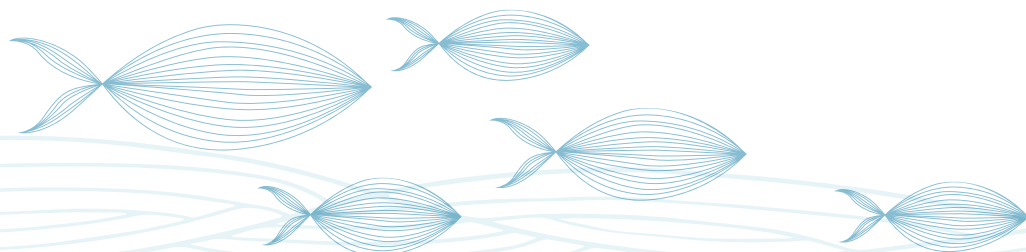




Monitoring Queensland's boat-based recreational fishing

Baseline report for Fisheries Queensland's
recreational boat ramp survey program

June 2017

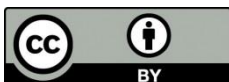


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Summary

This report presents baseline information for the first 12 months of Fisheries Queensland's boat ramp surveys of recreational fishers. The sampling started in November 2015 to coincide with the introduction of the net-free zones in Cairns, Mackay and Rockhampton. From August 2016, the sampling expanded into a statewide monitoring program to collect information about recreational fishing activities across Queensland. More than 45 boat ramps within 12 regions are now monitored 5 times a month on weekends and weekdays to provide a representative sample of boat-based recreational fishing activities at each ramp.

Interviewers collect information about the fishing trip by asking the recreational fishers which suburb they live in, where and how they fished, and how long they fished for. They collect information on more than 30 species. Interviewers identify, measure and count the fish kept. They also record the number and species reported as released. The number of mud crabs, blue swimmer crabs, tropical rock lobsters and sharks retained is also recorded.

The power of the monitoring program will be in the trends observed over subsequent years, and will help provide information on whether the number and size of fish caught change as a result of the net-free zones or other management interventions. Detecting these changes can require several years of data, particularly given seasonal and other influences (such as rainfall, cyclones and droughts).

This monitoring program provides indices of fishing activity so that changes through time can be detected. The program is not able to provide estimates of total recreational fishing harvest, effort or value, either regionally or statewide. It complements the statewide and national recreational fishing telephone–diary surveys, which will continue to provide an estimate of the total number of recreational fishers in Queensland, together with statewide recreational fishing estimates. Social surveys have also been undertaken to assess people's level of satisfaction and expectation with the introduction of net-free zones—these results are presented separately.

This baseline report highlights some interesting regional differences, as outlined overleaf.

Parts of the Cairns, Fraser, Hinchinbrook, Mackay, Rockhampton and Townsville regions have data for the full 12 months. Other regions and boat ramps were introduced after August 2016, and therefore less data are available for those regions.

