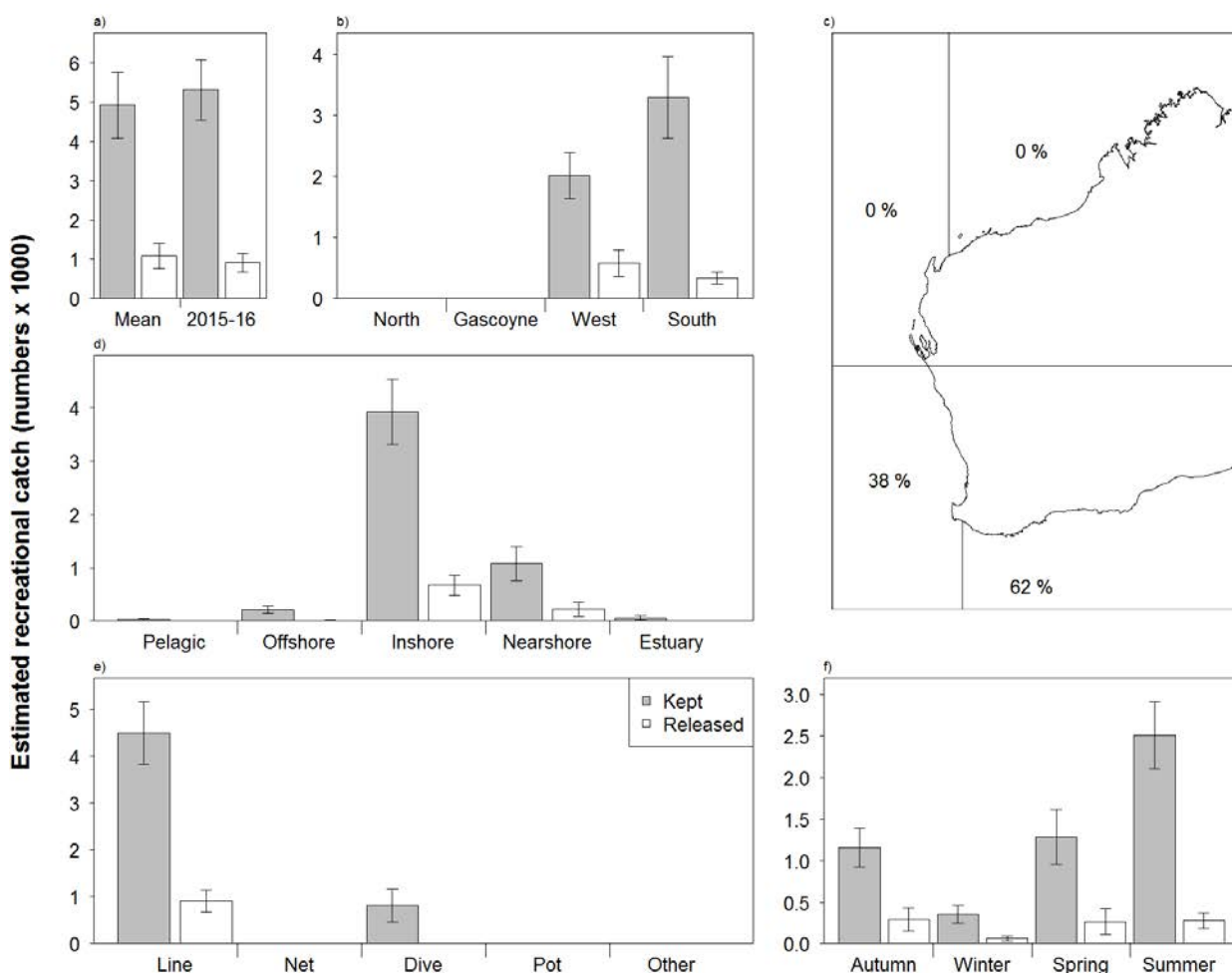
Bight Redfish is an indicator species in the West and South Coast bioregions. Most boat-based recreational catches of Bight Redfish occurred in the South Coast, with some catches in the West Coast (kept only, Figure 45b and c). The majority of catches were retained (36% released; Table 5, Figure 45a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (82%; Figure 45d). Bight Redfish were harvested throughout the year, with higher catches in summer (36%) and autumn (32%) compared with winter (11%) and spring (21%; Figure 45f). All catches were taken by line fishing (Figure 45e). The estimated kept and released recreational catches of Bight Redfish were similar in 2015/16 compared with previous statewide surveys (Figure 45a, Table 5).



**Figure 45.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Bight Redfish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.3 Blue Morwong (*Nemadactylus valenciennesi*)

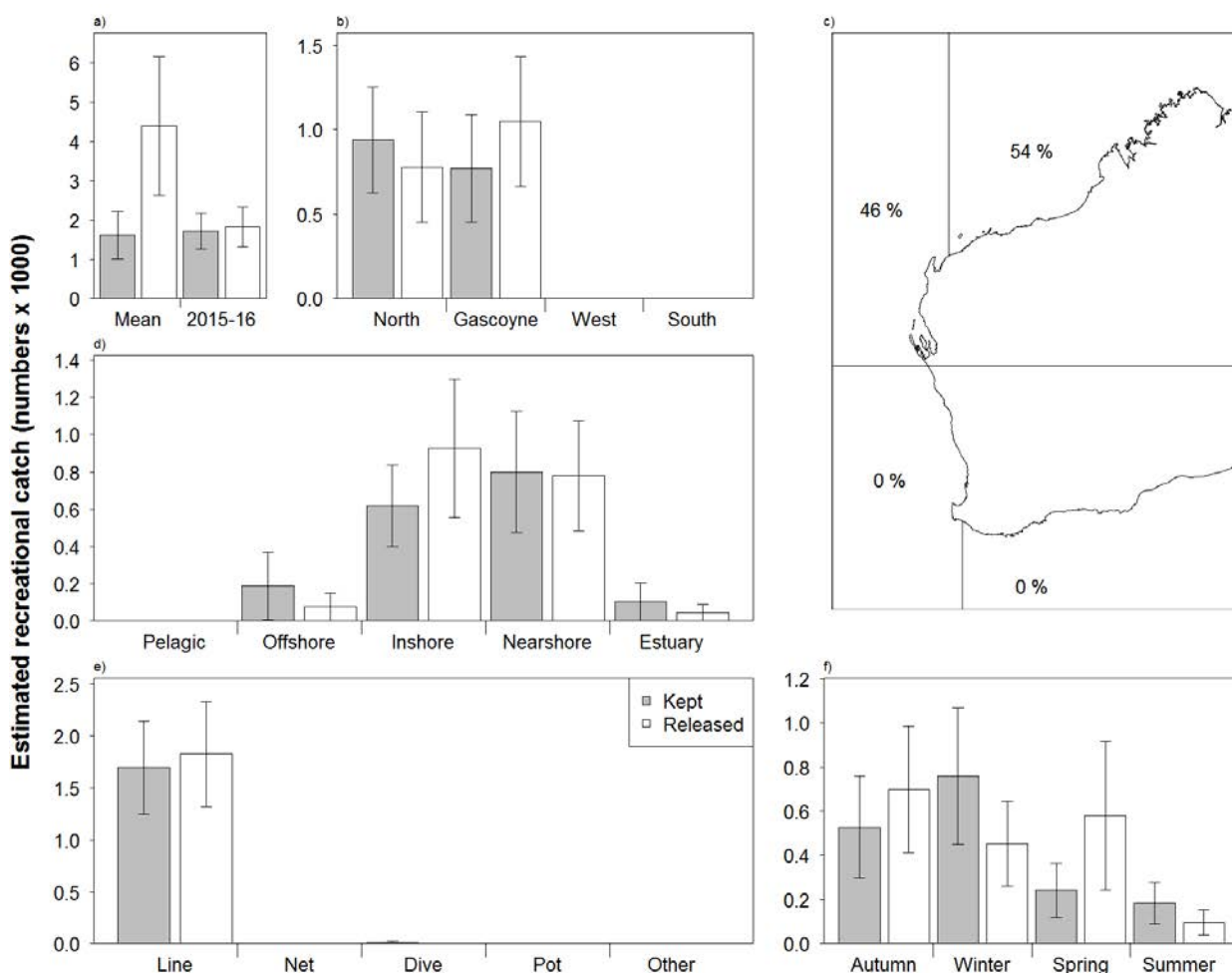
Blue Morwong is an indicator species in the South Coast bioregion. Most boat-based recreational catches of Blue Morwong occurred in the South Coast, followed by the West Coast (kept only, Figure 46b and c). The majority of catches were retained (15% released; Table 5, Figure 46a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (74%; Figure 46d). Blue Morwong were harvested throughout the year, with higher catches summer (45%) compared with spring (25%), autumn (23%) and winter (7%; Figure 46f). Most catches were taken by line fishing (87%), with some fishing from diving (13%; Figure 46e). The estimated kept and released recreational catches of Blue Morwong were similar in 2015/16 compared with previous statewide surveys (Figure 46a, Table 5).



**Figure 46.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Blue Morwong in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.4 Bluespotted Emperor (*Lethrinus punctulatus*)

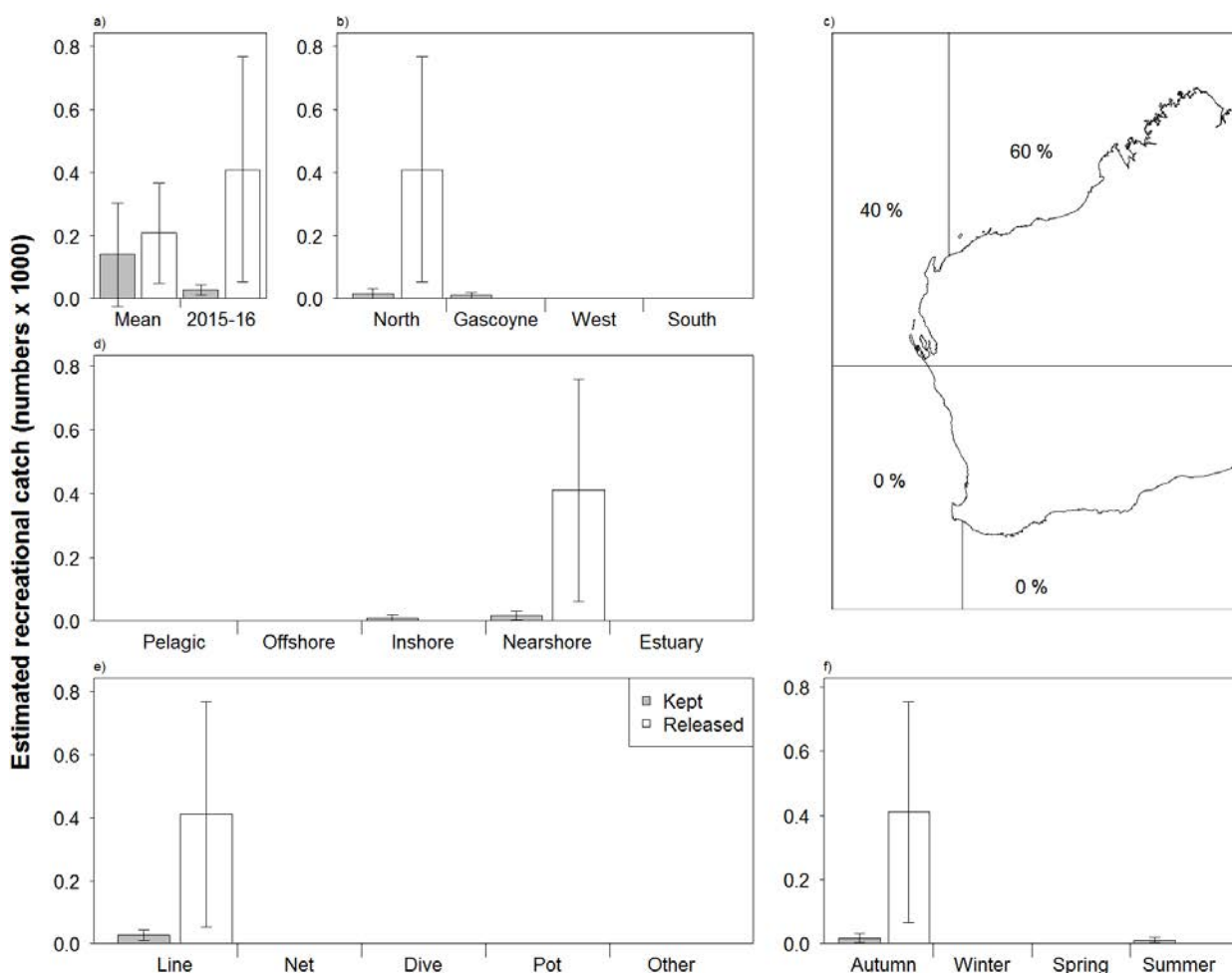
Bluespotted Emperor is an indicator species in the North Coast bioregion. Most boat-based recreational catches of Bluespotted Emperor occurred in the North Coast, followed by the Gascoyne Coast (kept only, Figure 47b and c). Almost half of all catches were retained (52% released; Table 5, Figure 47a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Catches were taken from inshore demersal (44%) and nearshore (44%; Figure 47d). Bluespotted Emperor were harvested throughout the year, with higher catches in autumn (35%) and winter (34%) compared with spring (23%) and summer (8%; Figure 47f). All catches were taken by line fishing (Figure 47e). The estimated kept recreational catch of Bluespotted Emperor was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 47a, Table 5).



**Figure 47.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Bluespotted Emperor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.5 Brownstripe Snapper (*Lutjanus vitta*)

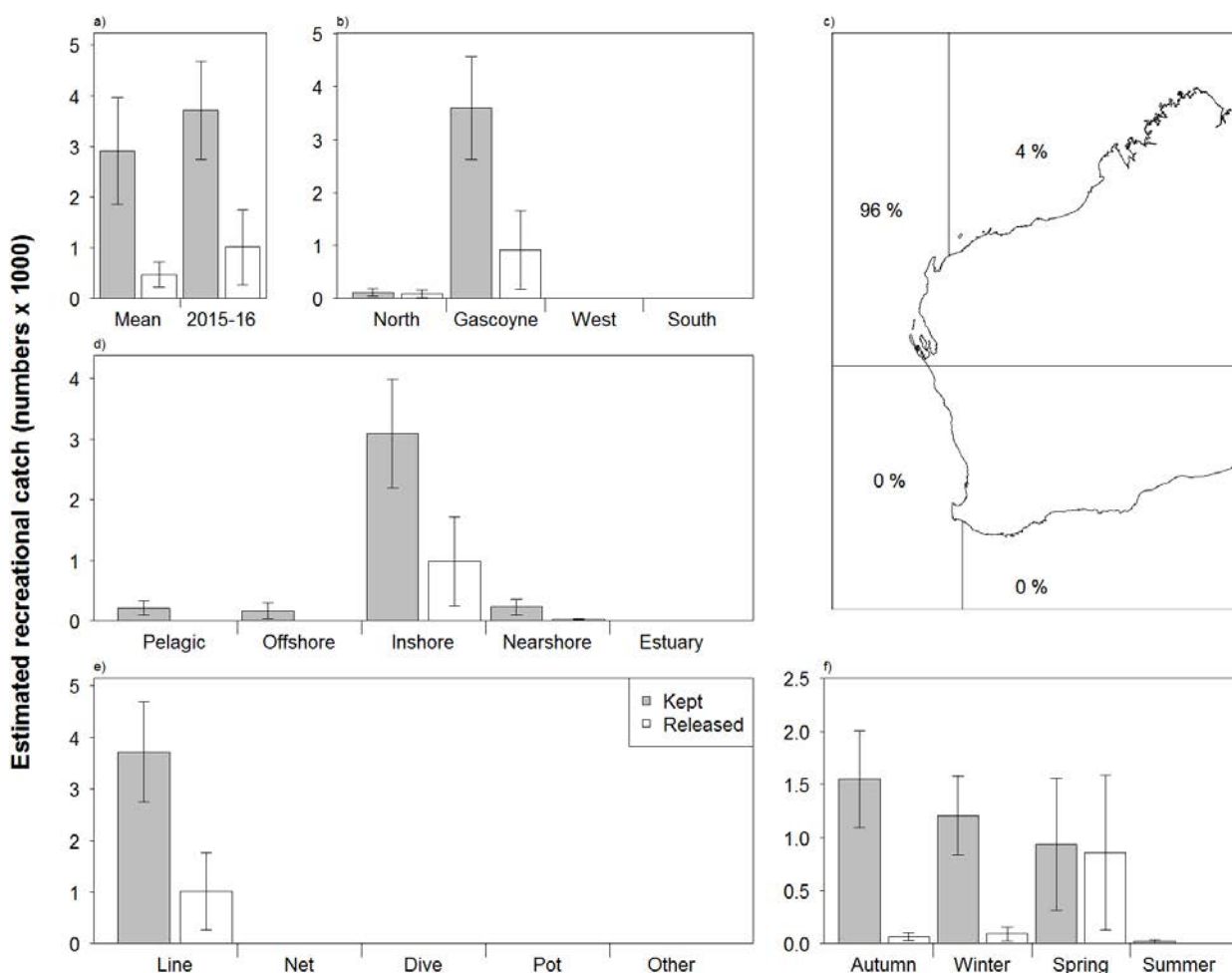
Brownstripe Snapper is an indicator species in the North Coast bioregion. Most boat-based recreational catches of Brownstripe Snapper occurred in the North Coast, followed by the Gascoyne Coast (kept only, Figure 48b and c). The majority of catches were released (94%; Table 5, Figure 48a) with most releases attributed to “Too Small” (Table 7). Catches were taken predominantly from nearshore (98%; Figure 48d). Brownstripe Snapper were harvested mostly in autumn (98%; Figure 48f). All catches were taken by line fishing (Figure 48e). The estimated kept and released recreational catches of Brownstripe Snapper were similar in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 48a, Table 5).



**Figure 48.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Brownstripe Snapper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.6 Goldband Snapper (*Pristipomoides multidens*)

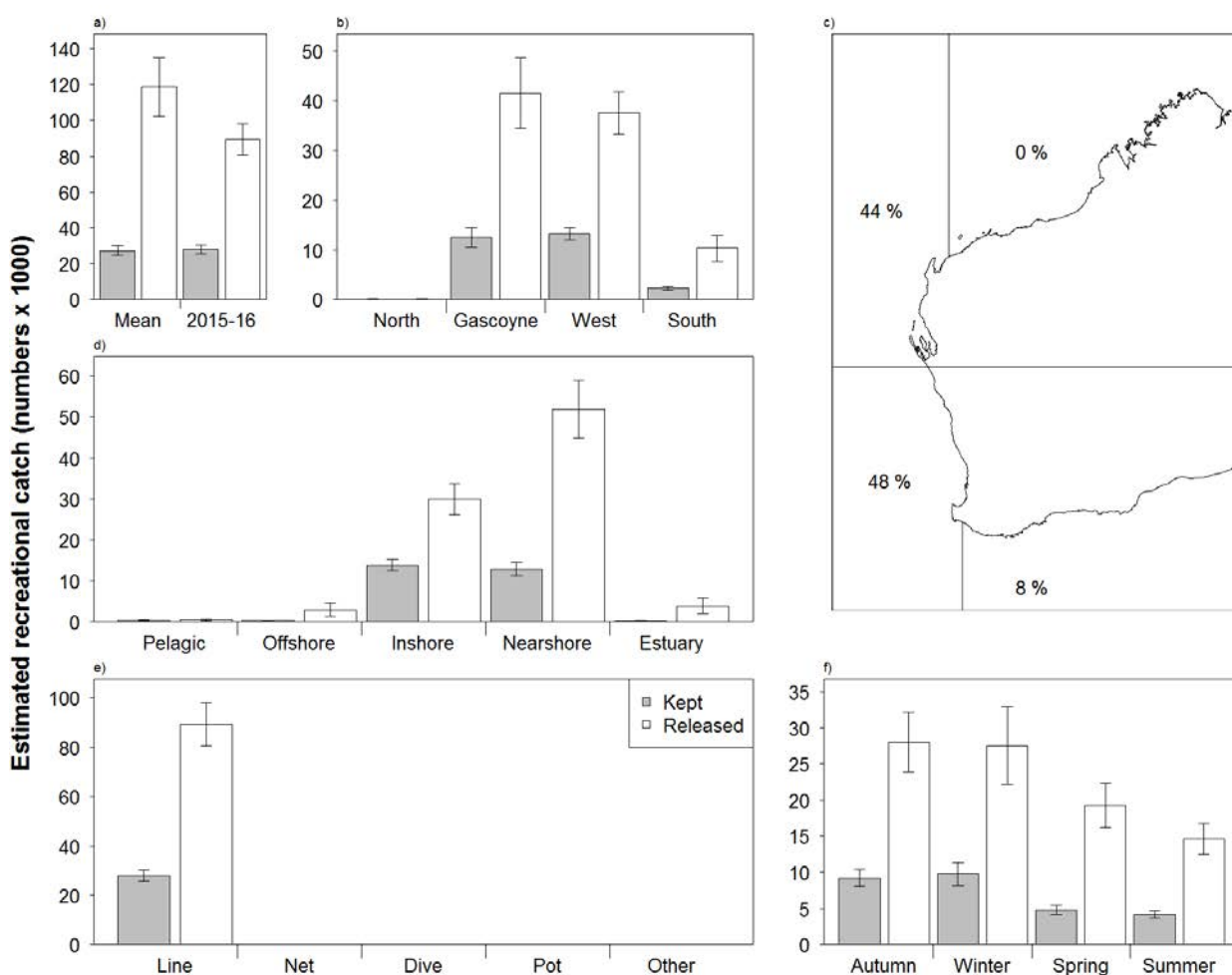
Goldband Snapper is an indicator species in the North Coast and Gascoyne Coast bioregions. Most boat-based recreational catches of Goldband Snapper occurred in the Gascoyne Coast, with some catches in the North Coast (kept only, Figure 49b and c). The majority of catches were released (94%; Table 5, Figure 49a) with most releases attributed to “Too Small” (Table 7). Catches were taken predominantly from inshore demersal (86%; Figure 49d). Goldband Snapper were harvested mostly in spring (38%) and autumn (34%) compared with winter (27%) and summer (<1%; Figure 49f). All catches were taken by line fishing (Figure 49e). The estimated kept and released recreational catches of Goldband Snapper were similar in 2015/16 compared with previous statewide surveys (Figure 49a, Table 5).



**Figure 49.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Goldband Snapper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.7 Pink Snapper (*Chrysophrys auratus*)

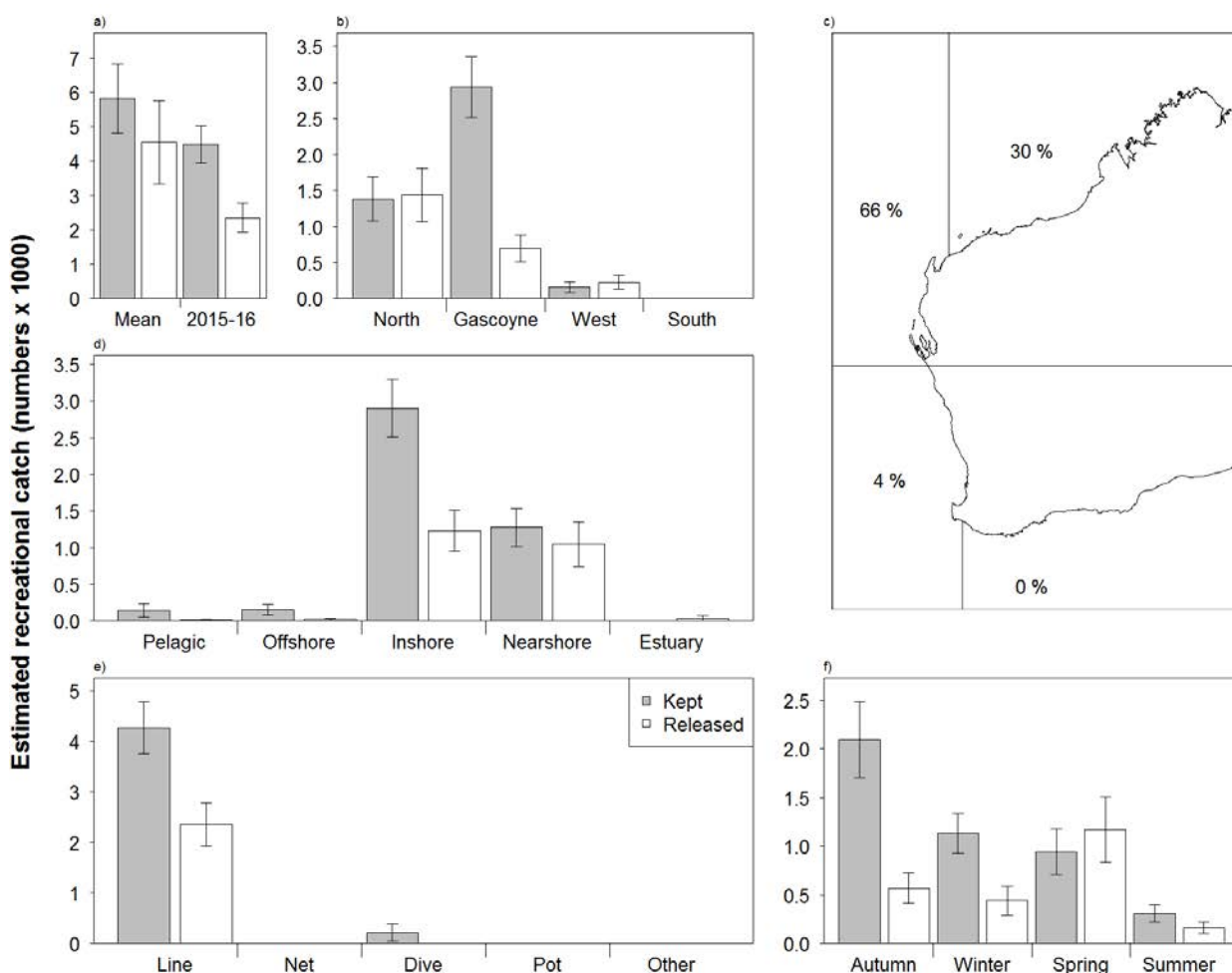
Pink Snapper is an inshore demersal indicator species in the Gascoyne Coast, West Coast and South Coast bioregions. It is also a nearshore indicator species in the Gascoyne Coast bioregion. Most boat-based recreational catches of Pink Snapper occurred in the West Coast and Gascoyne Coast, with some catches in the South Coast (kept only, Figure 50b and c). The majority of catches were released (76%; Table 5, Figure 50a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (55%) and inshore (37%; Figure 50d). Pink Snapper were harvested throughout the year, with higher catches in autumn (32%) and winter (32%) compared with spring (20%) and summer (16%; Figure 50f). All catches were taken by line fishing (Figure 50e). The estimated kept and released recreational catches of Pink Snapper were similar in 2015/16 compared with previous statewide surveys (Figure 50a, Table 5).



**Figure 50.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Pink Snapper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.8 Rankin Cod (*Epinephelus multinotatus*)

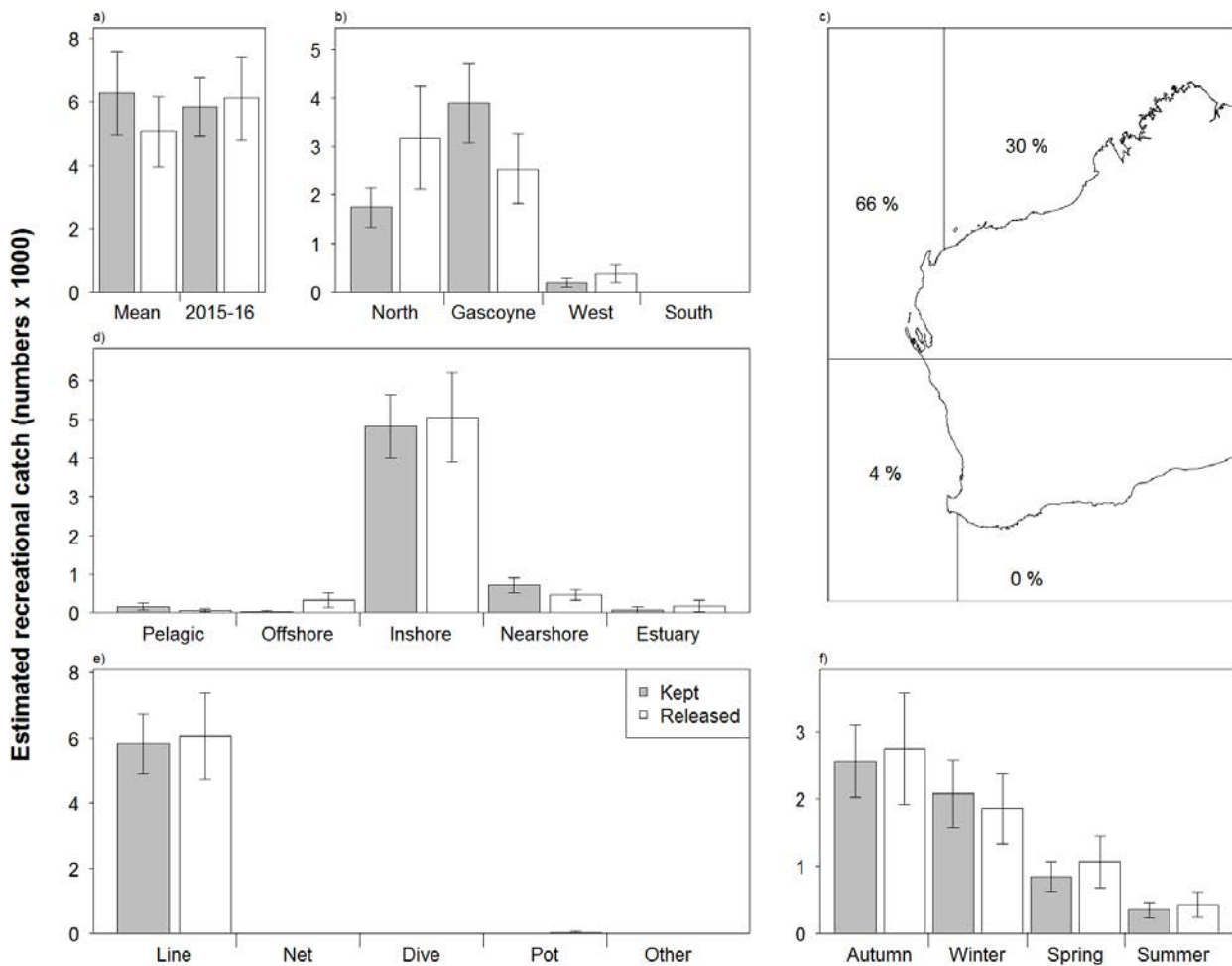
Rankin Cod is an indicator species in the North Coast bioregion. Most boat-based recreational catches of Rankin Cod occurred in the Gascoyne Coast, followed by the North Coast and West Coast (kept only, Figure 51b and c). The majority of catches were retained (34% released; Table 5, Figure 51a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (61%) and nearshore (34%; Figure 51d). Rankin Cod were harvested throughout the year, with higher catches in autumn (39%) and spring (31%) compared with winter (23%) and summer (7%; Figure 51f). Most catches were taken by line fishing (97%; Figure 51e). The estimated kept recreational catch of Rankin Cod was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 51a, Table 5).



**Figure 51.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Rankin Cod in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.9 Red Emperor (*Lutjanus sebae*)

Red Emperor is an indicator species in the Gascoyne Coast and North Coast bioregions. Most boat-based recreational catches of Red Emperor occurred in the Gascoyne Coast, followed by the North Coast and West Coast (kept only, Figure 52b and c). Similar proportions of the boat-based recreational catch were kept and released (52% released; Table 5, Figure 52a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (83%; Figure 52d). Red Emperor were harvested throughout the year, with higher catches in autumn (44%) and winter (33%) compared with spring (16%) and summer (7%; Figure 52f). All catches were taken by line fishing (Figure 52e). The estimated kept and released recreational catches of Red Emperor were similar in 2015/16 compared with previous statewide surveys (Figure 52a, Table 5).

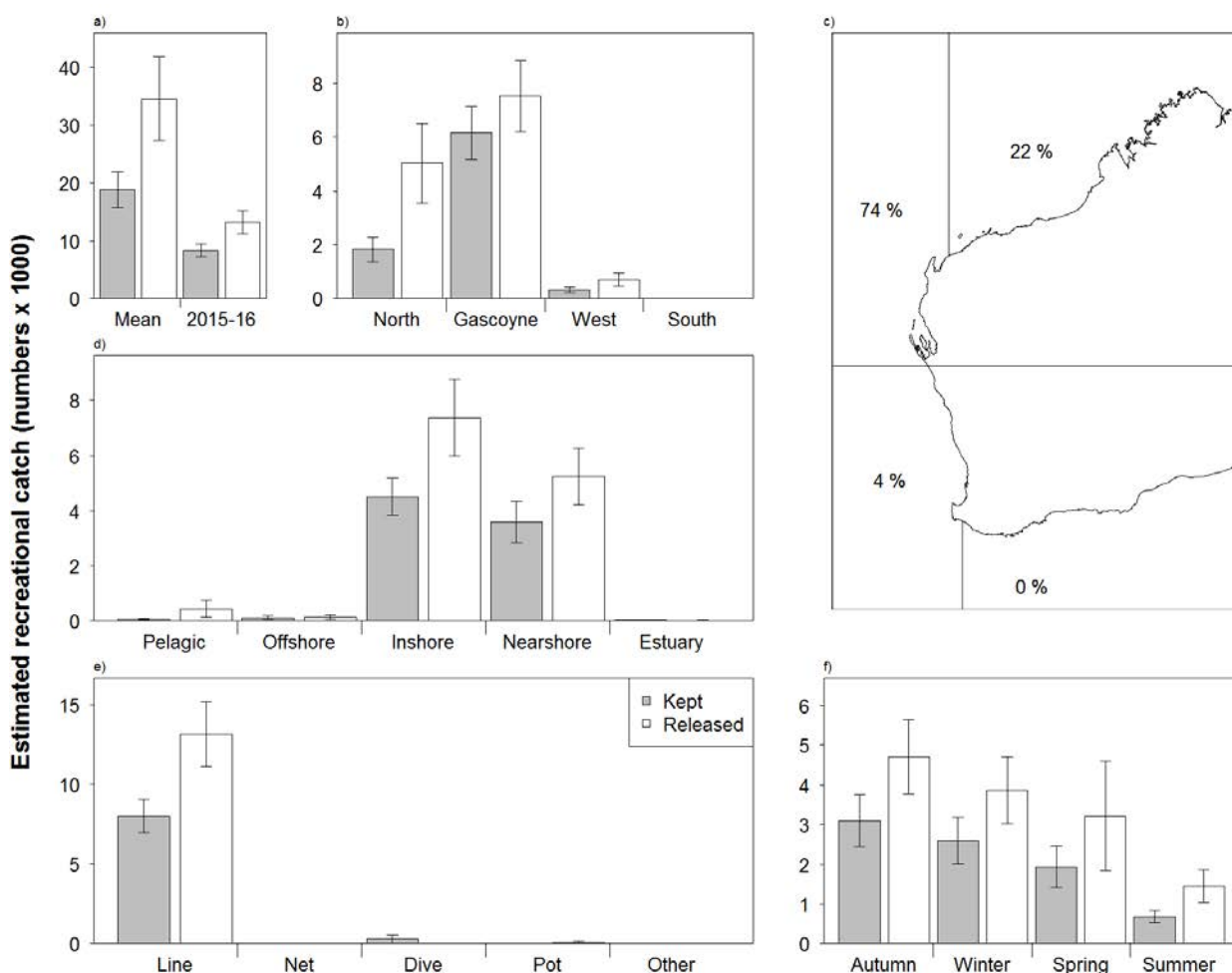


**Figure 52.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Red Emperor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



### 6.3.10 Spangled Emperor (*Lethrinus nebulosus*)

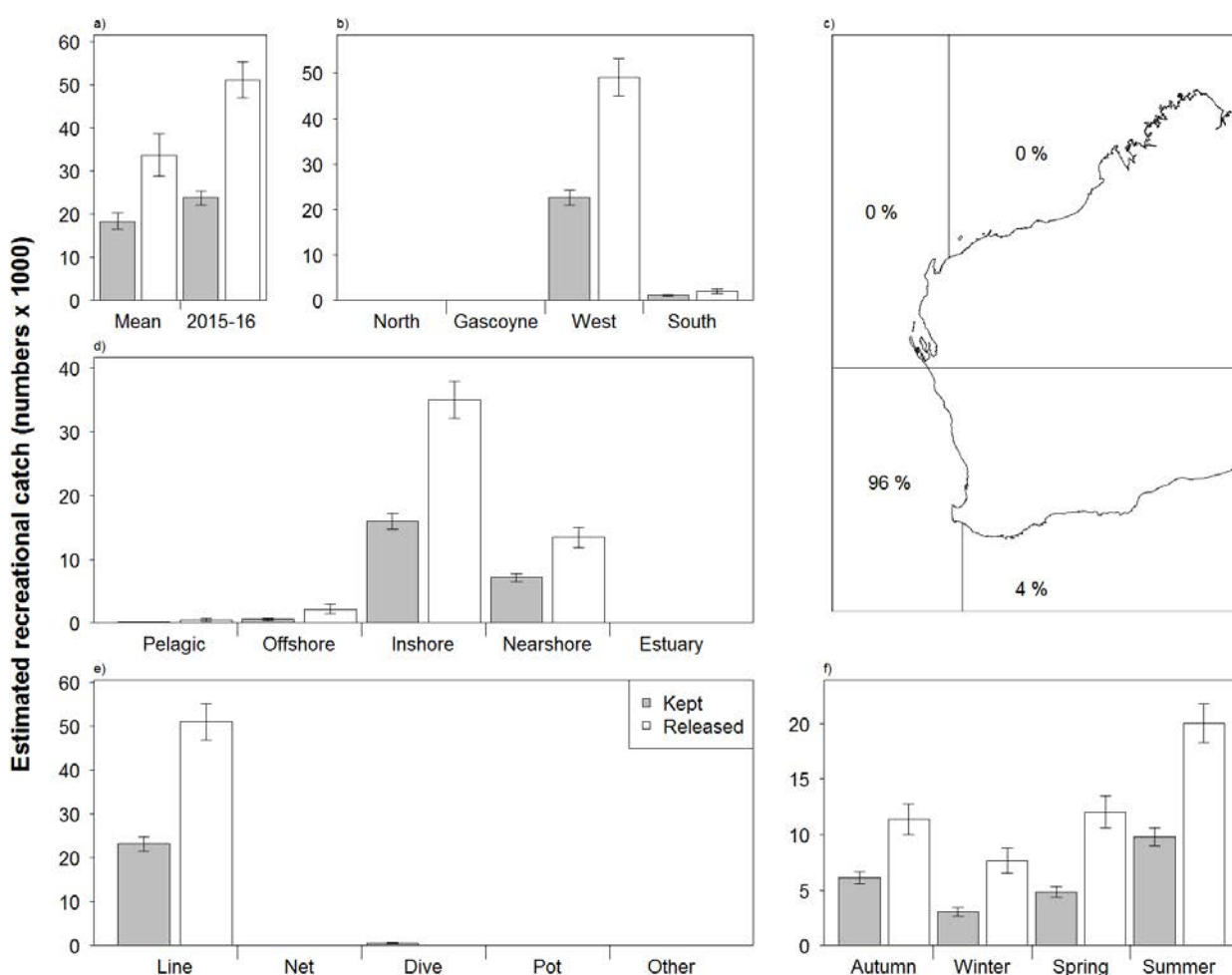
Spangled Emperor is an indicator species in the Gascoyne Coast bioregion. Most boat-based recreational catches of Spangled Emperor occurred in the Gascoyne Coast, followed by the North Coast and West Coast (kept only, Figure 53b and c). The majority of catches were released (61%; Table 5, Figure 53a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (55%) and nearshore (41%; Figure 53d). Spangled Emperor were harvested throughout the year, with higher catches in autumn (36%) and winter (30%) compared with spring (24%) and summer (10%; Figure 53f). Most catches were taken by line fishing (98%; Figure 53e). The estimated kept and released recreational catches of Spangled Emperor were lower in 2015/16 compared with previous statewide surveys (Figure 53a, Table 5).



**Figure 53.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Spangled Emperor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.11 West Australian Dhufish (*Glaucosoma hebraicum*)

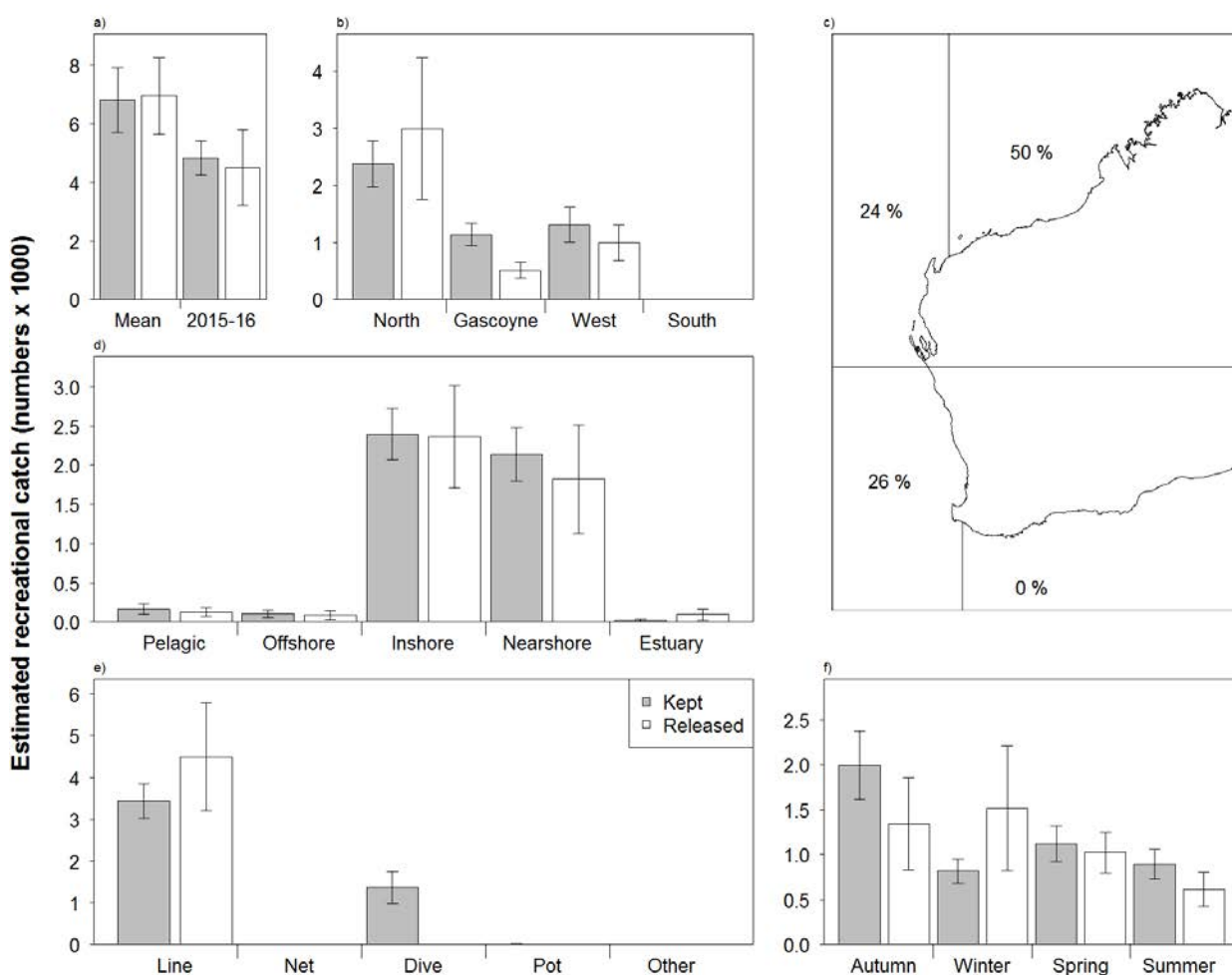
West Australian Dhufish is an indicator species in the West Coast bioregion. Most boat-based recreational catches of West Australian Dhufish occurred in the West Coast, with some catches in the South Coast (kept only, Figure 54b and c). The majority of catches were released (68%; Table 5, Figure 54a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (68%) and nearshore (27%; Figure 54d). West Australian Dhufish were harvested throughout the year, with higher catches in summer (40%) compared with spring (23%), autumn (23%) and winter (14%; Figure 54f). Catches were mostly taken by line fishing (99%; Figure 54e). The estimated kept and released recreational catches of West Australian Dhufish were higher in 2015/16 compared with previous statewide surveys (Figure 54a, Table 5).