Snapshot of baseline results—12 months until 31 October 2016

| Area | Average duration of boat trip (day trips only) | Top three species kept | | |
|--|---|------------------------|--|--|
| | | Fish species | Average number kept per trip catching that species | Average length of fish (cm) (refer to Table 2 for measurement type) |
| Fishing within net-free zones only | | | | |
| Cairns | 5 hrs 26 mins | Barred javelin | 0.9 | 54 |
| | | Common coral trout | 3.5 | 53 |
| | | Blue threadfin | 0.5 | 43 |
| Mackay | 5 hrs 59mins | Pikey bream | 1.7 | 28 |
| | | Barred javelin | 0.7 | 43 |
| | | Sand whiting | 2.0 | 26 |
| Rockhampton | 5 hrs 37 mins | School mackerel | 3.8 | 56 |
| | | King threadfin | 0.5 | 71 |
| | | Barramundi | 0.3 | 70 |
| Broader regions (south to north, including the net-free zone information above) | | | | |
| Gold Coast | 5 hrs 19 mins | Trumpeter whiting | 42.0 | Not measured |
| | | Yellowfin bream | 1.7 | 27 |
| | | Snapper (pink) | 2.3 | 38 |
| Brisbane | 5 hrs 26 mins | Trumpeter whiting | 31.2 | Not measured |
| | | Snapper (pink) | 0.9 | 42 |
| | | Yellowfin bream | 0.9 | 25 |
| Sunshine Coast | 4 hrs 38 mins | Sand whiting | 6.3 | 26 |
| | | Venus tuskfish | 2.6 | 34 |
| | | Yellowfin bream | 0.5 | 26 |
| Fraser Coast | 4 hrs 47 mins | Trumpeter whiting | 28.1 | Not measured |
| | | Sand whiting | 5.0 | 26 |
| | | Yellowfin bream | 1.3 | 27 |
| Rockhampton | 4 hrs 34 mins | School mackerel | 3.5 | 57 |
| | | Spanish mackerel | 1.6 | 97 |
| | | King threadfin | 0.5 | 70 |
| Mackay | 4 hrs 49 mins | Pikey bream | 1.7 | 28 |
| | | Barred javelin | 0.7 | 45 |
| | | Sand whiting | 2.0 | 26 |
| Townsville | 4 hrs 56 mins | School mackerel | 2.0 | 51 |
| | | Barred javelin | 0.6 | 45 |
| | | Spanish mackerel | 2.1 | 84 |
| Hinchinbrook | 5 hrs 0 mins | Common coral trout | 3.7 | 45 |
| | | Barred javelin | 1.3 | 46 |
| | | Pikey bream | 1.0 | 27 |
| Cairns | 5 hrs 13 mins | Common coral trout | 2.5 | 46 |
| | | Spanish mackerel | 1.2 | 93 |
| | | Mangrove jack | 0.7 | 44 |

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Introduction

Fisheries Queensland has used boat ramp surveys to collect recreational fishing information from recreational fishers across Queensland for more than 10 years. From 1 November 2015 the boat ramp survey program was progressively expanded to more than 45 boat ramps across Queensland. Surveys are conducted at the ramps five times a month, on weekdays and weekends. This report presents the baseline information from the boat ramp survey program for this 12-month period.

The major aim of the boat ramp survey program is to collect scientifically robust information to monitor trends in catch, effort and the value of recreational fishing through time. The boat ramp survey program collects information from recreational fishers at boat ramps when they return from a fishing trip. It collects information from recreational fishers in 12 regions across Queensland—Gold Coast, Brisbane, Sunshine Coast, Fraser Coast, Gladstone¹, Rockhampton, Mackay, Townsville, Hinchinbrook, Cairns, Weipa¹ and Karumba¹ (Figure 1).



Figure 1: Map of the regions and ramps where boat ramp surveys are conducted

The boat ramp survey program expanded in November 2015, coinciding with the introduction of the net-free zones (NFZs) in Cairns, Mackay and Rockhampton. As part of the Queensland Government's sustainable fishing policy, three NFZs were created along the Queensland coast on 1 November 2015 (Table 1). Commercial netting has been prohibited within the NFZs, with the aim of more fish being available to recreational fishers. It is expected that, over time, the introduction of these NFZs may lead to changes in the number and the size of the fish caught by recreational fishers, recreational fishing effort and recreational fishers' satisfaction with, and expectation of, fishing.

¹ Monitoring commenced in these regions from March 2017.

Table 1: Area of the new net-free zones

| Net-free zone | Region | Area (km²) |
|--------------------------------|---------------|------------------------------|
| Capricorn coast | Rockhampton | 1 380 |
| St Helens to Cape Hillsborough | Mackay | 163 |
| Trinity bay, Cairns | Cairns | 89 |

Fisheries Queensland has a long history of collecting important information from recreational fishers that directly contributes to the sustainable management of Queensland's fisheries. The monitoring programs have collected scientifically robust data on fish lengths at boat ramps and other access points for more than 10 years. There have been seven 12-month recreational fishing diary surveys run by Fisheries Queensland since 1995, and the Keen Angler Program has provided samples used to help calculate the age of fish caught. The boat ramp survey program builds upon Fisheries Queensland's experience and knowledge about collecting recreational fishing information in a scientifically robust method. This rigorous information is then available to evaluate the effectiveness of the NFZs and other management interventions.

Indices to understand trends on recreational fishing catch and effort

The boat ramp surveys will generate indices that can be used to monitor changes over time (e.g. an index of effort and an index of catch rate within the regions). Generating indices is a cost-effective way of monitoring changes in recreational fishing activity. The indices will reflect underlying changes in recreational fishing. By comparing the changes in these indices through time and between regions, it is possible to infer the effects of regional management and other changes in the fishery. The seasonal nature of fisheries means that changes in these indices should be compared annually, thereby providing an understanding of change over time.