**Figure 54.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of West Australian Dhufish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.12 Coral Trout (*Plectropomus maculatus* and *P. leopardus*)

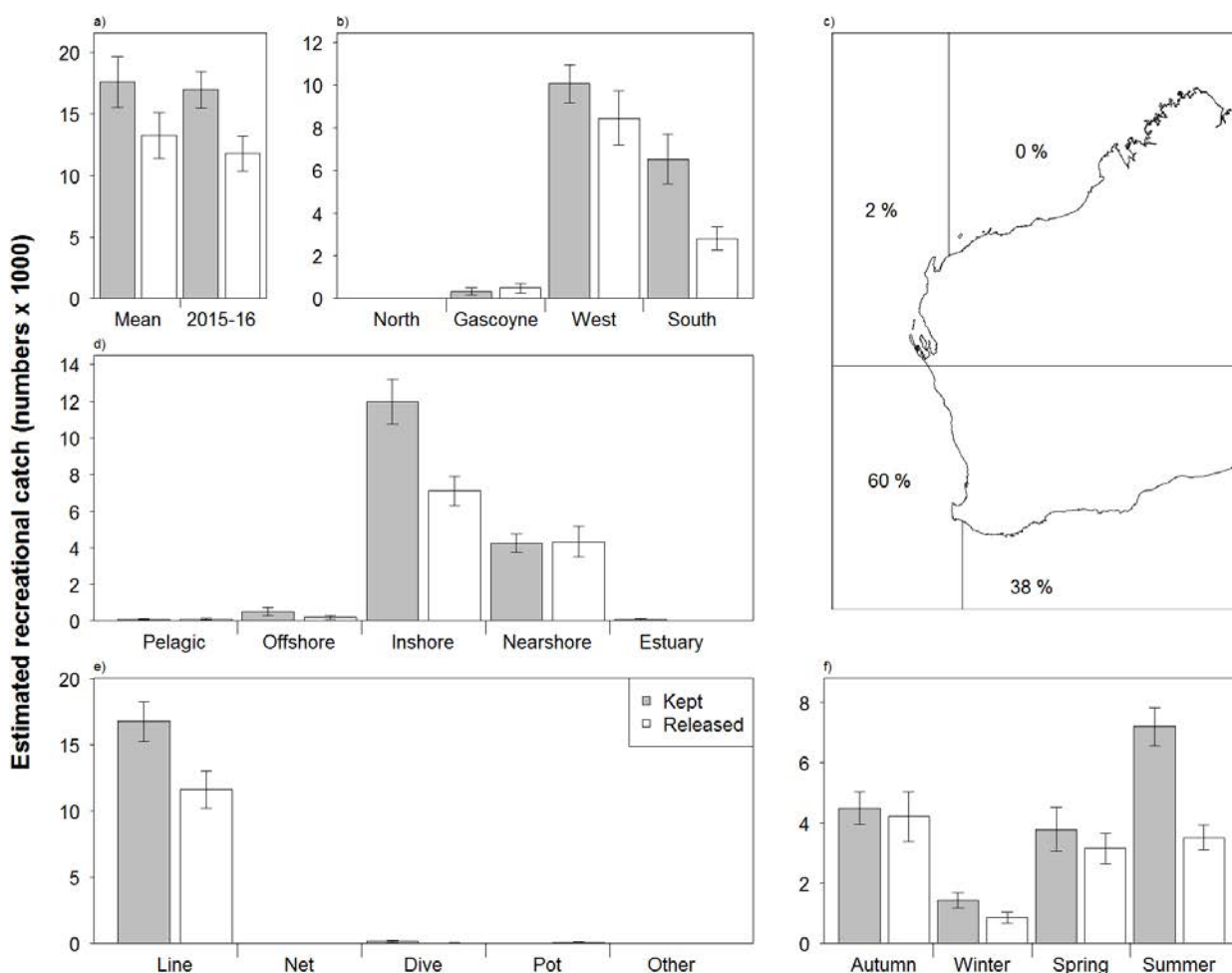
Barcheek Coral Trout is an indicator in the North Coast bioregion. Reporting for this species includes catches for Common Coral Trout (*Plectropomus leopardus*). Most boat-based recreational catches of Barcheek Coral Trout occurred in the North Coast, followed by the West Coast and Gascoyne Coast (kept only, Figure 55b and c). Similar proportions of the boat-based recreational catch were kept and released (48% released; Table 5, Figure 55a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (51%) and nearshore (42%; Figure 55d). Coral Trout were harvested throughout the year, with higher catches in autumn (36%) compared with winter (25%), spring (23%) and summer (16%; Figure 55f). Catches were mostly taken by line fishing (85%), with some fishing from diving (15%; Figure 55e). The estimated kept and released recreational catches of Coral Trout were lower in 2015/16 compared with previous statewide surveys (Figure 55a, Table 5).



**Figure 55.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Barcheek Coral Trout in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.13 Breaksea Cod (*Epinephelides armatus*)

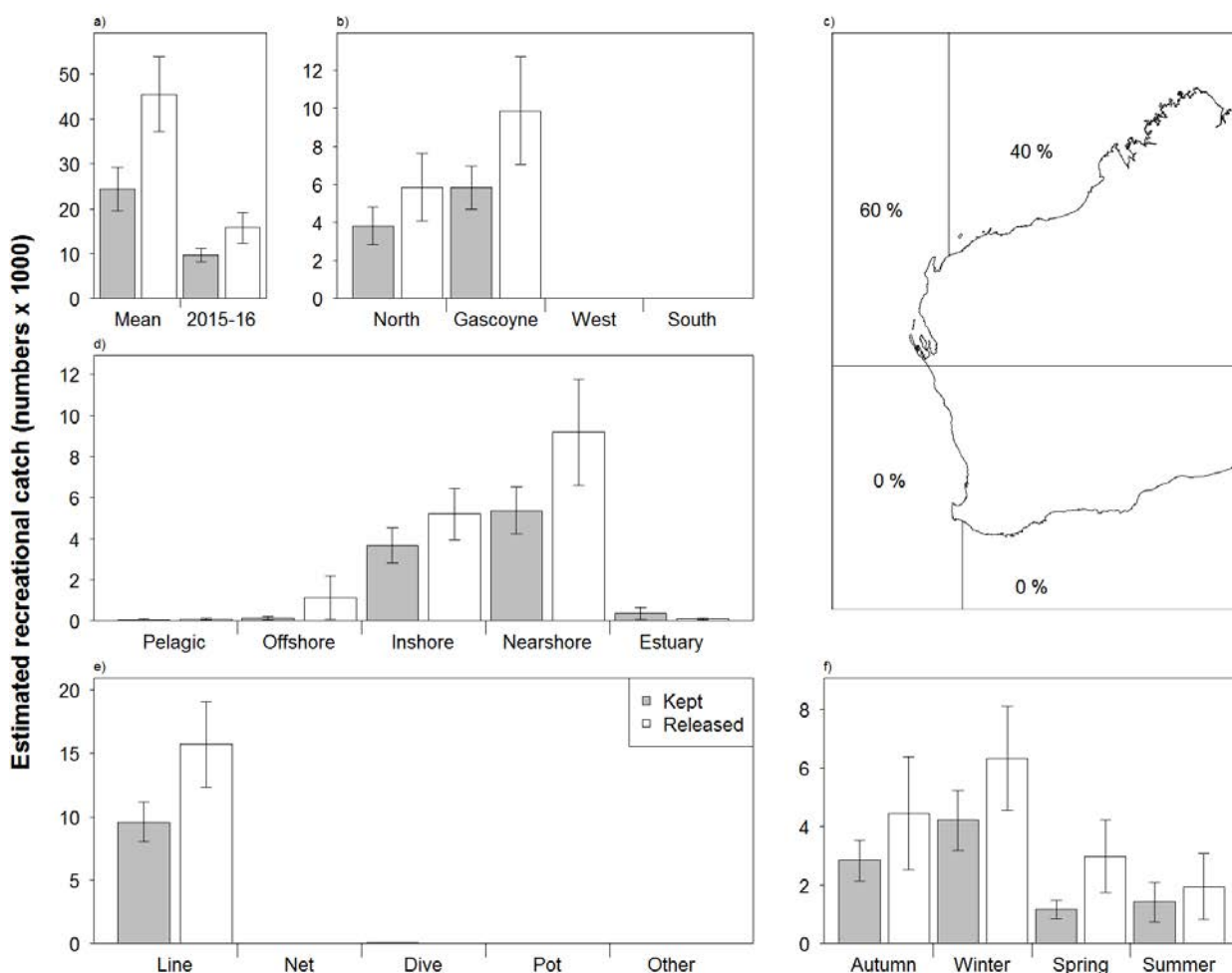
Most boat-based recreational catches of Breaksea Cod occurred in the West Coast, followed by the South Coast and Gascoyne Coast (kept only, Figure 56b and c). The majority of catches were retained (41% released; Table 5, Figure 56a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (66%) and nearshore (30%; Figure 56d). Breaksea Cod were harvested throughout the year, with higher catches in summer (37%) and autumn (30%) compared with spring (24%) and winter (8%; Figure 56f). Catches were mostly taken by line fishing (99%; Figure 56e). The estimated kept and released recreational catches of Breaksea Cod were similar in 2015/16 compared with previous statewide surveys (Figure 56a, Table 5).



**Figure 56.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Breaksea Cod in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.14 Grass Emperor (*Lethrinus laticaudis*)

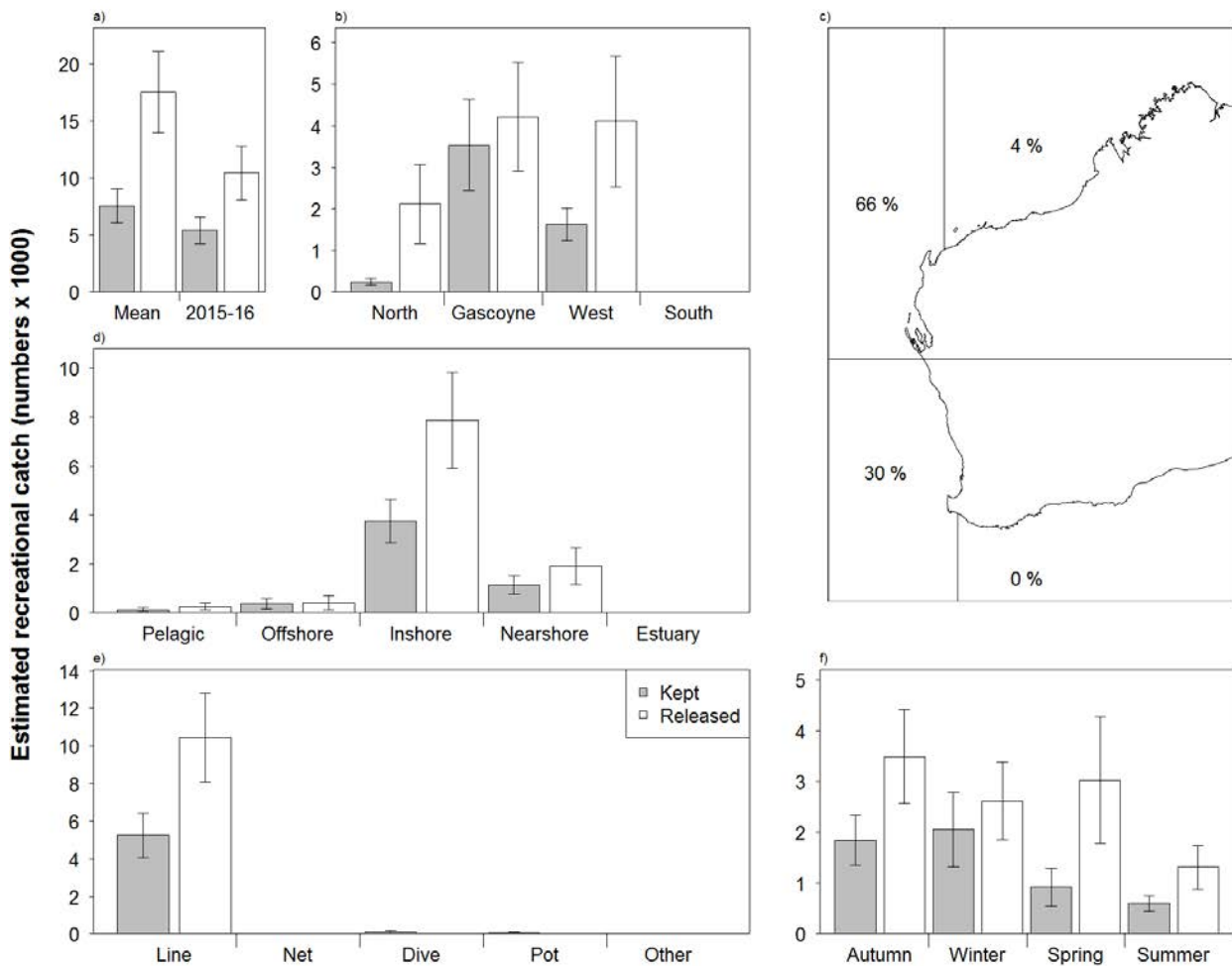
Most boat-based recreational catches of Grass Emperor occurred in the Gascoyne Coast, followed by the North Coast (kept only, Figure 57b and c). The majority of catches were released (62%; Table 5, Figure 57a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (67%) and inshore demersal (35%; Figure 57d). Grass Emperor were harvested throughout the year, with higher catches in winter (42%) compared with autumn (29%), spring (16%) and summer (13%; Figure 57f). All catches were taken by line fishing (Figure 57e). The estimated kept and released recreational catches of Grass Emperor were lower in 2015/16 compared with previous statewide surveys (Figure 57a, Table 5).



**Figure 57.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Grass Emperor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.15 Redthroat Emperor (*Lethrinus miniatus*)

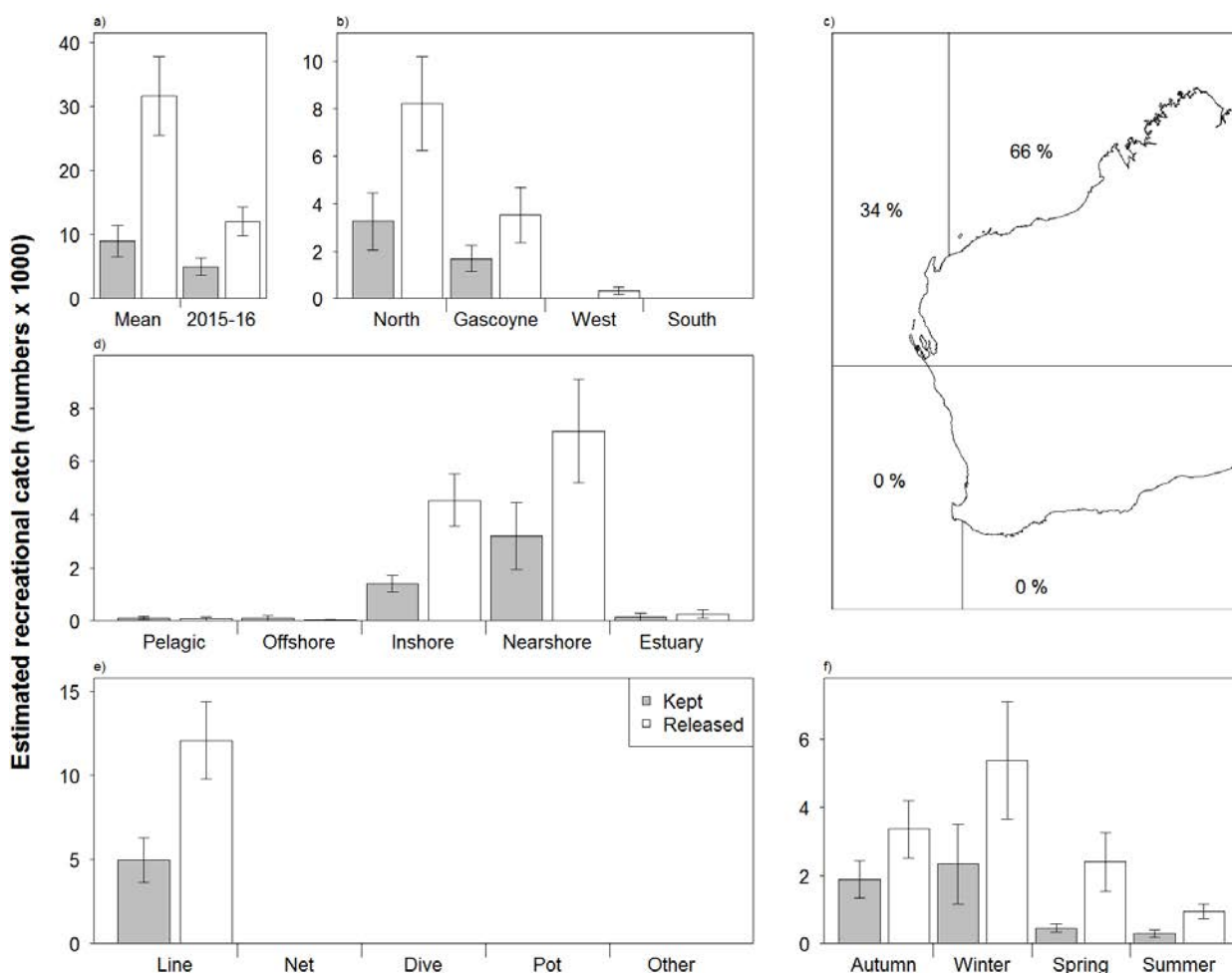
Redthroat Emperor is an indicator in the West Coast bioregion. Most boat-based recreational catches of Redthroat Emperor occurred in the Gascoyne Coast, followed by the West Coast and North Coast (kept only, Figure 58b and c). The majority of catches were released (66%; Table 5, Figure 58a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (73%) and nearshore (19%; Figure 58d). Redthroat Emperor were harvested throughout the year, with higher catches in autumn (34%), winter (29%) and spring (25%) compared with summer (12%; Figure 58f). Catches were mostly taken by line fishing (99%; Figure 58e). The estimated kept recreational catch of Redthroat Emperor was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 58a, Table 5).



**Figure 58.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Redthroat Emperor in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.3.16 Stripey Snapper (*Lutjanus carponotatus*)

Most boat-based recreational catches of Stripey Snapper occurred in the North Coast, followed by the Gascoyne Coast (kept only, Figure 59b and c). The majority of catches were released (71%; Table 5, Figure 59a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (61%) and inshore demersal (35%; Figure 59d). Stripey Snapper were harvested throughout the year, with higher catches in winter (45%) followed by autumn (31%), spring (17%) and summer (7%; Figure 59f). All catches were taken by line fishing (Figure 59e). The estimated kept recreational catch of Stripey Snapper was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 59a, Table 5).

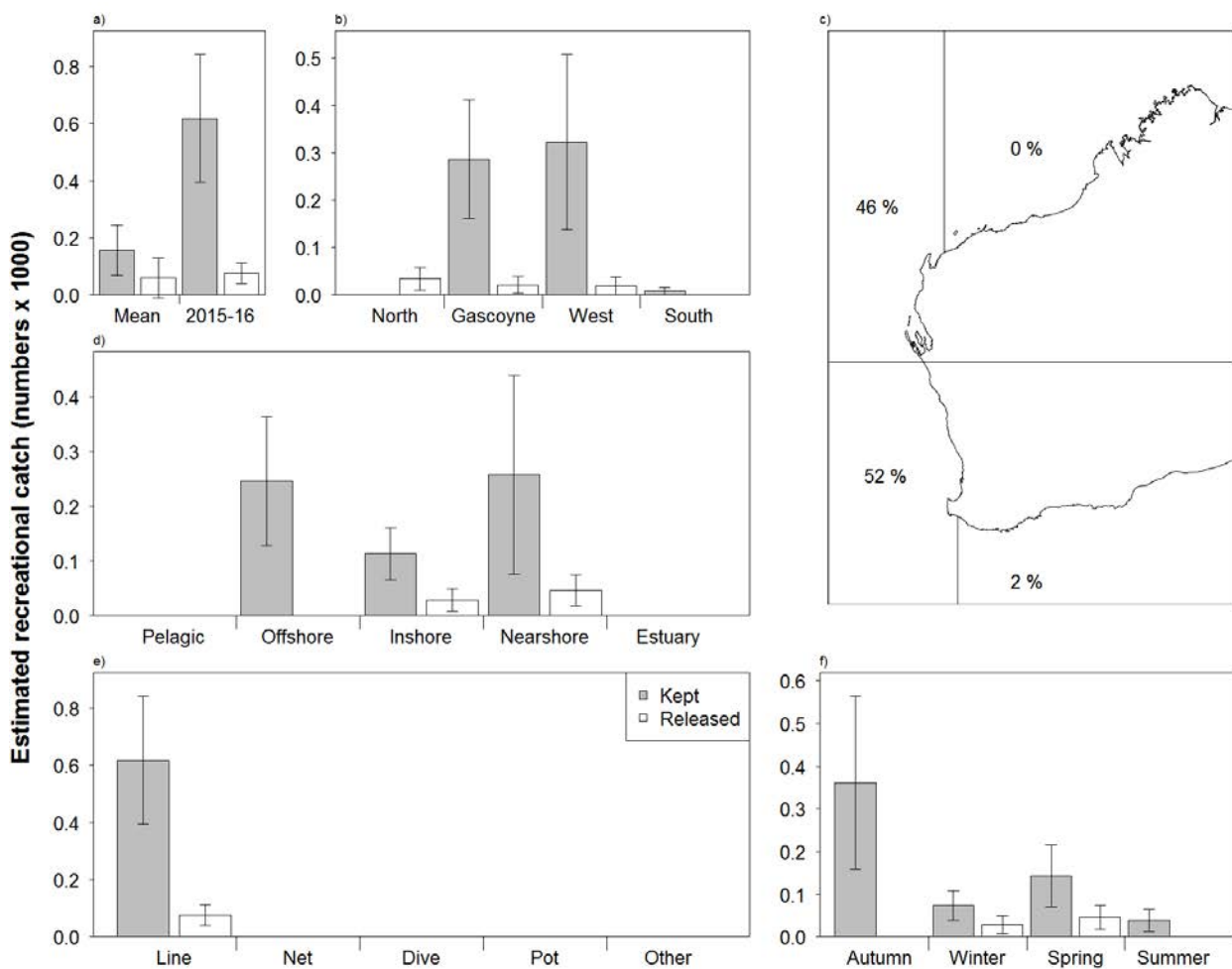


**Figure 59.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Stripey Snapper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.4 Offshore Demersal

### 6.4.1 Eightbar Grouper (*Hyporthodus octofasciatus*)

Eightbar Grouper is an indicator species in the North Coast, Gascoyne Coast, West Coast bioregions. Most boat-based recreational catches of Eightbar Grouper occurred in the West Coast and Gascoyne Coast, with some catches in the South Coast (kept only, Figure 60b and c). The majority of catches were retained (11% released; Table 5, Figure 60a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Eightbar Grouper were harvested throughout the year, with higher catches in autumn (52%) compared with spring (27%), winter (15%) and summer (6%; Figure 60f). All catches were taken by line fishing (Figure 60e). The estimated kept recreational catch of Eightbar Grouper was higher in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar; however, the uncertainty for this species is high (Figure 60a, Table 5).

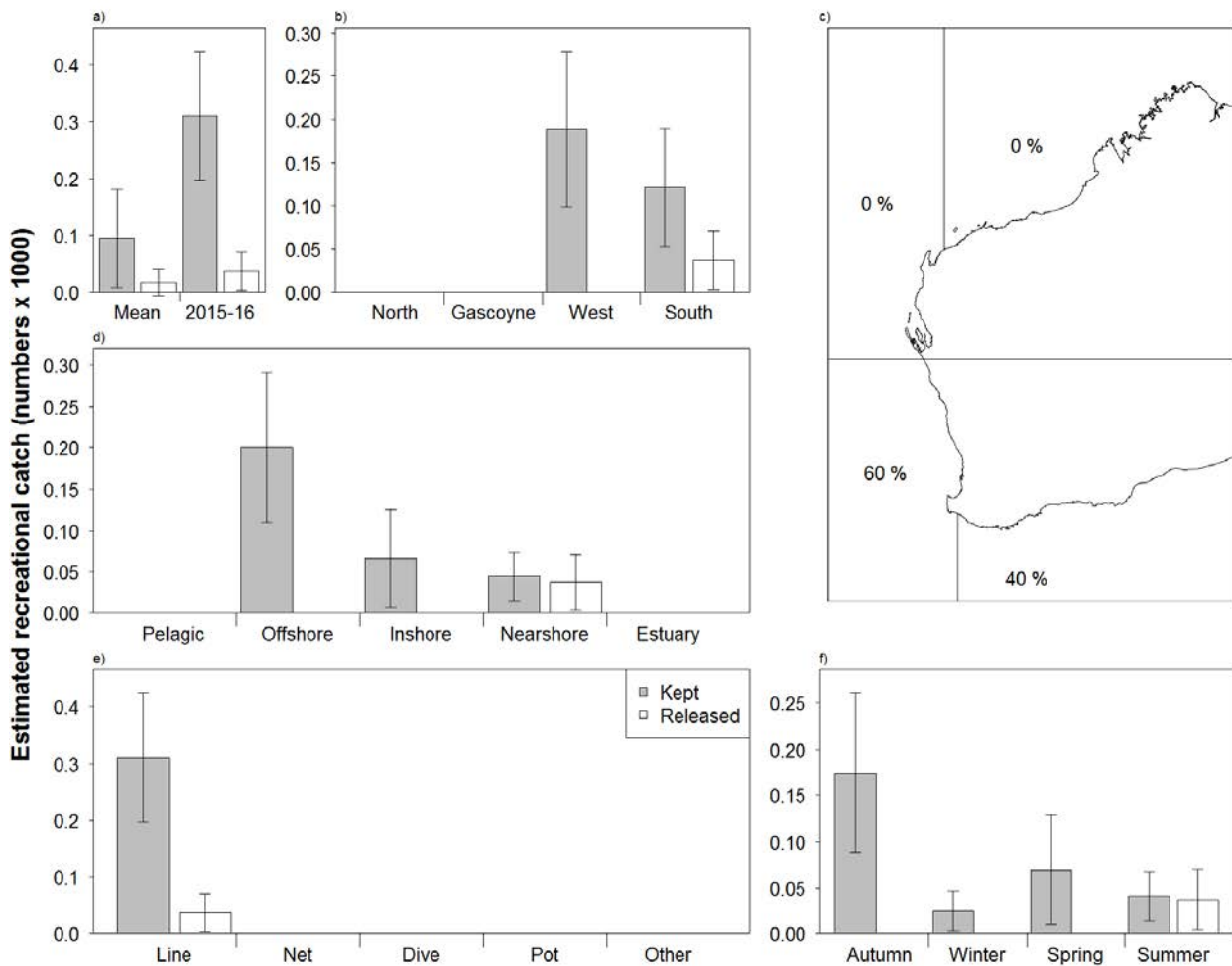


**Figure 60.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Eightbar Grouper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



### 6.4.2 Hapuku (*Polyprion oxygeneios*)

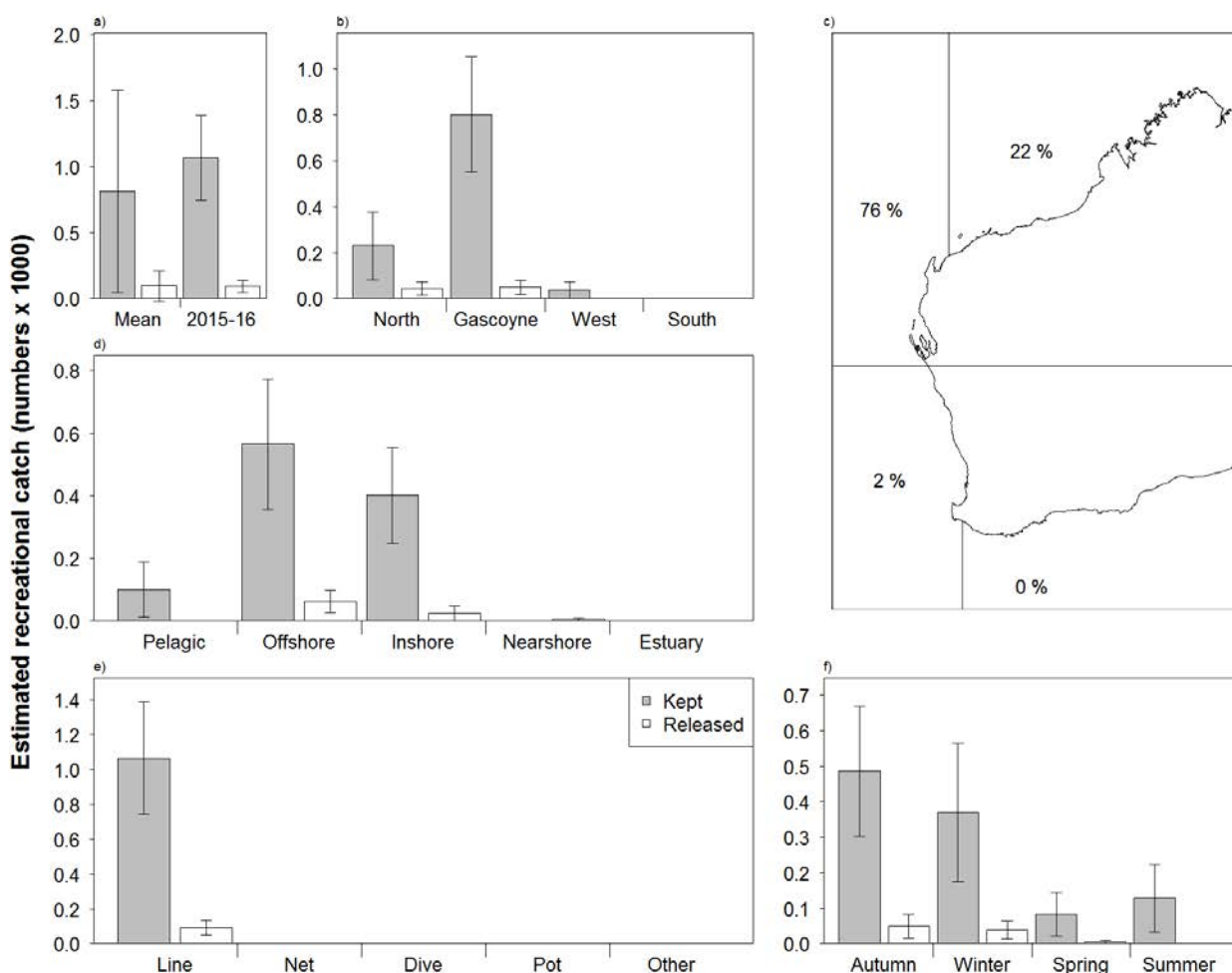
Hapuku is an indicator species in the West Coast and South Coast bioregions. Most boat-based recreational catches of Hapuku occurred in the West Coast, followed by the South Coast (kept only, Figure 61b and c). The majority of catches were retained (11% released; Table 5, Figure 61a) with all releases attributed to “Under Size” (Table 7). Catches were taken predominantly from offshore demersal (58%; Figure 61d). Hapuku were harvested throughout the year, with higher catches in autumn (50%) compared with summer (23%), spring (20%) and winter (7%; Figure 61f). All catches were taken by line fishing (Figure 61e). The estimated kept recreational catch of Hapuku was higher in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar; however, the uncertainty for this species is high (Figure 61a, Table 5).



**Figure 61.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Hapuku in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.4.3 Ruby Snapper (*Etelis carbunculus*)

Ruby Snapper is an indicator species in the North Coast and Gascoyne Coast bioregions. Most boat-based recreational catches of Ruby Snapper occurred in the Gascoyne Coast, with some catches in the North Coast and West Coast (kept only, Figure 62b and c). The majority of catches were retained (8% released; Table 5, Figure 62a) with most releases attributed to “Other” and “Under Size” (Table 7). Catches were taken predominantly from offshore demersal (54%; Figure 62d). Ruby Snapper were harvested throughout the year, with higher catches in autumn (46%) compared with winter (35%), summer (11%) and spring (8%; Figure 62f). All catches were taken by line fishing (Figure 62e). The estimated kept and released recreational catches of Ruby Snapper were similar in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 62a, Table 5).

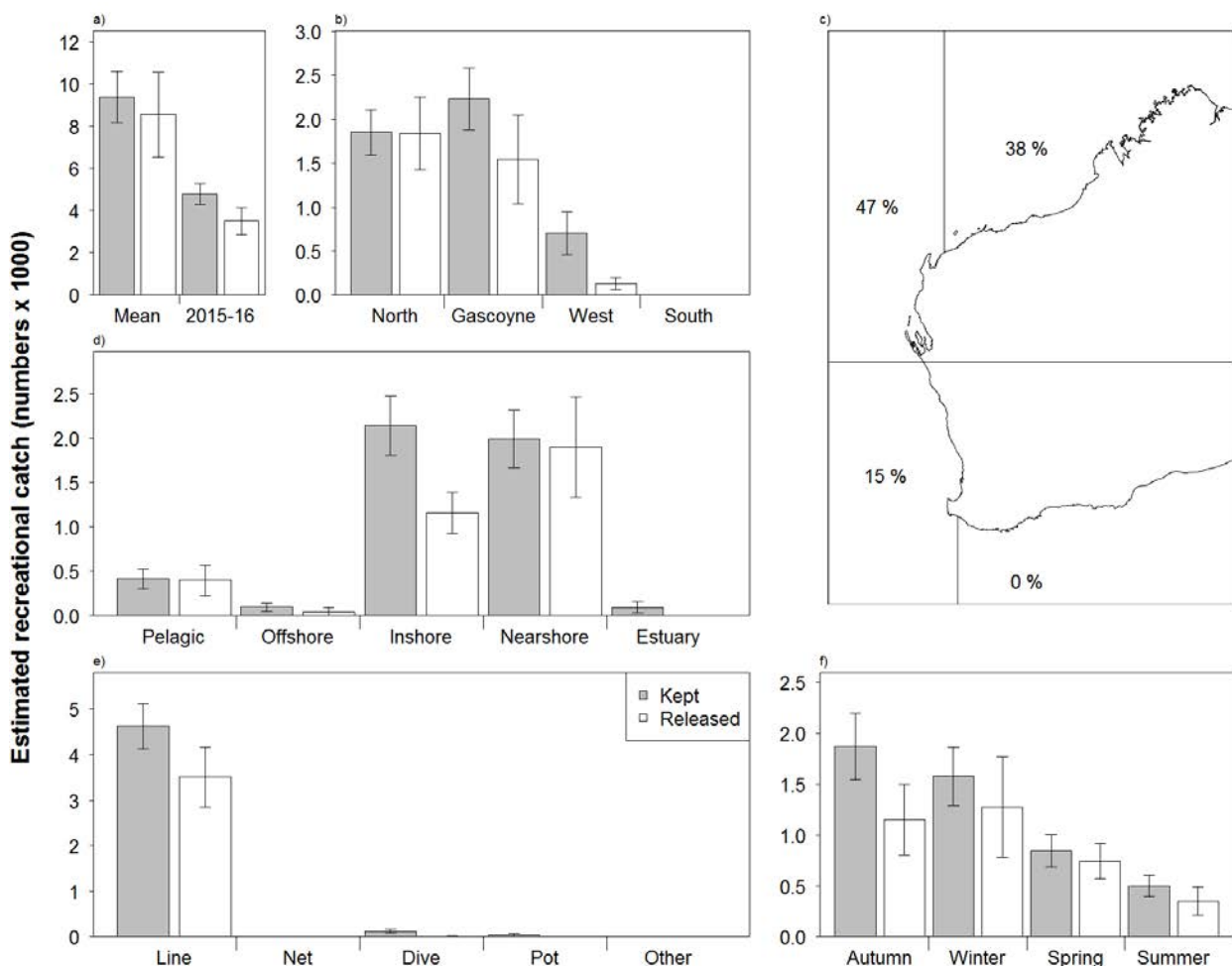


**Figure 62.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Ruby Snapper in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.5 Pelagic

### 6.5.1 Spanish Mackerel (*Scomberomorus commerson*)

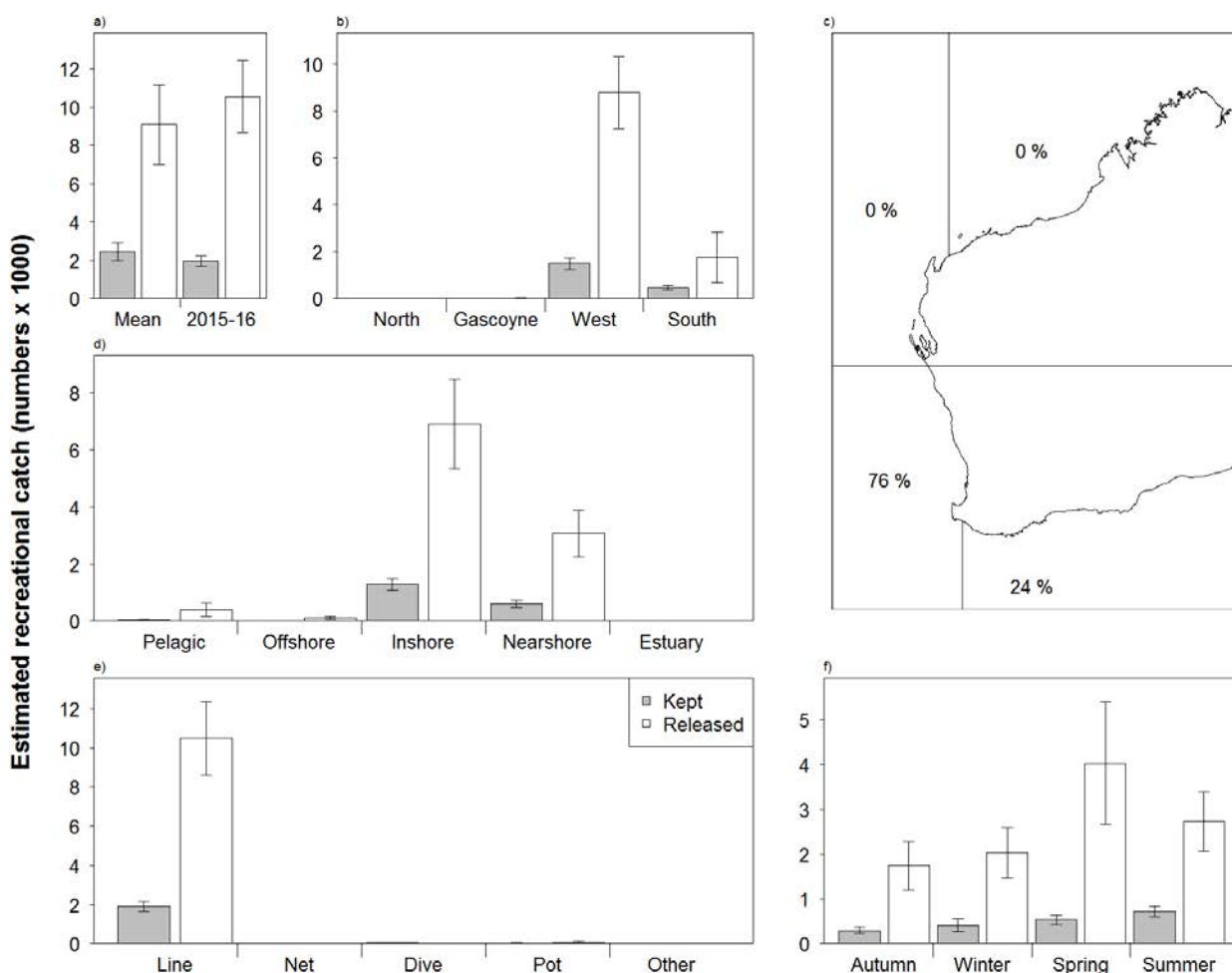
Spanish Mackerel is an indicator species in the North Coast and Gascoyne Coast bioregions. Most boat-based recreational catches of Spanish Mackerel occurred in the Gascoyne Coast and North Coast, with some catches in the West Coast (kept only, Figure 63b and c). The majority of catches were retained (42% released; Table 5, Figure 63a) with most releases attributed to “Under Size” and “Too Many” (Table 7). Catches were taken from nearshore (47%) and inshore demersal (40%; Figure 63d). Spanish Mackerel were harvested throughout the year, with higher catches in autumn (36%) and winter (34%) compared with spring (19%) and summer (10%; Figure 63f). Catches were mostly taken by line fishing (98%; Figure 63e). The estimated kept and released recreational catches of Spanish Mackerel were lower in 2015/16 compared with previous statewide surveys (Figure 63a, Table 5).



**Figure 63.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Spanish Mackerel in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.5.2 Samsonfish (*Seriola hippos*)

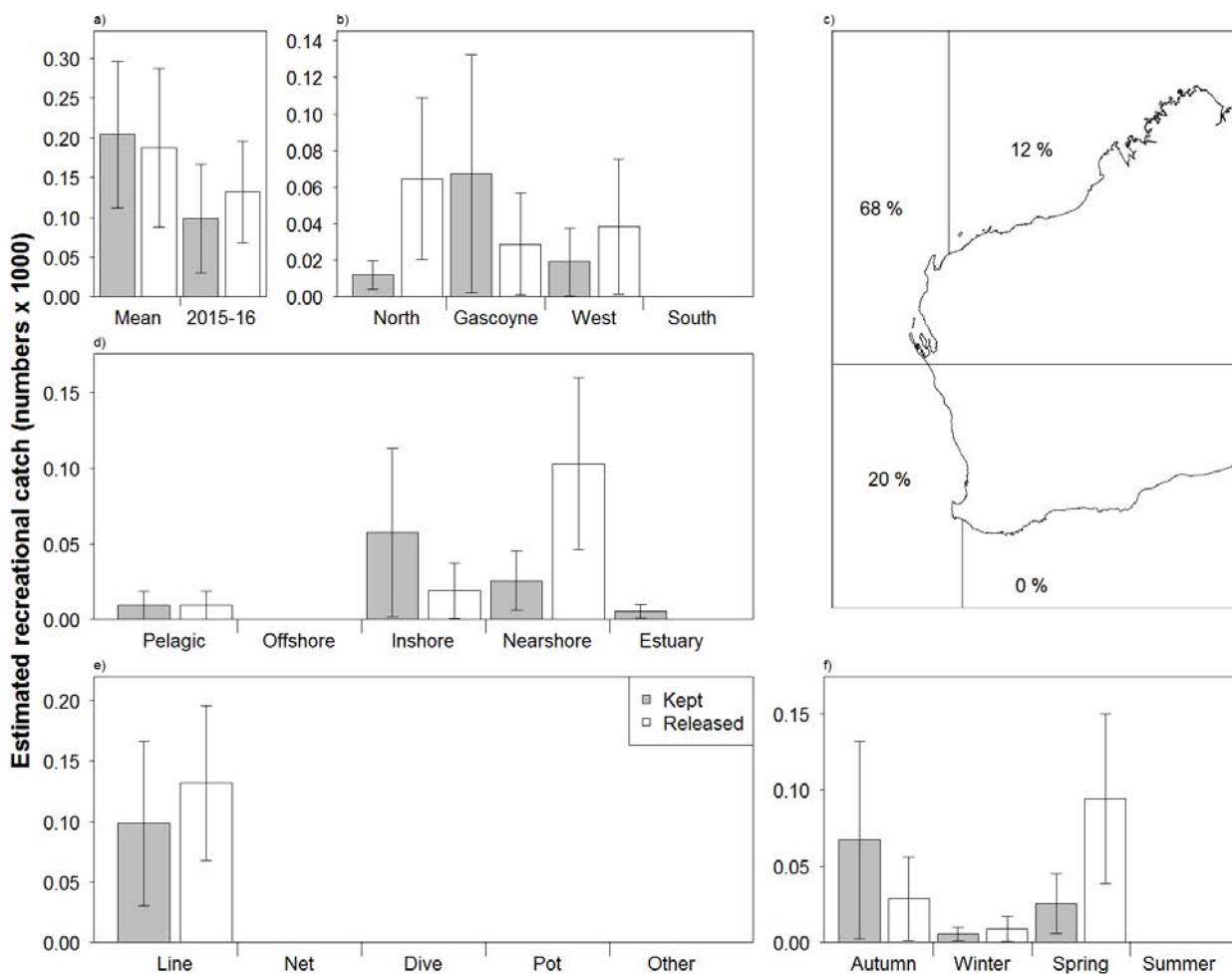
Samsonfish is an indicator species in the West Coast bioregion. Most boat-based recreational catches of Samsonfish occurred in the West Coast, followed by the South Coast (kept only, Figure 64b and c). The majority of catches were released (84%; Table 5, Figure 64a) and attributed to “Other” and “Catch and Release” (Table 7). Catches were taken from inshore demersal (66%; Figure 64d). Samsonfish were harvested throughout the year, with higher catches in spring (37%) compared with summer (28%), winter (20%) and autumn (16%; Figure 64f). Catches were mostly taken by line fishing (99%; Figure 64e). The estimated kept and released recreational catches of Samsonfish were similar in 2015/16 compared with previous statewide surveys (Figure 64a, Table 5).



**Figure 64.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Samsonfish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.5.3 Grey Mackerel (*Scomberomorus semifasciatus*)

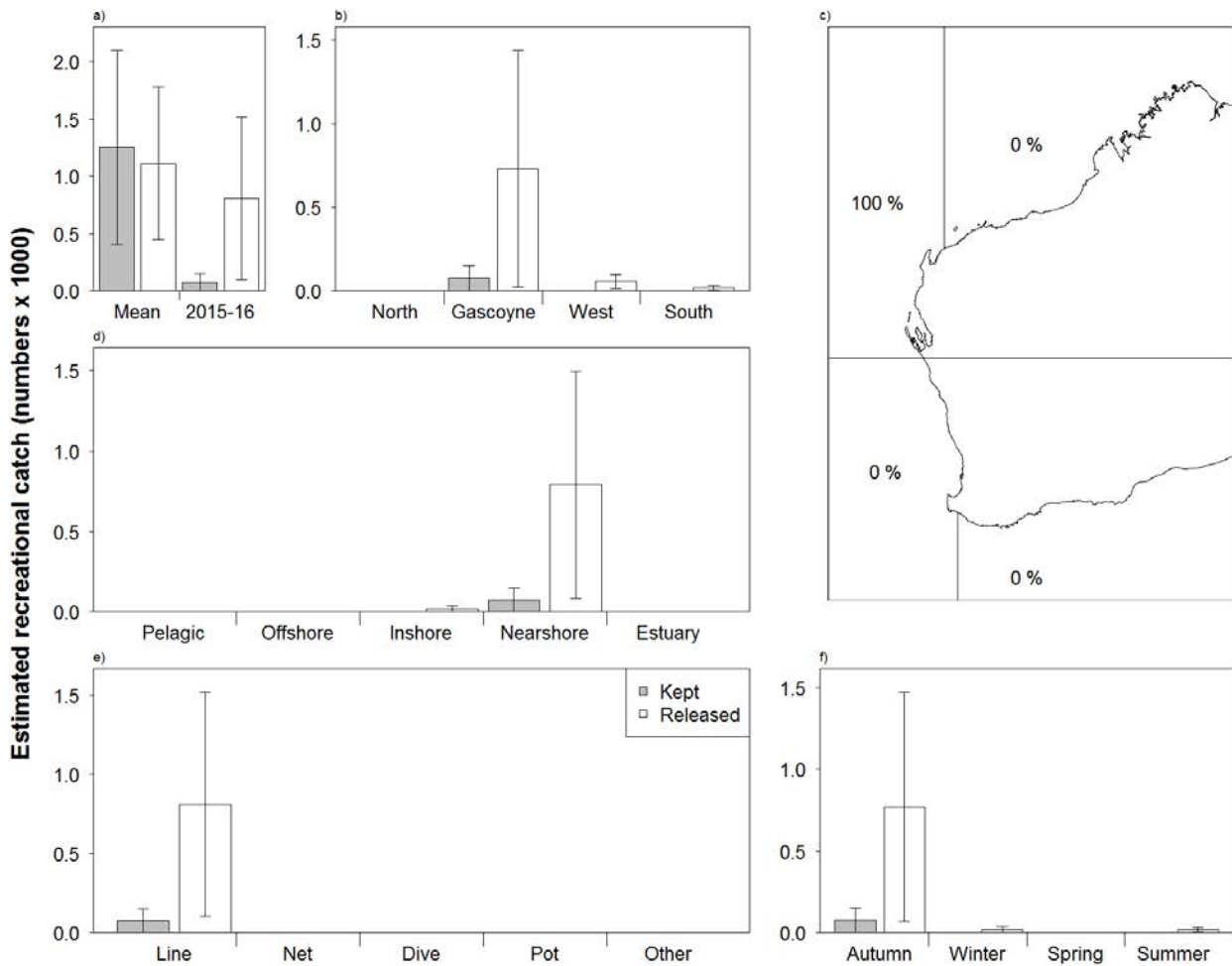
Grey Mackerel is an indicator species in the North Coast and Gascoyne Coast bioregions. Most boat-based recreational catches of Grey Mackerel occurred in the Gascoyne Coast, with some catches in the West Coast and North Coast (kept only, Figure 65b and c). The majority of catches were released (57%; Table 5, Figure 65a) and attributed to “Under Size” and “Too Many” (Table 7). Grey Mackerel were mostly harvested in spring (52%) and autumn (42%; Figure 65f). All catches were taken by line fishing (Figure 65e). The estimated kept recreational catch of Grey Mackerel was lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 65a, Table 5).



**Figure 65.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Grey Mackerel in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.5.4 Blue Mackerel (*Scomber australasicus*)

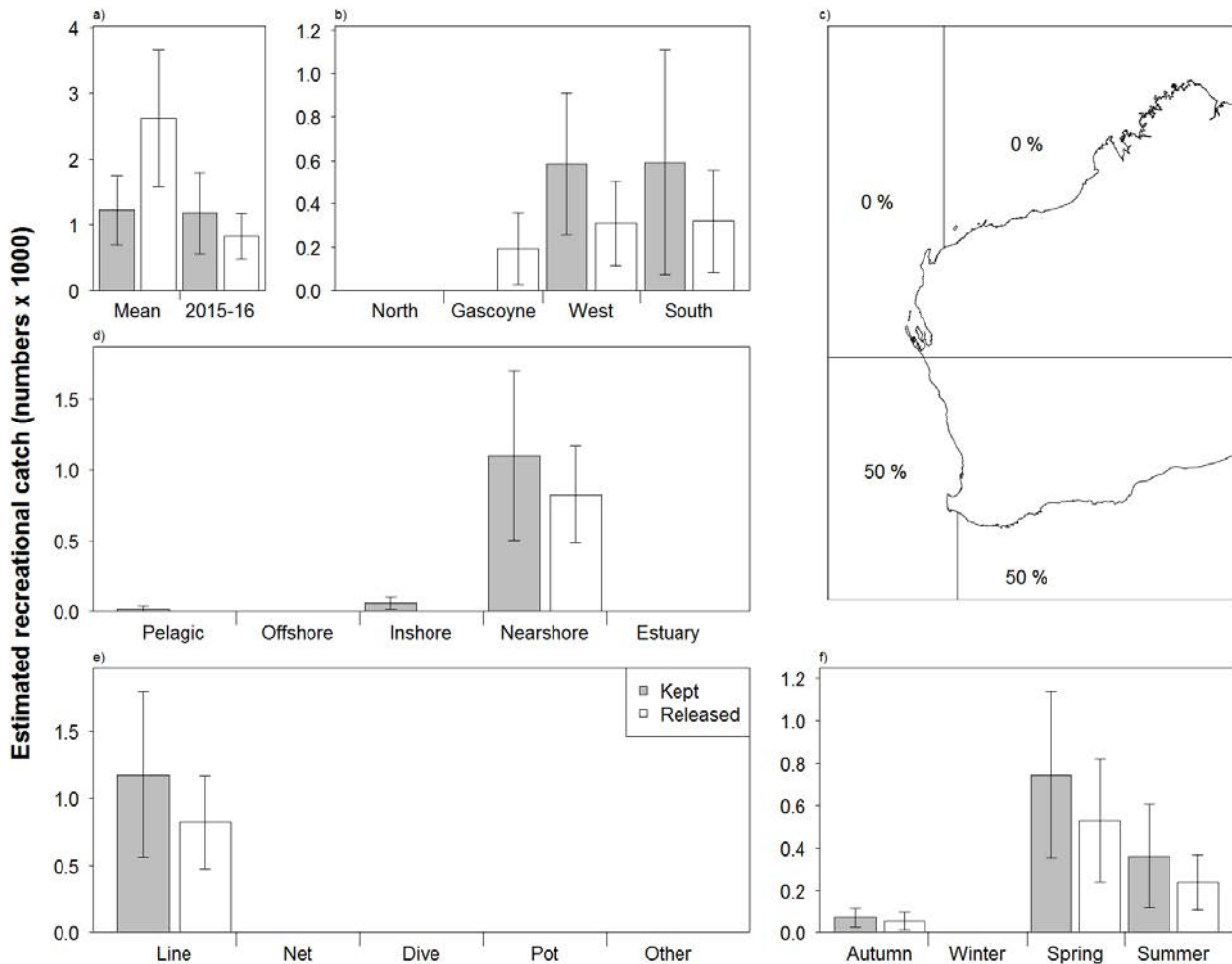
Most boat-based recreational catches of Blue Mackerel occurred in the Gascoyne Coast (kept only, Figure 66b and c). The majority of catches were released (91%; Table 5, Figure 66a) and attributed to “Too Many” (Table 7). Blue Mackerel were mostly harvested in autumn (95%; Figure 66f). All catches were taken by line fishing (Figure 66e). The estimated kept recreational catch of Blue Mackerel was lower in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar; however, the uncertainty for this species is high (Figure 66a, Table 5).



**Figure 66.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Blue Mackerel in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.5.5 Yellowtail Scad (*Trachurus novaezelandiae*)

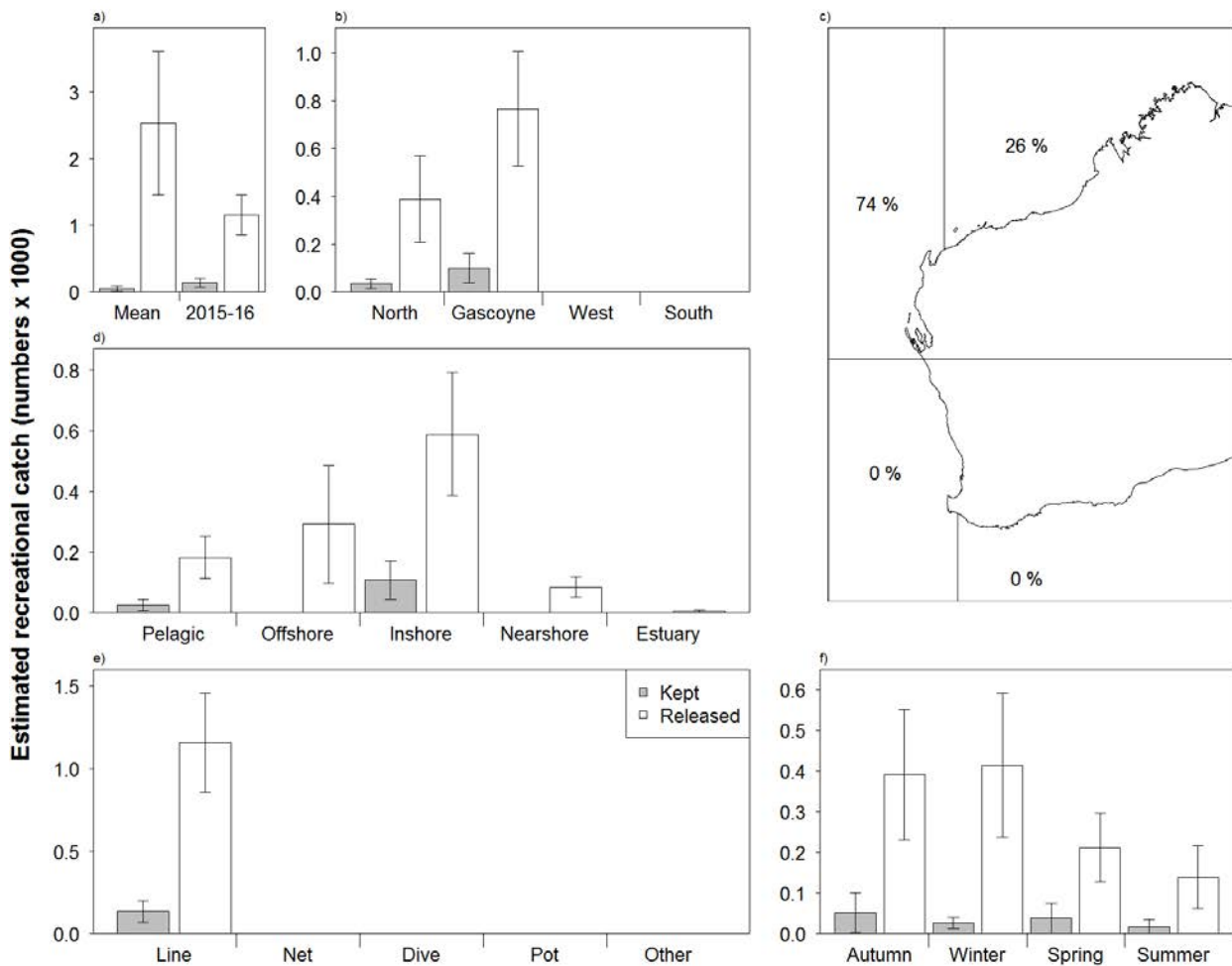
Yellowtail Scad is an indicator species in the South Coast bioregion. Most boat-based recreational catches of Yellowtail Scad occurred in the West Coast and South Coast (kept only, Figure 67b and c). The majority of catches were released (91%; Table 5, Figure 67a) and attributed to “Too Small” and “Too Many” (Table 7). Yellowtail Scad were mostly harvested in spring (64%) and summer (30%; Figure 67f). All catches were taken by line fishing (Figure 67e). The estimated kept recreational catch of Yellowtail Scad was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower; however, the uncertainty for this species is high (Figure 67a, Table 5).



**Figure 67.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Yellowtail Scad in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.5.6 Billfish

Billfish include Black Marlin (*Makaira indica*), Blue Marlin (*M. nigricans*), Striped Marlin (*Tetrapturus audax*) and Sailfish (*Istiophorus platypterus*). Most boat-based recreational catches of Billfish occurred in the Gascoyne Coast, followed by the North Coast (kept only, Figure 68b and c). The majority of catches were released (80% or higher; Table 5, Figure 68a) and attributed to “Catch and Release” and “Other” (Table 7). Billfish were harvested throughout the year, with higher catches in autumn (34%) and winter (34%) compared with spring (19%) and summer (12%; Figure 68f). All catches were taken by line fishing (Figure 68e). The estimated kept and released recreational catches of Billfish were similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower; however, the uncertainty for this species group is high (Figure 68a, Table 5).

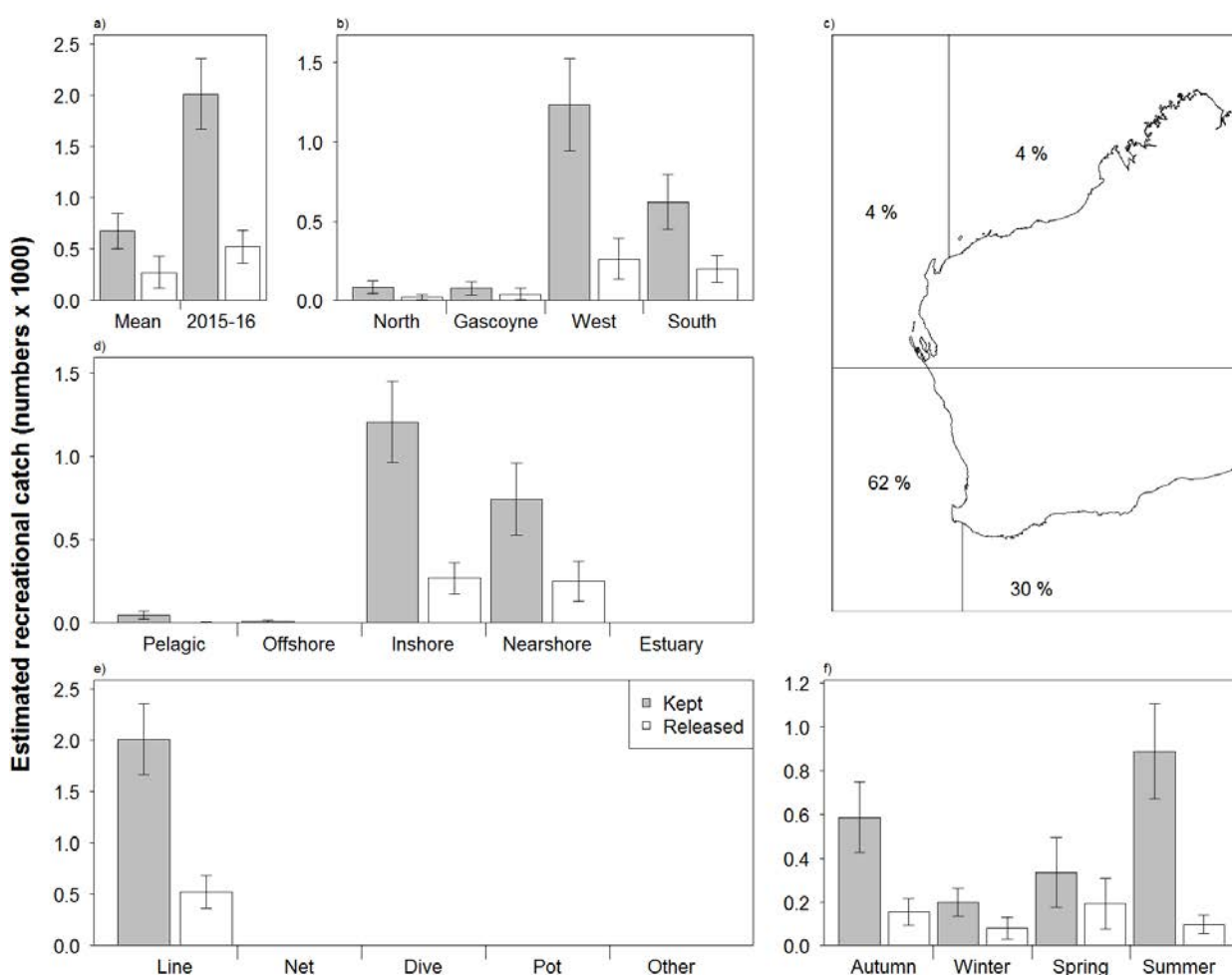


**Figure 68.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Billfish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



### 6.5.7 Southern Bluefin Tuna (*Thunnus maccoyii*)

Most boat-based recreational catches of Southern Bluefin Tuna occurred in the West Coast and South Coast, with some catches in the North Coast and Gascoyne Coast (kept only, Figure 69b and c). The majority of catches were retained (21% released; Table 5, Figure 69a) with most releases attributed to “Too Small” and “Under Size” (Table 7). Catches were taken predominantly from inshore demersal (58%; Figure 69d). Southern Bluefin Tuna were harvested throughout the year, with higher catches in summer (39%) and autumn (29%) compared with spring (21%) and winter (11%; Figure 69f). All catches were taken by line fishing (Figure 69e). The estimated kept recreational catch of Southern Bluefin Tuna was higher in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar (Figure 69a, Table 5).

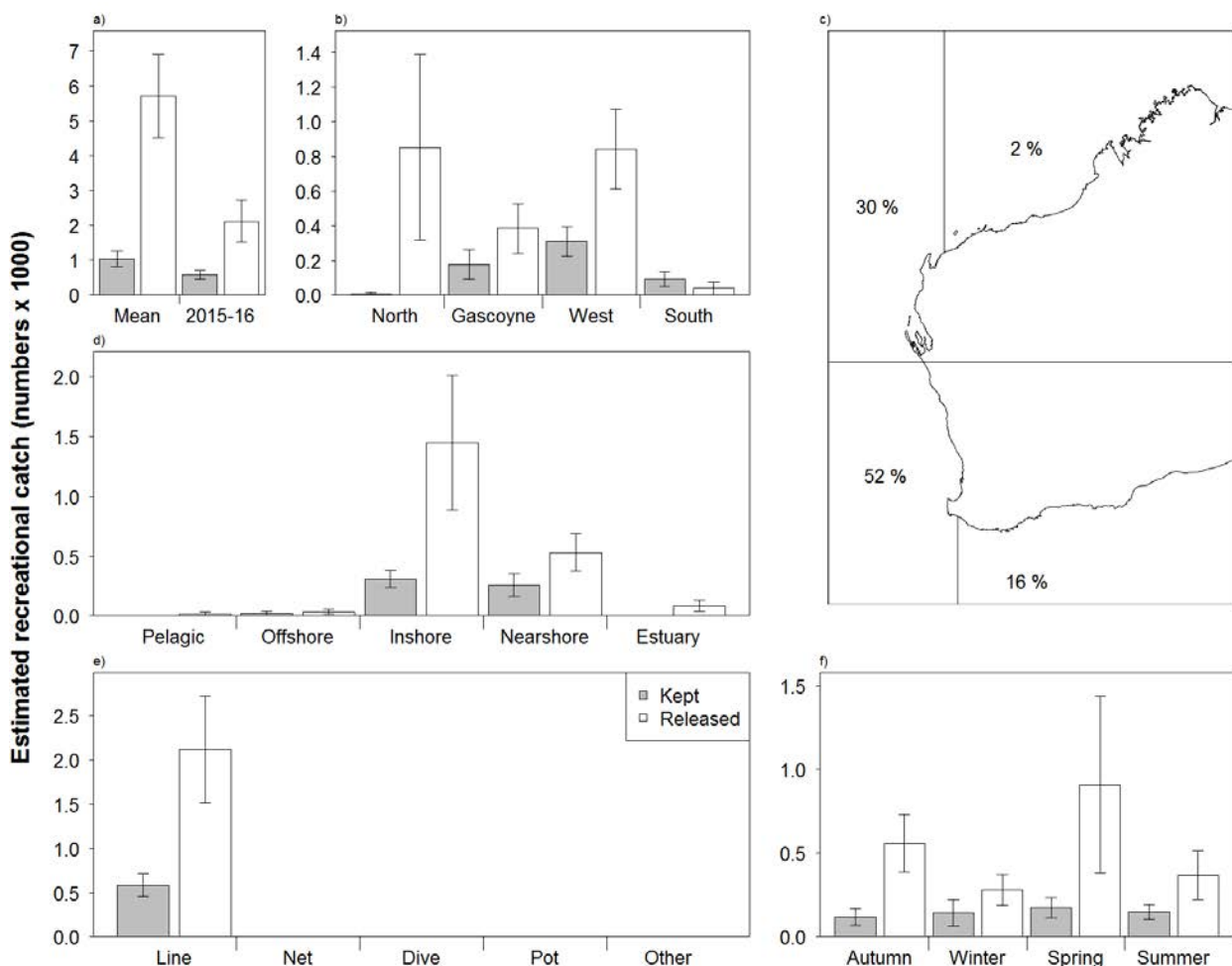


**Figure 69.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Southern Bluefin Tuna in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.6 Sharks

### 6.6.1 Whaler Sharks (Family Carcharhinidae)

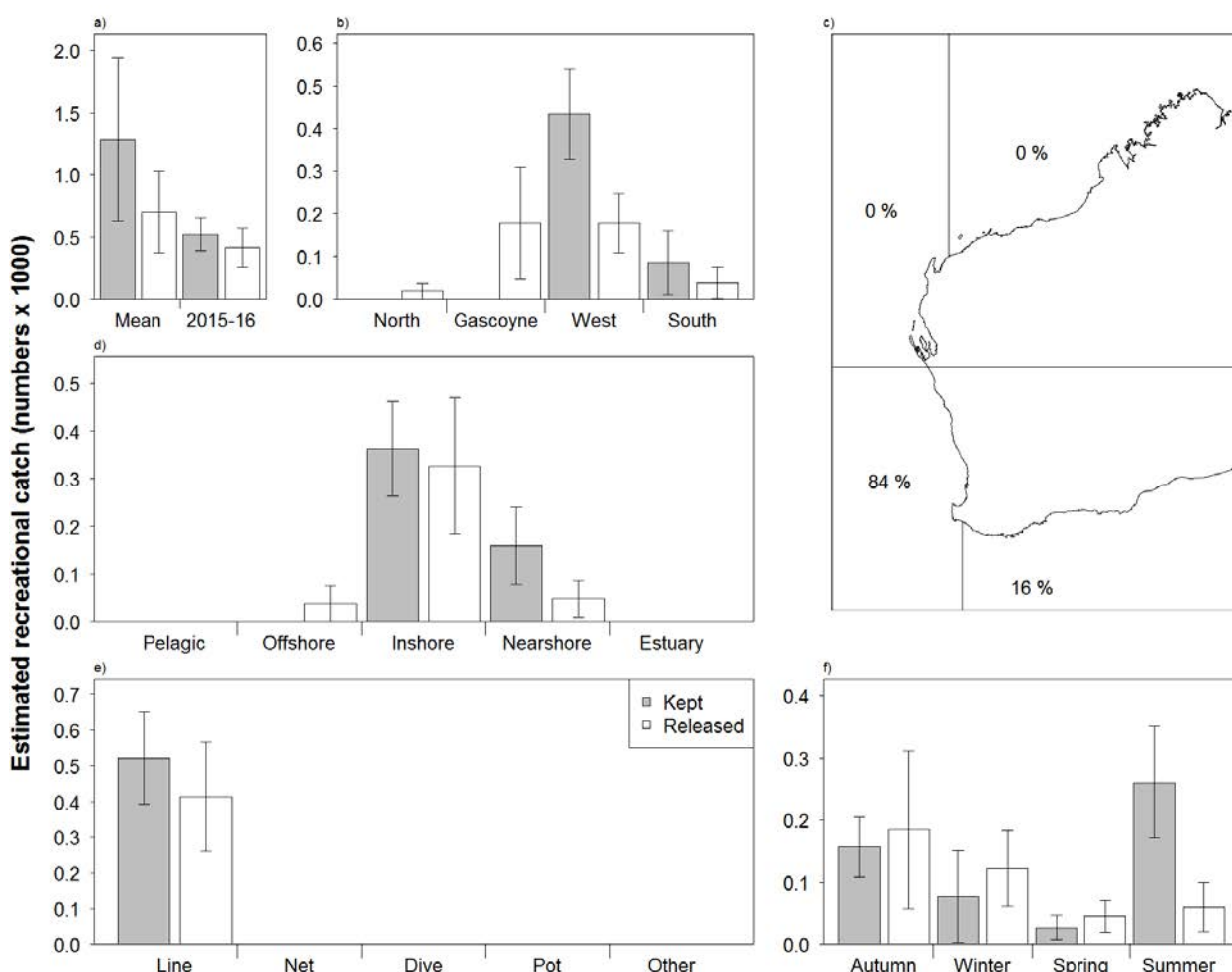
Whaler Sharks are a statewide indicator species. Whaler Sharks (Family Carcharhinidae) include Bronze Whaler (*Carcharhinus brachyurus*), Dusky Whaler (*Carcharhinus obscurus*) and Other Whaler Sharks (Carcharhinidae and Hemigaleidae - undifferentiated). Most boat-based recreational catches occurred in the West Coast (kept only, Figure 70b and c). The majority of catches were released (71% or higher; Table 5, Figure 70a) and attributed to “Too Many” and “Other” (Table 7). Catches were mostly taken from inshore demersal (65%; Figure 70d) throughout the year, with higher catches in spring (40%) compared with autumn (25%), summer (19%) and winter (16%; Figure 70f). All catches were taken by line fishing (Figure 70e). The estimated kept recreational catch of Whaler Sharks was similar in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was lower (Figure 70a, Table 5).



**Figure 70.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Whaler Sharks in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.6.2 Gummy Sharks (*Mustelus antarcticus* and *M. stevensi*)

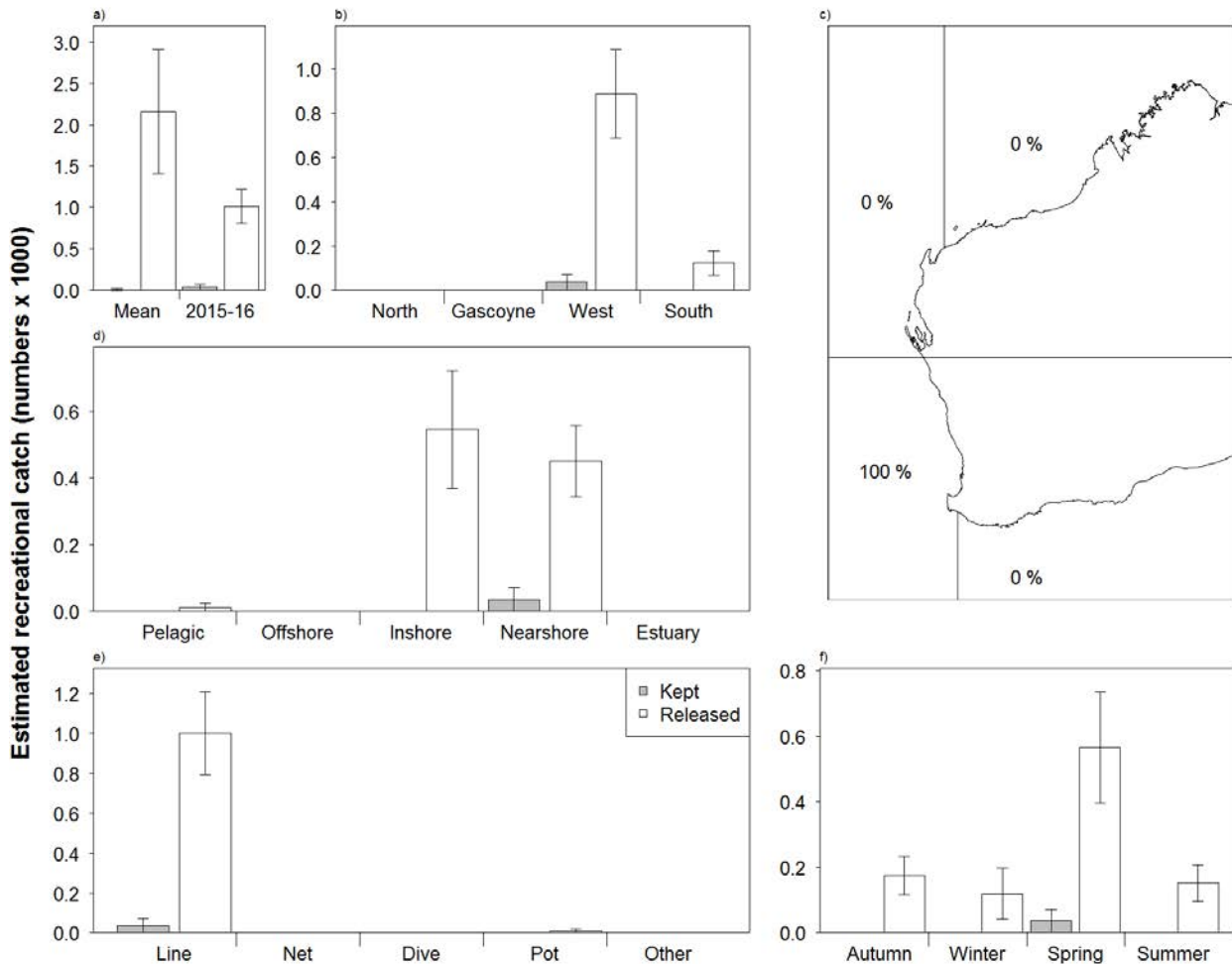
Gummy Sharks includes Gummy Shark (*Mustelus antarcticus*), which occurs in southern waters to Geraldton, and Western Spotted Gummy Shark (*M. stevensi*), which occurs from Shark Bay to the Kimberley. *M. antarcticus* is found nearshore to about 80m, although sometimes on the continental slope to 350m while *M. stevensi* is found at depths of 120–400m, possibly 735m (Last and Stevens 2009). Most boat-based recreational catches of Gummy Sharks occurred in the West Coast, with some catches in the South Coast (kept only, Figure 71b and c). The majority of catches were retained (44% released; Table 5, Figure 71a) with most releases attributed to “Too Small” (Table 7). Catches were taken predominantly from inshore demersal (74%; Figure 71d). Gummy Sharks were harvested throughout the year with higher catches in summer (34%) and autumn (36%; Figure 71f). All catches were taken by line fishing (Figure 71e). The estimated kept and released recreational catches of Gummy Sharks were lower in 2015/16 compared with previous statewide surveys, although uncertainty for this species is high (Figure 71a, Table 5).



**Figure 71.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Gummy Sharks in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.6.3 Port Jackson Shark (*Heterodontus portusjacksoni*)

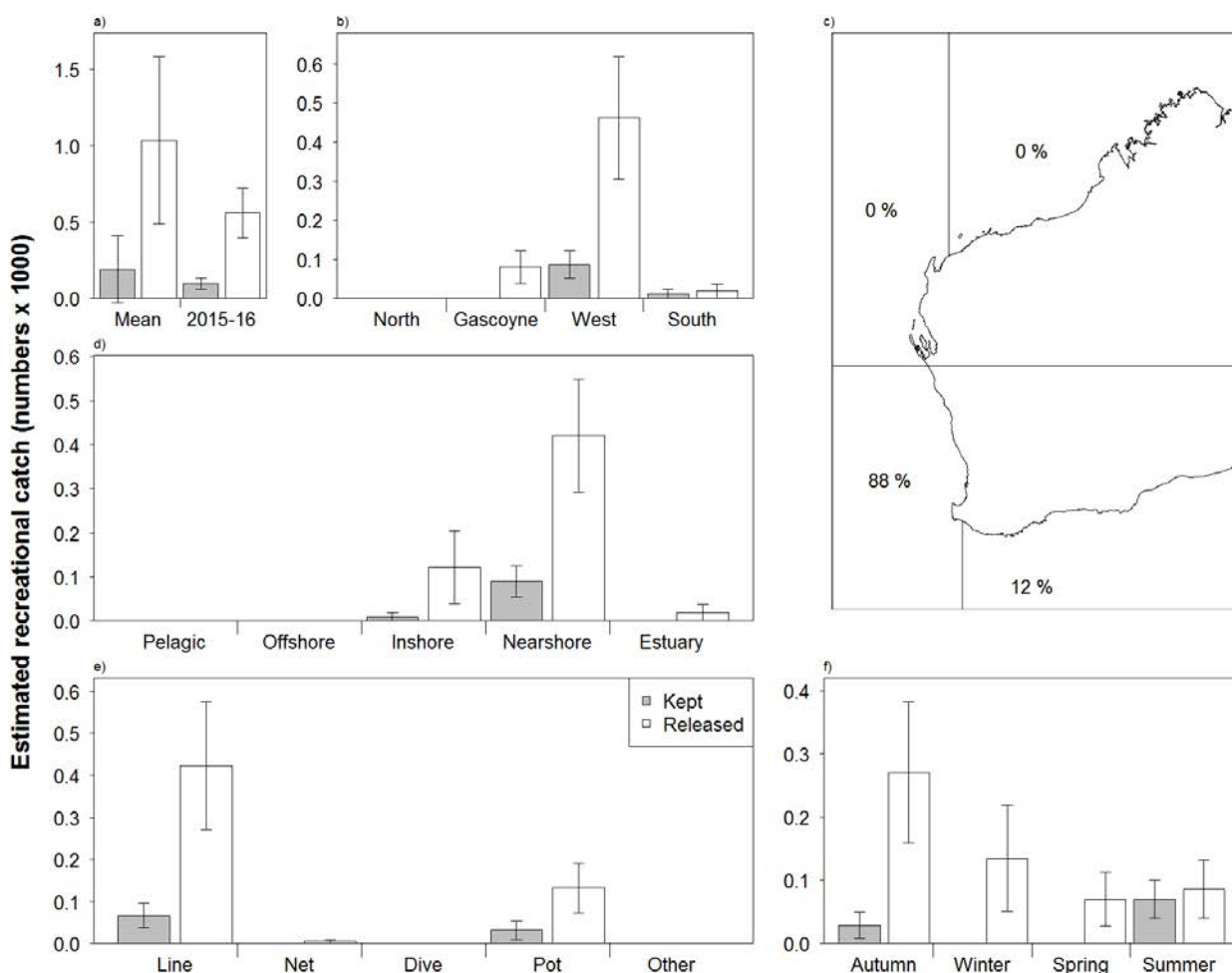
Most boat-based recreational catches of Port Jackson Shark occurred in the West Coast (kept only, Figure 72b and c). The majority of catches were released (96%; Table 5, Figure 72a) and attributed to “Too Many” and “Other” (Table 7). Catches were taken from inshore demersal (52%) and nearshore (47%; Figure 72d). Port Jackson Shark were harvested throughout the year, with higher catches in spring (57%) compared with autumn (17%), summer (15%) and winter (11%; Figure 72f). Catches were mostly taken by line fishing (99%; Figure 72e). The estimated kept recreational catch of Port Jackson Shark was similar in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 72a, Table 5).



**Figure 72.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Port Jackson Shark in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.6.4 Wobbegong (Family Orectolobidae)

Most boat-based recreational catches of Wobbegong occurred in the West Coast, with some catches in the South Coast (kept only, Figure 73b and c). The majority of catches were released (85%; Table 5, Figure 73a) and attributed to “Too Many” and “Other” (Table 7). Catches were taken predominantly from nearshore (77%) and inshore demersal (20%; Figure 73d). Wobbegong were harvested throughout the year, with higher catches autumn (45%) compared with summer (24%), winter (20%) and spring (11%; Figure 73f). Catches were mostly taken by line fishing (74%), with some catches from potting (25%; Figure 73e). The estimated kept recreational catch of Wobbegong was similar in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 73a, Table 5).

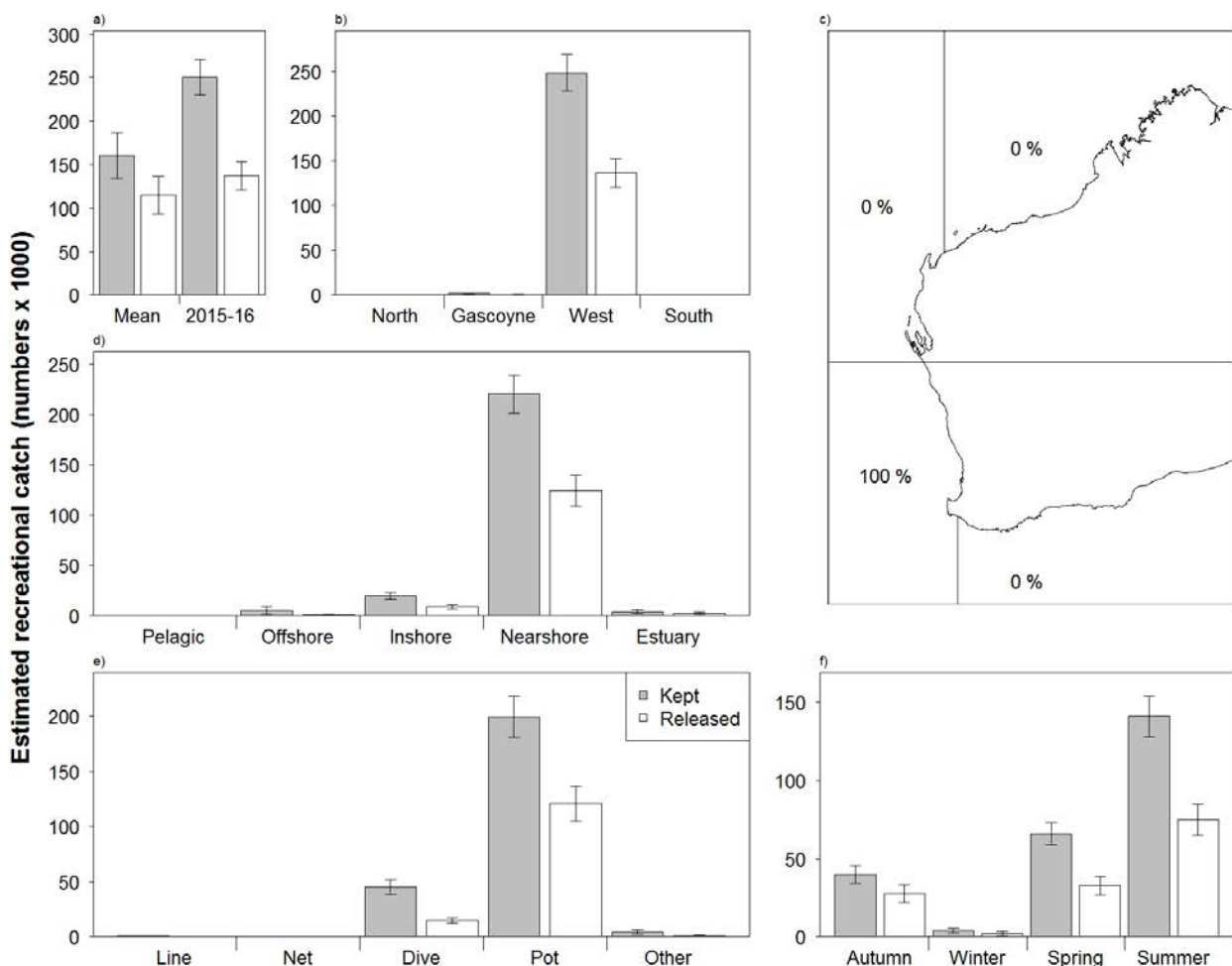


**Figure 73.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Wobbegong in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.7 Crustaceans

### 6.7.1 Western Rock Lobster (*Panulirus cygnus*)

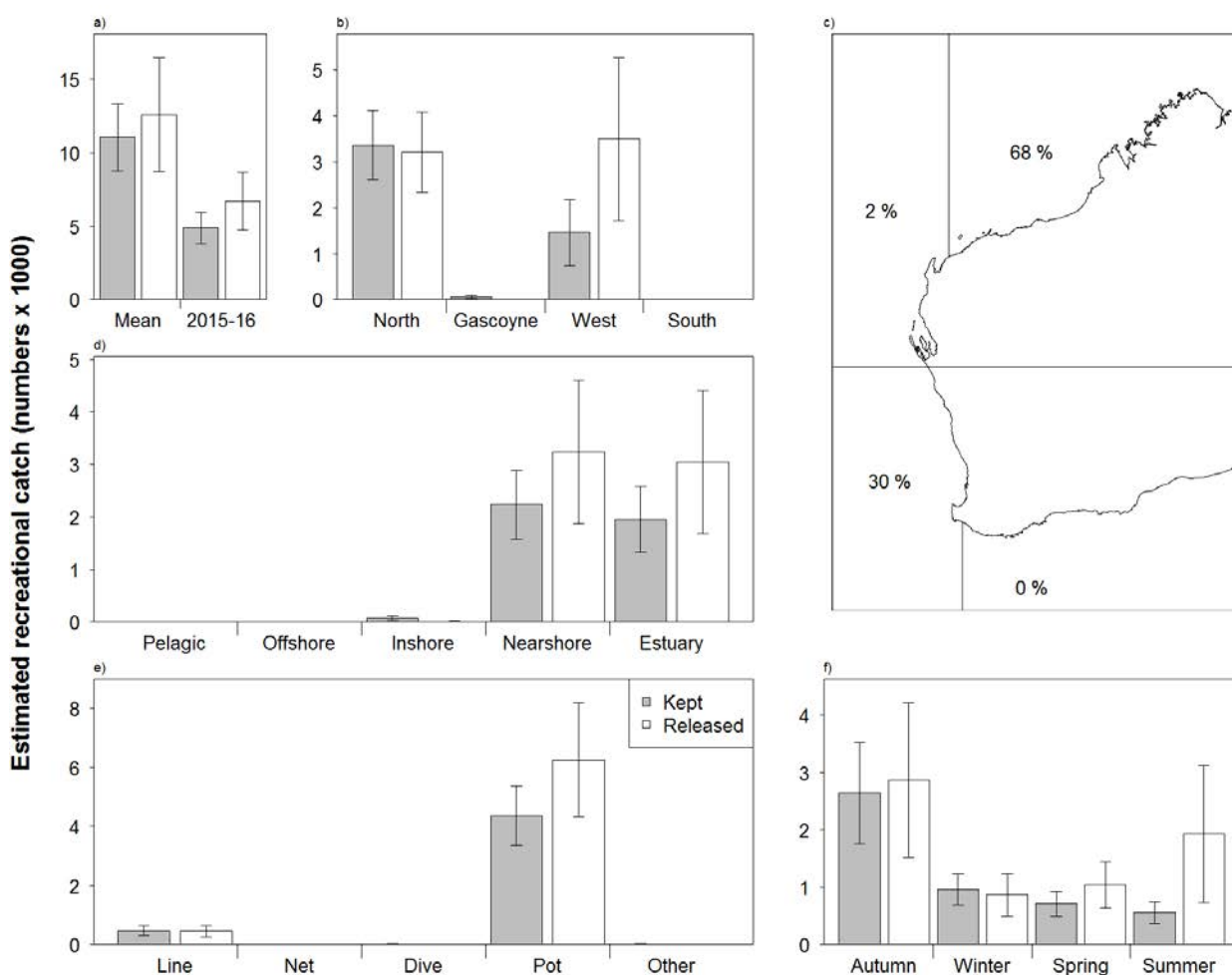
The estimated catch from this survey does not account for catches from fishers that only have a Rock Lobster licence. Approximately 40% of Rock Lobster licence holders do not have a RFBL; therefore, these results underestimate the catch of Western Rock Lobster. Most boat-based recreational catches occurred in the West Coast (kept only, Figure 74b and c). The majority of catches were retained (35% released; Table 5, Figure 74a) with most releases attributed to “Under Size” and “Other” (Table 7). Catches were taken predominantly from nearshore (89%; Figure 74d). Harvests occurred in summer (56%), spring (25%) and autumn (17%; Figure 74f). Catches were mostly taken by potting (83%), followed by diving (16%; Figure 74e). The estimated kept recreational catch was higher in 2015/16 compared with previous statewide surveys, and the estimated released recreational catch was similar (Figure 74a, Table 5).



**Figure 74.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Western Rock Lobster in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.7.2 Mud Crab (*Scylla olivacea* and *S. serrata*).

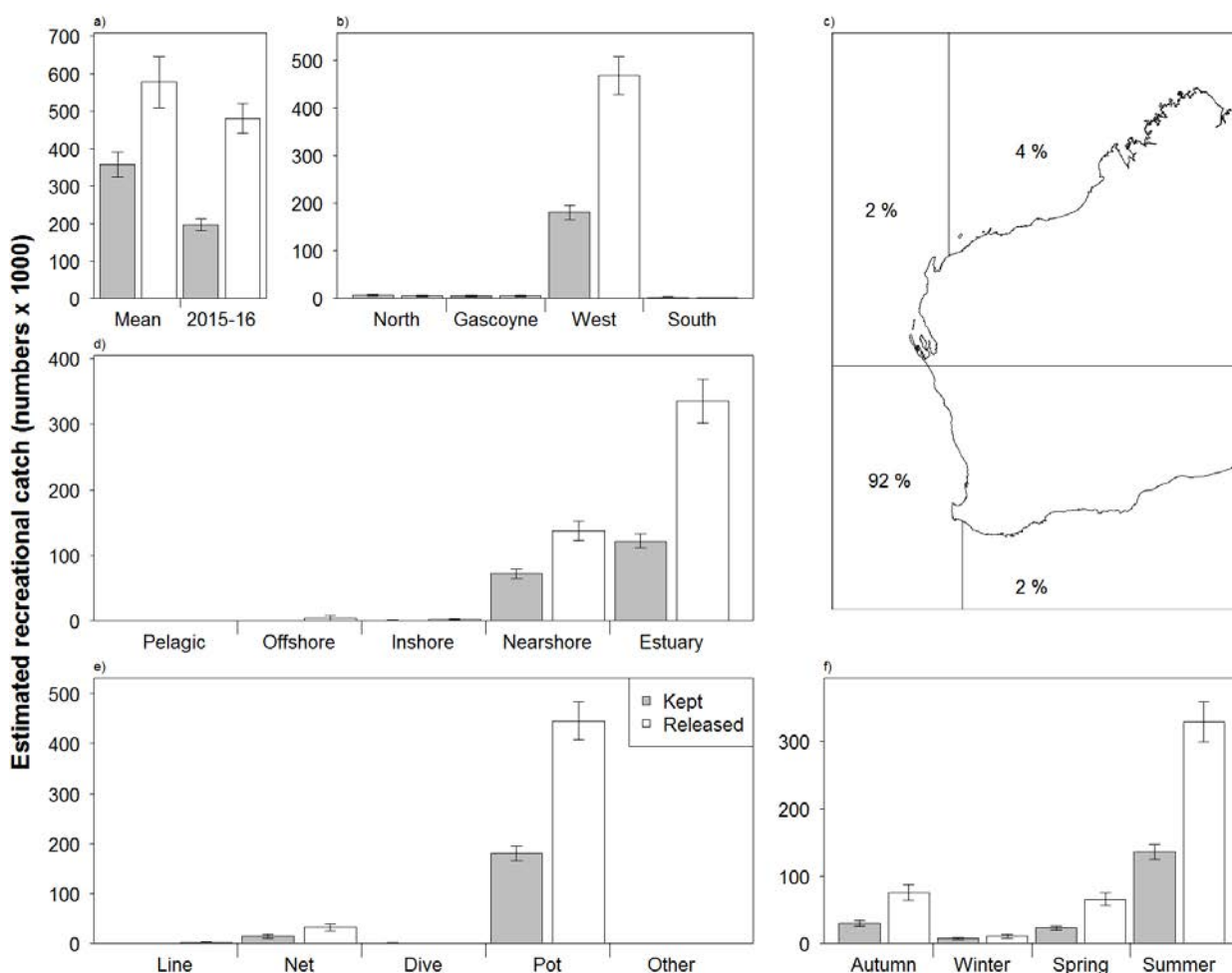
Mud Crabs include Brown Mud Crab (*Scylla olivacea*) and Green Mud Crab (*S. serrata*). Most boat-based recreational catches of Mud Crab occurred in the North Coast, with some catches in the West Coast and Gascoyne Coast (kept only, Figure 75b and c). There were different release rates for the two species (50% for Brown Mud Crab and 64% for Green Mud Crab; Table 5, Figure 75a) with most releases attributed to “Under Size” (Table 7). Catches were taken predominantly from nearshore (47%) and estuary (43%; Figure 75d). Mud Crab were harvested throughout the year, with higher catches in autumn (48%) compared with summer (21%), winter (16%) and spring (15%; Figure 75f). Most catches were taken by pots (92%; Figure 75e). The estimated kept and released recreational catches of Mud Crab were lower in 2015/16 compared with previous statewide surveys (Figure 75a, Table 5). Although the proportion of catch in the West Coast was higher in 2015/16 compared with previous years, catches in the West Coast have been stable across all years, while catch in the North Coast was lower in 15/16.