The boat ramp surveys will not generate estimates of statewide or regional total recreational harvest or effort—to do so is prohibitively expensive using this method. However, the boat ramp surveys complement Fisheries Queensland's other monitoring programs. For example, Queensland's statewide recreational fishing surveys provide estimates of total recreational harvest and fishing effort. However, it is impractical to complete statewide surveys every year. The boat ramp surveys complement the statewide surveys by providing information about the trends in fishing activity in the years between successive statewide surveys.

This recreational fishing information (together with biological, social, commercial and charter information) contributes to the sustainable management of Queensland's fishery resources.

Value of recreational fishing

Recreational fishing generates economic activity for Queensland and its regions. It also provides significant non-monetary social benefits to individuals and the community. For example, people gain many health benefits from enjoyable recreational experiences such as fishing. The travel cost method is a well-established method for understanding how users of a resource value it where that resource provides significant non-monetary benefits (Freeman, 2003; Loomis and Helfand, 2003; Gregg and Rolfe, 2013; Ridge Partners Pty Ltd, 2013; Pascoe et al., 2014; Georgeson et al., 2015). The boat ramp survey program will generate an index of the value of recreational fishing by adapting the travel cost method.

The driver of the travel cost method is the distance and frequency that recreational fishers travel to go fishing. The more frequently people do a recreational activity and the further they travel to do it is related to how much they like or value it. The boat ramp survey program will collect the information necessary to allow an index of the value of recreational fishing to be developed. Calculating it involves geographical information system (GIS) analysis, and this is currently underway. The results of those

analyses will be presented in subsequent reports. The indices developed will allow people to compare changes in the value of recreational fishing through time.

Program longevity

The power of the monitoring program will be in examining the trends observed over subsequent years. Understanding trends is often more useful than knowing an estimate for a single year. For that reason, the boat ramp surveys generate indices of recreational fishing activity so that we can see changes through time, which reveal the performance of the fishery. Therefore, the value of the information collected by the boat ramp surveys grows as the trends in the data grow. It is important to recognise that the boat ramp surveys require a substantial time commitment for its potential value to be fully realised.

Preliminary report

This report provides an overview of the methods used and a snapshot of some of the baseline results from 12 months of the boat ramp surveys (from 1 November 2015 to 31 October 2016). It shows the type of information collected and what is available. Surveys started in the NFZs and reference regions in November 2016. Other regions were added after August–September 2016. Surveys commenced on the Sunshine Coast in October 2016, so more information about recreational fishing activity in this region will be available in future reports.

Methods

Indices

The boat ramp survey is designed to monitor trends through time and will not provide estimates of total or regional recreational catch or effort. The sampling will provide a series of indices for catch, effort and value. Changes in these indices through time can be compared across regions.

Survey intensity and information collected

More than 45 ramps are being surveyed across Queensland (Appendix 1). The ramps were selected so that they provided a broad coverage of Queensland, would likely represent fishing activity for the survey species (Table 2) in the region, and were accessible.

They have been grouped into the 12 regions shown in Figure 1. Surveys began in the regions providing access to the NFZs in November 2015 (Rockhampton, Mackay and Cairns). Regions that could act as reference locations (comparison ramps) to the introduction of the NFZs were also sampled from November 2015 (Fraser Coast, Townsville and Hinchinbrook). In August–September 2016 and March 2017, more ramps were added to improve statewide coverage. Through this design, trends in fishing activity at ramps within a region can be compared to trends in fishing activity at other regions.

Survey shifts are scheduled at each ramp five times a month—three times on weekends/public holidays and two times on weekdays. More than 225 shifts (900 hours) are scheduled each month across Queensland. Staff trained in the survey protocol (Department of Agriculture and Fisheries, 2015) and identifying fish, interview the recreational fishers at boat ramps during a survey shift. A shift lasts for 4 hours and commences at either 8 am or 12 pm.

When a recreational fishing boat returns to the ramp, the fishers are interviewed and information is recorded. This information includes the usual residential suburb of the fishers, the fishing time, location, method and species they were targeting.

The survey collects data on more than 30 survey species (Table 2)—these data include the number of fish harvested and released and the length of the fish harvested (See Appendix 2 for data sheet). The number of non-fishing boat crews interviewed and those that refused to be interviewed are also recorded. An interview lasts between 1 and 10 minutes, depending on whether or not the boating party was fishing and the number of fish measured by the interviewer.

Effort information—trailer count and fishing trip duration

Accurately recording total recreational fishing effort at all ramps provides information useful in many ways, but it is costly to collect and requires additional monitoring techniques not presently available. However, the current monitoring program provides a good indication of how fishing effort changes through time.

The boat ramp surveys collect effort information in two ways:

1. a count of boat trailers parked at the ramp at the start of a survey provides an index of fishing effort at that ramp
2. the fishing trip duration, which is calculated as the time elapsed between launching and retrieving the boat and presented as hours.

The interviewer collects launch times during the interview with the fishers and retrieve times as observed when the boat is retrieved. The fishing trip duration, therefore, includes time spent travelling on the water to the fishing site, time spent searching for fish, time spent with fishing lines in the water

and breaks. Only trips that are completed within the same day are used when presenting fishing trip duration (hours) information. This removes the large non-fishing times spent sleeping or visiting islands, thereby providing a more stable indicator.

Catch and length information

Fishers are asked if they released or harvested (kept) any fish from the list of survey species (Table 2). For those species, the number of fish harvested are counted and the number released recorded. Harvested fish are measured on a standardised measuring board to the nearest centimetre for either fork length or total length (Table 2). Harvested crabs, lobsters, trumpeter whiting and sharks (all species) are counted but not measured.

Harvest rate

The harvest, or number kept, is divided by fishing effort to arrive at a rate—in this case the effort used is derived from trips where the respective survey species was caught, irrespective of whether the fish was kept or released. The rate unit is the number of fish harvested per fisher per hour.

Table 2: Survey species—species measured and/or counted as part of the survey

| Common name | Species | Measurement taken or count only |
|--------------------------|--|---------------------------------|
| Barramundi | <i>Lates calcarifer</i> | Total length |
| Bream | | |
| Pikey bream | <i>Acanthopagrus pacificus</i> | Fork length |
| Yellowfin bream | <i>Acanthopagrus australis</i> | Fork length |
| Cod | | |
| Blackspotted rockcod | <i>Epinephelus malabaricus</i> | Total length |
| Goldspotted rockcod | <i>Epinephelus coioides</i> | Total length |
| Crustacea | | |
| Blue swimmer crab | <i>Portunus armatus</i> | Count only |
| Mud crab | <i>Scylla serrata, Scylla olivacea</i> | Count only |
| Tropical rock lobster | <i>Panulirus ornatus</i> | Count only |
| Flathead | | |
| Dusky flathead | <i>Platycephalus fuscus</i> | Total length |
| Javelin | | |
| Barred javelin | <i>Pomadasys kaakan</i> | Fork length |
| Silver javelin | <i>Pomadasys argenteus</i> | Fork length |
| Jewfish | | |
| Black jewfish | <i>Protonibea diacanthus</i> | Total length |
| Mulloway | <i>Argyrosomus japonicus</i> | Total length |
| Silver jewfish | <i>Nibea soldado</i> | Total length |
| Mackerel | | |
| Grey mackerel | <i>Scomberomorus semifasciatus</i> | Fork length |
| School mackerel | <i>Scomberomorus queenslandicus</i> | Fork length |
| Spanish mackerel | <i>Scomberomorus commerson</i> | Fork length |
| Spotted mackerel | <i>Scomberomorus munroi</i> | Fork length |
| Other | | |
| Giant queenfish | <i>Scomberoides commersonnianus</i> | Fork length |
| Mangrove jack | <i>Lutjanus argentimaculatus</i> | Fork length |
| Tailor | <i>Pomatomus saltatrix</i> | Fork length |
| Reef species | | |
| Barred-cheek coral trout | <i>Plectropomus maculatus</i> | Fork length |
| Common coral trout | <i>Plectropomus leopardus</i> | Fork length |
| Crimson snapper | <i>Lutjanus erythropterus</i> | Fork length |
| Golden snapper | <i>Lutjanus johnii</i> | Fork length |
| Grass emperor | <i>Lethrinus laticaudis</i> | Fork length |
| Pearl perch | <i>Glaucosoma scapulares</i> | Fork length |
| Red emperor | <i>Lutjanus sebae</i> | Fork length |
| Redthroat emperor | <i>Lethrinus miniatus</i> | Fork length |
| Saddletail snapper | <i>Lutjanus malabaricus</i> | Fork length |
| Snapper (pink) | <i>Chrysophrys auratus</i> | Fork length |
| Shark | | |
| Shark unspecified | <i>Unspecified</i> | Count only |
| Threadfin | | |
| Blue threadfin | <i>Eleutheronema tetradactylum</i> | Fork length |
| King threadfin | <i>Polydactylus macrochir</i> | Fork length |
| Tuskfish | | |
| Blackspot tuskfish | <i>Choerodon schoenleinii</i> | Fork length |
| Venus tuskfish | <i>Choerodon venustus</i> | Fork length |
| Whiting | | |
| Goldenline whiting | <i>Sillago analis</i> | Fork length |
| Sand whiting | <i>Sillago ciliata</i> | Fork length |
| Trumpeter whiting | <i>Sillago maculata</i> | Count only |