**Figure 75.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Mud Crab in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.7.3 Blue Swimmer Crab (*Portunus armatus*)

Blue Swimmer Crab, previously known as *Portunus pelagicus*, but now classified as *Portunus armatus*, is harvested statewide. Most boat-based recreational catches of Blue Swimmer Crab occurred in the West Coast, with some catches in the North Coast, Gascoyne Coast and South Coast (kept only, Figure 76b and c). The majority of catches were released (71%; Table 5, Figure 76a) and attributed to “Under Size” (Table 7). Catches were taken predominantly from estuary (67%) and nearshore habitats (31%; Figure 76d). Blue Swimmer Crab were harvested throughout the year, with higher catches in summer (68%) compared with autumn (16%) and spring (13%; Figure 76f). Most catches were taken by pots (including drop nets) (92%; Figure 76e). The estimated kept recreational catch of Blue Swimmer Crab was lower in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar (Figure 76a, Table 5).



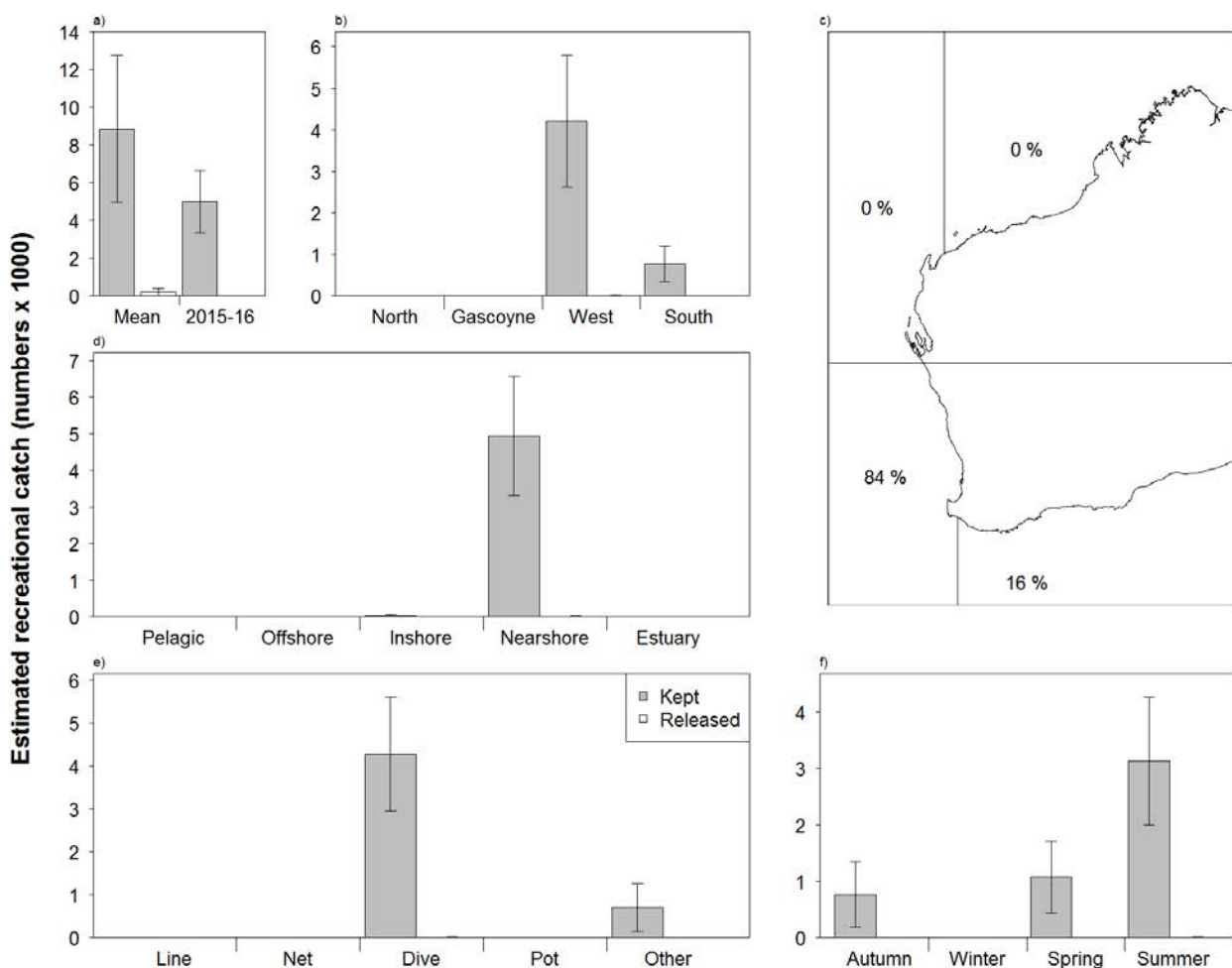
**Figure 76.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Blue Swimmer Crab in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.



## 6.8 Molluscs

### 6.8.1 Abalone (*Haliotis* spp.)

Abalone includes Roe's Abalone (*Haliotis roei*), Greenlip Abalone (*H. laevigata*) and Brownlip Abalone (*H. conicopora*). Most boat-based recreational catches of Abalone occurred in the West Coast, with some catches in the South Coast (kept only, Figure 77b and c). All boat-based recreational catches of Abalone were kept (Table 5, Figure 77a). Most catches were taken from nearshore (99%; Figure 77d). Abalone were mostly harvested in summer (63%) compared with spring (22%) and autumn (15%; Figure 77f). Catches were mostly taken by diving (86%; Figure 77e). The estimated kept and released recreational catches of Abalone were lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 77a, Table 5). These estimates do not include catches from shore-based recreational fishing.

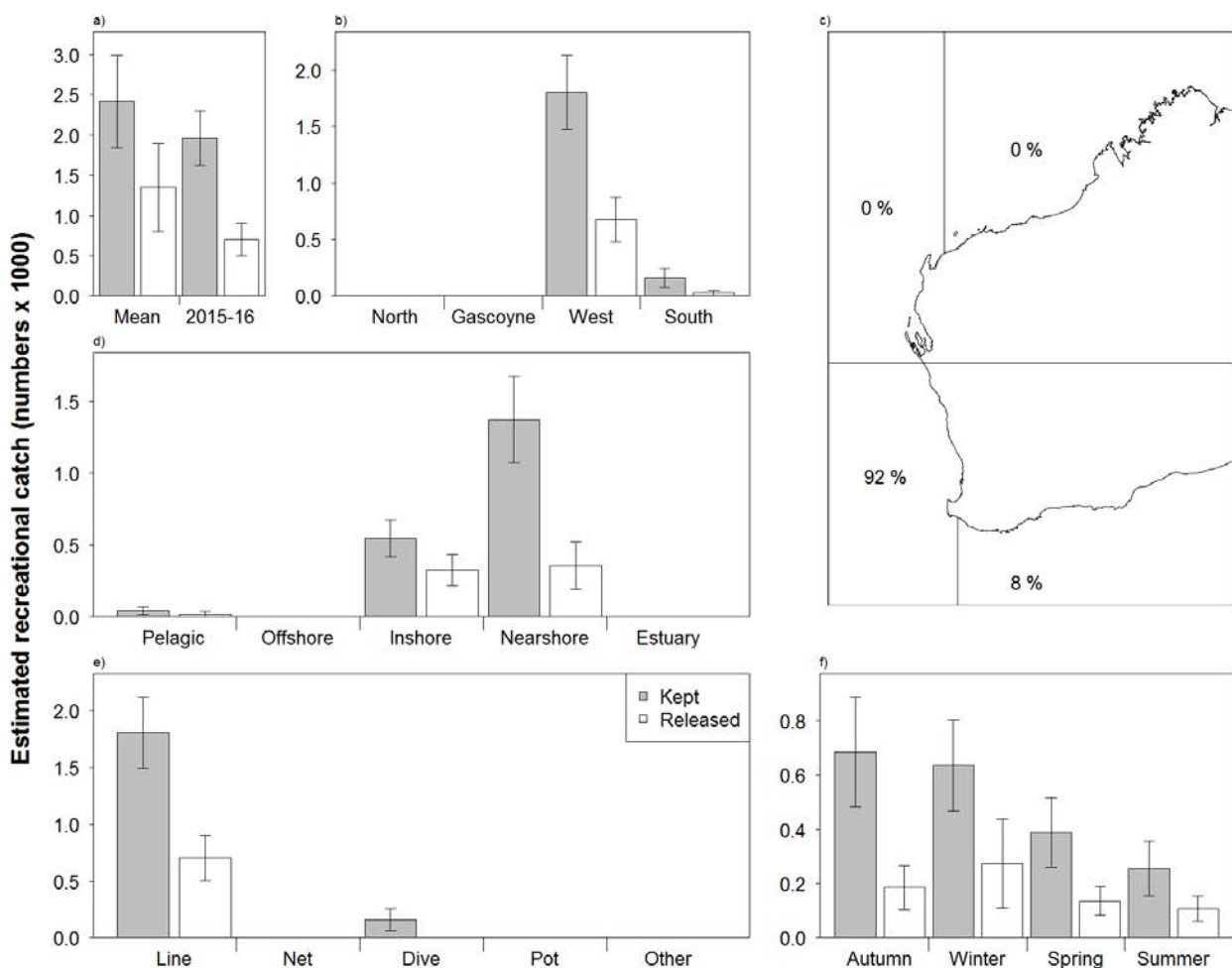


**Figure 77.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Abalone in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.9 Cephalopods

### 6.9.1 Cuttlefish (Order Sepiidae)

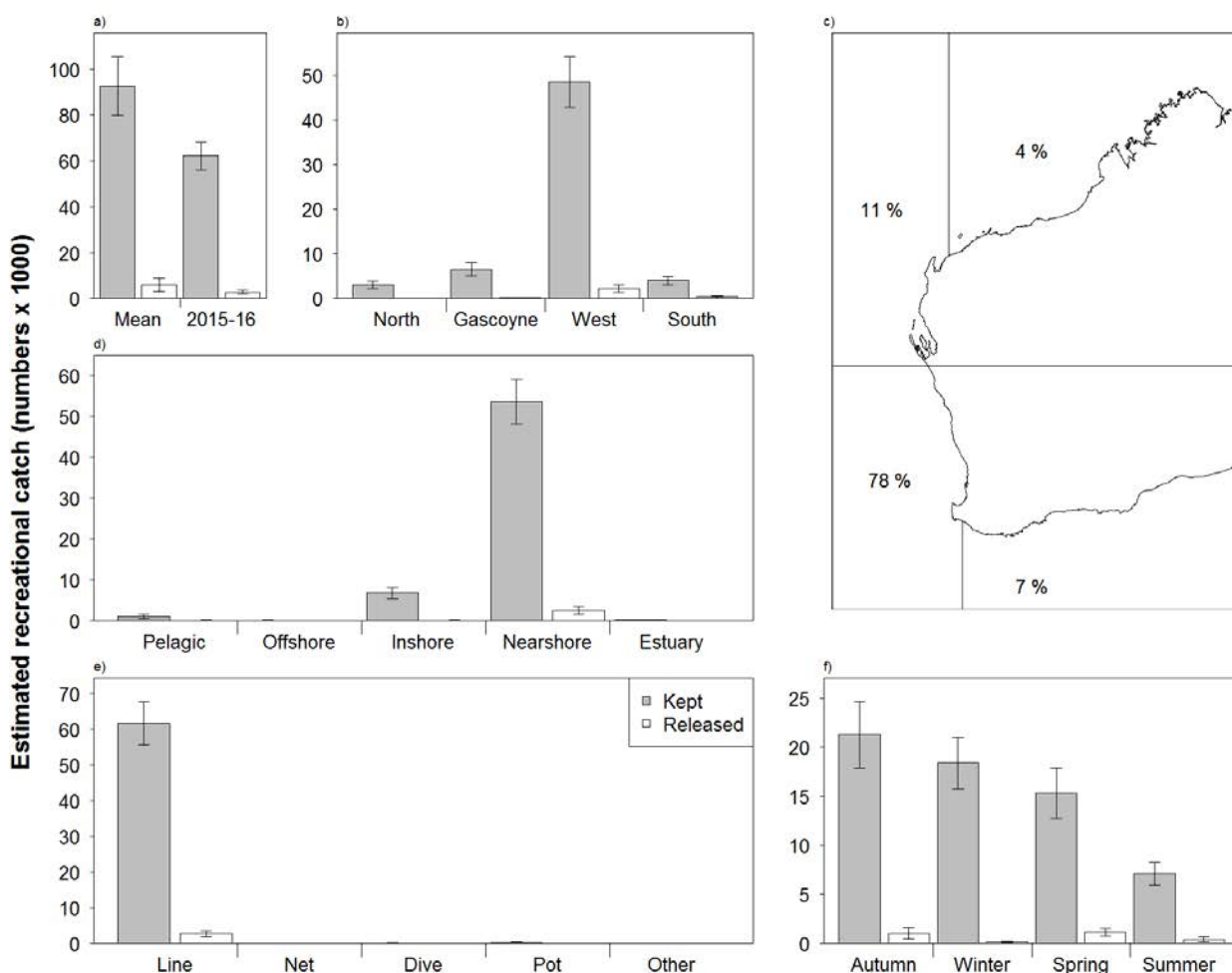
Most boat-based recreational catches of Cuttlefish occurred in the West Coast, with some catches in the South Coast (kept only, Figure 78b and c). The majority of catches were retained (26% released; Table 5, Figure 63a) with most releases attributed to “Too Many” and “Other” (Table 7). Catches were taken predominantly from nearshore (65%) and inshore demersal (33%; Figure 78d). Cuttlefish were harvested throughout the year, with higher catches in autumn (33%) and winter (34%) compared with spring (20%) and summer (14%; Figure 78f). Catches were mostly taken by line fishing (94%; Figure 78e). The estimated kept recreational catch of Cuttlefish was similar in 2015/16 compared with previous statewide surveys, and the estimated released recreational catch was lower (Figure 78a, Table 5).



**Figure 78.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Cuttlefish in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 6.9.2 Squid (Order Teuthoidea)

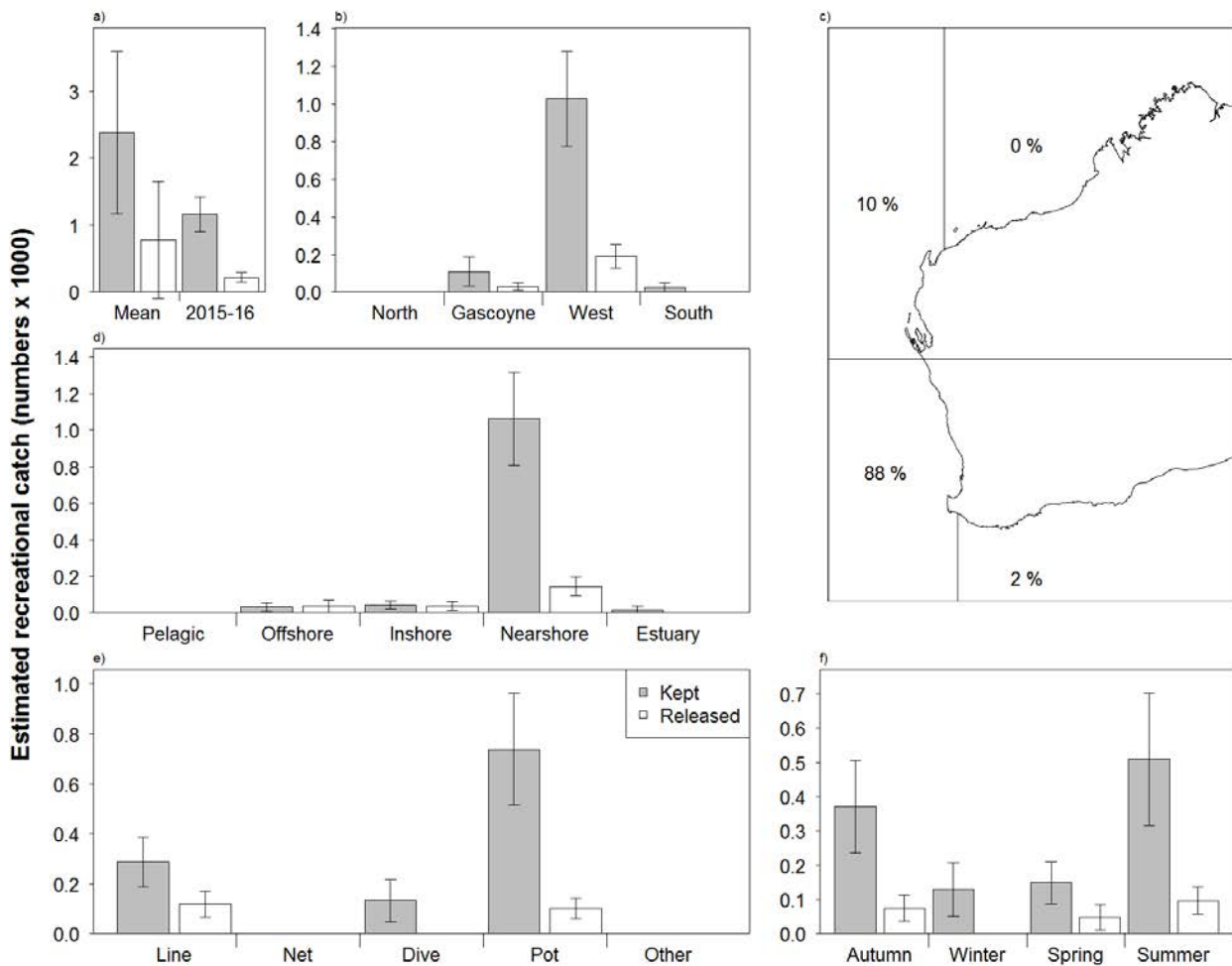
Most boat-based recreational catches of Squid occurred in the West Coast, with some catches in the North Coast, Gascoyne Coast and South Coast (kept only, Figure 79b and c). The majority of catches were retained (4% released; Table 5, Figure 79a) with most releases attributed to “Too Small” and “Too Many” (Table 7). Catches were taken predominantly from nearshore (87%) and inshore demersal (11%; Figure 79d). Squid were harvested throughout the year, with higher catches in autumn (34%) followed by winter (29%), spring (25%) and summer (12%; Figure 79f). Catches were mostly taken by line fishing (99%; Figure 79e). The estimated kept recreational catch of Squid was lower in 2015/16 compared with previous statewide surveys, although the estimated released recreational catch was similar (Figure 79a, Table 5).



**Figure 79.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Squid in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

### 6.9.3 Octopus (Order Octopodidae)

Most boat-based recreational catches of Octopus occurred in the West Coast, with some catches in the Gascoyne Coast and South Coast (kept only, Figure 80b and c). The majority of catches were retained (16% released; Table 5, Figure 80a) with most releases attributed to “Too Many” and “Other” (Table 7). Catches were taken predominantly from nearshore (88%; Figure 80d). Octopus were harvested throughout the year, with higher catches in summer (44%) and autumn (32%) compared with spring (14%) and winter (9%; Figure 80f). Catches were mostly taken by potting (61%), followed by line fishing (29%) and diving (10%; Figure 80e). The estimated kept and released recreational catches of Octopus were lower in 2015/16 compared with previous statewide surveys, although the uncertainty for this species is high (Figure 80a, Table 5, Table 5).



**Figure 80.** Boat-based kept (grey bars) and released (white bars) recreational catch (numbers x 1000) of Octopus in Western Australia during 2015/16: a) compared with mean (11/12 and 13/14); b) catch by bioregion; c) map of the proportion (%) of kept catch by bioregion; d) catch by habitat; e) catch by method; and f) catch by season.

## 7 Estimates of Catch by Bioregion

This section presents estimates of boat-based recreational catch by bioregion for the 12-months from September 2015 to August 2016. Estimates are presented for annual catch (total, kept and released, by number) and proportions released (% released) for all species in each bioregion: North Coast (Table 8), Gascoyne Coast (Table 9), West Coast (Table 10) and South Coast (Table 11).

### 7.1 North Coast

A total of 130 species/taxa were reported in the North Coast in 2015/16, which represented 6.1% of the statewide total catch (by numbers). The most common finfish species were Stripey Snapper (7% of the bioregion total catch), Grass Emperor (6%), Spangled Emperor (4%), Giant Sea Catfish (3%), Coral Trout (3%), Red Emperor (3%), Barramundi (3%), Golden Snapper (3%), Mangrove Jack (3%), Blackspotted Rockcod (3%), Blue Tuskfish (2%), Spanish Mackerel (2%), Blue Threadfin (2%), Rankin Cod (2%), Blackspot Tuskfish (2%), Golden Trevally (2%), Other Trevally (2%), Crimson Snapper (2%), Goldspotted Rockcod (2%), King Threadfin (2%) and Redthroat Emperor (2%). The most common invertebrate species were Blue Swimmer Crab (8%), Mud Crab (4%) and Squid (2%). These 25 species accounted for 74% of the total catch (by numbers) in the North Coast in 2015/16.

### 7.2 Gascoyne Coast

A total of 152 species/taxa were reported in the Gascoyne Coast in 2015/16, which represented 8.4% of the statewide total catch (by numbers). The most common finfish species were Pink Snapper (25% of the bioregion total catch), Chinaman Rockcod (8%), Grass Emperor (7%), Spangled Emperor (6%), Redthroat Emperor (4%), Red Emperor (3%), Stripey Snapper (2%), Goldband Snapper (2%), Baldchin Groper (2%), Spanish Mackerel (2%), Rankin Cod (2%), School Mackerel (2%), School Whiting (2%) and Western Butterfish (2%). The most common invertebrate species were Blue Swimmer Crab (5%) and Squid (3%). These 16 species accounted for 76% of the total catch (by numbers) in the Gascoyne Coast in 2015/16.

### 7.3 West Coast

A total of 155 species/taxa were reported in the West Coast in 2015/16, which represented 77.5% of the statewide total catch (by numbers). The most common finfish species were School Whiting (11% of the bioregion total catch), Australian Herring (5%), West Australian Dhufish (4%), Silver Trevally (3%), Pink Snapper (3%), Western King Wrasse (2%) and Southern Bluespotted Flathead (2%). The most common invertebrate species were Blue Swimmer Crab (33%), Western Rock Lobster (19%) and Squid (3%). These ten species accounted for 83% of the total catch (by numbers) in the West Coast in 2015/16.

### 7.4 South Coast

A total of 92 species/taxa were reported in the South Coast in 2015/16, which represented 8.0% of the statewide total catch (by numbers). The most common finfish species were Black Bream

(17% of the bioregion total catch), Australian Herring (14%), King George Whiting (10%), School Whiting (8%), Bight Redfish (8%), Pink Snapper (6%), Breaksea Cod (5%), Silver Trevally (4%), Blue Morwong (2%), Brownspotted Wrasse (2%), Swallowtail (2%) and West Australian Dhufish (2%). The most common invertebrate species were Blue Swimmer Crab (2%) and Squid (2%). These 14 species accounted for 83% of the total catch (by numbers) in the South Coast in 2015/16.

**Table 8.** Estimated annual catch (total, kept and released numbers) and proportion released in the North Coast bioregion during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); values in italics indicate <30 respondents recorded catches of the species).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cephalopod	Squid	Order Teuthoidea - undifferentiated	3,021	822	<b>89</b>	<b>54</b>	3,110	829	3%
Lobster	Painted Rock Lobster	<i>Panulirus versicolor</i>	649	219	<b>197</b>	<b>110</b>	846	273	23%
Lobster	Ornate Rock Lobster	<i>Panulirus ornatus</i>	<b>119</b>	<b>65</b>	0	0	<b>119</b>	<b>65</b>	0%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	7,044	1,898	5,976	1,608	13,020	3,393	46%
Crab	Green Mud Crab	<i>Scylla serrata</i>	869	236	525	174	1,394	367	38%
Crab	Brown Mud Crab	<i>Scylla olivacea</i>	2,495	649	2,683	817	5,179	1,376	52%
Sharks	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	0	0	464	110	464	110	100%
Sharks	Dusky Whaler	<i>Carcharhinus obscurus</i>	<b>7</b>	<b>6</b>	<b>853</b>	<b>536</b>	<b>859</b>	<b>537</b>	99%
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	0	0	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	100%
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	0	0	<b>42</b>	<b>18</b>	<b>42</b>	<b>18</b>	100%
Sharks	Lemon Shark	<i>Negaprion acutidens</i>	0	0	<b>84</b>	<b>53</b>	<b>84</b>	<b>53</b>	100%
Sharks	Sandbar Shark	<i>Carcharhinus plumbeus</i>	0	0	<b>40</b>	<b>38</b>	<b>40</b>	<b>38</b>	100%
Sharks	Tiger Shark	<i>Galeocerdo cuvier</i>	0	0	<b>32</b>	<b>26</b>	<b>32</b>	<b>26</b>	100%
Sharks	Whitetip Reef Shark	<i>Triaenodon obesus</i>	<b>13</b>	<b>12</b>	189	71	202	80	94%
Sharks	Other Shark	Sharks - undifferentiated	0	0	605	204	605	204	100%
Rays	Sawfishes	Pristidae - undifferentiated	0	0	<b>90</b>	<b>41</b>	<b>90</b>	<b>41</b>	100%
Rays	Western Shovelnose Ray	<i>Aptychotrema vincentiana</i>	0	0	<b>25</b>	<b>18</b>	<b>25</b>	<b>18</b>	100%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	0	0	<b>42</b>	<b>21</b>	<b>42</b>	<b>21</b>	100%
Billfish	Black Marlin	<i>Makaira indica</i>	<b>18</b>	<b>17</b>	<b>246</b>	<b>159</b>	<b>264</b>	<b>160</b>	93%
Billfish	Sailfish	<i>Istiophorus platypterus</i>	<b>17</b>	<b>11</b>	134	52	151	54	89%
Billfish	Striped Marlin	<i>Tetrapturus audax</i>	0	0	<b>9</b>	<b>8</b>	<b>9</b>	<b>8</b>	100%
Bonito	Bonito	<i>Sarda australis &amp; Cybiosarda elegans</i>	0	0	<b>35</b>	<b>23</b>	<b>35</b>	<b>23</b>	100%
Bream	Frypan Bream	<i>Argyrops spinifer</i>	<b>9</b>	<b>8</b>	0	0	<b>9</b>	<b>8</b>	0%
Bream	Northwest Black Bream	<i>Acanthopagrus palmaris</i>	<b>77</b>	<b>33</b>	884	284	962	299	92%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	<b>120</b>	<b>67</b>	<b>105</b>	<b>53</b>	<b>225</b>	<b>96</b>	47%
Bream	Western Yellowfin Bream	<i>Acanthopagrus morrisoni</i>	<b>34</b>	<b>26</b>	<b>834</b>	<b>459</b>	<b>868</b>	<b>470</b>	96%
Bream	Other Bream	Sparidae - undifferentiated	0	0	<b>82</b>	<b>71</b>	<b>82</b>	<b>71</b>	100%
Catfish	Eeltail Catfishes	Plotosidae - undifferentiated	0	0	<b>218</b>	<b>110</b>	<b>218</b>	<b>110</b>	100%
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	<b>111</b>	<b>46</b>	5,311	1,069	5,421	1,072	98%
Catfish	Silver Cobbler	<i>Neoarius midgleyi</i>	0	0	<b>941</b>	<b>513</b>	<b>941</b>	<b>513</b>	100%
Catfish	Other Catfish	Ariidae - undifferentiated	<b>8</b>	<b>7</b>	1,971	510	1,980	510	100%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cobia	Cobia	<i>Rachycentron canadum</i>	311	73	148	64	458	119	32%
Cod	Barramundi Cod	<i>Chromileptes altivelis</i>	80	59	76	39	156	91	49%
Cod	Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	654	247	3,305	986	3,958	1,045	83%
Cod	Blacktip Rockcod	<i>Epinephelus fasciatus</i>	16	14	206	186	222	187	93%
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	246	116	231	92	477	183	48%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	0	0	34	24	34	24	100%
Cod	Frostback Rockcod	<i>Epinephelus bilobatus</i>	0	0	46	31	46	31	100%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	766	178	1,625	407	2,391	512	68%
Cod	Potato Rockcod	<i>Epinephelus tukula</i>	9	8	84	37	93	43	90%
Cod	Queensland Grouper	<i>Epinephelus lanceolatus</i>	0	0	38	27	38	27	100%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	1,382	303	1,436	371	2,818	573	51%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	137	63	1,243	566	1,380	575	90%
Cod	Tomato Rockcod	<i>Cephalopholis sonnerati</i>	0	0	47	31	47	31	100%
Cod	Yellowspotted Rockcod	<i>Epinephelus areolatus</i>	49	23	601	374	650	375	92%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	2,377	402	2,991	1,245	5,368	1,428	56%
Emperor	Bluespotted Emperor	<i>Lethrinus punctulatus</i>	940	311	778	327	1,718	600	45%
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	3,820	1,005	5,853	1,780	9,673	2,504	61%
Emperor	Longnose Emperor	<i>Lethrinus olivaceus</i>	118	95	38	37	157	131	25%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	248	85	2,117	946	2,366	1,004	90%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	1,822	448	5,026	1,474	6,849	1,652	73%
Emperor	Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	13	13	121	113	134	126	90%
Flathead	Northern Sand Flathead	<i>Platycephalus endrachtensis</i>	118	101	43	29	161	105	27%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	73	32	184	83	257	90	72%
Giant Perch	Barramundi	<i>Lates calcarifer</i>	1,425	294	3,412	1,462	4,837	1,651	71%
Grunter	Western Sooty Grunter	<i>Hephaestus jenkinsi</i>	197	178	1,134	800	1,331	839	85%
Grunter Bream	Painted Sweetlips	<i>Diagramma labiosum</i>	348	141	363	189	711	266	51%
Grunter Bream	Barred Javelin	<i>Pomadasys kaakan</i>	276	95	729	292	1,006	360	73%
Grunter Bream	Blotched Javelin	<i>Pomadasys maculatus</i>	60	40	210	147	270	154	78%
Grunter Bream	Grunter Bream	Haemulidae - undifferentiated	0	0	29	28	29	28	100%
Gurnard	Gurnard	Neosebastidae - undifferentiated	0	0	9	8	9	8	100%
Jewfish	Black Jewfish	<i>Protonibea diacanthus</i>	227	62	769	293	996	312	77%
King Snapper	Goldband Snapper	<i>Pristipomoides multidens</i>	118	75	92	69	210	115	44%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	5	5	8	7	14	8	60%
Lizardfish	Lizardfish Grinners	Bathysauridae, Synodontidae - undiff	253	168	918	715	1,171	801	78%
Longtom	Longtom	Belonidae - undifferentiated	0	0	197	118	197	118	100%



Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Mackerel	Grey Mackerel	<i>Scomberomorus semifasciatus</i>	12	8	65	44	76	45	84%
Mackerel	School Mackerel	<i>Scomberomorus queenslandicus</i>	439	133	287	120	726	192	39%
Mackerel	Shark Mackerel	<i>Grammatorcynus bicarinatus</i>	112	42	483	296	595	303	81%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	1,851	258	1,839	410	3,690	566	50%
Mackerel	Spotted Mackerel	<i>Scomberomorus munroi</i>	186	87	81	37	267	110	30%
Mackerel	Wahoo	<i>Acanthocybium solandri</i>	44	34	22	14	66	48	33%
Mackerel	Other Mackerel & Tuna	Scombridae - undifferentiated	120	57	50	29	171	64	29%
Mahi Mahi	Mahi Mahi	<i>Coryphaena</i> spp.	0	0	27	25	27	25	100%
Mullet	Bluetail Mullet	<i>Valamugil buehanani</i>	191	166	0	0	191	166	0%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	330	220	43	29	373	226	12%
Mullet	Other Mullet	Mugilidae - undifferentiated	500	344	309	193	809	533	38%
Pearl Perch	Northern Pearl Perch	<i>Glaucosoma buergeri</i>	95	73	415	159	510	208	81%
Pike	Great Barracuda	<i>Sphyaena barracuda</i>	8	7	608	229	616	229	99%
Pike	Yellowtail Barracuda	<i>Sphyaena obtusata</i>	340	223	77	67	417	233	18%
Queenfish	Queenfish	<i>Scomberoides</i> spp.	202	73	1,528	494	1,731	539	88%
Small Baitfish	Herrings & Ilishas	Clupeidae, Pristigasteridae - undiff	737	632	197	142	933	647	21%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	0	0	5	5	5	5	100%
Threadfin	Blue Threadfin	<i>Eleutheronema tetradactylum</i>	2,051	424	1,228	334	3,278	631	37%
Threadfin	King Threadfin	<i>Polydactylus macrochir</i>	1,501	525	876	284	2,376	785	37%
Threadfin Bream	Rosy Threadfin Bream	<i>Nemipterus furcosus</i>	96	49	0	0	96	49	0%
Trevally	Amberjack	<i>Seriola dumerili</i>	0	0	9	8	9	8	100%
Trevally	Bludger Trevally	<i>Carangoides gymnostethus</i>	478	167	1,481	384	1,959	515	76%
Trevally	Giant Trevally	<i>Caranx ignobilis</i>	500	245	1,331	405	1,831	482	73%
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	678	142	1,909	415	2,587	477	74%
Trevally	Rainbow Runner	<i>Elagatis bipinnulata</i>	27	25	27	25	54	50	50%
Trevally	Turrun	<i>Carangoides fulvoguttatus</i>	22	14	33	28	54	32	60%
Trevally	Other Trevally	Carangidae - undifferentiated	899	732	1,666	891	2,565	1,603	65%
Tripletail	Tripletail	<i>Lobotes surinamensis</i>	82	31	45	29	127	47	36%
Tropical Snapper	Brownstripe Snapper	<i>Lutjanus vitta</i>	16	14	410	356	426	370	96%
Tropical Snapper	Chinamanfish	<i>Symphorus nematophorus</i>	265	98	381	261	646	281	59%
Tropical Snapper	Crimson Snapper	<i>Lutjanus erythropterus</i>	841	184	1,558	444	2,398	568	65%
Tropical Snapper	Darktail Snapper	<i>Lutjanus lemniscatus</i>	58	40	84	54	142	73	59%
Tropical Snapper	Golden Snapper	<i>Lutjanus johnii</i>	2,133	575	2,403	699	4,535	1,220	53%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	1,848	339	2,607	611	4,455	878	59%
Tropical Snapper	Moses' Snapper	<i>Lutjanus russellii</i>	220	71	768	504	987	540	78%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	1,737	407	3,170	1,066	4,906	1,418	65%
Tropical Snapper	Ruby Snapper	<i>Etelis carbunculus</i>	<b>230</b>	<b>148</b>	<b>44</b>	<b>30</b>	<b>273</b>	<b>177</b>	16%
Tropical Snapper	Saddletail Snapper	<i>Lutjanus malabaricus</i>	612	173	<b>886</b>	<b>550</b>	<b>1,498</b>	<b>630</b>	59%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	3,270	1,205	8,210	1,977	11,480	3,028	72%
Tuna	Dogtooth Tuna	<i>Gymnosarda unicolor</i>	0	0	<b>30</b>	<b>19</b>	<b>30</b>	<b>19</b>	100%
Tuna	Longtail Tuna	<i>Thunnus tonggol</i>	250	93	<b>400</b>	<b>170</b>	651	205	62%
Tuna	Mackerel Tuna	<i>Euthynnus affinis</i>	304	101	370	141	674	189	55%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	<b>83</b>	<b>40</b>	<b>23</b>	<b>16</b>	<b>106</b>	<b>45</b>	22%
Tuna	Yellowfin Tuna	<i>Thunnus albacares</i>	<b>8</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>14</b>	<b>9</b>	40%
Tuskfish Wrasse	Blackspot Tuskfish	<i>Choerodon schoenleinii</i>	1,158	279	1,530	439	2,687	599	57%
Tuskfish Wrasse	Blue Tuskfish	<i>Choerodon cyanodus</i>	1,162	291	2,700	752	3,862	920	70%
Tuskfish Wrasse	Bluebarred Parrotfish	<i>Scarus ghobban</i> spp. complex	0	0	<b>34</b>	<b>19</b>	<b>34</b>	<b>19</b>	100%
Tuskfish Wrasse	Bluespotted Tuskfish	<i>Choerodon cauteroma</i>	<b>6</b>	<b>6</b>	<b>50</b>	<b>44</b>	<b>57</b>	<b>45</b>	89%
Tuskfish Wrasse	Humphead Maori Wrasse	<i>Cheilinus undulatus</i>	<b>37</b>	<b>36</b>	<b>18</b>	<b>18</b>	<b>55</b>	<b>53</b>	33%
Tuskfish Wrasse	Purple Tuskfish	<i>Choerodon cephalotes</i>	<b>119</b>	<b>61</b>	<b>263</b>	<b>139</b>	<b>383</b>	<b>173</b>	69%
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	<b>13</b>	<b>13</b>	0	0	<b>13</b>	<b>13</b>	0%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	<b>8</b>	<b>8</b>	<b>78</b>	<b>63</b>	<b>86</b>	<b>64</b>	90%
Whiting	Goldenline Whiting	<i>Sillago analis</i>	<b>178</b>	<b>106</b>	<b>199</b>	<b>144</b>	<b>377</b>	<b>243</b>	53%
Finfish Other	Archerfishes	Toxotidae - undifferentiated	0	0	<b>25</b>	<b>21</b>	<b>25</b>	<b>21</b>	100%
Finfish Other	Butterfish	Stromateidae - undifferentiated	0	0	<b>128</b>	<b>124</b>	<b>128</b>	<b>124</b>	100%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	0	0	<b>90</b>	<b>72</b>	<b>90</b>	<b>72</b>	100%
Finfish Other	Moonfish Batfish	Ephippidae, Drepaneidae - undifferentiated	<b>27</b>	<b>25</b>	<b>147</b>	<b>70</b>	<b>174</b>	<b>74</b>	85%
Finfish Other	Silver Toadfish	<i>Lagocephalus sceleratus</i>	0	0	<b>55</b>	<b>29</b>	<b>55</b>	<b>29</b>	100%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	0	0	<b>27</b>	<b>25</b>	<b>27</b>	<b>25</b>	100%