Results

These results represent the information collected and entered into the Fisheries Resource Monitoring database from 1 November 2015 to 31 October 2016, unless otherwise shown. References to the number of fish measured relates only to species that are survey species (Table 2). Fishers may have caught other species that are not part of this monitoring program.

Monitoring catch and effort

Interviews and proportion fishing

A total of 867 shifts were undertaken at boat ramps from 1 November 2015 to 31 October 2016. During these shifts, 8077 boat crews were interviewed, of which 6679 (83%) were fishing. The greatest percentage of fishing boats were in the Mackay NFZ (95%), Hinchinbrook region and Cairns NFZ (89% each). The lowest percentage of fishing boats was in the Gold Coast region (38%) (Table 3).

Table 3: Number of boat crews interviewed by region (ordered south to north), and the percentage that were fishing

| Region | Fishing boat crews interviewed | Non-fishing boat crews interviewed | Total interviews | Percentage fishing |
|-----------------|--------------------------------|------------------------------------|------------------|--------------------|
| Gold Coast | 54 | 89 | 143 | 38% |
| Brisbane | 473 | 333 | 806 | 59% |
| Sunshine Coast | 36 | 27 | 63 | 57% |
| Fraser Coast | 1 456 | 328 | 1 784 | 82% |
| Rockhampton NFZ | 1 192 | 189 | 1 381 | 86% |
| Mackay NFZ | 760 | 36 | 796 | 95% |
| Townsville | 1 023 | 189 | 1 212 | 84% |
| Hinchinbrook | 1 095 | 134 | 1 229 | 89% |
| Cairns NFZ | 590 | 73 | 663 | 89% |
| TOTAL | 6 679 | 1 398 | 8 077 | 83% |

Numbers of fish measured

Pikey bream, barred javelin and sand whiting were the most commonly measured survey species, with more than 500 of each being measured across all ramps combined. The top 15 most frequently measured species are shown in Table 4.

Table 4: Top 15 most frequently measured survey species (all regions combined)

| | Common name | Total |
|----|--------------------------|-------|
| 1 | Pikey bream | 557 |
| 2 | Barred javelin | 533 |
| 3 | Sand whiting | 510 |
| 4 | Common coral trout | 452 |
| 5 | Yellowfin bream | 446 |
| 6 | School mackerel | 406 |
| 7 | Dusky flathead | 267 |
| 8 | Spanish mackerel | 249 |
| 9 | Snapper (pink) | 211 |
| 10 | Barred-cheek coral trout | 157 |
| 11 | Barramundi | 146 |
| 12 | Goldenline whiting | 142 |
| 13 | Mangrove jack | 130 |
| 14 | Blue threadfin | 120 |
| 15 | King threadfin | 113 |

More ramps were added to the boat ramp survey program from August–September 2016, which contributes to the number of fish measured from September onwards. The program also started to collect catch and length information for some additional survey species from August–September 2016. The number of some survey species measured across all regions combined is shown by month in Table 5.