**Table 9.** Estimated annual catch (total, kept and released numbers) and proportion released in the Gascoyne Coast bioregion during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); values in italics indicate <30 respondents recorded catches of the species).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cephalopod	Octopus	Octopodidae - undifferentiated	<b>108</b>	<b>77</b>	<b>29</b>	<b>21</b>	<b>137</b>	<b>84</b>	21%
Cephalopod	Squid	Order Teuthoidea - undifferentiated	6,559	1,474	<b>179</b>	<b>103</b>	6,738	1,525	3%
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	1,719	569	<b>728</b>	<b>363</b>	2,448	805	30%
Lobster	Painted Rock Lobster	<i>Panulirus versicolor</i>	<b>146</b>	<b>85</b>	0	0	<b>146</b>	<b>85</b>	0%
Lobster	Ornate Rock Lobster	<i>Panulirus ornatus</i>	<b>22</b>	<b>18</b>	<b>9</b>	<b>8</b>	<b>31</b>	<b>20</b>	29%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	5,379	1,600	4,818	1,556	10,197	2,938	47%
Crab	Green Mud Crab	<i>Scylla serrata</i>	<b>11</b>	<b>9</b>	0	0	<b>11</b>	<b>9</b>	0%
Crab	Brown Mud Crab	<i>Scylla olivacea</i>	<b>41</b>	<b>26</b>	0	0	<b>41</b>	<b>26</b>	0%
Sharks	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	<b>102</b>	<b>59</b>	414	154	516	177	80%
Sharks	Dusky Whaler	<i>Carcharhinus obscurus</i>	<b>177</b>	<b>86</b>	384	142	561	194	69%
Sharks	Grey Nurse Shark	<i>Carcharias taurus</i>	0	0	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	100%
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	0	0	<b>178</b>	<b>131</b>	<b>178</b>	<b>131</b>	100%
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	0	0	<b>16</b>	<b>13</b>	<b>16</b>	<b>13</b>	100%
Sharks	Lemon Shark	<i>Negaprion acutidens</i>	0	0	<b>50</b>	<b>27</b>	<b>50</b>	<b>27</b>	100%
Sharks	Sandbar Shark	<i>Carcharhinus plumbeus</i>	0	0	<b>18</b>	<b>18</b>	<b>18</b>	<b>18</b>	100%
Sharks	Tiger Shark	<i>Galeocerdo cuvier</i>	0	0	<b>98</b>	<b>56</b>	<b>98</b>	<b>56</b>	100%
Sharks	Whitetip Reef Shark	<i>Triaenodon obesus</i>	<b>30</b>	<b>22</b>	<b>307</b>	<b>224</b>	<b>337</b>	<b>226</b>	91%
Sharks	Wobbegong	Orectolobidae - undifferentiated	0	0	<b>80</b>	<b>42</b>	<b>80</b>	<b>42</b>	100%
Sharks	Other Whaler	Carcharhinidae, Hemigaleidae - undiff	<b>65</b>	<b>34</b>	<b>242</b>	<b>177</b>	<b>308</b>	<b>184</b>	79%
Sharks	Other Shark	Sharks - undifferentiated	<b>169</b>	<b>94</b>	1,009	369	1,178	401	86%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	0	0	<b>77</b>	<b>59</b>	<b>77</b>	<b>59</b>	100%
Billfish	Black Marlin	<i>Makaira indica</i>	<b>39</b>	<b>37</b>	<b>462</b>	<b>198</b>	<b>501</b>	<b>201</b>	92%
Billfish	Blue Marlin	<i>Makaira nigricans</i>	0	0	<b>102</b>	<b>42</b>	<b>102</b>	<b>42</b>	100%
Billfish	Sailfish	<i>Istiophorus platypterus</i>	<b>61</b>	<b>40</b>	<b>180</b>	<b>76</b>	<b>241</b>	<b>110</b>	75%
Billfish	Striped Marlin	<i>Tetrapturus audax</i>	0	0	<b>21</b>	<b>19</b>	<b>21</b>	<b>19</b>	100%
Bonito	Bonito	<i>Sarda australis &amp; Cybiosarda elegans</i>	<b>19</b>	<b>18</b>	<b>81</b>	<b>60</b>	<b>100</b>	<b>63</b>	81%
Bonito	Oriental Bonito	<i>Sarda orientalis</i>	<b>19</b>	<b>19</b>	<b>25</b>	<b>24</b>	<b>44</b>	<b>30</b>	56%
Bream	Frypan Bream	<i>Argyrops spinifer</i>	<b>41</b>	<b>24</b>	<b>96</b>	<b>56</b>	<b>137</b>	<b>71</b>	70%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	12,448	1,931	41,491	7,128	53,940	8,414	77%
Bream	Western Yellowfin Bream	<i>Acanthopagrus morrisoni</i>	<b>232</b>	<b>149</b>	<b>644</b>	<b>300</b>	876	336	74%
Bream	Other Bream	Sparidae - undifferentiated	<b>25</b>	<b>23</b>	<b>49</b>	<b>45</b>	<b>74</b>	<b>68</b>	67%
Catfish	Eeltail Catfishes	Plotosidae - undifferentiated	0	0	<b>31</b>	<b>25</b>	<b>31</b>	<b>25</b>	100%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	0	0	80	58	80	58	100%
Catfish	Other Catfish	Ariidae - undifferentiated	0	0	36	28	36	28	100%
Cobia	Cobia	<i>Rachycentron canadum</i>	1,237	268	509	218	1,746	394	29%
Cod	Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	589	134	559	210	1,148	280	49%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	343	177	490	221	833	336	59%
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	5,127	2,031	11,274	4,556	16,401	6,228	69%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	286	126	22	18	308	135	7%
Cod	Frostback Rockcod	<i>Epinephelus bilobatus</i>	11	9	49	38	60	39	82%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	1,802	600	674	196	2,476	670	27%
Cod	Potato Rockcod	<i>Epinephelus tukula</i>	37	36	0	0	37	36	0%
Cod	Queensland Grouper	<i>Epinephelus lanceolatus</i>	55	53	28	19	83	57	34%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	2,937	422	692	186	3,629	492	19%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	325	114	264	111	590	160	45%
Cod	Yellowspotted Rockcod	<i>Epinephelus areolatus</i>	411	143	1,232	624	1,643	649	75%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	1,138	190	512	140	1,650	248	31%
Coral Trout	Yellowedge Coronation Trout	<i>Variola louti</i>	122	49	145	113	267	123	54%
Emperor	Bluespotted Emperor	<i>Lethrinus punctulatus</i>	771	320	1,048	384	1,819	647	58%
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	5,839	1,140	9,872	2,832	15,711	3,459	63%
Emperor	Longnose Emperor	<i>Lethrinus olivaceus</i>	293	238	93	60	386	294	24%
Emperor	Redspot Emperor	<i>Lethrinus lentjan</i>	12	12	3	2	15	12	18%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	3,536	1,089	4,212	1,306	7,748	2,319	54%
Emperor	Robinsons' Seabream	<i>Gymnocranius grandoculis</i>	664	186	208	184	871	286	24%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	6,158	986	7,512	1,326	13,671	2,042	55%
Emperor	Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	58	56	223	141	280	194	79%
Emperor	Other Emperor	Lethrinidae - undifferentiated	0	0	15	15	15	15	100%
Flathead	Northern Sand Flathead	<i>Platycephalus endrachtensis</i>	38	24	62	42	100	48	62%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	117	57	12	8	129	57	9%
Garfish	Three-by-two Garfish	<i>Hemiramphus robustus</i>	33	28	0	0	33	28	0%
Garfish	Other Garfish	Hemiramphidae - undifferentiated	212	204	0	0	212	204	0%
Grunter	Western Striped Grunter	<i>Pelates octolineatus</i>	85	68	11	9	96	70	11%
Grunter Bream	Painted Sweetlips	<i>Diagramma labiosum</i>	149	76	462	160	611	198	76%
Grunter Bream	Barred Javelin	<i>Pomadasys kaakan</i>	0	0	13	13	13	13	100%
Grunter Bream	Grunter Bream	Haemulidae - undifferentiated	0	0	25	24	25	24	100%
Gurnard	Gurnard	Neosebastidae - undifferentiated	38	37	0	0	38	37	0%
Jewfish	Mulloway	<i>Argyrosomus japonicus</i>	433	173	611	278	1,044	426	58%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
King Snapper	Goldband Snapper	<i>Pristipomoides multidens</i>	3,597	965	922	741	4,519	1,558	20%
King Snapper	Rosy Snapper	<i>Pristipomoides filamentosus</i>	253	158	13	12	266	169	5%
King Snapper	Sharptooth Snapper	<i>Pristipomoides typus</i>	282	241	66	63	348	249	19%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	5	5	934	538	940	538	99%
Lizardfish	Lizardfish Grinners	Bathysauridae, Synodontidae - undiff	196	132	254	129	450	184	56%
Longtom	Longtom	Belonidae - undifferentiated	0	0	13	12	13	12	100%
Mackerel	Blue Mackerel	<i>Scomber australasicus</i>	77	74	731	706	808	780	90%
Mackerel	Grey Mackerel	<i>Scomberomorus semifasciatus</i>	67	65	29	28	96	93	30%
Mackerel	School Mackerel	<i>Scomberomorus queenslandicus</i>	1,259	538	2,310	1,593	3,569	2,090	65%
Mackerel	Shark Mackerel	<i>Grammatorcynus bicarinatus</i>	239	75	465	154	704	182	66%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	2,233	354	1,546	504	3,779	767	41%
Mackerel	Spotted Mackerel	<i>Scomberomorus munroi</i>	151	87	222	104	374	155	59%
Mackerel	Wahoo	<i>Acanthocybium solandri</i>	182	87	39	37	221	97	17%
Mackerel	Other Mackerel & Tuna	Scombridae - undifferentiated	95	49	95	89	191	116	50%
Mahi Mahi	Mahi Mahi	<i>Coryphaena</i> spp.	278	101	26	25	304	110	8%
Mullet	Bluetail Mullet	<i>Valamugil buchani</i>	16	14	0	0	16	14	0%
Mullet	Greenback Mullet	<i>Liza subviridis</i>	68	57	0	0	68	57	0%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	894	317	0	0	894	317	0%
Mullet	Other Mullet	Mugilidae - undifferentiated	0	0	69	55	69	55	100%
Pearl Perch	Northern Pearl Perch	<i>Glaucosoma buergeri</i>	586	194	125	84	711	211	18%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	19	19	58	56	77	74	75%
Pike	Great Barracuda	<i>Sphyraena barracuda</i>	0	0	61	33	61	33	100%
Pike	Yellowtail Barracuda	<i>Sphyraena obtusata</i>	159	75	148	82	308	112	48%
Pike	Other Pike	Sphyraenidae - undifferentiated	8	7	0	0	8	7	0%
Queenfish	Queenfish	<i>Scomberoides</i> spp.	0	0	124	83	124	83	100%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	128	102	15	15	144	103	11%
Small Baitfish	Herrings & Ilishas	Clupeidae, Pristigasteridae - undiff	46	45	82	62	128	76	64%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	422	357	205	119	627	466	33%
Threadfin	Blue Threadfin	<i>Eleutheronema tetradactylum</i>	11	9	0	0	11	9	0%
Threadfin Bream	Rosy Threadfin Bream	<i>Nemipterus furcosus</i>	0	0	7	7	7	7	100%
Threadfin Bream	Western Butterfish	<i>Pentapodus vitta</i>	1,318	788	2,005	1,176	3,322	1,415	60%
Trevalla	Blue-Eye Trevalla	<i>Hyperoglyphe antarctica</i>	0	0	4	4	4	4	100%
Trevally	Amberjack	<i>Seriola dumerili</i>	47	24	39	37	86	44	45%
Trevally	Bludger Trevally	<i>Carangoides gymnostethus</i>	124	81	495	408	619	416	80%
Trevally	Common Dart	<i>Trachinotus botla</i>	0	0	38	37	38	37	100%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Trevally	Giant Trevally	<i>Caranx ignobilis</i>	13	12	511	165	524	165	98%
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	502	117	916	274	1,418	341	65%
Trevally	Rainbow Runner	<i>Elagatis bipinnulata</i>	0	0	64	53	64	53	100%
Trevally	Samsonfish	<i>Seriola hippos</i>	10	9	19	15	29	18	66%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	289	103	892	304	1,181	378	76%
Trevally	Turrum	<i>Carangoides fulvoguttatus</i>	55	53	84	68	139	86	60%
Trevally	Yellowtail Kingfish	<i>Seriola lalandi</i>	19	19	0	0	19	19	0%
Trevally	Yellowtail Scad	<i>Trachurus novaezelandiae</i>	0	0	193	163	193	163	100%
Trevally	Other Trevally	Carangidae - undifferentiated	0	0	29	28	29	28	100%
Tropical Snapper	Brownstripe Snapper	<i>Lutjanus vitta</i>	11	9	0	0	11	9	0%
Tropical Snapper	Chinamanfish	<i>Symphorus nematophorus</i>	36	20	191	99	227	108	84%
Tropical Snapper	Crimson Snapper	<i>Lutjanus erythropterus</i>	187	83	116	71	303	118	38%
Tropical Snapper	Darktail Snapper	<i>Lutjanus lemniscatus</i>	11	9	14	12	25	21	57%
Tropical Snapper	Flame Snapper	<i>Etelis coruscans</i>	0	0	19	19	19	19	100%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	470	275	128	62	598	288	21%
Tropical Snapper	Moses' Snapper	<i>Lutjanus russellii</i>	124	56	195	93	319	110	61%
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	3,886	803	2,537	721	6,422	1,385	39%
Tropical Snapper	Ruby Snapper	<i>Etelis carbunculus</i>	800	251	49	30	849	271	6%
Tropical Snapper	Saddletail Snapper	<i>Lutjanus malabaricus</i>	168	116	0	0	168	116	0%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	1,689	535	3,518	1,156	5,207	1,365	68%
Tropical Snapper	Other Snapper	Lutjanidae - undifferentiated	208	98	357	117	565	171	63%
Tuna	Longtail Tuna	<i>Thunnus tonggol</i>	195	94	63	31	258	100	24%
Tuna	Mackerel Tuna	<i>Euthynnus affinis</i>	123	50	290	113	414	129	70%
Tuna	Skipjack Tuna	<i>Katsuwonus pelamis</i>	93	60	19	19	112	65	17%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	77	41	41	36	118	63	35%
Tuna	Yellowfin Tuna	<i>Thunnus albacares</i>	230	67	82	41	312	83	26%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	2,096	367	2,381	1,027	4,478	1,185	53%
Tuskfish Wrasse	Blackspot Tuskfish	<i>Choerodon schoenleinii</i>	427	141	1,056	440	1,482	486	71%
Tuskfish Wrasse	Blue Tuskfish	<i>Choerodon cyanodus</i>	400	135	116	64	516	158	22%
Tuskfish Wrasse	Bluebarred Parrotfish	<i>Scarus ghobban</i> spp. complex	10	9	195	114	204	114	95%
Tuskfish Wrasse	Bluespotted Tuskfish	<i>Choerodon cauteroma</i>	0	0	33	28	33	28	100%
Tuskfish Wrasse	Brownspotted Wrasse	<i>Notolabrus parilus</i>	69	44	214	154	282	195	76%
Tuskfish Wrasse	Goldspot Pigfish	<i>Bodianus perditio</i>	42	21	0	0	42	21	0%
Tuskfish Wrasse	Purple Tuskfish	<i>Choerodon cephalotes</i>	63	41	676	590	739	593	91%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	0	0	170	96	170	96	100%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	96	93	13	12	109	94	12%
Tuskfish Wrasse	Other Tuskfish	<i>Choerodon</i> spp.	31	25	0	0	31	25	0%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	30	29	30	29	59	58	50%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	2,808	1,274	620	453	3,428	1,378	18%
Whiting	Western Trumpeter Whiting	<i>Sillago burrus</i>	0	0	148	88	148	88	100%
Whiting	Other Whiting	Sillaginidae - undifferentiated	0	0	7	6	7	6	100%
Wreckfish	Bass Groper	<i>Polyprion americanus</i>	13	9	7	6	20	14	34%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	0	0	19	19	19	19	100%
Finfish Other	Silver Toadfish	<i>Lagocephalus sceleratus</i>	0	0	668	257	668	257	100%
Finfish Other	Weeping Toadfish	<i>Torquigener pleurogramma</i>	0	0	195	108	195	108	100%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	0	0	941	332	941	332	100%

**Table 10.** Estimated annual catch (total, kept and released numbers) and proportion released in the West Coast bioregion during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); values in italics indicate <30 respondents recorded catches of the species).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Abalone	Roe's Abalone	<i>Haliotis roei</i>	<b>3,362</b>	<b>1,459</b>	<b>12</b>	<b>12</b>	<b>3,374</b>	<b>1,459</b>	0%
Abalone	Greenlip Abalone	<i>Haliotis laevigata</i>	<b>847</b>	<b>592</b>	0	0	<b>847</b>	<b>592</b>	0%
Cephalopod	Cuttlefish	<i>Sepia</i> spp.	1,803	327	676	197	2,480	391	27%
Cephalopod	Octopus	Octopodidae - undifferentiated	1,026	251	192	63	1,217	263	16%
Cephalopod	Squid	Order Teuthoidea - undifferentiated	48,555	5,653	2,227	815	50,782	5,900	4%
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	248,618	20,195	136,392	15,972	385,010	33,318	35%
Lobster	Southern Rock Lobster	<i>Jasus edwardsii</i>	<b>539</b>	<b>325</b>	<b>38</b>	<b>37</b>	<b>577</b>	<b>335</b>	7%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	181,709	14,924	468,608	39,479	650,317	51,402	72%
Crab	Green Mud Crab	<i>Scylla serrata</i>	<b>1,353</b>	<b>714</b>	<b>3,497</b>	<b>1,768</b>	<b>4,849</b>	<b>2,283</b>	72%
Crab	Brown Mud Crab	<i>Scylla olivacea</i>	<b>108</b>	<b>88</b>	0	0	<b>108</b>	<b>88</b>	0%
Sharks	Blacktip Reef Shark	<i>Carcharhinus melanopterus</i>	<b>105</b>	<b>49</b>	<b>333</b>	<b>165</b>	<b>438</b>	<b>176</b>	76%
Sharks	Bronze Whaler	<i>Carcharhinus brachyurus</i>	309	84	843	229	1,151	248	73%
Sharks	Grey Nurse Shark	<i>Carcharias taurus</i>	0	0	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	100%
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	435	105	177	70	612	132	29%
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	<b>40</b>	<b>32</b>	<b>71</b>	<b>34</b>	<b>111</b>	<b>47</b>	64%
Sharks	Lemon Shark	<i>Negaprion acutidens</i>	0	0	<b>13</b>	<b>12</b>	<b>13</b>	<b>12</b>	100%
Sharks	Port Jackson Shark	<i>Heterodontus portusjacksoni</i>	<b>37</b>	<b>36</b>	886	200	923	203	96%
Sharks	Sandbar Shark	<i>Carcharhinus plumbeus</i>	0	0	<b>49</b>	<b>34</b>	<b>49</b>	<b>34</b>	100%
Sharks	Tiger Shark	<i>Galeocerdo cuvier</i>	0	0	<b>70</b>	<b>43</b>	<b>70</b>	<b>43</b>	100%
Sharks	Whiskery Shark	<i>Furgaleus macki</i>	168	61	<b>199</b>	<b>100</b>	367	143	54%
Sharks	Wobbegong	Orectolobidae - undifferentiated	<b>87</b>	<b>35</b>	462	156	548	160	84%
Sharks	Other Whaler	Carcharhinidae, Hemigaleidae - undiff	0	0	<b>58</b>	<b>55</b>	<b>58</b>	<b>55</b>	100%
Sharks	Other Shark	Sharks - undifferentiated	<b>220</b>	<b>120</b>	599	178	819	215	73%
Rays	Western Shovelnose Ray	<i>Aptychotrema vincentiana</i>	0	0	231	71	231	71	100%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	<b>38</b>	<b>37</b>	2,024	354	2,063	356	98%
Bonito	Bonito	<i>Sarda australis &amp; Cybiosarda elegans</i>	<b>31</b>	<b>17</b>	<b>71</b>	<b>53</b>	<b>101</b>	<b>60</b>	70%
Bonito	Oriental Bonito	<i>Sarda orientalis</i>	<b>51</b>	<b>39</b>	<b>77</b>	<b>74</b>	<b>128</b>	<b>84</b>	60%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	4,824	1,598	21,754	5,102	26,578	5,763	82%
Bream	Frypan Bream	<i>Argyrops spinifer</i>	0	0	<b>39</b>	<b>37</b>	<b>39</b>	<b>37</b>	100%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	13,201	1,151	37,539	4,224	50,741	4,948	74%
Bream	Tarwhine	<i>Rhabdosargus sarba</i>	1,273	470	5,043	1,263	6,316	1,457	80%
Bream	Other Bream	Sparidae - undifferentiated	0	0	<b>45</b>	<b>31</b>	<b>45</b>	<b>31</b>	100%



Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Catfish	Estuary Cobbler	<i>Cnidoglanis macrocephalus</i>	49	34	73	56	122	66	60%
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	19	19	67	56	86	59	78%
Catfish	Other Catfish	Ariidae - undifferentiated	193	185	0	0	193	185	0%
Cobia	Cobia	<i>Rachycentron canadum</i>	96	46	59	41	156	61	38%
Cod	Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	294	86	1,067	310	1,361	325	78%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	10,077	888	8,462	1,259	18,539	1,865	46%
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	719	251	1,689	473	2,408	557	70%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	322	185	19	19	342	186	6%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	129	57	586	185	715	203	82%
Cod	Harlequin Fish	<i>Othos dentex</i>	1,325	205	411	112	1,737	237	24%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	160	75	223	98	384	147	58%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	204	80	882	334	1,086	358	81%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	1,313	305	998	312	2,311	534	43%
Coral Trout	Yellowedge Coronation Trout	<i>Variola louti</i>	19	19	100	70	119	81	84%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	1,628	384	4,113	1,574	5,741	1,871	72%
Emperor	Robinsons' Seabream	<i>Gymnocranius grandoculis</i>	38	37	32	22	71	53	45%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	329	87	693	250	1,022	287	68%
Emperor	Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	58	56	87	59	144	82	60%
Emperor	Other Emperor	Lethrinidae - undifferentiated	515	175	1,289	513	1,804	617	71%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	3,524	1,062	26,997	8,202	30,521	8,645	88%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	1,269	460	6,482	2,199	7,752	2,355	84%
Flounder	Smalltooth Flounder	<i>Pseudorhombus jenynsii</i>	270	86	154	72	424	113	36%
Flounder	Other Flatfish	Bothidae, Psettodidae & Pleuronectidae	116	52	44	29	160	60	27%
Garfish	Southern Garfish	<i>Hyporhamphus melanochir</i>	1,994	992	221	125	2,215	1,008	10%
Garfish	Three-by-two Garfish	<i>Hemiramphus robustus</i>	0	0	58	56	58	56	100%
Giant Perch	Sand Bass	<i>Psammoperca waigiensis</i>	0	0	77	52	77	52	100%
Goatfish	Bluespotted Goatfish	<i>Upeneichthys vlamingii</i>	454	201	1,460	469	1,913	570	76%
Grunter	Sea Trumpeter	<i>Pelsartia humeralis</i>	700	433	7,748	3,358	8,449	3,393	92%
Grunter	Western Striped Grunter	<i>Pelates octolineatus</i>	549	386	5,655	1,720	6,204	1,831	91%
Grunter	Striped Grunter	Terapontidae - undifferentiated	0	0	376	162	376	162	100%
Grunter Bream	Painted Sweetlips	<i>Diagramma labiosum</i>	236	73	192	129	428	152	45%
Gurnard	Bighead Gurnard Perch	<i>Neosebastes pandus</i>	381	171	2,177	598	2,559	632	85%
Gurnard	Gurnard	Neosebastidae - undifferentiated	197	83	3,429	769	3,627	780	95%
Jewfish	Mulloway	<i>Argyrosomus japonicus</i>	264	113	339	143	602	204	56%
Leatherjacket	Horseshoe Leatherjacket	<i>Meuschenia hippocrepis</i>	160	66	467	182	627	214	74%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Leatherjacket	Sixspine Leatherjacket	<i>Meuschenia freycineti</i>	38	37	125	53	164	70	76%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	420	145	802	194	1,222	252	66%
Mackerel	Blue Mackerel	<i>Scomber australasicus</i>	0	0	58	42	58	42	100%
Mackerel	Grey Mackerel	<i>Scomberomorus semifasciatus</i>	19	19	38	37	58	56	67%
Mackerel	School Mackerel	<i>Scomberomorus queenslandicus</i>	154	127	0	0	154	127	0%
Mackerel	Shark Mackerel	<i>Grammatocynus bicarinatus</i>	119	48	50	30	170	56	30%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	704	243	130	70	833	295	16%
Mackerel	Spotted Mackerel	<i>Scomberomorus munroi</i>	13	12	0	0	13	12	0%
Mackerel	Other Mackerel & Tuna	Scombridae - undifferentiated	147	86	32	22	180	89	18%
Mahi Mahi	Mahi Mahi	<i>Coryphaena</i> spp.	185	99	19	19	204	111	9%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	2,014	375	576	220	2,589	448	22%
Morwong	Dusky Morwong	<i>Dactylophora nigricans</i>	49	34	0	0	49	34	0%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	2,690	1,425	37	36	2,726	1,426	1%
Mullet	Yelloweye Mullet	<i>Aldrichetta forsteri</i>	7,292	6,056	0	0	7,292	6,056	0%
Mullet	Other Mullet	Mugilidae - undifferentiated	2,301	2,133	0	0	2,301	2,133	0%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	22,628	1,617	49,020	4,114	71,648	5,499	68%
Pike	Great Barracuda	<i>Sphyaena barracuda</i>	0	0	38	37	38	37	100%
Pike	Snook	<i>Sphyaena novaehollandiae</i>	1,265	533	1,271	633	2,536	919	50%
Pike	Yellowtail Barracuda	<i>Sphyaena obtusata</i>	257	102	346	164	604	200	57%
Pike	Other Pike	Sphyaenidae - undifferentiated	300	105	0	0	300	105	0%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	1,371	249	1,204	345	2,574	482	47%
Redfish	Swallowtail	<i>Centroberyx lineatus</i>	200	87	123	63	323	133	38%
Redfish	Yelloweye Redfish	<i>Centroberyx australis</i>	0	0	10	9	10	9	100%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	83,651	12,109	20,102	4,819	103,753	14,673	19%
Salmon Herring	Western Australian Salmon	<i>Arripis truttaceus</i>	3,620	660	15,612	3,707	19,232	4,069	81%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	2,199	652	3,764	580	5,963	1,012	63%
Small Baitfish	Herrings & Iishas	Clupeidae, Pristigasteridae - undiff	0	0	25	17	25	17	100%
Sweep	Banded Sweep	<i>Scorpius georgiana</i>	649	257	1,173	277	1,822	391	64%
Sweep	Sea Sweep	<i>Scorpius aequipinnis</i>	887	228	783	334	1,670	407	47%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	7,682	1,583	5,421	1,216	13,102	2,450	41%
Threadfin Bream	Western Butterfish	<i>Pentapodus vitta</i>	5,342	1,589	19,449	5,675	24,792	6,436	78%
Trevalla	Blue-Eye Trevalla	<i>Hyperoglyphe antarctica</i>	135	92	0	0	135	92	0%
Trevally	Amberjack	<i>Seriola dumerili</i>	55	53	469	263	524	275	89%
Trevally	Common Dart	<i>Trachinotus botla</i>	39	26	58	42	96	62	60%
Trevally	Giant Trevally	<i>Caranx ignobilis</i>	58	42	0	0	58	42	0%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	<b>26</b>	<b>25</b>	0	0	<b>26</b>	<b>25</b>	0%
Trevally	Samsonfish	<i>Seriola hippos</i>	1,491	239	8,768	1,531	10,259	1,616	85%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	27,717	3,735	23,498	6,475	51,215	9,127	46%
Trevally	Turrum	<i>Carangoides fulvoguttatus</i>	0	0	<b>13</b>	<b>12</b>	<b>13</b>	<b>12</b>	100%
Trevally	Yellowtail Kingfish	<i>Seriola lalandi</i>	670	228	690	231	1,360	399	51%
Trevally	Yellowtail Scad	<i>Trachurus novaezelandiae</i>	<b>584</b>	<b>327</b>	<b>308</b>	<b>195</b>	<b>892</b>	<b>515</b>	35%
Trevally	Other Trevally	Carangidae - undifferentiated	<b>96</b>	<b>49</b>	<b>196</b>	<b>178</b>	<b>292</b>	<b>185</b>	67%
Tripletail	Tripletail	<i>Lobotes surinamensis</i>	<b>19</b>	<b>18</b>	0	0	<b>19</b>	<b>18</b>	0%
Tropical Snapper	Crimson Snapper	<i>Lutjanus erythropterus</i>	<b>37</b>	<b>22</b>	<b>69</b>	<b>67</b>	<b>107</b>	<b>79</b>	65%
Tropical Snapper	Darktail Snapper	<i>Lutjanus lemniscatus</i>	<b>25</b>	<b>24</b>	0	0	<b>25</b>	<b>24</b>	0%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	<b>18</b>	<b>18</b>	<b>19</b>	<b>18</b>	<b>38</b>	<b>26</b>	51%
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	<b>209</b>	<b>90</b>	<b>392</b>	<b>182</b>	600	206	65%
Tropical Snapper	Ruby Snapper	<i>Etelis carbunculus</i>	<b>37</b>	<b>36</b>	0	0	<b>37</b>	<b>36</b>	0%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	<b>6</b>	<b>6</b>	<b>335</b>	<b>155</b>	<b>342</b>	<b>155</b>	98%
Tropical Snapper	Other Snapper	Lutjanidae - undifferentiated	<b>19</b>	<b>19</b>	0	0	<b>19</b>	<b>19</b>	0%
Tuna	Longtail Tuna	<i>Thunnus tonggol</i>	<b>38</b>	<b>37</b>	<b>19</b>	<b>19</b>	<b>58</b>	<b>42</b>	33%
Tuna	Mackerel Tuna	<i>Euthynnus affinis</i>	<b>156</b>	<b>82</b>	<b>198</b>	<b>149</b>	<b>354</b>	<b>188</b>	56%
Tuna	Skipjack Tuna	<i>Katsuwonus pelamis</i>	<b>475</b>	<b>270</b>	<b>173</b>	<b>107</b>	<b>648</b>	<b>295</b>	27%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	1,232	290	<b>261</b>	<b>128</b>	1,493	372	17%
Tuna	Yellowfin Tuna	<i>Thunnus albacares</i>	204	75	<b>627</b>	<b>502</b>	<b>831</b>	<b>560</b>	75%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	14,516	1,485	9,786	1,502	24,302	2,610	40%
Tuskfish Wrasse	Bluebarred Parrotfish	<i>Scarus ghobban</i> spp. complex	<b>666</b>	<b>318</b>	1,647	493	2,313	609	71%
Tuskfish Wrasse	Brownspotted Wrasse	<i>Notolabrus parilus</i>	4,002	1,168	10,943	1,452	14,944	1,952	73%
Tuskfish Wrasse	Foxfish	<i>Bodianus frenchii</i>	1,168	240	1,033	285	2,201	479	47%
Tuskfish Wrasse	Southern Maori Wrasse	<i>Ophthalmolepis lineolatus</i>	1,058	392	3,986	892	5,044	1,056	79%
Tuskfish Wrasse	Western Blue Groper	<i>Achoerodus gouldii</i>	<b>366</b>	<b>171</b>	<b>29</b>	<b>18</b>	<b>395</b>	<b>174</b>	7%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	6,127	1,295	27,700	3,342	33,827	3,775	82%
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	<b>58</b>	<b>42</b>	1,676	635	1,734	638	97%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	<b>169</b>	<b>92</b>	2,168	706	2,336	716	93%
Western Blue Devil	Western Blue Devil	<i>Paraplesiops sinclairi</i>	<b>38</b>	<b>26</b>	332	113	370	119	90%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	22,686	3,191	4,255	1,038	26,942	3,593	16%
Whiting	School Whiting	<i>Sillago schomburgkii</i> , <i>bassensis</i> & <i>vittata</i>	159,293	24,505	50,590	18,318	209,883	39,039	24%
Whiting	Western Trumpeter Whiting	<i>Sillago berrus</i>	<b>500</b>	<b>250</b>	3,407	1,021	3,907	1,060	87%
Whiting	Other Whiting	Sillaginidae - undifferentiated	<b>74</b>	<b>72</b>	<b>134</b>	<b>105</b>	<b>208</b>	<b>142</b>	64%
Wreckfish	Bass Groper	<i>Polyprion americanus</i>	<b>13</b>	<b>12</b>	0	0	<b>13</b>	<b>12</b>	0%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Wreckfish	Hapuku	<i>Polyprion oxygeneios</i>	<b>188</b>	<b>90</b>	0	0	<b>188</b>	<b>90</b>	0%
Finfish Other	Butterfish	Stromateidae - undifferentiated	0	0	<b>462</b>	<b>251</b>	<b>462</b>	<b>251</b>	100%
Finfish Other	Dory	Zeidae - undifferentiated	<b>19</b>	<b>18</b>	<b>13</b>	<b>12</b>	<b>32</b>	<b>22</b>	40%
Finfish Other	Conger Eel	Congridae, Colocongridae - undiff	0	0	<b>96</b>	<b>77</b>	<b>96</b>	<b>77</b>	100%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	0	0	<b>82</b>	<b>44</b>	<b>82</b>	<b>44</b>	100%
Finfish Other	Moonfish Batfish	Ephippidae, Drepaneidae - undifferentiated	<b>13</b>	<b>12</b>	0	0	<b>13</b>	<b>12</b>	0%
Finfish Other	Silver Toadfish	<i>Lagocephalus sceleratus</i>	0	0	2,218	527	2,218	527	100%
Finfish Other	Weeping Toadfish	<i>Torquigener pleurogramma</i>	0	0	1,566	459	1,566	459	100%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	<b>39</b>	<b>37</b>	9,632	3,087	9,671	3,088	100%
Finfish Other	Other Boxfish	Ostraciidae - undifferentiated	0	0	<b>38</b>	<b>37</b>	<b>38</b>	<b>37</b>	100%
Finfish Other	Other Boarfish	Pentacerotidae - undifferentiated	<b>39</b>	<b>26</b>	0	0	<b>39</b>	<b>26</b>	0%

**Table 11.** Estimated annual catch (total, kept and released numbers) and proportion released in the South Coast bioregion during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); values in italics indicate <30 respondents recorded catches of the species).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Abalone	Roe's Abalone	<i>Haliotis roei</i>	<b>712</b>	<b>421</b>	0	0	<b>712</b>	<b>421</b>	0%
Abalone	Greenlip Abalone	<i>Haliotis laevigata</i>	<b>57</b>	<b>37</b>	0	0	<b>57</b>	<b>37</b>	0%
Cephalopod	Cuttlefish	<i>Sepia</i> spp.	<b>160</b>	<b>84</b>	<b>27</b>	<b>23</b>	<b>188</b>	<b>87</b>	15%
Cephalopod	Octopus	Octopodidae - undifferentiated	<b>25</b>	<b>23</b>	0	0	<b>25</b>	<b>23</b>	0%
Cephalopod	Squid	Order Teuthoidea - undifferentiated	4,038	915	<b>357</b>	<b>224</b>	4,395	980	8%
Lobster	Southern Rock Lobster	<i>Jasus edwardsii</i>	<b>69</b>	<b>57</b>	<b>5</b>	<b>5</b>	<b>75</b>	<b>62</b>	7%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	2,918	1,156	<b>1,817</b>	<b>777</b>	<b>4,735</b>	<b>1,894</b>	38%
Sharks	Bronze Whaler	<i>Carcharhinus brachyurus</i>	<b>45</b>	<b>21</b>	<b>39</b>	<b>37</b>	<b>84</b>	<b>43</b>	46%
Sharks	Dusky Whaler	<i>Carcharhinus obscurus</i>	<b>47</b>	<b>38</b>	0	0	<b>47</b>	<b>38</b>	0%
Sharks	Gummy Sharks	<i>Mustelus antarcticus &amp; stevensi</i>	<b>87</b>	<b>75</b>	<b>39</b>	<b>37</b>	<b>125</b>	<b>83</b>	31%
Sharks	Hammerhead Shark	Sphyrnidae - undifferentiated	<b>12</b>	<b>8</b>	<b>32</b>	<b>22</b>	<b>45</b>	<b>24</b>	72%
Sharks	Port Jackson Shark	<i>Heterodontus portusjacksoni</i>	0	0	<b>124</b>	<b>55</b>	<b>124</b>	<b>55</b>	100%
Sharks	Whiskery Shark	<i>Furgaleus macki</i>	<b>12</b>	<b>11</b>	0	0	<b>12</b>	<b>11</b>	0%
Sharks	Wobbegong	Orectolobidae - undifferentiated	<b>12</b>	<b>11</b>	<b>19</b>	<b>18</b>	<b>32</b>	<b>22</b>	61%
Sharks	Other Shark	Sharks - undifferentiated	0	0	<b>137</b>	<b>97</b>	<b>137</b>	<b>97</b>	100%
Rays	Western Shovelnose Ray	<i>Aptychotrema vincentiana</i>	0	0	<b>32</b>	<b>22</b>	<b>32</b>	<b>22</b>	100%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	0	0	<b>59</b>	<b>40</b>	<b>59</b>	<b>40</b>	100%
Bonito	Bonito	<i>Sarda australis &amp; Cybiosarda elegans</i>	301	101	<b>225</b>	<b>124</b>	526	197	43%
Bonito	Oriental Bonito	<i>Sarda orientalis</i>	<b>147</b>	<b>78</b>	<b>23</b>	<b>16</b>	<b>171</b>	<b>83</b>	14%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	<b>11,154</b>	<b>4,795</b>	23,311	6,045	34,466	10,289	68%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	2,260	413	10,317	2,670	12,577	2,825	82%
Bream	Tarwhine	<i>Rhabdosargus sarba</i>	351	131	<b>2,106</b>	<b>1,399</b>	<b>2,456</b>	<b>1,412</b>	86%
Catfish	Estuary Cobbler	<i>Cnidoglanis macrocephalus</i>	<b>632</b>	<b>373</b>	0	0	<b>632</b>	<b>373</b>	0%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	6,544	1,157	2,818	537	9,361	1,583	30%
Cod	Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	<b>8</b>	<b>8</b>	0	0	<b>8</b>	<b>8</b>	0%
Cod	Harlequin Fish	<i>Othos dentex</i>	921	188	99	38	1,020	209	10%
Cod	Temperate Basses & Rockcods	<i>Percichthyidae, Serranidae</i> - undiff	<b>25</b>	<b>23</b>	<b>616</b>	<b>256</b>	<b>641</b>	<b>257</b>	96%
Emperor	Other Emperor	Lethrinidae - undifferentiated	<b>78</b>	<b>43</b>	0	0	<b>78</b>	<b>43</b>	0%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	1,195	339	945	280	2,140	470	44%
Flounder	Smalltooth Flounder	<i>Pseudorhombus jenynsii</i>	<b>72</b>	<b>32</b>	<b>76</b>	<b>41</b>	148	52	51%
Garfish	Southern Garfish	<i>Hyporhamphus melanochir</i>	<b>273</b>	<b>158</b>	<b>8</b>	<b>8</b>	<b>281</b>	<b>162</b>	3%
Garfish	Other Garfish	Hemiramphidae - undifferentiated	<b>39</b>	<b>37</b>	<b>158</b>	<b>108</b>	<b>197</b>	<b>141</b>	80%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Goatfish	Bluespotted Goatfish	<i>Upeneichthys vlamingii</i>	25	16	228	91	253	93	90%
Grunter	Sea Trumpeter	<i>Pelsartia humeralis</i>	0	0	574	251	574	251	100%
Grunter	Western Striped Grunter	<i>Pelates octolineatus</i>	0	0	969	575	969	575	100%
Grunter	Striped Grunter	Terapontidae - undifferentiated	0	0	210	171	210	171	100%
Gurnard	Bighead Gurnard Perch	<i>Neosebastes pandus</i>	19	19	288	175	307	176	94%
Gurnard	Gurnard	Neosebastidae - undifferentiated	84	45	276	102	361	120	77%
Jewfish	Mulloway	<i>Argyrosomus japonicus</i>	12	8	215	161	227	162	95%
Leatherjacket	Horseshoe Leatherjacket	<i>Meuschenia hippocrepis</i>	255	121	402	177	657	238	61%
Leatherjacket	Sixspine Leatherjacket	<i>Meuschenia freycineti</i>	28	20	60	29	88	43	69%
Leatherjacket	Leatherjacket	Monacanthidae - undifferentiated	107	57	1,014	322	1,122	330	90%
Lizardfish	Lizardfish Grinners	Bathysauridae, Synodontidae - undiff	0	0	8	7	8	7	100%
Mackerel	Blue Mackerel	<i>Scomber australasicus</i>	0	0	21	13	21	13	100%
Mackerel	Other Mackerel & Tuna	Scombridae - undifferentiated	137	56	80	63	217	88	37%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	3,294	671	331	97	3,625	694	9%
Mullet	Sea Mullet	<i>Mugil cephalus</i>	55	53	165	143	220	159	75%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	1,171	236	2,086	499	3,257	695	64%
Pike	Snook	<i>Sphyraena novaehollandiae</i>	555	211	109	76	664	228	16%
Pike	Yellowtail Barracuda	<i>Sphyraena obtusata</i>	17	12	12	11	30	17	42%
Pike	Other Pike	Sphyraenidae - undifferentiated	27	16	38	37	66	40	59%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	10,221	1,511	5,430	1,616	15,651	2,761	35%
Redfish	Swallowtail	<i>Centroberyx lineatus</i>	2,202	687	1,151	353	3,353	1,000	34%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	20,817	3,263	8,274	1,782	29,091	4,270	28%
Salmon Herring	Western Australian Salmon	<i>Arripis truttaceus</i>	948	318	1,674	663	2,622	889	64%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	456	172	1,585	405	2,041	498	78%
Small Baitfish	Herrings & Ilshas	Clupeidae, Pristigasteridae - undiff	11	10	0	0	11	10	0%
Sweep	Banded Sweep	<i>Scorpis georgiana</i>	154	76	79	36	233	94	34%
Sweep	Sea Sweep	<i>Scorpis aequipinnis</i>	1,182	273	305	83	1,487	306	21%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	111	72	37	34	148	104	25%
Trevalla	Blue-Eye Trevalla	<i>Hyperoglyphe antarctica</i>	29	19	0	0	29	19	0%
Trevally	Samsonfish	<i>Seriola hippos</i>	462	95	1,746	1,079	2,207	1,124	79%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	4,770	911	3,720	825	8,491	1,642	44%
Trevally	Yellowtail Kingfish	<i>Seriola lalandi</i>	478	127	248	133	725	214	34%
Trevally	Yellowtail Scad	<i>Trachurus novaezelandiae</i>	592	519	321	235	913	747	35%
Trevally	Other Trevally	Carangidae - undifferentiated	468	182	74	39	542	193	14%
Tropical Snapper	Other Snapper	Lutjanidae - undifferentiated	37	34	0	0	37	34	0%

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Tuna	Skipjack Tuna	<i>Katsuwonus pelamis</i>	<b>62</b>	<b>41</b>	0	0	<b>62</b>	<b>41</b>	0%
Tuna	Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	618	173	<b>199</b>	<b>86</b>	817	222	24%
Tuskfish Wrasse	Brownspeckled Wrasse	<i>Notolabrus parilus</i>	361	141	3,112	767	3,473	826	90%
Tuskfish Wrasse	Foxfish	<i>Bodianus frenchii</i>	609	173	<b>270</b>	<b>188</b>	879	329	31%
Tuskfish Wrasse	Southern Maori Wrasse	<i>Ophthalmolepis lineolatus</i>	<b>51</b>	<b>31</b>	<b>1,009</b>	<b>432</b>	<b>1,060</b>	<b>433</b>	95%
Tuskfish Wrasse	Western Blue Groper	<i>Achoerodus gouldii</i>	224	71	<b>24</b>	<b>13</b>	249	76	10%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	<b>190</b>	<b>98</b>	2,047	505	2,237	545	91%
Tuskfish Wrasse	Other Parrotfish	Scaridae - undifferentiated	<b>611</b>	<b>541</b>	<b>63</b>	<b>43</b>	<b>674</b>	<b>543</b>	9%
Tuskfish Wrasse	Other Tuskfish	<i>Choerodon</i> spp.	<b>136</b>	<b>56</b>	<b>5</b>	<b>5</b>	142	56	4%
Tuskfish Wrasse	Other Wrasse	Labridae - undifferentiated	<b>518</b>	<b>473</b>	<b>502</b>	<b>291</b>	<b>1,020</b>	<b>555</b>	49%
Western Blue Devil	Western Blue Devil	<i>Paraplesiops sinclairi</i>	<b>63</b>	<b>53</b>	<b>337</b>	<b>179</b>	<b>400</b>	<b>187</b>	84%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	13,134	3,401	7,487	2,247	20,622	5,256	36%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	11,888	3,605	<b>4,853</b>	<b>2,018</b>	16,741	4,580	29%
Wreckfish	Bass Groper	<i>Polyprion americanus</i>	0	0	<b>11</b>	<b>10</b>	<b>11</b>	<b>10</b>	100%
Wreckfish	Hapuku	<i>Polyprion oxygeneios</i>	<b>121</b>	<b>68</b>	<b>37</b>	<b>34</b>	<b>158</b>	<b>86</b>	23%
Finfish Other	Butterfish	Stromateidae - undifferentiated	0	0	<b>21</b>	<b>19</b>	<b>21</b>	<b>19</b>	100%
Finfish Other	Dory	Zeidae - undifferentiated	<b>13</b>	<b>12</b>	0	0	<b>13</b>	<b>12</b>	0%
Finfish Other	Other Eel	Order Anguilliformes - undifferentiated	0	0	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	100%
Finfish Other	Weeping Toadfish	<i>Torquigener pleurogramma</i>	0	0	<b>37</b>	<b>34</b>	<b>37</b>	<b>34</b>	100%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	0	0	<b>56</b>	<b>27</b>	<b>56</b>	<b>27</b>	100%
Finfish Other	Other Boxfish	Ostraciidae - undifferentiated	<b>8</b>	<b>8</b>	0	0	<b>8</b>	<b>8</b>	0%
Finfish Other	Other Boarfish	Pentacerotidae - undifferentiated	<b>13</b>	<b>12</b>	0	0	<b>13</b>	<b>12</b>	0%

## 8 Estimates of Catch by Zones within Bioregions

This section presents estimates of boat-based recreational catch for the 12-months from September 2015 to August 2016. Estimates are presented for annual catch (total, kept and released, by number) and proportions released (% released) for zones in each bioregion: Kimberley (Table 12) and Pilbara (Table 13) zones in the North Coast; Ningaloo (Table 14) and Carnarvon/Shark Bay (Table 15) zones in the Gascoyne Coast; Mid West (Table 16), Metro (Table 17) and South West (Table 18) zones in the West Coast; and the Albany (Table 19) and Esperance (Table 20) zones in the South Coast.

### 8.1 Kimberley

A total of 105 species/taxa were reported in the Kimberley zone in 2015/16, which represented 2.7% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 12. The most common finfish species were Stripey Snapper (8% of the zone total catch), Golden Snapper (6%), Giant Sea Catfish (6%), Barramundi (6%), Grass Emperor (6%), Blue Threadfin (4%), King Threadfin (3%), Blue Tuskfish (3%), Golden Trevally (3%), Other Catfish (3%), Spanish Mackerel (3%), Mangrove Jack (2%), Spangled Emperor (2%), Crimson Snapper (2%), Queenfish (2%), Giant Trevally (2%), Goldspotted Rockcod (2%), Bludger Trevally (2%), Blackspot Tuskfish (2%) and Western Sooty Grunter (2%). The most common invertebrate species were Mud Crab (8%) and Blue Swimmer Crab (3%). These 22 species accounted for 77% of the total catch (by numbers) in the Kimberley zone in 2015/16.

### 8.2 Pilbara

A total of 116 species/taxa were reported in the Pilbara zone in 2015/16, which represented 3.4% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 13. The most common finfish species were Grass Emperor (7% of the zone total catch), Stripey Snapper (7%), Spangled Emperor (6%), Coral Trout (6%), Red Emperor (5%), Blackspotted Rockcod (3%), Mangrove Jack (3%), Rankin Cod (3%), Redthroat Emperor (3%), Blue Tuskfish (2%), Spanish Mackerel (2%), Other Trevally (2%), Blackspot Tuskfish (2%) and Giant Sea Catfish (2%). The most common invertebrate species were Blue Swimmer Crab (13%) and Squid (3%). These 16 species accounted for 68% of the total catch (by numbers) in the Pilbara zone in 2015/16.

### 8.3 Ningaloo

A total of 120 species/taxa were reported in the Ningaloo zone in 2015/16, which represented 2.3% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 14. The most common finfish species were Chinaman Rockcod (23% of the zone total catch), Spangled Emperor (11%), Redthroat Emperor (8%), Goldband Snapper (4%), Grass Emperor (3%), Prawn (3%), Spanish Mackerel (3%), Red Emperor (2%) and Stripey Snapper (2%). The most common invertebrate species



were Squid (7%) and Blue Swimmer Crab (2%). These 11 species accounted for 67% of the total catch (by numbers) in the Ningaloo zone in 2015/16.

#### **8.4 Carnarvon/Shark Bay**

A total of 131 species/taxa were reported in the Carnarvon/Shark Bay zone in 2015/16, which represented 6.1% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 15. The most common finfish species were Pink Snapper (34% of the zone total catch), Grass Emperor (9%), Spangled Emperor (5%), Red Emperor (3%), Baldchin Groper (3%), Stripey Snapper (3%), School Whiting (2%), Redthroat Emperor (2%), Chinaman Rockcod (2%), School Mackerel (2%), Western Butterfish (2%) and Rankin Cod (2%). The most common invertebrate species were Blue Swimmer Crab (6%) and Squid (2%). These 14 species accounted for 76% of the total catch (by numbers) in the Carnarvon/Shark Bay zone in 2015/16.

#### **8.5 Mid West**

A total of 99 species/taxa were reported in the Mid West zone (including the Kalbarri zone) in 2015/16, which represented 7.0% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 16. The most common finfish species were West Australian Dhufish (9% of the zone total catch), Baldchin Groper (8%), Pink Snapper (4%), Redthroat Emperor (3%), Western King Wrasse (2%), Breaksea Cod (2%) and Australian Herring (2%). The most common invertebrate species was Western Rock Lobster (52%). These eight species accounted for 82% of the total catch (by numbers) in the Mid West zone in 2015/16.

#### **8.6 Metropolitan**

A total of 140 species/taxa were reported in the Metropolitan zone in 2015/16, which represented 55.1% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 17. The most common finfish species were School Whiting (11% of the zone total catch), Australian Herring (5%), Silver Trevally (2%), West Australian Dhufish (2%), Pink Snapper (2%), Western King Wrasse (2%) and Western Butterfish (2%). The most common invertebrate species were Blue Swimmer Crab (41%), Western Rock Lobster (18%) and Squid (3%). These ten species accounted for 86% of the total catch (by numbers) in the Metropolitan zone in 2015/16.

#### **8.7 South West**

A total of 107 species/taxa were reported in the South West zone in 2015/16, which represented 15.4% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 18. The most common finfish species were School Whiting (14% of the zone total catch), Australian Herring (9%), Western Rock Lobster (8%), West Australian Dhufish (7%), Silver Trevally (5%), Pink Snapper (4%), Black Bream (3%), Southern Bluespotted Flathead (3%), King George Whiting (3%), Western King

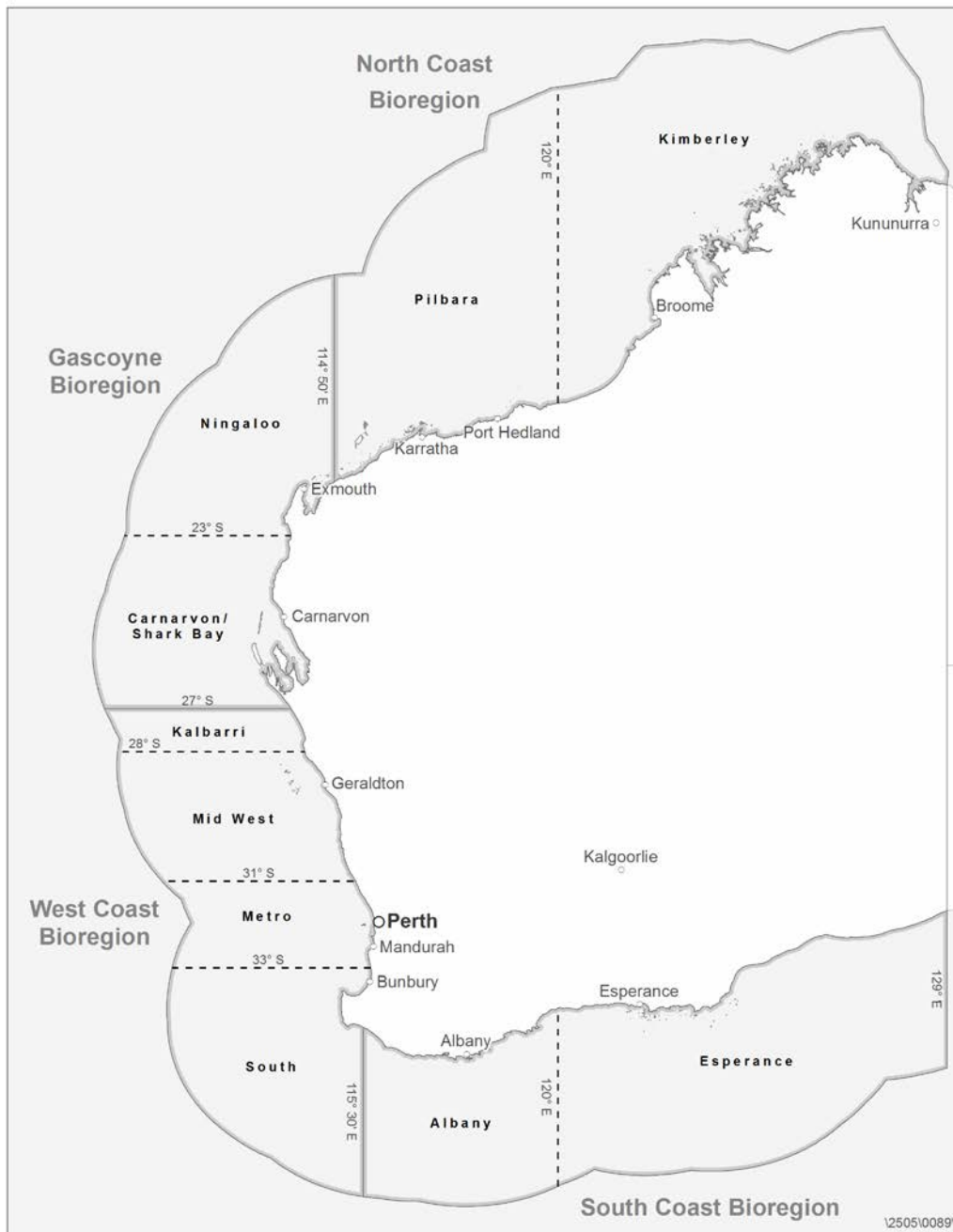
Wrasse (2%) and Sea Trumpeter (2%) The most common invertebrate species were Blue Swimmer Crab (19%) and Squid (4%). These 13 species accounted for 84% of the total catch (by numbers) in the South West zone in 2015/16.

## **8.8 Albany**

A total of 84 species/taxa were reported in the Albany zone in 2015/16, which represented 6.4% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 19. The most common finfish species were Black Bream (19% of the zone total catch), King George Whiting (12%), Australian Herring (11%), Pink Snapper (8%), School Whiting (7%), Bight Redfish (5%), Breaksea Cod (4%), Silver Trevally (4%), West Australian Dhufish (2%), Blue Morwong (2%), Swallowtail (2%), Brownspotted Wrasse (2%), Western Australian Salmon (2%) and Tarwhine (2%). The most common invertebrate species were Squid (2%) and Blue Swimmer Crab (2%). These 16 species accounted for 86% of the total catch (by numbers) in the Albany zone in 2015/16.

## **8.9 Esperance**

A total of 56 species/taxa were reported in the Esperance zone in 2015/16, which represented 1.6% of the statewide total catch (by numbers). Estimates for species where the sample size and relative standard error was acceptable are given in Table 20. The most common finfish species were Australian Herring (25% of the zone total catch), Bight Redfish (18%), School Whiting (14%), Black Bream (7%), Breaksea Cod (5%), Silver Trevally (4%), King George Whiting (2%), Western King Wrasse (2%), Brownspotted Wrasse (2%) and Blue Morwong (2%). The most common invertebrate species was Blue Swimmer Crab (3%). These 11 species accounted for 83% of the total catch (by numbers) in the Esperance zone in 2015/16.



**Figure 81.** Map of reporting areas in Western Australia, including four bioregions (solid lines) and ten zones within bioregions (dotted lines).

**Table 12.** Estimated annual catch (total, kept and released numbers) and proportion released in the Kimberley zone of the North Coast **2015/16** by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Catfish	Giant Sea Catfish	<i>Netuma thalassina</i>	<b>49</b>	<b>32</b>	4,011	942	4,060	944	99%
Catfish	Other Catfish	Ariidae - undifferentiated	<b>8</b>	<b>7</b>	1,805	499	1,814	499	100%
Giant Perch	Barramundi	<i>Lates calcarifer</i>	1,067	222	<b>2,978</b>	<b>1,441</b>	4,045	1,599	74%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	842	187	888	346	1,729	459	51%
Threadfin	Blue Threadfin	<i>Eleutheronema tetradactylum</i>	1,805	408	1,000	310	2,805	591	36%
Threadfin	King Threadfin	<i>Polydactylus macrochir</i>	1,469	524	716	263	2,185	775	33%
Trevally	Golden Trevally	<i>Gnathanodon speciosus</i>	412	120	1,420	388	1,832	445	78%
Tropical Snapper	Golden Snapper	<i>Lutjanus johnii</i>	1,998	571	2,283	695	4,282	1,215	53%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	634	170	969	267	1,603	370	60%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	<b>2,208</b>	<b>1,170</b>	<b>3,516</b>	<b>1,514</b>	<b>5,724</b>	<b>2,668</b>	61%

**Table 13.** Estimated annual catch (total, kept and released numbers) and proportion released in the Pilbara zone of the North Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	1,275	293	1,219	332	2,494	544	49%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	2,166	390	<b>2,678</b>	<b>1,241</b>	4,843	1,420	55%
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	1,862	476	3,903	1,468	5,765	1,682	68%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	1,412	418	3,987	1,418	5,399	1,559	74%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	1,010	178	951	218	1,961	331	49%
Tropical Snapper	Mangrove Jack	<i>Lutjanus argentimaculatus</i>	1,214	292	1,638	550	2,852	796	57%
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	1,671	406	3,044	1,064	4,715	1,416	65%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	1,062	282	4,694	1,268	5,755	1,423	82%
Tuskfish Wrasse	Blue Tuskfish	<i>Choerodon cyanodus</i>	455	138	1,559	574	2,014	599	77%

**Table 14.** Estimated annual catch (total, kept and released numbers) and proportion released in the Ningaloo zone of the Gascoyne Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cod	Chinaman Rockcod	<i>Epinephelus rivulatus</i>	<b>4,107</b>	<b>1,984</b>	<b>9,154</b>	<b>4,457</b>	<b>13,261</b>	<b>6,097</b>	69%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	441	95	379	127	820	170	46%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	2,887	686	3,451	954	6,338	1,487	54%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	931	197	544	167	1,475	317	37%

**Table 15.** Estimated annual catch (total, kept and released numbers) and proportion released in the Carnarvon/Shark Bay zone of the Gascoyne Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	12,250	1,925	41,389	7,122	53,639	8,405	77%
Cobia	Cobia	<i>Rachycentron canadum</i>	1,106	262	<b>485</b>	<b>216</b>	1,591	389	30%
Cod	Goldspotted Rockcod	<i>Epinephelus coioides</i>	1,574	589	374	142	1,949	646	19%
Cod	Rankin Cod	<i>Epinephelus multinotatus</i>	2,364	394	538	157	2,902	446	19%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	698	162	<b>133</b>	<b>59</b>	830	178	16%
Emperor	Grass Emperor	<i>Lethrinus laticaudis</i>	5,173	1,078	8,860	2,796	14,032	3,378	63%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	1,674	477	1,603	460	3,277	821	49%
Emperor	Spangled Emperor	<i>Lethrinus nebulosus</i>	3,271	706	4,062	920	7,332	1,398	55%
Mackerel	Spanish Mackerel	<i>Scomberomorus commerson</i>	1,302	294	<b>1,002</b>	<b>475</b>	2,304	698	43%
Tropical Snapper	Red Emperor	<i>Lutjanus sebae</i>	3,132	759	1,955	594	5,087	1,261	38%
Tropical Snapper	Stripey Snapper	<i>Lutjanus carponotatus</i>	1,267	502	3,062	1,144	4,329	1,334	71%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	2,076	367	<b>2,291</b>	<b>1,023</b>	4,368	1,180	52%

**Table 16.** Estimated annual catch (total, kept and released numbers) and proportion released in the Mid West zone of the West Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	51,695	8,995	41,133	9,974	92,829	18,180	44%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	3,468	513	4,393	870	7,860	1,248	56%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	1,536	227	1,324	359	2,860	467	46%
Coral Trout	Coral Trout	<i>Plectropomus maculatus &amp; leopardus</i>	1,313	305	998	312	2,311	534	43%
Emperor	Redthroat Emperor	<i>Lethrinus miniatus</i>	1,479	377	<b>3,859</b>	<b>1,562</b>	5,338	1,853	72%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	7,454	882	9,228	1,580	16,681	2,318	55%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	8,921	1,261	5,565	933	14,486	1,982	38%



**Table 17.** Estimated annual catch (total, kept and released numbers) and proportion released in the Metropolitan zone of the West Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cephalopod	Cuttlefish	<i>Sepia</i> spp.	1,205	273	493	184	1,698	338	29%
Cephalopod	Squid	Order Teuthoidea - undifferentiated	34,576	4,691	986	297	35,562	4,787	3%
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	173,030	17,228	87,297	12,205	260,327	26,940	34%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	161,302	14,325	413,135	37,714	574,437	49,061	72%
Rays	Other Rays Skates	Order Rajiformes - undifferentiated	<b>38</b>	<b>37</b>	1,434	313	1,472	315	97%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	<b>1,856</b>	<b>1,053</b>	10,578	3,074	12,434	3,634	85%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	5,504	697	20,043	3,027	25,547	3,332	78%
Bream	Tarwhine	<i>Rhabdosargus sarba</i>	629	228	3,494	1,102	4,123	1,139	85%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	5,732	701	6,000	1,008	11,733	1,510	51%
Cod	Harlequin Fish	<i>Othos dentex</i>	577	124	342	95	918	162	37%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	2,448	966	<b>14,980</b>	<b>7,167</b>	<b>17,427</b>	<b>7,634</b>	86%
Flathead	Yellowtail Flathead	<i>Platycephalus westraliae</i>	<b>516</b>	<b>221</b>	3,365	1,229	3,881	1,391	87%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	7,897	792	19,350	2,074	27,247	2,750	71%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	50,405	9,324	14,889	4,646	65,294	11,853	23%
Salmon Herring	Western Australian Salmon	<i>Arripis truttaceus</i>	3,079	647	11,334	3,353	14,413	3,733	79%
Sergeant Baker	Sergeant Baker	<i>Latropiscis purpurissatus</i>	1,248	396	1,836	393	3,084	675	60%
Tailor	Tailor	<i>Pomatomus saltatrix</i>	4,090	989	3,065	668	7,155	1,472	43%
Threadfin Bream	Western Butterfish	<i>Pentapodus vitta</i>	4,302	1,512	17,140	5,545	21,442	6,274	80%
Trevally	Samsonfish	<i>Seriola hippos</i>	717	174	6,428	1,442	7,145	1,504	90%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	15,908	2,529	15,516	6,156	31,423	8,079	49%
Tuskfish Wrasse	Baldchin Groper	<i>Choerodon rubescens</i>	5,233	738	4,117	1,169	9,351	1,658	44%
Tuskfish Wrasse	Brownspotted Wrasse	<i>Notolabrus parilus</i>	1,880	480	7,390	1,214	9,270	1,427	80%
Tuskfish Wrasse	Foxfish	<i>Bodianus frenchii</i>	817	215	839	276	1,656	461	51%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	4,246	1,054	18,299	2,396	22,544	2,846	81%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	11,809	1,993	2,810	846	14,619	2,311	19%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	106,682	19,597	<b>45,445</b>	<b>18,247</b>	152,128	35,839	30%
Finfish Other	Other Toadfish	Tetraodontidae - undifferentiated	0	0	6,325	2,120	6,325	2,120	100%

**Table 18.** Estimated annual catch (total, kept and released numbers) and proportion released in the South West zone of the West Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cephalopod	Squid	Order Teuthoidea - undifferentiated	13,703	3,118	<b>1,242</b>	<b>758</b>	14,944	3,415	8%
Lobster	Western Rock Lobster	<i>Panulirus cygnus</i>	23,892	5,054	7,962	2,319	31,855	6,629	25%
Crab	Blue Swimmer Crab	<i>Portunus armatus</i>	20,108	3,586	55,310	10,529	75,418	13,434	73%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	4,230	702	13,103	2,773	17,333	3,353	76%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	2,809	469	1,138	277	3,946	671	29%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	<b>963</b>	<b>431</b>	12,017	3,898	12,980	3,966	93%
Gurnard	Gurnard	Neosebastidae - undifferentiated	<b>90</b>	<b>63</b>	2,833	739	2,924	744	97%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	1,178	260	<b>63</b>	<b>39</b>	1,241	267	5%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	7,277	1,027	20,443	3,060	27,719	3,958	74%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	844	213	448	155	1,292	291	35%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	30,771	7,619	4,971	1,259	35,741	8,547	14%
Trevally	Samsonfish	<i>Seriola hippos</i>	640	159	1,498	416	2,137	492	70%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	10,724	2,701	7,579	1,818	18,303	4,068	41%
Tuskfish Wrasse	Western King Wrasse	<i>Coris auricularis</i>	<b>1,460</b>	<b>727</b>	6,697	2,103	8,157	2,245	82%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	10,826	2,470	<b>1,381</b>	<b>596</b>	12,208	2,727	11%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	50,725	14,421	4,719	1,323	55,444	15,121	9%

**Table 19.** Estimated annual catch (total, kept and released numbers) and proportion released in the Albany zone of the South Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cephalopod	Squid	Order Teuthoidea - undifferentiated	3,534	902	<b>345</b>	<b>223</b>	3,879	967	9%
Bream	Black Bream	<i>Acanthopagrus butcheri</i>	<b>10,504</b>	<b>4,773</b>	21,040	5,888	31,544	10,130	67%
Bream	Pink Snapper	<i>Chrysophrys auratus</i>	2,083	401	10,179	2,654	12,262	2,793	83%
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	4,908	1,075	2,338	516	7,246	1,491	32%
Flathead	Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	1,146	337	717	235	1,863	441	38%
Morwong	Blue Morwong	<i>Nemadactylus valenciennesi</i>	2,690	654	176	59	2,866	670	6%
Pearl Perch	West Australian Dhufish	<i>Glaucosoma hebraicum</i>	1,164	236	2,086	499	3,249	694	64%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	5,727	1,150	<b>2,488</b>	<b>1,288</b>	8,216	2,011	30%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	12,526	2,199	6,182	1,676	18,708	3,283	33%
Trevally	Silver Trevally	<i>Pseudocaranx</i> spp. complex	3,931	867	3,030	774	6,961	1,558	44%
Whiting	King George Whiting	<i>Sillaginodes punctata</i>	12,701	3,388	6,871	2,174	19,572	5,187	35%
Whiting	School Whiting	<i>Sillago schomburgkii, bassensis &amp; vittata</i>	7,160	2,030	<b>3,853</b>	<b>1,942</b>	11,013	2,975	35%

**Table 20.** Estimated annual catch (total, kept and released numbers) and proportion released in the Esperance zone of the South Coast during 2015/16 by RFBL holders aged five years or older (se is standard error; values in bold indicate relative standard error >40% (i.e. se >40% of estimate); only species where >30 respondents recorded catches of the species are reported).

Reporting Group	Common Name	Scientific Name	Kept	se	Released	se	Total	se	% Rel
Cod	Breaksea Cod	<i>Epinephelides armatus</i>	1,636	419	480	148	2,115	522	23%
Redfish	Bight Redfish	<i>Centroberyx gerrardi</i>	4,494	907	2,942	742	7,436	1,515	40%
Salmon Herring	Australian Herring	<i>Arripis georgianus</i>	8,291	2,261	2,092	591	10,383	2,566	20%

## 9 Harvest Weights

This section presents estimates of harvest (kept catch, by weight) for the 12-months from September 2015 to August 2016 for the species assemblages (or suites) within each bioregion and habitat aligned with fisheries management in Western Australia. Estimates are provided for the: top 10 nearshore and estuarine scalefish species (or species groupings) in each bioregion (Table 21); dominant 15 scalefish species for the West Coast Demersal Scalefish Resource (Table 22); top 10 demersal scalefish species in the North Coast, Gascoyne Coast and South Coast (Table 23); top 10 pelagic scalefish species in the North Coast (Table 24); and crab resources in each Bioregion (Table 25).

Estimates of boat-based recreational catch (by number) are converted to estimates of harvest (by weight) according to average weights for key species, obtained from Boat Ramp Surveys (Appendix 1) or Tour Operator Returns (Charter Logbooks). Estimated average weights are influenced by sample design, management, and biological/environmental factors, therefore, sources of information and assumptions associated with estimated average weights can introduce bias for some species, and estimated average weights may be refined and adjusted over time. Consequently, estimated average weights and harvest estimates for the 2011/12 and 2013/14 statewide surveys have been updated (Appendix 3). The revised recreational harvest estimates were used to determine recreational harvest ranges for comparisons with harvest ranges from the 2015/16 statewide survey (Table 26).

Estimates of harvest from boat-based recreational fishing do not include catches from charter-boat recreational fishing. Estimates of harvest for nearshore and estuarine species will be underestimated, particularly those species with high proportions of shore-based recreational fishing effort. An overview of the information required for stock status reporting of major recreational fisheries, based on estimates of harvest and 95% confidence intervals during 2015/16, is provided in Table 26.

### 9.1 Nearshore and Estuarine Resources

The top 10 nearshore and estuarine species (or species groupings) in 2015/16 represented: 83% of the total catch (kept by numbers) in the North Coast, 91% in the Gascoyne Coast, 93% in the West Coast, and 95% in the South Coast (Table 26). Estimated recreational harvest ranges (as 95% confidence intervals, CI) for the top 10 nearshore and estuarine species in 2015/16 compared with estimates from previous statewide surveys indicated the estimated harvest range:

- in the North Coast were steady at 27 t (95% CI 20–35 tonnes) in 2015/16 compared with 21 t (95% CI 15–27) in 2013/14 and 28 t (95% CI 20–36) in 2011/12
- in the Gascoyne Coast were lower at 9 t (95% CI 6–13) in 2015/16, but not significantly different with 16 t (95% CI 9–22) in 2013/14 and 12 t (95% CI 8–16) in 2011/12
- in the West Coast were steady at 68 t (95% CI 58–77) in 2015/16 compared with 77 t (95% CI 68–87) in 2013/14, but lower than 114 t (95% CI 101–126) in 2011/12 (as determined by confidence intervals not overlapping)

**Table 21.** Estimated annual catch (kept numbers), average weight and estimated harvest weight for the top 10 nearshore and estuarine scalefish species during 2015/16 by RFB holders aged five years or older (values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species).

Bioregion	Species	Estimated catch (kept by number)	Average weight (kg)	Source	Estimated harvest (tonnes)	Standard Error
North	King Threadfin	1,501	4.996	C	7.499	2.628
North	Barramundi	1,425	4.057	C	5.781	1.193
North	Blue Threadfin	2,051	2.744	C	5.628	1.163
North	Golden Trevally	678	4.983	C	3.378	0.708
North	Other Trevally	<b>899</b>	2.250	C	2.023	1.647
North	Giant Trevally	<b>500</b>	3.751	C	1.876	0.919
North	Bludger Trevally	478	2.250	C	1.075	0.376
North	Yellowtail Barracuda	<b>340</b>	0.417	S	0.142	0.093
North	Mullet	<b>1,021</b>	0.051	C	0.052	0.023
North	Small Baitfish	<b>737</b>	0	N/A	0	0
<b>TOTAL</b>		<b>9,630</b>			<b>27.454</b>	<b>3.727</b>
Gascoyne	Chinaman Rockcod	5,127	0.716	C	3.671	1.454
Gascoyne	Golden Trevally	502	4.983	C	2.501	0.583
Gascoyne	Mulloway	433	3.986	C	1.726	0.690
Gascoyne	Tailor	<b>422</b>	0.671	S	0.283	0.240
Gascoyne	School Whiting	<b>2,808</b>	0.095	S	0.267	0.121
Gascoyne	Garfish	<b>244</b>	0.980	S	0.239	0.202
Gascoyne	Western Butterfish	<b>1,318</b>	0.180	S	0.237	0.142
Gascoyne	Silver Trevally	289	0.517	S	0.149	0.053
Gascoyne	Western Yellowfin Bream	<b>232</b>	0.528	C	0.122	0.079
Gascoyne	Sea Mullet	894	0.051	C	0.046	0.016
<b>TOTAL</b>		<b>12,269</b>			<b>9.241</b>	<b>1.753</b>
West	Silver Trevally	27,717	0.561	B	15.549	2.095
West	School Whiting	159,293	0.095	S	15.133	2.328
West	King George Whiting	22,686	0.513	B	11.638	1.637
West	Australian Herring	83,651	0.131	B	10.958	1.586
West	Tailor	7,682	0.671	S	5.155	1.062
West	Yelloweye Mullet	<b>7,292</b>	0.444	C	3.238	2.689
West	Western King Wrasse	6,127	0.312	S	1.912	0.404
West	Brownspeckled Wrasse	4,002	0.436	S	1.745	0.510
West	Black Bream	4,824	0.298	S	1.438	0.476
West	Western Butterfish	5,342	0.179	B	0.956	0.284
<b>TOTAL</b>		<b>328,616</b>			<b>67.722</b>	<b>4.909</b>
South	Black Bream	<b>11,154</b>	0.298	S	3.324	1.430
South	Western Australian Salmon	948	3.344	S	3.170	1.063
South	Australian Herring	20,817	0.138	B	2.873	0.450
South	King George Whiting	13,134	0.200	B	2.627	0.680
South	Silver Trevally	4,770	0.517	S	2.466	0.471
South	School Whiting	11,888	0.095	S	1.129	0.343
South	Southn Bluespotted Flathead	1,195	0.575	S	0.687	0.195
South	Snook	599	0.610	S	0.365	0.130
South	Yellowtail Scad	<b>592</b>	0.071	S	0.042	0.037
South	Estuary Cobbler	<b>632</b>	0	N/A	0	0
<b>TOTAL</b>		<b>65,729</b>			<b>16.683</b>	<b>2.058</b>

Average weights where: <sup>B</sup> is the bioregion estimate from Appendix 1\*, <sup>S</sup> is the statewide estimate from Appendix 1\*, <sup>C</sup> unpublished Tour Operator Returns

- in the South Coast were steady at 17 t (95% CI 13–21) in 2015/16 compared with 25 t (95% CI 20–31) in 2013/14, but lower than 44 t (95% CI 37–52) in 2011/12

Estimated recreational harvests were steady in 2015/16 compared with previous statewide surveys for:

- Barramundi, Bludger Trevally, Blue Threadfin, Golden Trevally, Mullet, Small Baitfish and Yellowtail Barracuda in the North Coast
- Chinaman Rockcod, Garfish, Golden Trevally, Mulloway, School Whiting, Sea Mullet, Silver Trevally, Tailor, Western Butterfish and Western Yellowfin Bream in the Gascoyne Coast
- Black Bream, King George Whiting, School Whiting, Tailor, Western Butterfish and Western King Wrasse in the West Coast
- Australian Herring, Black Bream, School Whiting, Snook, Southern Bluespotted Flathead and Western Australian Salmon, in the South Coast

Decreases in the estimated recreational harvest of individual species in the top 10 nearshore and estuarine species occurred for:

- Australian Herring in the West Coast was steady at 11 t (95% CI 8–14) in 2015/16 compared with 12 t (95% CI 10–15) in 2013/14, but lower than 26 t (95% CI 21–31) in 2011/12
- Silver Trevally in the West Coast was steady at 16 t (95% CI 11–20) in 2015/16 compared with 16 t (95% CI 12–19) in 2013/14, but lower than 26 t (95% CI 21–30) in 2011/12
- King George Whiting in the South Coast was steady at 3 t (95% CI 1–4) in 2015/16 was lower than 9 t (95% CI 5–13) in 2013/14 and 12 t (95% CI 8–17) in 2011/12
- Silver Trevally in the South Coast was steady at 2 t (95% CI 2–3) in 2015/16 compared with 3 t (95% CI 2–4) in 2013/14, but lower than 8 t (95% CI 4–7) in 2011/12

## 9.2 Demersal Resources

The Integrated Fisheries Management Plan for the West Coast Demersal Scalefish utilised estimates of recreational catch by weight from surveys conducted in 2005/06 (Department of Fisheries 2010). The estimated harvest weights for the West Coast Demersal Scalefish Fishery (Table 22) includes: the top commercial and recreational species, demersal species where boat-based catches predominate, and species groupings for comparisons with the commercial catches. The ‘Emperor’ grouping includes 5 species: Bluespotted Emperor (*Lethrinus punctulatus*), Grass Emperor (*L. laticaudis*), Longnose Emperor (*L. olivaceus*), Redspot Emperor (*L. lentjan*), Redthroat Emperor (*L. miniatus*), Robinson’s Seabream (*Gymnocranius grandoculis*), Spangled Emperor (*L. nebulosus*) and Yellowtail Emperor (*L. atkinsoni*). The ‘Bight Redfish’ grouping includes Bight Redfish (*Centroberyx gerrardi*), Swallowtail (*C. lineatus*) and Yelloweye Redfish (*C. australis*).

The top 10 demersal species (or species groupings, 15 in the West Coast) in 2015/16 represented: 77% of the total catch (kept by numbers) in the North Coast, 82% in the Gascoyne Coast, 93% in the West Coast, and 96% in the South Coast (Table 26). Estimated recreational harvest ranges for the top top demersal species in 2015/16 compared with estimates from previous statewide surveys indicated the estimated harvest range:

- in the North Coast decreased from 41 t (95% CI 34–47 tonnes) in 2015/16 compared with 58 t (95% CI 48–69) in 2013/14 and 83 t (95% CI 73–92) in 2011/12
- the Gascoyne Coast were steady at 103 t (95% CI 87–118) in 2015/16 compared with 101 t (95% CI 88–115) in 2013/14, but lower than 143 t (95% CI 127–159) in 2011/12
- in the West Coast were higher at 211 t (95% CI 193–230) in 2015/16 compared with 155 t (95% CI 140–169) in 2013/14 and 160 t (95% CI 146–174) in 2011/12
- in the South Coast were steady at 45 t (95% CI 38–51) in 2015/16 compared with 34 t (95% CI 30–38) in 2013/14 and 55 t (95% CI 47–63) in 2011/12

Estimated recreational harvests were steady in 2015/16 compared with previous statewide surveys for:

- Blackspot Tuskfish, Golden Snapper, Mangrove Jack, Rankin Cod, Red Emperor and Stripey Snapper and in the North Coast
- Baldchin Groper, Goldband Snapper, Goldspotted Rockcod, Pink Snapper, Rankin Cod, Red Emperor and Stripey Snapper in the Gascoyne Coast
- Baldchin Groper, Bight Redfish, Blue Morwong, Breaksea Cod, Emperor, Foxfish, Pink Snapper, Sea Sweep and Sergeant Baker in the West Coast
- Bight Redfish, Blue Morwong, Breaksea Cod, Foxfish, Harlequin Fish, Pink Snapper, Sea Sweep, West Australian Dhufish and Swallowtail in the South Coast

Decreases in the the estimated recreational harvest of individual species in the top 10 demersal species (or groupings) occurred for:

- Coral Trout in the North Coast was steady at 6 t (95% CI 4–8) in 2015/16 compared with 7 t (95% CI 5–9) in 2013/14, but lower than 12 t (95% CI 9–15) in 2011/12



- Grass Emperor in the North Coast was steady at 6 t (95% CI 3–9) in 2015/16 compared with 12 t (95% CI 6–18) in 2013/14, but lower than 15 t (95% CI 9–20) in 2011/12
- Spangled Emperor in the North Coast was lower at 4 t (95% CI 2–5) in 2015/16 compared with 6 t (95% CI 3–9) in 2013/14 and 15 t (95% CI 11–18) in 2011/12
- Spangled Emperor in the Gascoyne Coast was lower at 12 t (95% CI 8–16) in 2015/16 compared with 17 t (95% CI 12–22) in 2013/14 and 36 t (95% CI 27–45) in 2011/12
- Grass Emperor in the Gascoyne Coast was lower at 5 t (95% CI 3–7) in 2015/16 compared with 10 t (95% CI 5–14) in 2013/14 and 16 t (95% CI 12–20) in 2011/12
- Redthroat Emperor in the Gascoyne Coast was lower at 3 t (95% CI 1–5) in 2015/16 compared with 3 t (95% CI 2–4) in 2013/14 and 8 t (95% CI 6–11) in 2011/12

The estimated recreational harvests for the indicator species in the West Coast were:

- West Australian Dhufish was higher at 113 t (95% CI 97–129) in 2015/16 compared with 82 t (95% CI 69–94) and 75 t (95% CI 64–87) in 2011/12
- Baldchin Groper was higher at 35 t (95% CI 28–42) in 2015/16 compared with 21 t (95% CI 17–25) in 2013/14 and 30 t (95% CI 24–36) in 2011/12
- Pink Snapper was steady at 36 t (95% CI 30–42) in 2015/16 compared with 30 t (95% CI 25–36) in 2013/14 and 32 t (95% CI 27–38) in 2011/12

**Table 22.** Estimated annual catch (kept numbers), average weight and estimated harvest weight for the dominant 15 species in the West Coast Demersal Scalefish Fishery during 2015/16 by RFBL holders aged five years or older (values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species).

Bioregion	Species	Estimated catch (kept by number)	Average weight (kg)	Source	Estimated harvest (tonnes)	Standard Error
West	West Australian Dhufish	22,628	5.003	B	113.208	8.095
West	Pink Snapper	13,201	2.711	B	35.788	3.120
West	Baldchin Groper	14,516	2.425	B	35.201	3.601
West	Breaksea Cod	10,077	0.972	S	9.795	0.863
West	Blue Morwong	2,014	2.816	S	5.671	1.056
West	Emperor	2,568	1.449	C	3.721	0.632
West	Sergeant Baker	2,199	1.093	C	2.404	0.713
West	Bight Redfish	1,571	1.223	S	1.921	0.323
West	Eightbar Grouper	<b>322</b>	3.694	C	1.189	0.683
West	Sea Sweep	887	1.331	S	1.181	0.303
West	Foxfish	1,168	0.836	S	0.976	0.201
West	Ruby Snapper	<b>37</b>	8.042	C	0.298	0.290
West	Bass Groper	<b>13</b>	0	N/A	0	0
West	Blue-Eye Trevalla	<b>135</b>	0	N/A	0	0
West	Hapuku	<b>188</b>	0	N/A	0	0
<b>TOTAL</b>		<b>71,524</b>			<b>211.353</b>	<b>9.581</b>

Average weights where: <sup>B</sup> is the bioregion estimate from Appendix 1\*, <sup>S</sup> is the statewide estimate from Appendix 1\*, <sup>C</sup> unpublished Tour Operator Returns, n/a is not available

**Table 23.** Estimated annual catch (kept numbers), average weight and estimated harvest weight for the top 10 demersal scalefish species during 2015/16 by RFBL holders aged five years or older (excluding West Coast, refer to Table 22) (values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species).

Bioregion	Species	Estimated catch (kept by number)	Average weight (kg)	Source	Estimated harvest (tonnes)	Standard Error
North	Coral Trout	2,377	2.615	C	6.216	1.051
North	Grass Emperor	3,820	1.582	B	6.043	1.590
North	Red Emperor	1,737	3.357	S	5.831	1.366
North	Rankin Cod	1,382	3.419	S	4.725	1.036
North	Blue Tuskfish	1,162	3.255	C	3.782	0.950
North	Spangled Emperor	1,822	1.994	S	3.633	0.893
North	Blackspot Tuskfish	1,158	2.818	S	3.263	0.789
North	Golden Snapper	2,133	1.393	C	2.971	0.802
North	Stripey Snapper	3,270	0.870	C	2.845	1.049
North	Mangrove Jack	1,848	0.772	S	1.427	0.262
<b>TOTAL</b>		<b>20,709</b>			<b>40.736</b>	<b>3.273</b>
Gascoyne	Pink Snapper	12,448	2.591	S	32.253	5.003
Gascoyne	Goldband Snapper	3,597	4.137	C	14.881	3.992
Gascoyne	Red Emperor	3,886	3.357	S	13.045	2.699
Gascoyne	Spangled Emperor	6,158	2.007	B	12.359	1.979
Gascoyne	Rankin Cod	2,937	3.419	S	10.042	1.443
Gascoyne	Goldspotted Rockcod	1,802	2.929	S	5.278	1.757
Gascoyne	Grass Emperor	5,839	0.855	B	4.992	0.975
Gascoyne	Baldchin Groper	2,096	2.364	S	4.955	0.870
Gascoyne	Redthroat Emperor	3,536	0.922	B	3.260	1.004
Gascoyne	Stripey Snapper	1,689	0.870	C	1.469	0.465
<b>TOTAL</b>		<b>43,988</b>			<b>102.534</b>	<b>7.764</b>
South	Bight Redfish	10,221	1.223	S	12.500	1.849
South	Blue Morwong	3,294	2.816	S	9.276	1.892
South	Breaksea Cod	6,544	0.972	S	6.361	1.125
South	Pink Snapper	2,260	2.591	S	5.856	1.070
South	West Australian Dhufish	1,171	4.861	S	5.692	1.147
South	Sea Sweep	1,182	1.331	S	1.573	0.363
South	Harlequin Fish	921	1.424	S	1.312	0.268
South	Swallowtail	2,202	0.381	S	0.839	0.262
South	Other Parrotfish	<b>611</b>	1.202	C	0.734	0.651
South	Foxfish	<i>609</i>	0.836	S	0.509	0.145
<b>TOTAL</b>		<b>29,015</b>			<b>44.652</b>	<b>3.383</b>

Average weights where: <sup>B</sup> is the bioregion estimate from Appendix 1\*, <sup>S</sup> is the statewide estimate from Appendix 1\*, <sup>C</sup> unpublished Tour Operator Returns

### 9.3 Pelagic Resources

The top 10 pelagic scalefish species (or species groupings) in 2015/16 represented 99% of the total resource catch (kept by numbers) (Table 26).

Estimated recreational harvest ranges for the top ten pelagic species (or groupings) compared with estimates from previous statewide surveys indicated estimated harvest range in the North Coast was steady at 26 t (95% CI 21–31 tonnes) in 2015/16 compared with 32 t (95% CI 23–41) in 2013/14, but lower than 51 t (95% CI 40–61) in 2011/12 (Table 26).

The estimated recreational harvest of Spanish Mackerel was steady at 17 t (95% CI 12–22) in 2015/16 (Table 24) compared with 24 t in 2015/16 (95% CI 16–32), but lower than 37 t in 2011/12 (95% CI 27–47). Estimated recreational harvests were steady in 2015/16 compared with 2013/14 and 2011/12 for Cobia, Northern Bluefin Tuna, Mackerel Tuna, School Mackerel, Southern Bluefin Tuna and Spotted Mackerel.

**Table 24.** Estimated annual catch (kept numbers), average weight and estimated harvest weight for the top 10 North Coast pelagic scalefish species during 2015/16 by RFBL holders aged five years or older (values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species).

Bioregion	Species	Estimated catch (kept by number)	Average weight (kg)	Source	Estimated harvest (tonnes)	Standard Error
North	Spanish Mackerel	1,851	9.291	C	17.198	2.397
North	Cobia	<i>311</i>	6.940	C	2.158	0.507
North	Northern Bluefin Tuna	<i>250</i>	5.711	C	1.428	0.531
North	Mackerel Tuna	<i>304</i>	4.367	C	1.328	0.441
North	Other Mackerel & Tuna	<b>140</b>	9.291	C	1.301	0.539
North	Shark Mackerel	<i>112</i>	8.598	C	0.963	0.361
North	School Mackerel	<i>439</i>	1.988	C	0.873	0.264
North	Spotted Mackerel	<b>186</b>	2.197	C	0.409	0.191
North	Southern Bluefin Tuna	<b>83</b>	4.859	C	0.403	0.199
North	Wahoo	<b>44</b>	0	N/A	0	0
<b>TOTAL</b>		<b>3,720</b>			<b>26.061</b>	<b>2.655</b>

Average weights where: <sup>B</sup> is the bioregion estimate from Appendix 1\*, <sup>S</sup> is the statewide estimate from Appendix 1\*, <sup>C</sup> unpublished Tour Operator Returns

## 9.4 Crab Resources

Estimated recreational harvest ranges of crab resources in each bioregion are compared with estimates from previous statewide surveys (Table 26):

- Mud Crab in the North Coast (3,364, kept by number; Table 25) represents 70% of the estimated statewide catch (Table 5), catches for the Gascoyne Coast (Table 8) and West Coast (Table 9) had low sample size (< 30) and high rse (>40%)
- Mud Crab in the North Coast were lower at 2 t (95% CI 2–3) in 2015/16 compared with 8 t (95% CI 5–10) in 2013/14 and 8 t (95% CI 6–10) in 2011/12
- Blue Swimmer Crab in the North Coast were lower at 2 t (95% CI 1–3) in 2015/16 compared with 4 t (95% CI 2–6) in 2013/14 and 3 t (95% CI 2–5) in 2011/12
- Blue Swimmer Crab in the Gascoyne Coast were steady at 1 t (95% CI 1–2) in 2015/16 compared with 2 t (95% CI 1–4) in 2013/14 and 4 t (95% CI 1–8) in 2011/12
- Blue Swimmer Crab in the West Coast were steady at 43 t (95% CI 36–50) in 2015/16 compared with 59 t (95% CI 50–68) in 2013/14, but lower than 86 t (95% CI 75–97) in 2011/12
- Blue Swimmer Crab in the South Coast were steady at 1 t (95% CI 0–1) in 2015/16 compared with 2 t (95% CI 1–3) in 2013/14, but lower than 3 t (95% CI 1–4) in 2011/12

**Table 25.** Estimated annual catch (kept numbers), average weight and estimated harvest weight for the crab resources during 2015/16 by RFBL holders aged five years or older (values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species).

Bioregion	Species	Estimated catch (kept by number)	Average weight (kg)	Source	Estimated harvest (tonnes)	Standard Error
North	Brown Mud Crab	2,495	0.612	C	1.527	0.397
North	Green Mud Crab	869	1.106	C	0.961	0.261
<b>TOTAL</b>		<b>3,364</b>			<b>2.488</b>	<b>0.475</b>
North	Blue Swimmer Crab	7,044	0.240	S	1.691	0.456
Gascoyne	Blue Swimmer Crab	5,379	0.240	S	1.291	0.384
West	Blue Swimmer Crab	181,709	0.236	B	42.883	3.522
South	Blue Swimmer Crab	2,918	0.240	S	0.700	0.277

Average weights where: <sup>B</sup> is the bioregion estimate from Appendix 1\*, <sup>S</sup> is the statewide estimate from Appendix 1\*, <sup>C</sup> unpublished Tour Operator Returns

## 9.5 Summary

Estimates of harvest from boat-based recreational fishing presented in this chapter will be used alongside information provided in Commercial Logbooks and Tour Operator Returns to assess the status of fisheries resources. Estimates of harvest (Table 26) are important when a significant portion of the total catch is attributable to the recreational sector, and therefore, estimates for these species are included in stock assessments and required for resource allocation.

**Table 26.** Information required for stock status reporting of major recreational fisheries based on estimates of boat-based recreational catch during 2011/12, 2013/14 and 2015/16 by RFBL holders aged five years or older (excluding charter-boat recreational fishing).

Resource	Year	Number of species/taxa	Proportion of total catch (kept by number)	Estimated harvest (kept by number)	Standard Error	Estimated harvest (tonnes)	Standard Error	Estimated harvest (tonnes, 95% CI)
<b>North Coast Bioregion</b>								
North Coast Nearshore and Estuarine	1112	10	79	13,008	1,713	28.012	4.025	20–36
	1314	10	76	11,928	1,506	21.189	2.980	15–27
	1516	10	83	9,630	1,353	27.454	3.727	20–35
North Coast Demersal Scalefish	1112	10	80	45,953	3,227	82.586	4.878	73–92
	1314	10	76	30,491	2,840	58.480	5.274	48–69
	1516	10	77	20,709	1,922	40.736	3.273	34–47
North Coast Pelagic (Mackerel)	1112	10	97	6,938	678	50.747	5.440	40–61
	1314	10	98	5,156	921	31.881	4.482	23–41
	1516	10	99	3,720	352	26.061	2.655	21–31
North Coast Mud Crab	1112	2	100	9,508	1,250	7.905	1.128	6–10
	1314	2	100	8,948	1,351	7.606	1.144	5–10
	1516	2	100	3,364	691	2.488	0.475	2–3
North Coast Blue Swimmer Crab	1112	1	100	14,802	3,973	3.390	0.910	2–5
	1314	1	100	15,938	3,980	4.048	1.011	2–6
	1516	1	100	7,044	1,899	1.691	0.456	1–3
<b>Gascoyne Coast Bioregion</b>								
Gascoyne Coast Nearshore and Estuarine	1112	10	81	14,100	2,885	12.264	2.097	8–16
	1314	10	88	16,268	2,977	15.553	3.253	9–22
	1516	10	91	12,269	2,591	9.241	1.753	6–13
Gascoyne Coast Demersal Scalefish	1112	10	83	71,301	4,068	143.419	8.154	127–159
	1314	10	77	51,657	3,986	101.315	6.867	88–115
	1516	10	82	43,988	3,118	102.534	7.764	87–118
Gascoyne Coast Blue Swimmer Crab	1112	1	100	19,050	7,846	4.362	1.797	1–8
	1314	1	100	8,764	3,126	2.226	0.794	1–4
	1516	1	100	5,379	1,602	1.291	0.385	1–2

Resource	Year	Number of species/ taxa	Proportion of total catch (by number)	Estimated harvest (by number)	Standard Error	Estimated harvest (tonnes)	Standard Error	Estimated harvest (t, 95% CI)
<b>West Coast Bioregion</b>								
West Coast Nearshore and Estuarine	1112	10	91	603,220	33,315	113.744	6.459	101–126
	1314	10	95	449,449	33,834	77.316	4.757	68–87
	1516	10	93	328,616	28,613	67.722	4.909	58–77
West Coast Demersal Scalefish	1112	15	90	61,795	2,418	159.818	7.257	146–174
	1314	15	87	59,625	2,414	154.562	7.323	140–169
	1516	15	93	71,524	2,815	211.353	9.581	193–230
West Coast Blue Swimmer Crab	1112	1	100	380,816	24,843	85.684	5.590	75–97
	1314	1	100	254,373	19,742	58.760	4.560	50–68
	1516	1	100	181,709	14,925	42.883	3.522	36–50
<b>South Coast Bioregion</b>								
South Coast Nearshore and Estuarine	1112	10	95	152,040	14,927	44.094	3.829	37–52
	1314	10	95	119,008	13,944	25.340	2.646	20–31
	1516	10	95	65,729	7,729	16.683	2.058	13–21
South Coast Demersal Scalefish	1112	10	97	35,423	2,527	55.089	4.189	47–63
	1314	10	98	24,174	1,505	34.293	2.081	30–38
	1516	10	96	29,015	2,282	44.652	3.383	38–51
South Coast Blue Swimmer Crab	1112	1	100	12,164	3,145	2.786	0.720	1–4
	1314	1	100	8,640	2,015	2.195	0.512	1–3
	1516	1	100	2,918	1,156	0.700	0.277	0–1

## 10 Summary and Future Research

### 10.1 Overview

Participation, effort and catch from boat-based recreational fishing have been estimated from statewide surveys in 2011/12, 2013/14 and 2015/16. Although recreational fishing in Western Australia is conducted from boats and the shore across a range of marine and freshwater habitats, boat-based recreational fishing was estimated to account for 43% of recreational fishing effort and 46% of the recreational harvest in 2000/01, with both boat- and shore-based recreational fishing occurring almost entirely in marine waters (Henry and Lyle 2003).

Approximately 138,000 recreational fishers purchased a Recreational Fishing from Boat Licence (RFBL) in 2015/16 with half of these fishers residing in the Perth metropolitan area. Trends in participation (by recall for the previous 12-months) by residence, age, gender, avidity and bioregion fished varied but overall were consistent across the Screening and Benchmark Surveys from 2011 to 2016. The spatial coverage of the resident population influences the distribution of boat-based recreational fishing effort. Consequently, boat-based recreational fishing effort in 2015/16 was highest in the West Coast (74%) with the remainder in the North Coast (8%), Gascoyne Coast (12%) and South Coast (6%).

At a statewide level, most boat-based recreational fishing effort occurred in coastal nearshore (60%), inshore demersal (25%) and estuary habitats (11%), and the remainder in pelagic (2%), offshore demersal (1%) and freshwater (1%). Shore-based recreational fishing was not included in this report; therefore, recreational fishing effort would be under-estimated for nearshore, estuary and freshwater habitats. However, patterns in boat-based recreational fishing effort in this report were consistent with previous statewide surveys, including the National Recreational Fishing Survey in 2000/01, where most boat-based recreational fishing effort occurred in coastal waters (from the shoreline to 5km) (66%), followed by estuarine (19%), then offshore (>5km from the coast) (11%) (Henry and Lyle 2003).