Table 5: Number of individual fish measured from different survey species for all regions combined

| Survey species | 2015 | | | 2016 | | | | | | | | | Total |
|----------------------------|------|-----|-----|------|-----|-----|-----|-----|-----|-----|------------------|-----|-------|
| | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep ² | Oct | |
| Barramundi | 3 | | | 33 | 24 | 19 | 16 | 15 | 2 | 4 | 12 | 18 | 146 |
| Barred javelin | 126 | 6 | 34 | 39 | 62 | 71 | 58 | 49 | 51 | 30 | 67 | 40 | 533 |
| Blue threadfin | 12 | 8 | 20 | 9 | 9 | 5 | 6 | 10 | 5 | 8 | 14 | 14 | 120 |
| Coral trout—common | 21 | 46 | 71 | 37 | 9 | 6 | 95 | 12 | 28 | 7 | 81 | 39 | 452 |
| Coral trout—barred-cheek | 1 | 5 | 10 | 5 | 23 | 9 | 33 | 36 | 7 | 7 | 17 | 4 | 157 |
| Dusky flathead | 7 | 7 | 5 | 4 | 2 | 21 | 35 | 20 | 11 | 16 | 46 | 93 | 267 |
| Grass emperor ³ | | | | | | | | | | 9 | 34 | 52 | 95 |
| King threadfin | 8 | 3 | 10 | 3 | 13 | 4 | 37 | 12 | 9 | 2 | 4 | 8 | 113 |
| Mangrove jack | 10 | 3 | 15 | 30 | 15 | 8 | 10 | 7 | 1 | 6 | 10 | 15 | 130 |
| Pearl perch | 1 | | | | | | | | | | 11 | 24 | 36 |
| Pikey bream | 15 | 15 | 1 | 13 | 12 | 34 | 75 | 88 | 60 | 96 | 88 | 60 | 557 |
| Sand whiting | 17 | 31 | 25 | 4 | 21 | 31 | 29 | 60 | 37 | 38 | 59 | 158 | 510 |
| School mackerel | 44 | 42 | 8 | 2 | 3 | 15 | 50 | 65 | 30 | 2 | 74 | 71 | 406 |
| Snapper (pink) | 1 | | 2 | | 4 | 1 | 12 | 15 | 23 | 1 | 81 | 71 | 211 |
| Spanish mackerel | 42 | 27 | 8 | 11 | 16 | | 32 | 20 | 10 | 7 | 24 | 52 | 249 |
| Spotted mackerel | 21 | 17 | 4 | | 3 | 3 | 15 | 31 | 9 | 1 | 5 | 2 | 111 |
| Tailor | | | | | | | 2 | 1 | | | 6 | 7 | 16 |
| Yellowfin bream | 9 | 19 | 33 | 7 | 11 | 23 | 44 | 24 | 55 | 19 | 53 | 149 | 446 |

² Prior to August 2016, the most southern boat ramp surveyed in this program was in Hervey bay. Therefore, species that are more frequently caught in south-eastern Queensland coastal waters tend to be encountered after August 2016 (e.g. pearl perch, snapper (pink), tailor, yellowfin bream).

³ Grass emperor were added to the species list from August 2016 onwards.

Fishing trip duration—single day trips

In Queensland, the average single day fishing trip lasted for 4.9 hours. The pattern seen for all regions combined (Figure 2) coincides with holiday periods and seasonal changes. Fishing times increased around the December–January and March–April (Easter) holidays and in the September–October period, which may be a combination of school holiday times and more favourable weather. This pattern varies by region, where the effects of holidays and seasonal weather act differently.

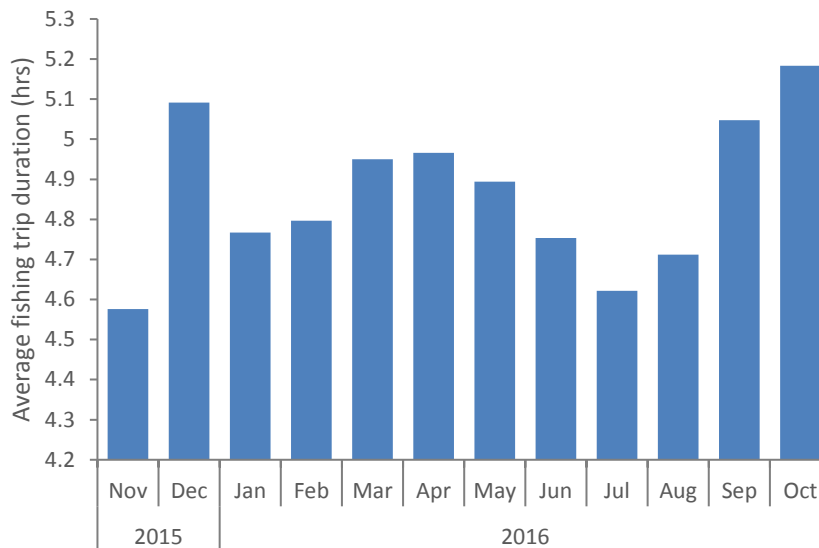


Figure 2: Average fishing trip duration (hours) for all regions

Harvest rates—fish survey species

For all ramps combined, more than 50% of fishing trips that are completed within a day or overnight do not harvest any fish. These harvest rates relate only to fish from the survey species—fishers may have kept other fish species and crustaceans. A small proportion of trips harvested more than five fish (Figure 3). All regions showed a similar pattern when looking at the frequency of the number of fish harvested per day or overnight trip. Regional information is presented in the next section.

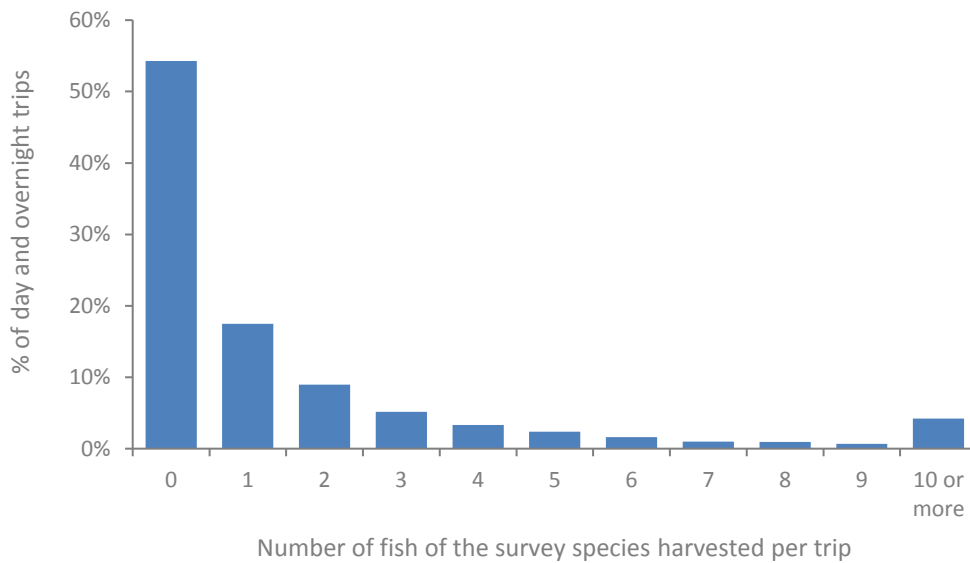


Figure 3: Percentage of day and overnight fishing trips by number of fish harvested (all regions combined and only for fish from the survey species, crustaceans not included)

Statewide catch rates—harvest per unit effort

The rates presented here are harvest rates (harvest equates to retained animals only) as opposed to catch rates (catch = harvested + released). Harvest per unit effort (HPUE) is therefore lower than catch rates because catch per unit effort includes the released fish.

The data are collected at ramps and the fish are identified and counted by trained interviewers. Using data observed by interviewers avoids the problem of unintentional bias by fisher-reported activities. These biases include species misidentification and inaccuracies in recalling the number of fish released.

The harvest rates for fish across the state show seasonal variation and the effect of fishing closures (e.g. the higher harvest rates of snapper (pink) in the cooler months and the near absence of barramundi measured during the November to January closure). Being able to see these known trends in the data collected to date provides confidence that the program is representing underlying trends in fishing activity.

For conciseness in this report, the monthly HPUE for some example species is presented to demonstrate the type of information available (Figure 4). As the program continues, more information will become available for more survey species.

Length frequency distributions of fish measured

The distribution of lengths measured for species is an important variable input into Fisheries Queensland’s sustainable management process. Boat ramp surveys sample length information from a large number of species and a wide range of recreational fishers. The length frequency distributions generated vary through time and by region, and will be valuable for use in assessing stock status and stock assessments for these species.