Recreational fishers use a variety of fishing methods. At a statewide level, most boat-based recreational fishing effort was line fishing (62%), followed by potting (32%), diving (4%) and nets (1%). In 2000/01, line fishing accounted for 77% of recreational fishing effort, followed by potting methods (16%) (Henry and Lyle 2003). Distinct seasonal patterns of boat-based recreational fishing effort occur in autumn and winter, which are the most active seasons in the North Coast and Gascoyne Coast, and summer and autumn, the most active seasons in the West Coast and South Coast.

Estimates of effort from boat-based recreational fishing in Western Australia were generally consistent across the three statewide surveys, as were trends in effort by habitat, method and month. While statewide effort declined in 2015/16, there was an increase in proportion of fishing effort in the West Coast which was consistent with results from the annual Community Survey (Department of Fisheries 2016), where the proportion of days fished in 2015/16 (74%) was higher than 2013/14 (62%).

Estimates of effort from boat-based recreational fishing by bioregion were broadly consistent across the three statewide surveys. Effort by habitat, method and month for each bioregion

were also generally consistent across the three statewide surveys. Notable exceptions for lower effort in 2015/16 occurred: in the North Coast (for line fishing, in inshore and nearshore habitats, from April to August); in the Gascoyne Coast (for line fishing, in inshore habitat, from April to August); and in the South Coast (for line fishing in inshore and nearshore habitats, throughout the year). Estimated boat-based recreational fishing effort in the West Coast was higher in 15/16 for potting, in nearshore habitat, and during November and December.

At a statewide level, estimates of catch from boat-based recreational fishing were generally consistent across the three statewide surveys. At a bioregion level, comparisons can be made for both the species contributing to the top 10 species in each resource and the estimated harvest for each resource. The estimated recreational harvest ranges for the top 10 nearshore and estuarine species were steady in 2015/16 in the North Coast (95% CI 20–35 tonnes compared with 15–27 in 2013/14 and 20–36 in 2011/12) and Gascoyne Coast (95% CI 6–13 compared with 9–22 in 2013/14 and 8–16 in 2011/12). The estimated recreational harvest range for the top 10 nearshore and estuarine species in the West Coast was steady in 2015/16 (95% CI 58–77) compared with 2013/14 (68–87), but lower than 2011/12 (101–126). The estimated recreational harvest range for the top 10 nearshore and estuarine species in the South Coast was steady in 2015/16 (95% CI 13–21) compared with 2013/14 (20–31), but lower than 2011/12 (37–52).

The estimated recreational harvest range for the top 10 demersal species (or groupings) in the North Coast was lower in 2015/16 (95% CI 34–47 tonnes compared with 48–69 in 2013/14 and 73–92 in 2011/12). This decrease was consistent with lower estimates of effort by boat-based recreational fishers in the North Coast in 2015/16. Estimated recreational harvests were steady for Blackspot Tuskfish, Coral Trout, Golden Snapper, Grass Emperor, Mangrove Jack, Rankin Cod, Red Emperor and Stripey Snapper. The estimated recreational harvest range for Spangled Emperor was steady in 2015/16 (95% CI 2–5 tonnes) compared with 2013/14 (3–9), but lower than 2011/12 (11–18).

The estimated recreational harvest range for the top 10 demersal species (or groupings) in the Gascoyne Coast was steady in 2015/16 (95% CI 87–118 tonnes compared with 88–115 in 2013/14, but lower than 127–159 in 2011/12). The estimated recreational harvest range for: Spangled Emperor was steady in 2015/16 (8–16) compared with 2013/14 (12–22), but lower than 2011/12 (27–45); Grass Emperor was steady in 2015/16 (3–7) compared with 2013/14 (5–14), but lower than 2011/12 (12–20); and Redthroat Emperor was steady in 2015/16 (1–5) compared with 2013/14 (2–4), but lower than 2011/12 (6–11). Estimated recreational harvests were steady for Baldchin Groper, Goldband Snapper, Goldspotted Rockcod, Pink Snapper, Rankin Cod, Red Emperor and Stripey Snapper in the Gascoyne Coast.

The estimated recreational harvest range for the top 15 demersal species (or groupings) in the West Coast was higher in 2015/16 (95% CI 193–230 tonnes compared with 140–169 in 2013/14 and 146–174 in 2011/12). The estimated recreational harvest range of West Australian Dhufish was higher in 2015/16 (97–129 compared with 69–94 in 2013/14 and 64–87 in 2011/12). The estimated recreational harvest range of Baldchin Groper was higher in 2015/16 (28–42) compared with 2013/14 (17–25), but similar to the harvest range in 2011/12



(24–36). The estimated recreational harvest range of Pink Snapper was steady in 2015/16 (30–42 compared with 25–36 in 2013/14 and 27–38 in 2011/12). Estimated recreational harvests were also steady for Baldchin Groper, Bight Redfish, Blue Morwong, Breaksea Cod, Emperor, Foxfish, Pink Snapper, Sea Sweep and Sergeant Baker in the West Coast.

The estimated recreational harvest range for the top 10 demersal species (or groupings) in the South Coast was steady in 2015/16 (95% CI 38–51 tonnes compared with 30–38 in 2013/14 and 47–63 in 2011/12). Estimated recreational harvests were steady for Bight Redfish, Blue Morwong, Breaksea Cod, Foxfish, Harlequin Fish, Pink Snapper, Sea Sweep, West Australian Dhufish and Swallowtail in the South Coast.

The estimated recreational harvest of Mud Crab in the North Coast represented 70% of the statewide total catch (kept by numbers) in 2015/16. The estimated recreational harvest range of Mud Crab in the North Coast were lower in 2015/16 (95% CI 2–3 tonnes compared with 5–10 in 2013/14 and 6–10 in 2011/12). The estimated recreational harvest of blue swimmer crab in the West Coast represented 92% of the statewide total catch (kept by numbers) in 2015/16. The estimated recreational harvest range for blue swimmer crab in the West Coast was steady in 2015/16 (95% CI 36–50 tonnes) compared with 2013/14 (50–68), but lower than 2011/12 (75–97).

Changes in the magnitude of estimates over time only provide an indication of the number kept and/or released from recreational fishing between surveys and does not necessarily provide an indication of the drivers of any change. Effort and catches reported from recreational fishers varies in accordance with the nature of the fishery (from both biological and human dimensions), spatial and temporal scales of the resource and fishing activity, and how these collectively respond to management actions. For example, access to the resource can vary over time through fish availability, legal size and bag limits, fisher mobility or fishing technology. Comparing estimates of catch from recreational fishing has similar constraints to those required for evaluating changes in commercial catch where differences can result from changes in both fish abundance and catchability. Catchability can vary with changes in fish behaviour and movement patterns, which vary by species, age and environmental factors, or changes in fishing practices, such as changes in targeted effort, time spent fishing and distance travelled to fishing location. Comparing estimates of catch from recreational fishing also requires consideration of release rates and the potential for change in fisher behaviour (e.g. species or targeting substitution).

Most importantly, evaluating time series of estimates of catch from recreational fishing requires consideration of the uncertainty associated with estimates. For the statewide surveys, the desired outcome was to achieve estimates for indicator species at statewide and bioregion levels with a precision suitable for stock assessments and developing management policies. It should not be expected that similar precision will be achieved for less common species, or any species at small spatial scales, although the survey design and sample size have allowed this to occur for some species. For example, the sample size and relative standard error achieved for indicator species in the Mid West, Metropolitan and South West zones have provided representative and precise estimates for spatial assessment of the West Coast Demersal Scalefish Resource.

While this report compares estimates from three statewide surveys of boat-based recreational fishing, additional catches from charter-boat recreational fishing (reported in Tour Operator Returns) and shore-based fishing (where available) are used to determine the total catch from the recreational sector. Specific performance indicators, reference levels and catch tolerances will be reported separately, and these will be used to provide trends in total catch to assist in developing, monitoring and refining management arrangements.

## **10.2 Fine-scale Estimates**

It was anticipated that highest precision would be achieved for key species at annual and statewide levels, however, estimates with lower precision may be available at finer scale temporal (monthly) and spatial (zone within bioregions) levels.

The precision achieved for any estimate is generally dependent on the sample size and the level of variability in the data. Consequently, low accuracy and precision can occur for species caught rarely or infrequently from recreational fishing, or when disaggregating data to smaller spatial and temporal scales. The ability to improve precision in these situations depends on the ability to increase the sample size. Therefore, there is a recognised trade-off between survey costs and precision, which often requires balancing the need for desired precision with the available funding before commencing surveys. The desired outcome for the statewide surveys of recreational fishing is to achieve precise estimates for indicator species at statewide and bioregion levels. It is acknowledged that precise estimates for less common species, or species at small spatial scales, might not always be achieved for the given sample size.

## **10.3 Validation of Estimates from On-Site Surveys**

Estimates of effort and catch from boat-based recreational fishing from the three statewide surveys are being compared with previous recreational fishing surveys to determine if there have been changes in the catch composition and harvest, and whether current management arrangements are appropriate. The results of these analyses will be published separately.

Additional components of the statewide surveys, the Boat Ramp and Remote Camera Surveys have provided biological data to assist in converting catch (by number) to harvest (by weight) and comparison of estimates of boat-based recreational fishing effort from the Phone-Diary Survey (fishers only) against launch and retrieval counts from the Remote Cameras (fishers and non-fishers). Additional information on the proportion of boat launches with fishers and non-fishers will allow direct comparison of boat-based recreational fishing effort and potentially an ongoing measure of fishing activity between statewide surveys.

## **10.4 Improving Accuracy and Precision of Estimates**

Recreational fishers are numerous, diverse and diffuse. They use numerous access points and platforms for fishing, including boats launched from harbours, marinas, beaches and private docks. Their divergent nature ranges from avid to infrequent fishers and different survey methods will encounter avid and infrequent fishers in different relative proportions. This means there is no single survey method that can be used to accurately and precisely estimate effort and catch from all recreational fisheries. Consequently, all surveys of recreational

fishing have customised designs, which reflect the specific objectives of the survey, the spatial and temporal scope to be covered, the nature of the recreational fishery, and the constraints on resources available to conduct the survey.

A Research Partnership between the Department and Edith Cowan University has provided opportunities for postgraduate research to explore integration of spatial and temporal data obtained from recreational fishing surveys. To date, appropriate statistical and modelling methods have been explored to integrate the uncertainty associated with estimates of catch at different spatial and temporal scales (Aidoo *et al.* 2015; 2016). This research will assist in determining whether data from the statewide surveys can provide information at the resolution required for management of recreational fisheries at small spatial and temporal scales.

The Recreational Fishing from Boat Licence (RFBL) was implemented in 2010 and uptake of licences has increased each year. Understanding any biases that may occur due to changes in annual patterns of RFBL usage is critical when considering survey design and analysis, including behavioural adjustments of fishers. It is likely that some survey components will need to be modified to address any bias, and in some cases, it may be necessary to apply emerging techniques in survey design to further improve the accuracy and precision of estimates. This could include adjustment of weighting factors to account for avidity bias and non-intending fishing, subsequently estimates (and their uncertainty) may be revised on this basis.

As patterns in recreational fishing can change, the survey design needs to be flexible enough to accommodate these changes. A critical element of the Research Partnership is utilising expertise across several related disciplines (experimental design, data mining, spatial and temporal statistics, survey sampling) to allow further development and implementation of changes to the surveys if warranted. The Research Partnership with Edith Cowan University will also have a focus on developing human capital in fields directly relevant to statewide surveys.

The Department will continue to work proactively to ascertain whether additional information could be collected to better understand the human dimensions of recreational fishing and improve the accuracy and precision associated with estimates of effort and catch from recreational fishing to continue to provide the best available information for sustainable management of fishery resources.

## 11 Acknowledgements

This report would not be possible without contributions from all the recreational fishers who voluntarily participated in the recreational fishing surveys. The authors would also like to thank staff from the Department of Primary Industries and Regional Development, Edith Cowan University and RecFishWest that provided support and assistance for this project: Brett Harrison, Agata Zabolotny and Dale Smith from Geospatial Services for preparing licence extracts and maps; Stuart Blight and Cameron Desfosses for facilitating the remote camera surveys; Alissa Tate and field staff for conducting the on-site interviews and reading the remote camera data; Veronique Vanderklift and Mark Goninon for assistance with average weights from Tour Operator Returns; Vangie Gerginis for entering the on-site interview data and administration assistance throughout the phone surveys; Joshua Brown, Brett Crissafulli, Paul Lewis, Stephen Newman and Corey Wakefield for providing species identification training for interviewers; and Vicki Graham, Theresa Wilkes, Amber Sky and staff from the Survey Research Centre (Edith Cowan University) for data collection and entry of the phone surveys. Laurie West (Kewagama Research) and Jeremy Lyle provided advice in ensuring a consistent approach to statewide Phone Surveys of recreational fishing. We also thank Nick Caputi, David Fairclough, Danielle Johnston, Rod Lenanton, Paul Lewis, Mervi Kangas, Brett Molony, Stephen Newman, Mark Pagano, Lachlain Strain and Clinton Syers for reviewing the report and providing valuable comments.

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## 13 Appendices

### Appendix 1: Statewide and bioregion estimates of average weight of key species from Boat Ramp Surveys.

Av wt is the average weight (measured in grams); n is the number of weight measurements recorded; se is standard error; values in bold indicate <10 recorded weights for the species.

Note: Statewide sample size will not equal the sum of bioregion sample sizes because estimates for North Coast and Gascoyne Coast were calculated from surveys in 2011/12 and 2013/14; and estimates for West Coast and South Coast were calculated from surveys in 2015/16. Statewide estimates were determined by aggregating data from Boat Ramp Surveys in 2011/12, 2013/14 and 2015/16.

Common Name	Scientific Name	Statewide			North Coast			Gascoyne Coast			West Coast			South Coast		
		n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se
Roe's Abalone	<i>Haliotis roei</i>	103	74	2							49	65	2	13	92	7
Western Rock Lobster	<i>Panulirus cygnus</i>	1577	636	10				17	1399	84	1284	632	11			
Blue Swimmer Crab	<i>Portunus armatus</i>	1363	240	2	2	228	49	22	280	12	637	236	2	15	289	25
Green Mud Crab	<i>Scylla serrata</i>	12	866	69	10	850	81	2	944	125						
Orange Mud Crab	<i>Scylla olivacea</i>	60	606	16	60	606	16									
Gummy Shark	<i>Mustelus antarcticus</i>	12	4179	557	1	2005					2	3639	110			
Leaping Bonito	<i>Cybiosarda elegans</i>	17	854	42				1	369		16	884	31			
Oriental Bonito	<i>Sarda orientalis</i>	163	2080	48				3	3896	695	1	1244		88	2260	37
Black Bream	<i>Acanthopagrus butcheri</i>	51	298	13							2	489	25	10	287	17
Frypan Bream	<i>Argyrops spinifer</i>	30	683	34	3	453	115	27	708	32						
Pink Snapper	<i>Chrysophrys auratus</i>	458	2591	74				35	2328	119	106	2711	160	31	3883	331
Tarwhine	<i>Rhabdosargus sarba</i>	44	399	23							17	386	43	9	330	36
Western Yellowfin Bream	<i>Acanthopagrus morrisoni</i>	29	523	29	25	523	25	4	521	154						
Cobia	<i>Rachycentron canadum</i>	54	7827	438	7	5362	634	36	7907	558	5	11166	781			
Blackspotted Rockcod	<i>Epinephelus malabaricus</i>	48	1948	199	40	1620	171	7	3987	455	1	759				
Breaksea Cod	<i>Epinephelides armatus</i>	864	972	15							228	945	26	179	1069	38
Chinaman Rockcod	<i>Epinephelus rivulatus</i>	475	438	7	1	300		459	437	6	5	472	75			
Eightbar Grouper	<i>Hyporthodus octofasciatus</i>	16	7332	1848				11	9733	2362	1	950				
Frostback Rockcod	<i>Epinephelus bilobatus</i>	14	1806	264				14	1806	264						
Goldspotted Rockcod	<i>Epinephelus coioides</i>	92	2929	343	57	2416	329	27	2760	631	4	6590	2918			
Greasy Rockcod	<i>Epinephelus tauvina</i>	15	1416	121				15	1416	121						
Harlequin Fish	<i>Othos dentex</i>	130	1424	51							33	1361	77	42	1704	96

Common Name	Scientific Name	Statewide			North Coast			Gascoyne Coast			West Coast			South Coast		
		n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se
Rankin Cod	<i>Epinephelus multinotatus</i>	129	3419	183	37	2936	204	92	3614	241						
Tomato Rockcod	<i>Cephalopholis sonnerati</i>	33	1277	112	2	1030	235	31	1293	118						
Yellowspotted Rockcod	<i>Epinephelus areolatus</i>	67	747	42	6	1094	279	61	712	35						
Temperate Basses & Rockcods	Percichthyidae, Serranidae - undiff	22	3903	1072	20	4214	1158	2	793	350						
Barcheek Coral Trout	<i>Plectropomus maculatus</i>	129	2347	108	81	1914	87	45	3105	227						
Common Coral Trout	<i>Plectropomus leopardus</i>	29	2058	162				2	3169	849	19	2124	208			
Yellowedge Coronation Trout	<i>Variola louti</i>	23	1890	236				23	1890	236						
Western Rock Blackfish	<i>Girella tephraeops</i>	13	1583	166							2	1363	62	3	1210	383
Bluespotted Emperor	<i>Lethrinus punctulatus</i>	13	507	43	11	489	49	2	608	1						
Grass Emperor	<i>Lethrinus laticaudis</i>	421	1224	27	213	1582	34	207	855	23						
Redspot Emperor	<i>Lethrinus lentjan</i>	23	690	106				23	690	106						
Redthroat Emperor	<i>Lethrinus miniatus</i>	198	919	32	2	688	98	126	922	37	17	1007	84			
Robinson's Seabream	<i>Gymnocranius grandoculis</i>	85	1638	87				85	1638	87						
Spangled Emperor	<i>Lethrinus nebulosus</i>	385	1994	44	17	1546	172	355	2007	45	10	2172	446			
Spotcheek Emperor	<i>Lethrinus rubrioperculatus</i>	27	515	21				27	515	21						
Yellowtail Emperor	<i>Lethrinus atkinsoni</i>	79	537	20	5	726	18	74	525	20						
Southern Bluespotted Flathead	<i>Platycephalus speculator</i>	183	575	25							40	651	48	34	471	54
Yellowtail Flathead	<i>Platycephalus westraliae</i>	12	461	120	1	760		5	352	57	3	831	414			
Flatheads	Platycephalidae - undifferentiated	13	761	132	1	180								8	941	178
Smalltooth Flounder	<i>Pseudorhombus jenynsii</i>	18	426	38							5	508	80	5	426	62
Southern Garfish	<i>Hyporhamphus melanochir</i>	138	98	2							24	95	6	1	91	
Three-By-Two Garfish	<i>Hemiramphus robustus</i>	16	169	17												
Blacksaddle Goatfish	<i>Parupeneus spilurus</i>	14	862	65							3	997	43			
Bluespotted Goatfish	<i>Upeneichthys vlamingii</i>	29	351	58							10	625	117			
Western Striped Grunter	<i>Pelates octolineatus</i>	82	118	4							17	124	10	27	114	8
Goldspotted Sweetlips	<i>Plectorhinchus flavomaculatus</i>	36	1533	85							18	1482	129			
Painted Sweetlips	<i>Diagramma labiosum</i>	63	2251	142	18	2044	208	38	2068	164	2	2824	1256			
Bighead Gurnard Perch	<i>Neosebastes pandus</i>	22	761	29							13	762	42			
Sandy Sprat	<i>Hyperlophus vittatus</i>	25	45	2												
Black Jewfish	<i>Protonibea diacanthus</i>	16	8080	1067	14	8445	1191	2	5526	214						
Mulloway	<i>Argyrosomus hololepidotus</i>	13	7561	1219				1	9600		6	7073	1245			
Bluelined Leatherjacket	<i>Meuschenia galii</i>	12	396	32							2	400	3	1	375	
Horseshoe Leatherjacket	<i>Meuschenia hippocrepis</i>	21	812	72							8	764	152	1	972	
Sixspine Leatherjacket	<i>Meuschenia freycineti</i>	26	629	101							3	770	479	7	551	194

Common Name	Scientific Name	Statewide			North Coast			Gascoyne Coast			West Coast			South Coast		
		n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se
Triggerfishes & Leatherjackets	Balistidae, Monacanthidae - undiff	18	500	81				1	473		1	326		9	349	21
Blue Mackerel	<i>Scomber australasicus</i>	60	154	12							6	347	26	46	119	5
Mackerel Tuna	<i>Euthynnus affinis</i>	38	3156	282	5	5533	1156	27	3015	243	1	3607				
School Mackerel	<i>Scomberomorus queenslandicus</i>	83	1949	128	33	1759	193	44	1938	179	3	2650	478			
Spanish Mackerel	<i>Scomberomorus commerson</i>	218	8406	242	41	8064	691	150	8480	283	7	9275	1121			
Blue Morwong	<i>Nemadactylus valenciennesi</i>	294	2816	83							20	2485	244	135	2919	121
Northern Pearl Perch	<i>Glaucosoma buergeri</i>	34	1623	99	1	515		33	1656	96						
West Australian Dhufish	<i>Glaucosoma hebraicum</i>	794	4861	101							349	5003	155	7	3410	884
Saddleback Pigfish	<i>Bodianus bilunulatus</i>	14	893	83				13	919	85	1	550				
Snook	<i>Sphyræna novaehollandiae</i>	82	610	46							13	565	91	32	620	85
Striped Barracuda	<i>Sphyræna pinguis</i>	29	446	56												
Bight Redfish	<i>Centroberyx gerrardi</i>	481	1223	30							19	1141	96	306	1249	42
Swallowtail	<i>Centroberyx lineatus</i>	179	381	9							5	420	28	97	396	16
Australian Herring	<i>Arripis georgianus</i>	2838	130	1							554	131	1	694	138	2
Western Australian Salmon	<i>Arripis truttaceus</i>	269	3344	105							113	4503	56	79	2136	186
Sergeant Baker	<i>Latropiscis purpurissatus</i>	60	736	43							8	625	32	11	649	112
Goldband Snapper	<i>Pristipomoides multidens</i>	198	1974	68	2	2420	320	196	1969	69						
Rosy Snapper	<i>Pristipomoides filamentosus</i>	13	1372	156				13	1372	156						
Sharptooth Snapper	<i>Pristipomoides typus</i>	91	1448	64				91	1448	64						
Chinamanfish	<i>Symphorus nematophorus</i>	38	4455	413	27	3993	442	11	5588	868						
Crimson Snapper	<i>Lutjanus erythropterus</i>	13	2025	192	13	2025	192									
Darktail Snapper	<i>Lutjanus lemniscatus</i>	23	718	92	3	338	82	19	784	104						
Golden Snapper	<i>Lutjanus johnii</i>	16	761	38	15	776	38	1	540							
Mangrove Jack	<i>Lutjanus argentimaculatus</i>	73	772	38	67	719	29	5	1279	263	1	1820				
Moses' Snapper	<i>Lutjanus russellii</i>	48	795	58	11	709	24	37	821	74						
Red Emperor	<i>Lutjanus sebae</i>	178	3357	154	40	2534	193	136	3557	183	1	2929				
Ruby Snapper	<i>Etelis carbunculus</i>	73	6162	451				73	6162	451						
Saddletail Snapper	<i>Lutjanus malabaricus</i>	80	1540	149	56	1505	173	24	1623	295						
Stripey Snapper	<i>Lutjanus carponotatus</i>	132	592	15	63	581	18	69	602	24						
Fusiliers & Tropical Snappers	Caesionidae, Lutjanidae - undiff	18	1475	86	14	1515	107	4	1334	86						
Western Red Scorpionfish	<i>Scorpaena sumptuosa</i>	11	638	54										2	859	41
Eastern Striped Grunter	<i>Pelates sexlineatus</i>	56	93	5												
Banded Sweep	<i>Scorpis georgiana</i>	33	783	61							18	606	64	2	698	32
Moonlighter	<i>Tilodon sexfasciatus</i>	15	899	56							2	981	73	1	1227	
Sea Sweep	<i>Scorpis aequipinnis</i>	143	1331	33							20	1410	67	48	1399	71

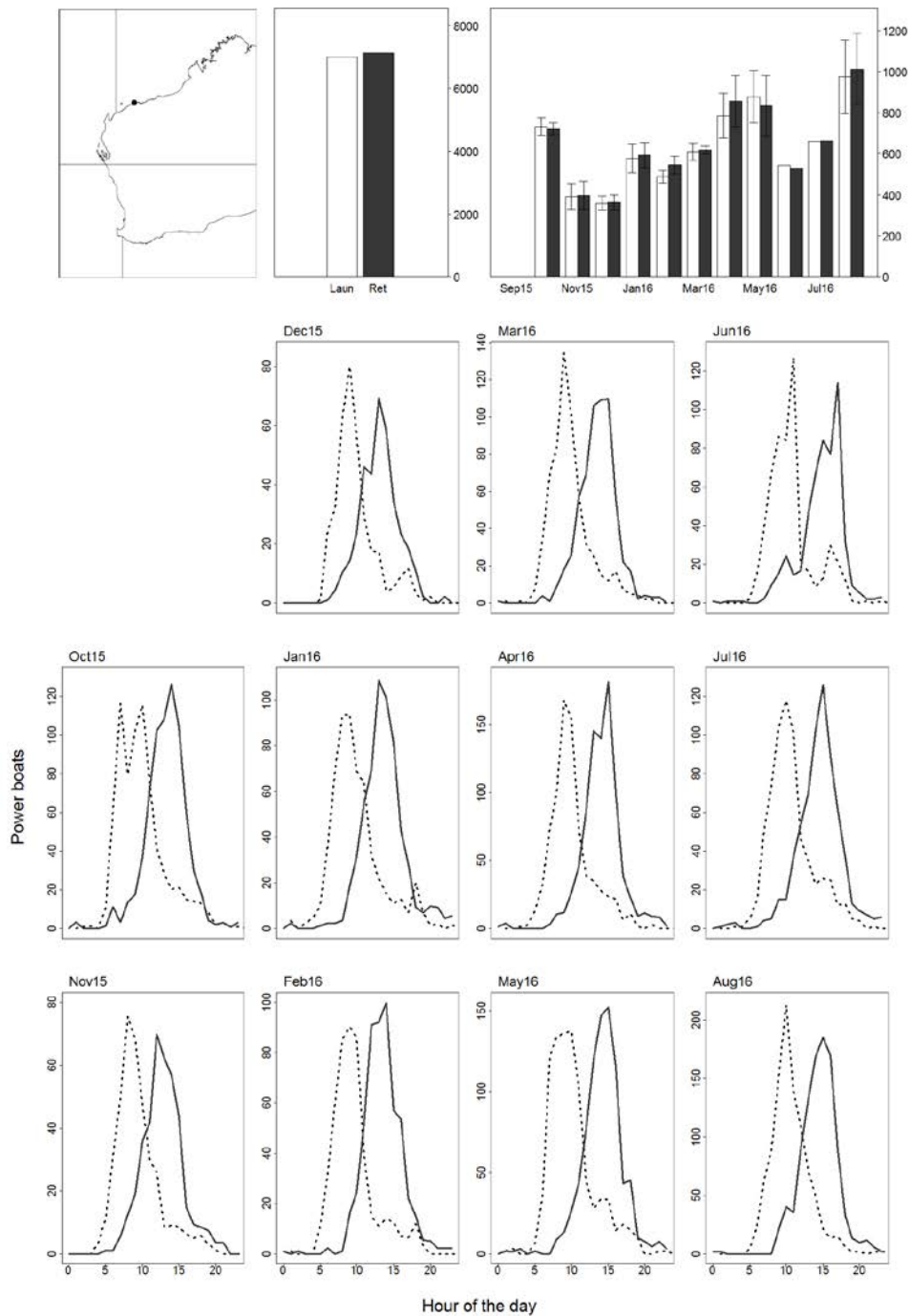
Common Name	Scientific Name	Statewide			North Coast			Gascoyne Coast			West Coast			South Coast		
		n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se	n	AvWt	se
Tailor	<i>Pomatomus saltatrix</i>	106	671	36				10	835	71	24	707	88			
Blue Threadfin	<i>Eleutheronema tetradactylum</i>	21	1403	272	20	1454	281	1	382							
Western Butterfish	<i>Pentapodus vitta</i>	199	180	5				3	130	11	96	179	6			
Amberjack	<i>Seriola dumerili</i>	11	6273	1659				3	11843	5195	3	3752	611			
Bludger Trevally	<i>Carangoides gymnostethus</i>	22	1703	85	2	1190	610	20	1754	73						
Giant Trevally	<i>Caranx ignobilis</i>	14	1700	386	9	1196	125	4	1754	650						
Golden Trevally	<i>Gnathanodon speciosus</i>	97	2246	203	69	1793	214	28	3363	399						
Samsonfish	<i>Seriola hippos</i>	98	6588	475							35	6570	824	7	9341	1028
Silver Trevally	<i>Pseudocaranx</i> spp. complex	1302	517	10							358	561	11	223	483	28
Turrum	<i>Carangoides fulvoguttatus</i>	83	2097	181	22	2777	391	61	1851	194						
Yellowtail Kingfish	<i>Seriola lalandi</i>	44	3155	317							16	3275	317	9	3844	894
Yellowtail Scad	<i>Trachurus novaezelandiae</i>	116	71	2							15	82	3	42	69	2
Trevallies	Carangidae - undifferentiated	22	2283	417	21	2357	430							1	725	
Longtail Tuna	<i>Thunnus tonggol</i>	61	4965	237	3	5270	341	55	5046	251	2	2063	303			
Skipjack Tuna	<i>Katsuwonus pelamis</i>	59	3426	123				38	2986	93	1	4132		2	4157	237
Southern Bluefin Tuna	<i>Thunnus maccoyii</i>	102	5045	238							17	2271	257	74	5585	264
Yellowfin Tuna	<i>Thunnus albacares</i>	29	7010	594	1	6865		15	8004	699						
Baldchin Groper	<i>Choerodon rubescens</i>	649	2364	40				13	2702	346	301	2425	63			
Blackspot Tuskfish	<i>Choerodon schoenleinii</i>	83	2818	183	35	2641	236	48	2948	265						
Brownspotted Wrasse	<i>Notolabrus parilus</i>	342	436	10							135	403	13	50	461	32
Foxfish	<i>Bodianus frenchii</i>	119	836	23							43	785	36	29	973	48
Southern Maori Wrasse	<i>Ophthalmolepis lineolatus</i>	83	256	8							33	260	13	15	260	15
Tuskfishes	<i>Choerodon</i> spp.	20	3662	549	19	3824	553	1	595							
Western Blue Groper	<i>Achoerodus gouldii</i>	32	6639	762							10	9693	1868	8	6689	1081
Western King Wrasse	<i>Coris auricularis</i>	395	312	7							236	298	8	20	381	25
Wrasses	Labridae - undifferentiated	12	430	95				3	778	277						
King George Whiting	<i>Sillaginodes punctata</i>	2677	238	3							125	513	28	1060	200	3
Southern School Whiting	<i>Sillago bassensis</i>	3057	95	1							786	84	1	303	115	2
Western School Whiting	<i>Sillago vittata</i>	311	98	2							76	101	5	12	83	4
Yellowfin Whiting	<i>Sillago schomburgkii</i>	20	167	20				6	192	6						
Whittings	Sillaginidae - undifferentiated	20	124	13	1	320								15	108	6
Western Wirrah	<i>Acanthistius serratus</i>	12	845	79							5	742	65			
Southern Blue Devil	<i>Paraplesiops meleagris</i>	18	455	24										10	473	34

## **Appendix 2: Summary of launches and retrievals by power boat at 11 boat ramps from Remote Camera Survey in 2015/16.**

The following pages provide summaries of total launches and retrievals of power boats during 2015/16, by year, month and hours (within month). Major periods of data loss during the 12-months are indicated by an asterix and error bars are 1 standard error where imputation was required for missing data.

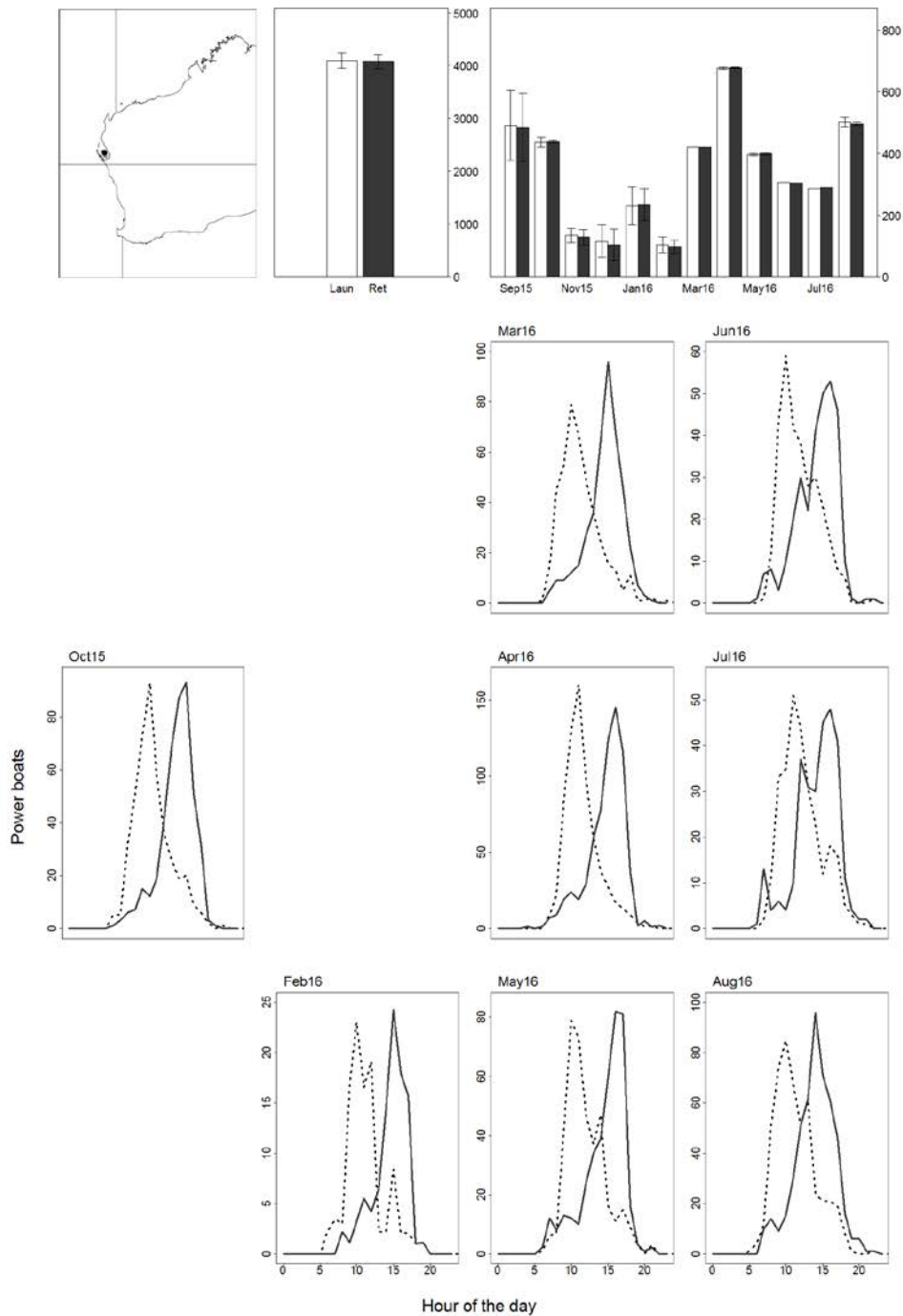
Results are presented for the 11 boat ramps monitored in the Camera Survey:

- Dampier (Lat 20.656, Long 116.707)
- Monkey Mia (Lat 25.793, Long 113.720)
- Denham (Lat 25.928, Long 113.533)
- Mindarie (Lat 31.692, Long 115.702)
- Ocean Reef (Lat 31.762, Long 115.728)
- Hillarys (Lat 31.822, Long 115.739)
- Leeuwin (Lat 32.030, Long 115.762)
- Woodman Point Public Ramp (Lat 32.139, Long 115.762)
- Woodman Point Private Ramp (Lat 32.139, Long 115.762)
- Point Peron (Lat 32.271, Long 115.698)
- Emu Point (Lat 34.995, Long 117.945)



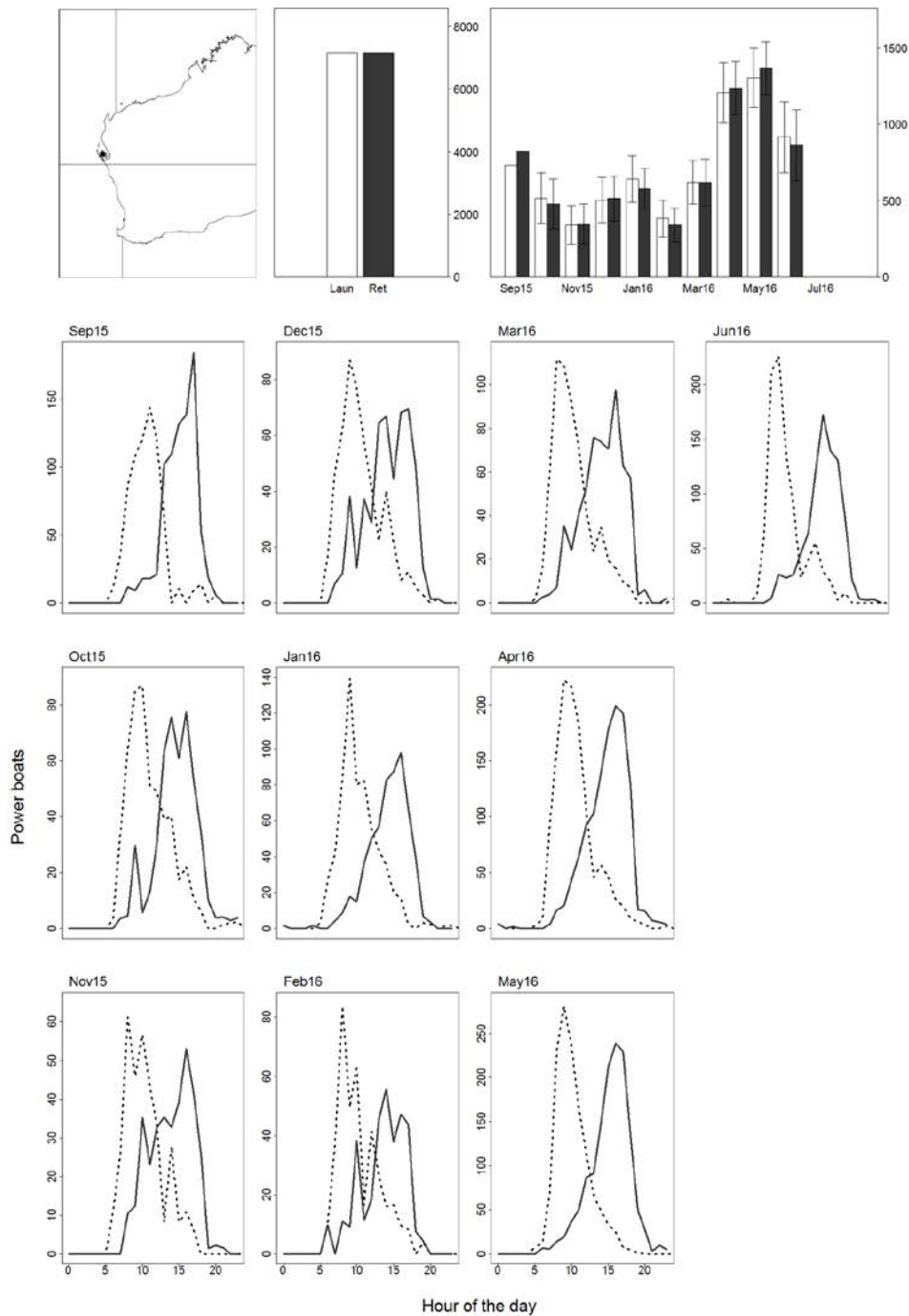
**Figure 82:** Total launches (white bar) and retrievals (black bar) by power boats from Dampier (Lat 20.656, Long 116.707) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

Data for September 2015 were unavailable.



**Figure 83.** Total launches (white bar) and retrievals (black bar) by power boats from Monkey Mia (Lat 25.793, Long 113.720) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

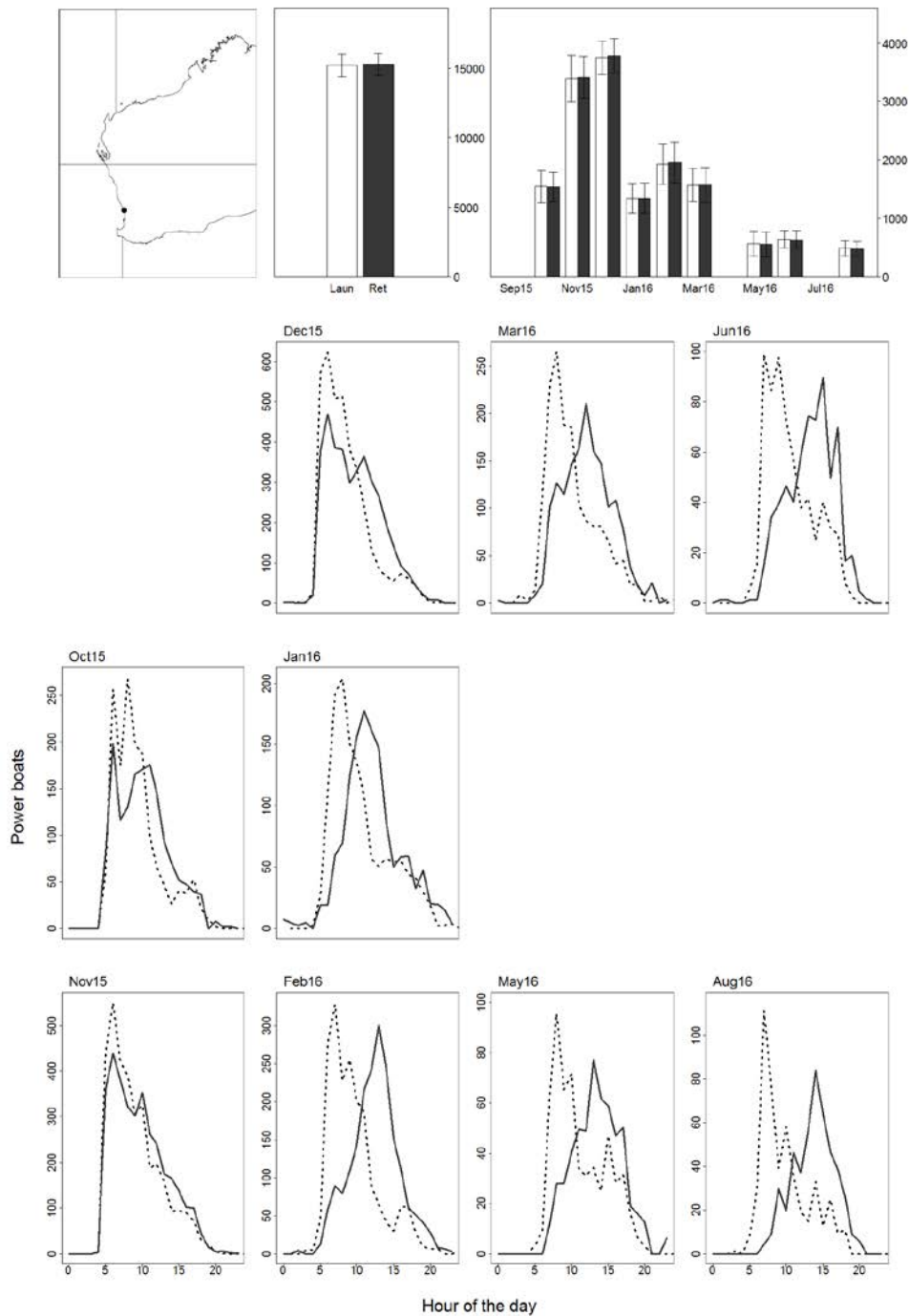
Data for September 2015, November 2015, December 2015 and January 2016 were unavailable.



**Figure 84.** Total launches (white bar) and retrievals (black bar) by power boats from Denham (Lat 25.928, Long 113.533) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

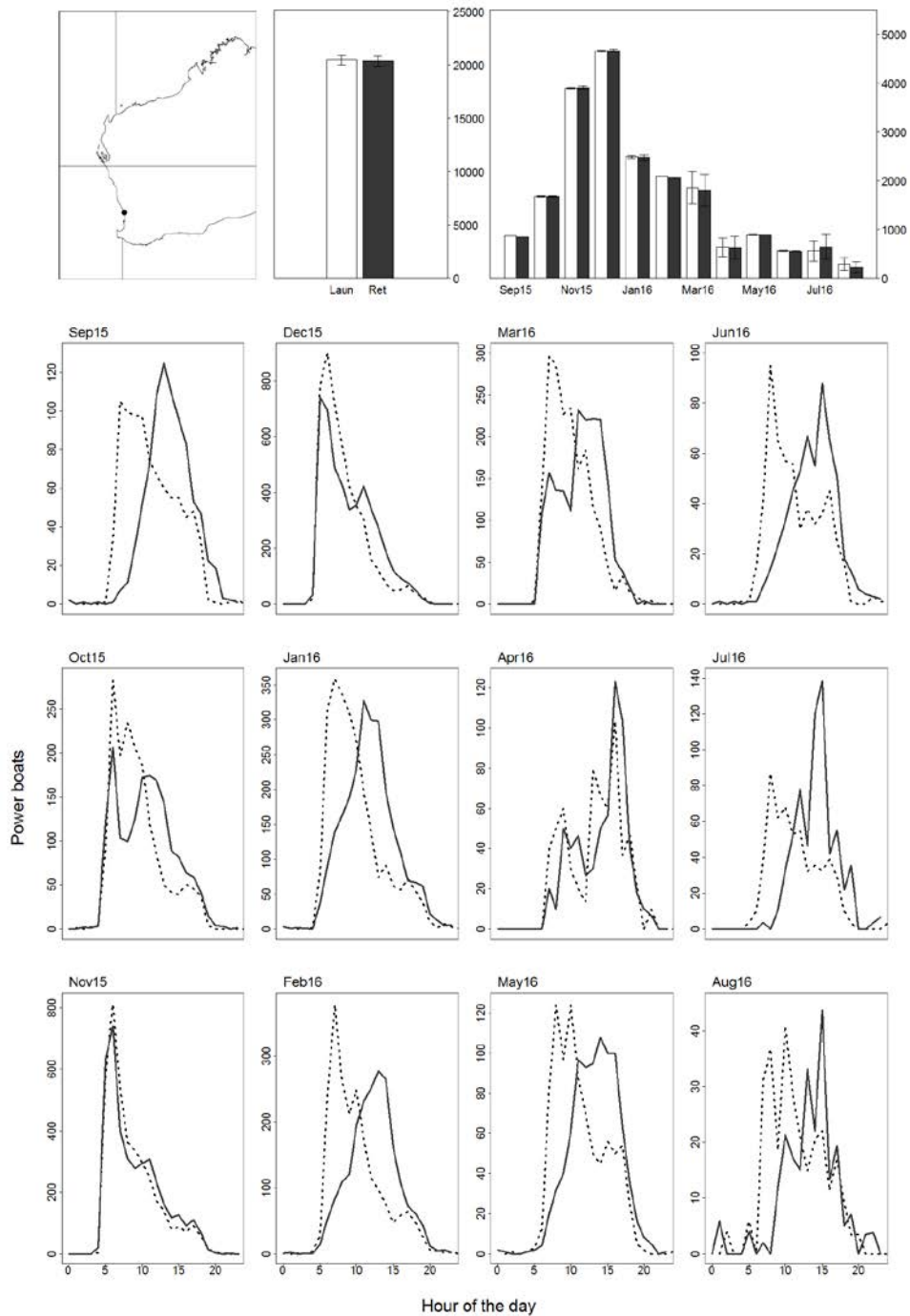
Data for July to August 2016 were unavailable.



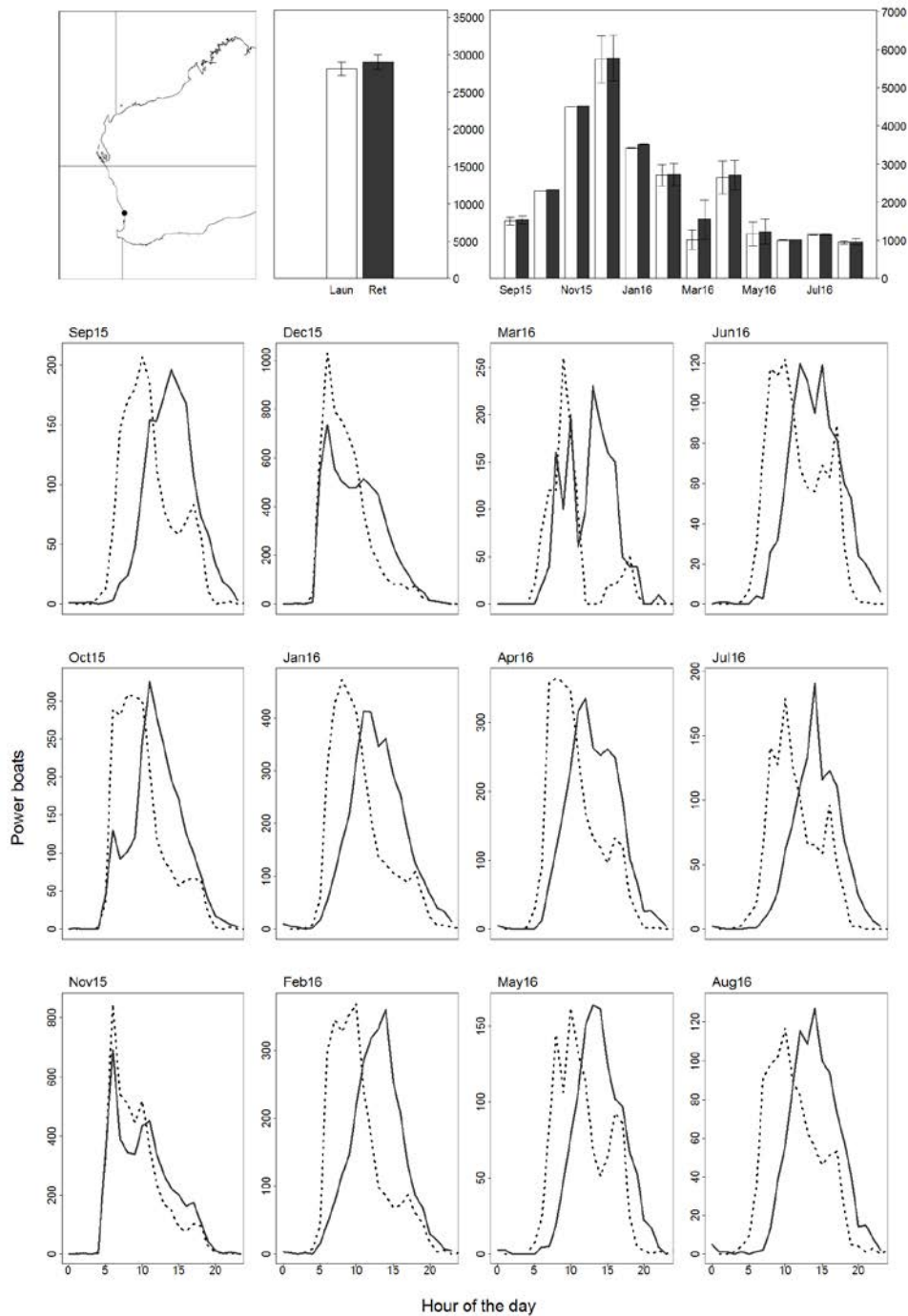


**Figure 85.** Total launches (white bar) and retrievals (black bar) by power boats from Mindarie (Lat 31.692, Long 115.702) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

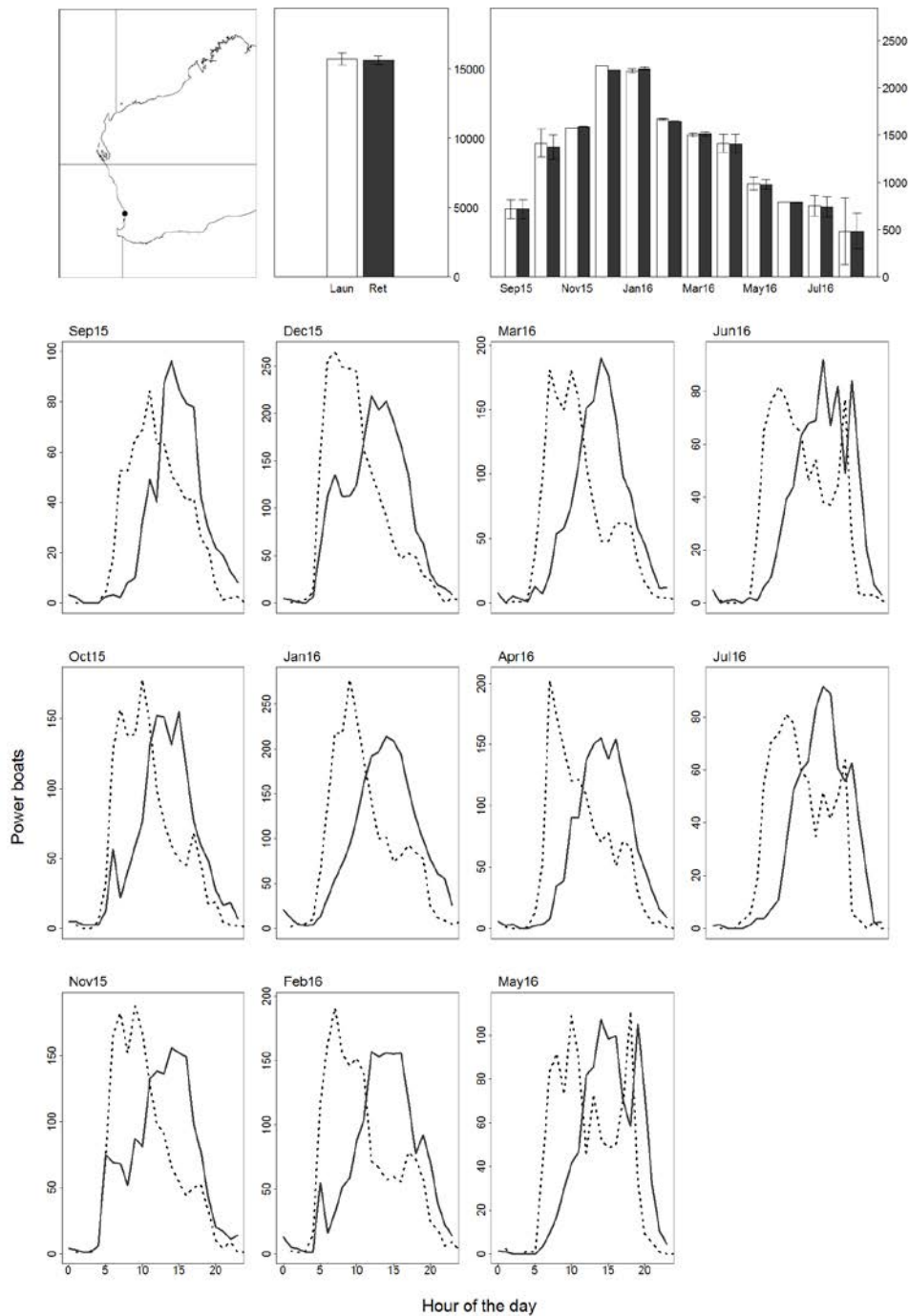
Data for September 2015, April 2016 and July 2016 were unavailable.



**Figure 86.** Total launches (white bar) and retrievals (black bar) by power boats from Ocean Reef (Lat 31.762, Long 115.728) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

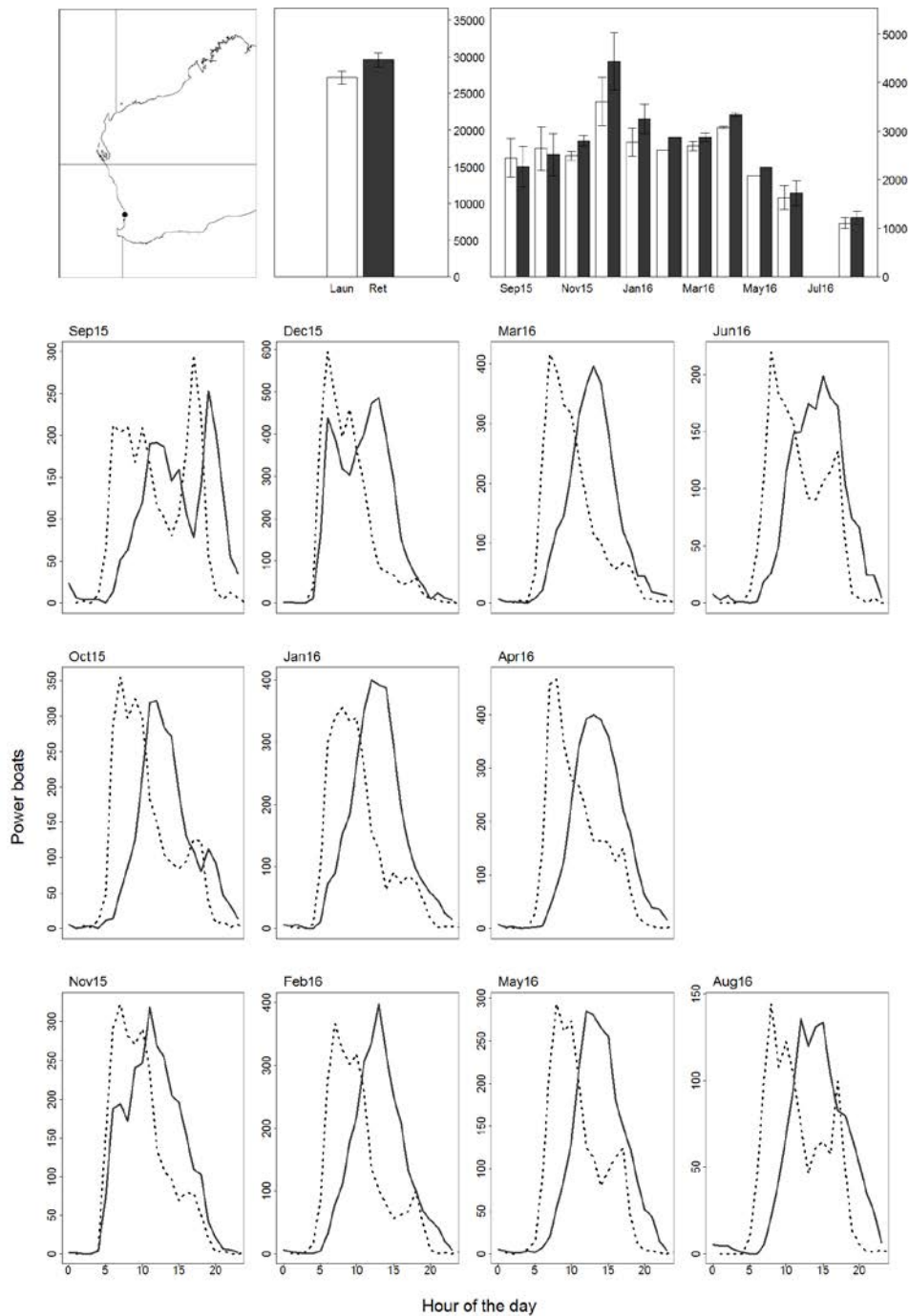


**Figure 87.** Total launches (white bar) and retrievals (black bar) by power boats from Hillarys (Lat 31.822, Long 115.739) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.



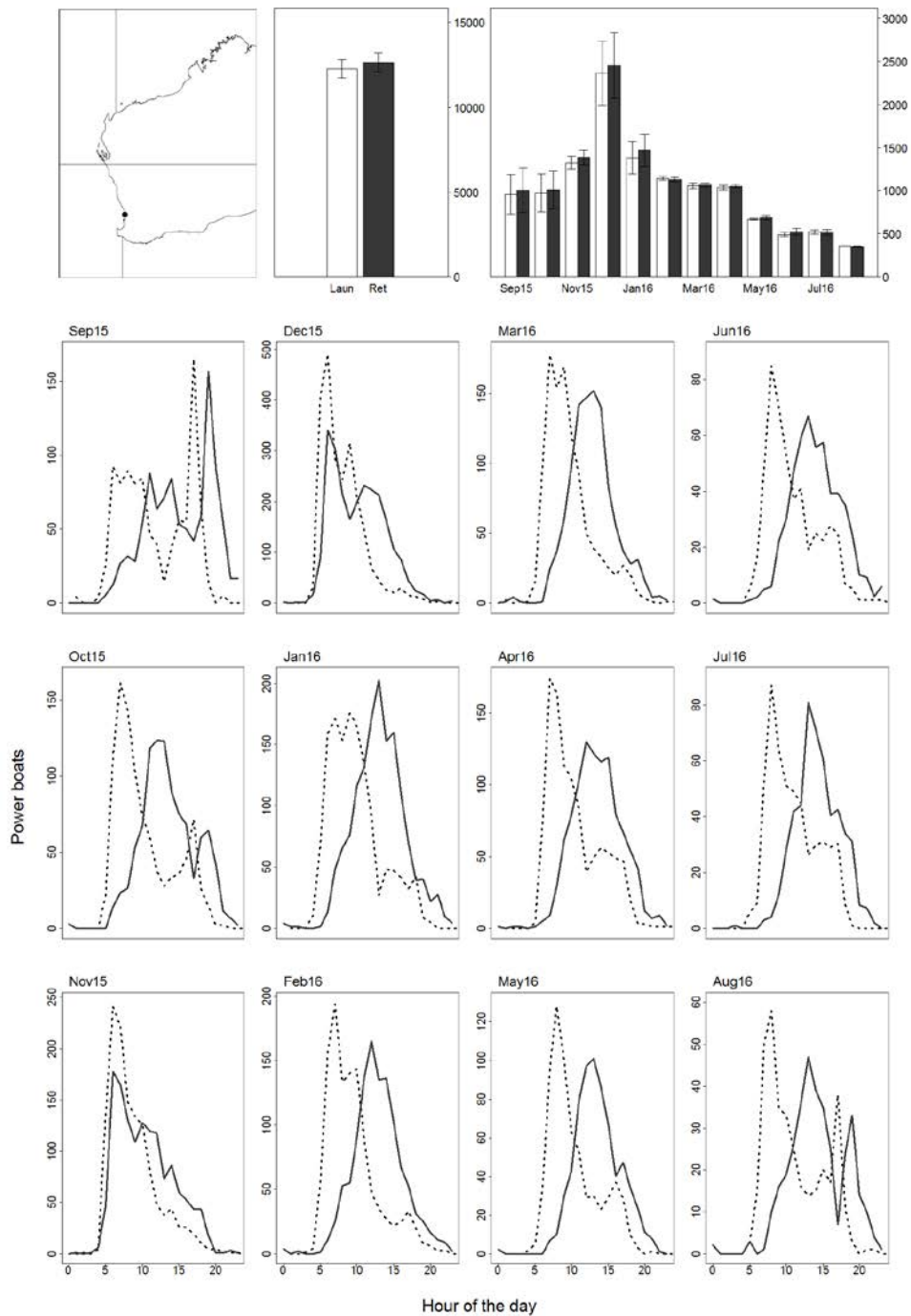
**Figure 88.** Total launches (white bar) and retrievals (black bar) by power boats from Leeuwin (Lat 32.030, Long 115.762) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

Data for August 2016 were unavailable.

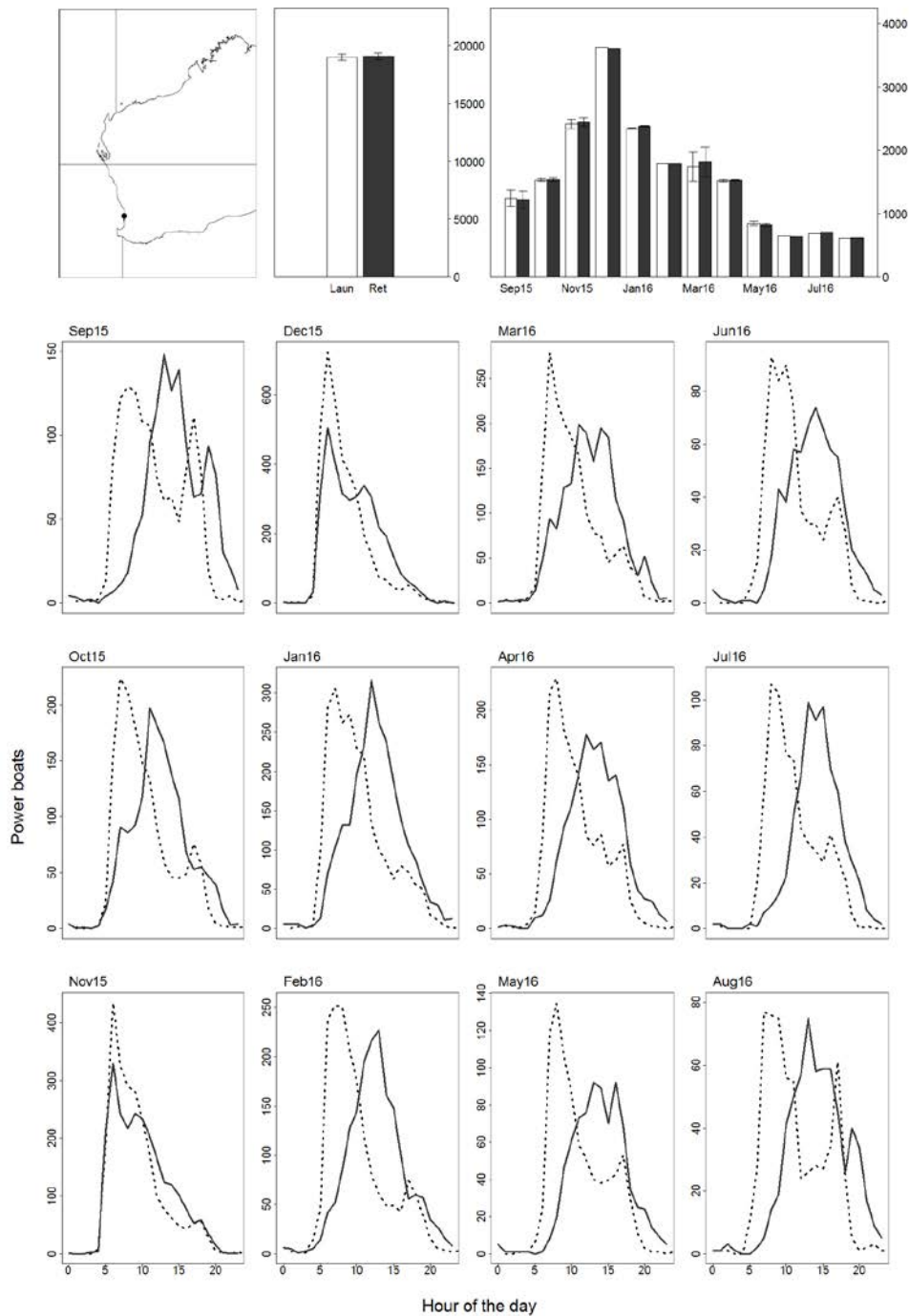


**Figure 89.** Total launches (white bar) and retrievals (black bar) by power boats from Woodman Point Public Ramp (Lat 32.139, Long 115.762) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

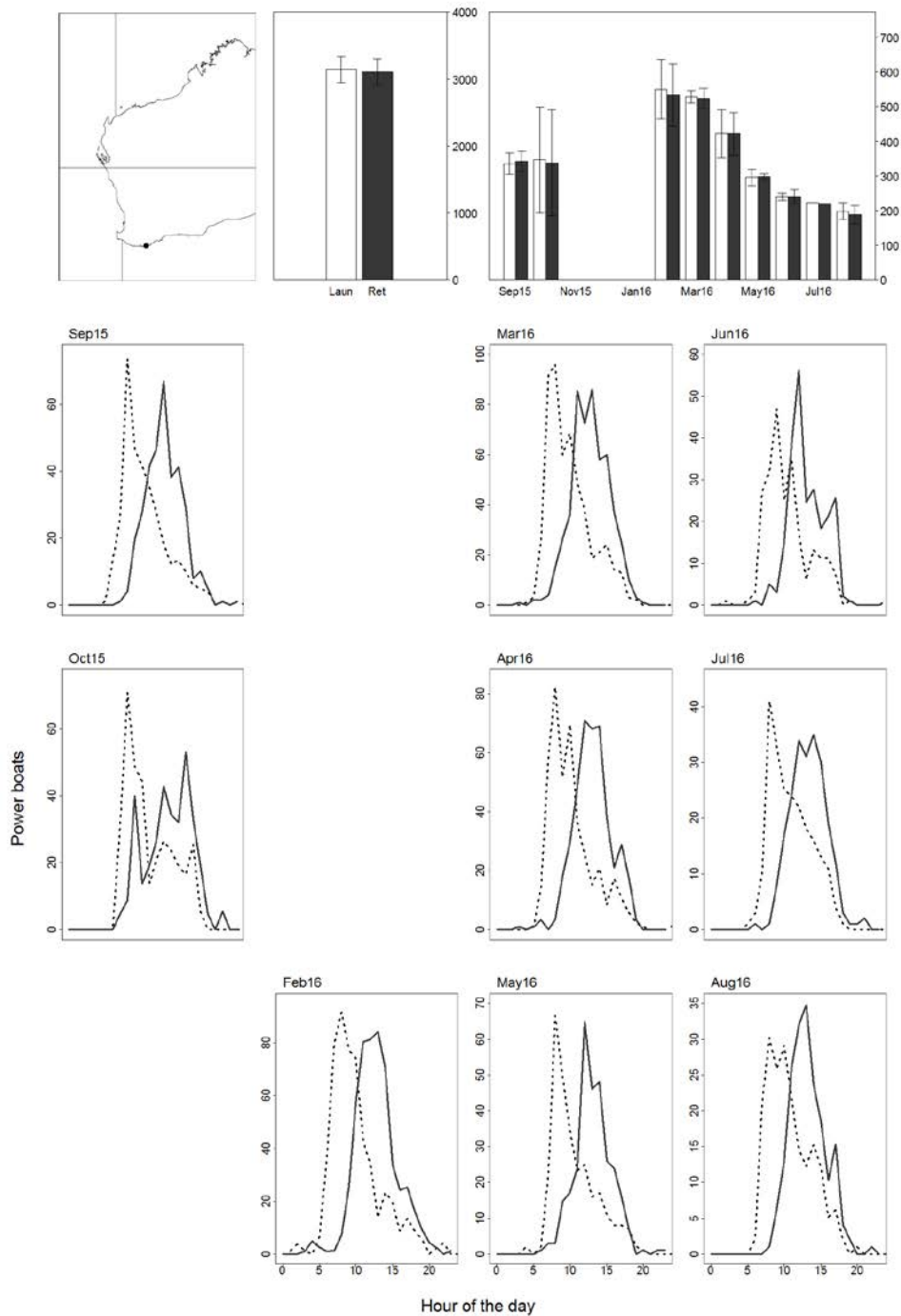
Data for July 2016 were unavailable.



**Figure 90.** Total launches (white bar) and retrievals (black bar) by power boats from Woodman Point Private Ramp (Lat 32.139, Long 115.762) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.



**Figure 91.** Total launches (white bar) and retrievals (black bar) by power boats from Point Peron (Lat 32.271, Long 115.698) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.



**Figure 92.** Total launches (white bar) and retrievals (black bar) by power boats from Emu Point (Lat 34.995, Long 117.945) during 2015/16 (top centre); total launches (white bars) and retrievals (black bars) by month (top right); and hourly launches (dotted line) and retrievals (solid line) by month. Error bars are 1 standard error where data imputation required for missing data.

Data for November 2015, December 2015 and January 2016 were unavailable.



### Appendix 3: Harvest ranges from 2011/12 and 2013/14 statewide surveys.

values in bold indicate relative standard error >40%; values in italics indicate <30 diarists recorded catches of the species; Sources for average weights: B is the bioregion estimate from boat ramp surveys, S is the statewide estimate from boat ramp surveys, C unpublished data from Tour Operator Returns

Year	Bioregion	Species	Estimated catch (kept by number)	Average weight (kgjt)	Source	Estimated harvest (tonnes)	Standard Error
<b>Nearshore and Estuarine Resources (all Bioregions)</b>							
1112	North	Barramundi	2,082	4.087	C	8.509	2.710
1112	North	Golden Trevally	1,611	5.156	C	8.306	1.598
1112	North	Blue Threadfin	2,428	2.559	C	6.213	2.239
1112	North	Giant Trevally	680	4.410	C	2.999	1.050
1112	North	Bludger Trevally	546	2.348	C	1.282	0.392
1112	North	Chinaman Rockcod	<b>451</b>	0.718	C	0.324	0.142
1112	North	Whiting	<b>1,342</b>	0.107	C	0.144	0.079
1112	North	Garfish	<b>1,140</b>	0.104	S	0.119	0.054
1112	North	Mullet	<i>2,150</i>	0.054	C	0.116	0.044
1112	North	Northwest Black Bream	<i>578</i>	0	N/A	0	0
<b>1112</b>	<b>TOTAL</b>		<b>13,008</b>			<b>28.012</b>	<b>4.025</b>
1112	Gascoyne	Chinaman Rockcod	6,281	0.718	C	4.510	1.765
1112	Gascoyne	Golden Trevally	792	5.156	C	4.084	0.887
1112	Gascoyne	Giant Trevally	511	4.410	C	2.254	0.600
1112	Gascoyne	Tailor	<b>906</b>	0.652	S	0.591	0.290
1112	Gascoyne	Western Butterfish	<b>1,733</b>	0.191	S	0.331	0.165
1112	Gascoyne	Silver Trevally	<b>473</b>	0.518	S	0.245	0.126
1112	Gascoyne	Garfish	<b>1,003</b>	0.104	S	0.104	0.091
1112	Gascoyne	School Whiting	<i>924</i>	0.097	S	0.090	0.035
1112	Gascoyne	Sea Mullet	<b>1,020</b>	0.054	C	0.055	0.025
1112	Gascoyne	Small Baitfish	<b>457</b>	0	N/A	0	0
<b>1112</b>	<b>TOTAL</b>		<b>14,100</b>			<b>12.264</b>	<b>2.097</b>
1112	West	Australian Herring	187,231	0.140	B	26.212	2.683
1112	West	Silver Trevally	55,127	0.468	B	25.799	2.664
1112	West	School Whiting	235,912	0.097	S	22.883	2.308
1112	West	King George Whiting	48,601	0.312	B	15.164	2.351
1112	West	Tailor	21,439	0.652	S	13.978	3.867
1112	West	Western King Wrasse	9,202	0.350	S	3.221	0.739
1112	West	Black Bream	10,021	0.312	S	3.127	0.878
1112	West	Garfish	22,320	0.104	S	2.321	0.448
1112	West	Other Whiting	<i>5,991</i>	0.107	C	0.641	0.205
1112	West	Sea Mullet	<b>7,376</b>	0.054	C	0.398	0.226
<b>1112</b>	<b>TOTAL</b>		<b>603,220</b>			<b>113.744</b>	<b>6.459</b>
1112	South	King George Whiting	61,435	0.196	B	12.041	2.299
1112	South	Western Australian Salmon	2,462	3.135	S	7.718	1.696
1112	South	Black Bream	22,916	0.312	S	7.150	1.926
1112	South	Silver Trevally	10,092	0.518	S	5.228	0.696
1112	South	Australian Herring	28,899	0.129	B	3.728	0.686
1112	South	Snook	3,505	0.862	S	3.021	1.159
1112	South	Leatherjacket	1,555	1.424	C	2.214	0.537
1112	South	School Whiting	16,265	0.097	S	1.578	0.333
1112	South	Southn Bluespotted Flathead	2,039	0.548	S	1.117	0.254
1112	South	Garfish	<b>2,872</b>	0.104	S	0.299	0.173

Year	Bioregion	Species	Estimated catch (kept by number)	Average weight (kgjt)	Source	Estimated harvest (tonnes)	Standard Error
<b>1112</b>	<b>TOTAL</b>		<b>152,040</b>			<b>44.094</b>	<b>3.829</b>
<b>Nearshore and Estuarine Resources (all Bioregions)</b>							
1314	North	Barramundi	1,648	4.067	C	6.702	1.708
1314	North	Blue Threadfin	2,097	2.658	C	5.574	1.204
1314	North	Golden Trevally	1,014	5.073	C	5.144	2.029
1314	North	Black Jewfish	557	3.056	C	1.702	0.455
1314	North	Bludger Trevally	542	2.347	C	1.272	0.354
1314	North	Yellowtail Barracuda	<b>1,230</b>	0.417	S	0.513	0.223
1314	North	Garfish	<b>2,213</b>	0.095	S	0.210	0.094
1314	North	Mullet	1,406	0.051	C	0.072	0.023
1314	North	Northwest Black Bream	<b>638</b>	0	N/A	0	0
1314	North	Small Baitfish	<b>583</b>	0	N/A	0	0
<b>1314</b>	<b>TOTAL</b>		<b>11,928</b>			<b>21.189</b>	<b>2.980</b>
1314	Gascoyne	Mulloway	<b>1,289</b>	4.535	C	5.846	2.857
1314	Gascoyne	Golden Trevally	785	5.073	C	3.982	0.898
1314	Gascoyne	Chinaman Rockcod	5,493	0.719	C	3.949	1.201
1314	Gascoyne	Western Butterfish	<b>2,104</b>	0.232	S	0.488	0.311
1314	Gascoyne	Tailor	<b>709</b>	0.666	S	0.472	0.204
1314	Gascoyne	Northern Sand Flathead	325	0.778	C	0.253	0.087
1314	Gascoyne	School Whiting	<b>2,160</b>	0.094	S	0.203	0.107
1314	Gascoyne	Western Yellowfin Bream	355	0.488	C	0.173	0.060
1314	Gascoyne	Sea Mullet	<b>2,321</b>	0.051	C	0.118	0.075
1314	Gascoyne	Garfish	<b>727</b>	0.095	S	0.069	0.049
<b>1314</b>	<b>TOTAL</b>		<b>16,268</b>			<b>15.553</b>	<b>3.253</b>
1314	West	School Whiting	247,728	0.094	S	23.286	2.860
1314	West	Silver Trevally	29,326	0.539	B	15.807	1.861
1314	West	King George Whiting	27,832	0.475	B	13.220	2.335
1314	West	Australian Herring	102,066	0.122	B	12.452	1.386
1314	West	Tailor	7,485	0.666	S	4.985	0.967
1314	West	Western King Wrasse	8,460	0.320	S	2.707	0.690
1314	West	Yellowtail Barracuda	<b>4,790</b>	0.417	S	1.997	1.402
1314	West	Black Bream	4,882	0.254	S	1.240	0.281
1314	West	Western Butterfish	4,091	0.237	B	0.970	0.262
1314	West	Sea Mullet	<b>12,789</b>	0.051	C	0.652	0.296
<b>1314</b>	<b>TOTAL</b>		<b>449,449</b>			<b>77.316</b>	<b>4.757</b>
1314	South	King George Whiting	47,234	0.187	B	8.833	2.120
1314	South	Western Australian Salmon	1,591	2.652	S	4.219	0.931
1314	South	Australian Herring	30,118	0.118	B	3.554	0.532
1314	South	Silver Trevally	5,627	0.495	S	2.785	0.596
1314	South	School Whiting	21,062	0.094	S	1.980	0.576
1314	South	Black Bream	7,114	0.254	S	1.807	0.528
1314	South	Snook	<b>2,703</b>	0.449	S	1.214	0.593
1314	South	Southern Bluespotted Flathead	1,420	0.588	S	0.835	0.193
1314	South	Garfish	1,191	0.095	S	0.113	0.043
1314	South	Oriental Bonito	948	0	N/A	0	0
<b>1314</b>	<b>TOTAL</b>		<b>119,008</b>			<b>25.340</b>	<b>2.646</b>

Year	Bioregion	Species	Estimated catch (kept by number)	Average weight (kgjt)	Source	Estimated harvest (tonnes)	Standard Error
<b>Demersal Resources (all Bioregions)</b>							
1112	North	Grass Emperor	11,099	1.340	B	14.873	2.750
1112	North	Spangled Emperor	7,047	2.084	S	14.686	1.880
1112	North	Coral Trout	4,723	2.556	C	12.072	1.628
1112	North	Red Emperor	2,749	3.441	S	9.459	1.359
1112	North	Rankin Cod	2,630	2.994	S	7.874	1.159
1112	North	Stripsey Snapper	8,529	0.899	C	7.668	1.578
1112	North	Blackspot Tuskfish	2,227	2.684	S	5.977	1.264
1112	North	Blackspotted Rockcod	1,403	4.098	C	5.749	1.406
1112	North	Mangrove Jack	4,090	0.822	B	3.362	0.852
1112	North	Bluespotted Emperor	1,456	0.595	C	0.866	0.255
<b>1112</b>	<b>TOTAL</b>		<b>45,953</b>			<b>82.586</b>	<b>4.878</b>
1112	Gascoyne	Spangled Emperor	17,195	2.093	B	35.989	4.829
1112	Gascoyne	Pink Snapper	11,433	2.476	S	28.308	3.724
1112	Gascoyne	Grass Emperor	16,695	0.961	B	16.044	2.251
1112	Gascoyne	Red Emperor	4,407	3.441	S	15.164	2.564
1112	Gascoyne	Rankin Cod	4,627	2.994	S	13.853	2.096
1112	Gascoyne	Goldband Snapper	2,256	4.223	C	9.527	2.863
1112	Gascoyne	Redthroat Emperor	7,771	1.088	B	8.455	1.253
1112	Gascoyne	Baldchin Groper	3,178	2.368	S	7.526	1.397
1112	Gascoyne	Coral Trout	1,903	2.556	C	4.864	0.943
1112	Gascoyne	Goldspotted Rockcod	1,836	2.009	S	3.689	0.816
<b>1112</b>	<b>TOTAL</b>		<b>71,301</b>			<b>143.419</b>	<b>8.154</b>
1112	West	West Australian Dhufish	16,814	4.485	B	75.411	5.938
1112	West	Pink Snapper	14,023	2.315	B	32.463	2.611
1112	West	Baldchin Groper	12,764	2.337	B	29.829	2.935
1112	West	Breaksea Cod	9,874	1.031	S	10.180	0.798
1112	West	Blue Morwong	1,319	2.717	S	3.584	0.565
1112	West	Emperor	2,472	1.385	C	3.424	0.857
1112	West	Sergeant Baker	1,599	1.050	C	1.679	0.360
1112	West	Bight Redfish	1,069	1.171	S	1.252	0.195
1112	West	Sea Sweep	799	1.252	S	1.000	0.258
1112	West	Foxfish	982	0.811	S	0.796	0.136
1112	West	Eightbar Grouper	<b>50</b>	4.003	C	0.200	0.144
1112	West	Bass Groper	<b>12</b>	0	N/A	0	0
1112	West	Blue-Eye Trevalla	<b>18</b>	0	N/A	0	0
1112	West	Hapuku	0	0	N/A	0	0
1112	West	Ruby Snapper	0	0	N/A	0	0
<b>1112</b>	<b>TOTAL</b>		<b>61,795</b>			<b>159.818</b>	<b>7.257</b>
1112	South	Blue Morwong	4,568	2.717	S	12.411	1.872
1112	South	Bight Redfish	10,279	1.171	S	12.037	1.691
1112	South	Pink Snapper	3,556	2.476	S	8.805	2.097
1112	South	Breaksea Cod	8,437	1.031	S	8.699	1.459
1112	South	West Australian Dhufish	<b>923</b>	4.536	S	4.187	1.828
1112	South	Sea Sweep	2,432	1.252	S	3.045	0.871
1112	South	Swallowtail	2,672	1.091	S	2.915	0.570
1112	South	Harlequin Fish	1,262	1.401	S	1.768	0.382
1112	South	Sergeant Baker	722	1.050	C	0.758	0.193
1112	South	Foxfish	<b>572</b>	0.811	S	0.464	0.227
<b>1112</b>	<b>TOTAL</b>		<b>35,423</b>			<b>55.089</b>	<b>4.189</b>

Year	Bioregion	Species	Estimated catch (kept by number)	Average weight (kgjt)	Source	Estimated harvest (tonnes)	Standard Error
<b>Demersal Resources (all Bioregions)</b>							
1314	North	Grass Emperor	7,046	1.714	B	12.077	2.868
1314	North	Red Emperor	2,019	3.574	S	7.216	1.544
1314	North	Coral Trout	2,738	2.583	C	7.072	1.113
1314	North	Rankin Cod	1,730	3.719	S	6.434	1.450
1314	North	Spangled Emperor	3,182	1.929	S	6.138	1.481
1314	North	Blackspot Tuskfish	1,968	2.792	S	5.495	1.393
1314	North	Stripsey Snapper	5,848	0.899	C	5.257	1.469
1314	North	Painted Sweetlips	<b>1,339</b>	3.206	C	4.293	2.667
1314	North	Mangrove Jack	3,291	0.775	S	2.551	0.525
1314	North	Golden Snapper	1,330	1.464	C	1.947	0.423
<b>1314</b>	<b>TOTAL</b>		<b>30,491</b>			<b>58.480</b>	<b>5.274</b>
1314	Gascoyne	Pink Snapper	9,712	2.342	S	22.746	2.712
1314	Gascoyne	Spangled Emperor	8,715	1.930	B	16.820	2.575
1314	Gascoyne	Goldband Snapper	3,445	4.295	C	14.796	3.445
1314	Gascoyne	Red Emperor	3,167	3.574	S	11.319	3.131
1314	Gascoyne	Grass Emperor	13,954	0.708	B	9.879	2.237
1314	Gascoyne	Rankin Cod	2,346	3.719	S	8.725	1.175
1314	Gascoyne	Baldchin Groper	2,836	2.247	S	6.372	1.292
1314	Gascoyne	Goldspotted Rockcod	2,229	2.770	S	6.174	1.748
1314	Gascoyne	Redthroat Emperor	3,670	0.834	B	3.061	0.570
1314	Gascoyne	Stripsey Snapper	1,583	0.899	C	1.423	0.262
<b>1314</b>	<b>TOTAL</b>		<b>51,657</b>			<b>101.315</b>	<b>6.867</b>
1314	West	West Australian Dhufish	18,306	4.456	B	81.572	6.283
1314	West	Pink Snapper	12,681	2.394	B	30.358	2.827
1314	West	Baldchin Groper	9,426	2.235	B	21.067	1.971
1314	West	Breaksea Cod	10,975	0.919	S	10.086	0.913
1314	West	Emperor	2,472	1.455	C	3.597	0.837
1314	West	Blue Morwong	1,058	2.733	S	2.892	0.593
1314	West	Sea Sweep	1,228	1.244	S	1.528	0.409
1314	West	Bight Redfish	1,114	1.102	S	1.228	0.216
1314	West	Sergeant Baker	1,122	1.092	C	1.225	0.358
1314	West	Foxfish	1,108	0.772	S	0.855	0.159
1314	West	Eightbar Grouper	<b>39</b>	3.960	C	0.154	0.139
1314	West	Bass Groper	<b>20</b>	0	N/A	0	0
1314	West	Blue-Eye Trevalla	<b>76</b>	0	N/A	0	0
1314	West	Hapuku	0	0	N/A	0	0
1314	West	Ruby Snapper	0	0	N/A	0	0
<b>1314</b>	<b>TOTAL</b>		<b>59,625</b>			<b>154.562</b>	<b>7.323</b>
1314	South	Bight Redfish	8,343	1.102	S	9.194	1.217
1314	South	Blue Morwong	2,871	2.733	S	7.846	0.973
1314	South	Pink Snapper	2,579	2.342	S	6.040	0.941
1314	South	Breaksea Cod	5,482	0.919	S	5.038	0.651
1314	South	West Australian Dhufish	568	4.446	S	2.525	0.676
1314	South	Sea Sweep	1,052	1.244	S	1.309	0.274
1314	South	Harlequin Fish	908	1.137	S	1.032	0.163
1314	South	Swallowtail	1,559	0.340	S	0.530	0.130
1314	South	Sergeant Baker	476	1.092	C	0.520	0.127
1314	South	Foxfish	336	0.772	S	0.259	0.058
<b>1314</b>	<b>TOTAL</b>		<b>24,174</b>			<b>34.293</b>	<b>2.081</b>

Year	Bioregion	Species	Estimated catch (kept by number)	Average weight (kg/t)	Source	Estimated harvest (tonnes)	Standard Error
<b>Pelagic Resources (North Coast)</b>							
1112	North	Spanish Mackerel	3,794	9.723	C	36.889	4.978
1112	North	Cobia	406	6.937	C	2.816	0.909
1112	North	Shark Mackerel	311	8.689	C	2.702	1.147
1112	North	Other Mackerel & Tuna	252	9.723	C	2.450	1.235
1112	North	School Mackerel	1,197	1.972	C	2.360	0.651
1112	North	Northern Bluefin Tuna	201	5.653	C	1.136	0.396
1112	North	Mackerel Tuna	216	4.590	C	0.991	0.376
1112	North	Spotted Mackerel	343	2.226	C	0.764	0.254
1112	North	Skipjack Tuna	110	5.811	C	0.639	0.599
1112	North	Great Barracuda	108	0	N/A	0	0
<b>1112</b>	<b>TOTAL</b>		<b>6,938</b>			<b>50.747</b>	<b>5.440</b>
1314	North	Spanish Mackerel	2,506	9.507	C	23.825	4.107
1314	North	School Mackerel	1,539	1.959	C	3.015	1.559
1314	North	Cobia	320	6.955	C	2.226	0.675
1314	North	Northern Bluefin Tuna	216	5.867	C	1.267	0.411
1314	North	Mackerel Tuna	172	4.364	C	0.751	0.310
1314	North	Grey Mackerel	70	5.410	C	0.379	0.195
1314	North	Southern Bluefin Tuna	47	5.220	C	0.245	0.141
1314	North	Spotted Mackerel	79	2.184	C	0.173	0.087
1314	North	Amberjack	47	0	N/A	0	0
1314	North	Great Barracuda	160	0	N/A	0	0
<b>1314</b>	<b>TOTAL</b>		<b>5,156</b>			<b>31.881</b>	<b>4.482</b>
<b>Crab Resources (all Bioregions)</b>							
1112	North	Green (Giant) Mud Crab	4,730	1.044	C	4.938	1.018
1112	North	Brown (Orange) Mud Crab	4,778	0.621	C	2.967	0.486
<b>1112</b>	<b>TOTAL</b>		<b>9,508</b>			<b>7.905</b>	<b>1.128</b>
1314	North	Green (Giant) Mud Crab	4,252	1.103	C	4.690	0.941
1314	North	Brown (Orange) Mud Crab	4,696	0.621	C	2.916	0.651
<b>1314</b>	<b>TOTAL</b>		<b>8,948</b>			<b>7.606</b>	<b>1.144</b>
1112	North	Blue Swimmer Crab	14,802	0.229	S	3.390	0.910
1112	Gascoyne	Blue Swimmer Crab	19,050	0.229	S	4.362	1.797
1112	West	Blue Swimmer Crab	380,816	0.225	B	85.684	5.590
1112	South	Blue Swimmer Crab	12,164	0.229	S	2.786	0.720
1314	North	Blue Swimmer Crab	15,938	0.254	S	4.048	1.011
1314	Gascoyne	Blue Swimmer Crab	8,764	0.254	S	2.226	0.794
1314	West	Blue Swimmer Crab	254,373	0.231	B	58.760	4.560
1314	South	Blue Swimmer Crab	8,640	0.254	S	2.195	0.512