In this report, the length frequencies for some commonly caught species are presented to demonstrate the type of information available (Figure 5). As the program continues, more information will become available for more survey species.

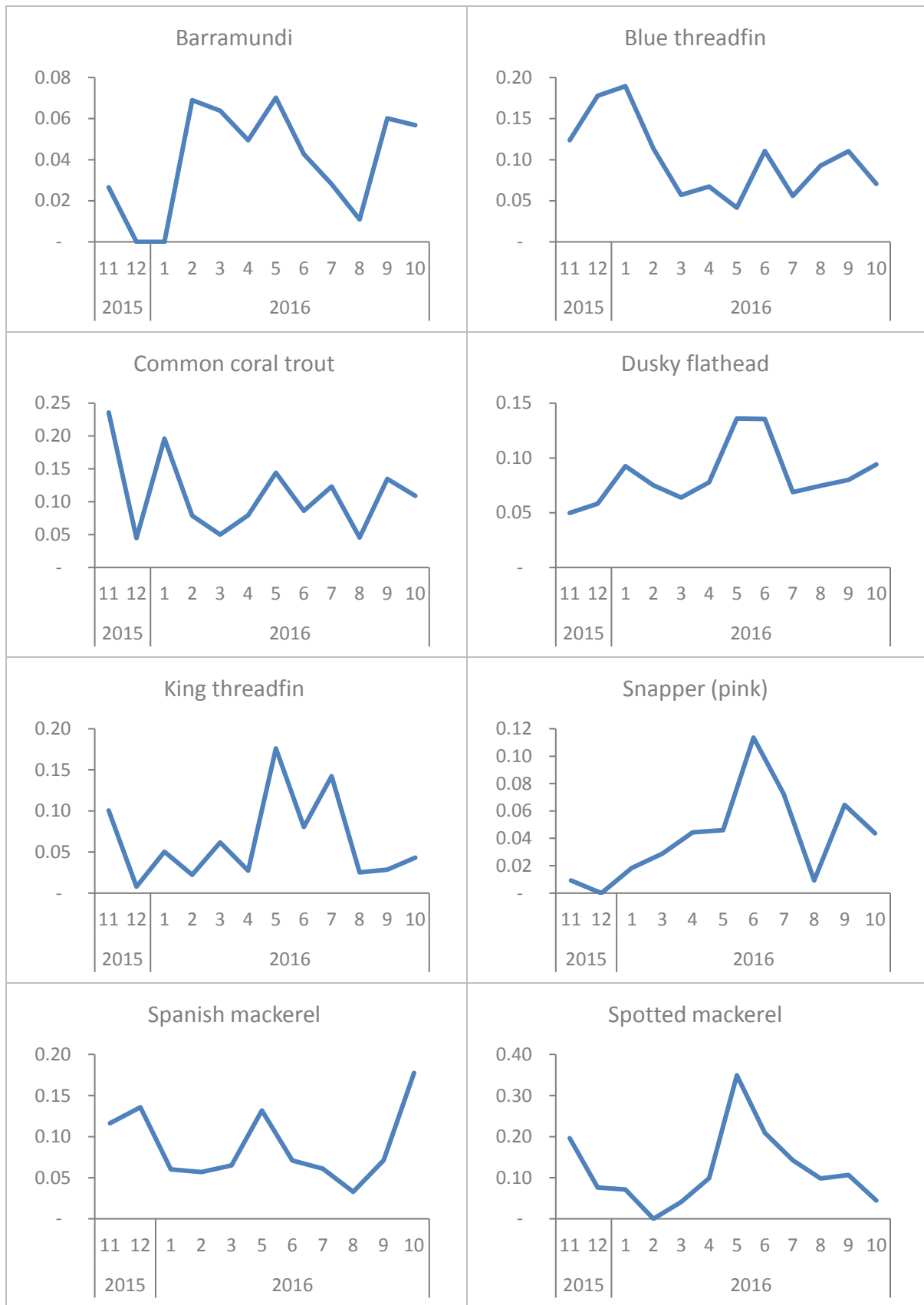


Figure 4: Harvest per unit effort (fish per fisher per hour) from day trips for some example species across Queensland—from 1 November 2015 to 31 October 2016 by month

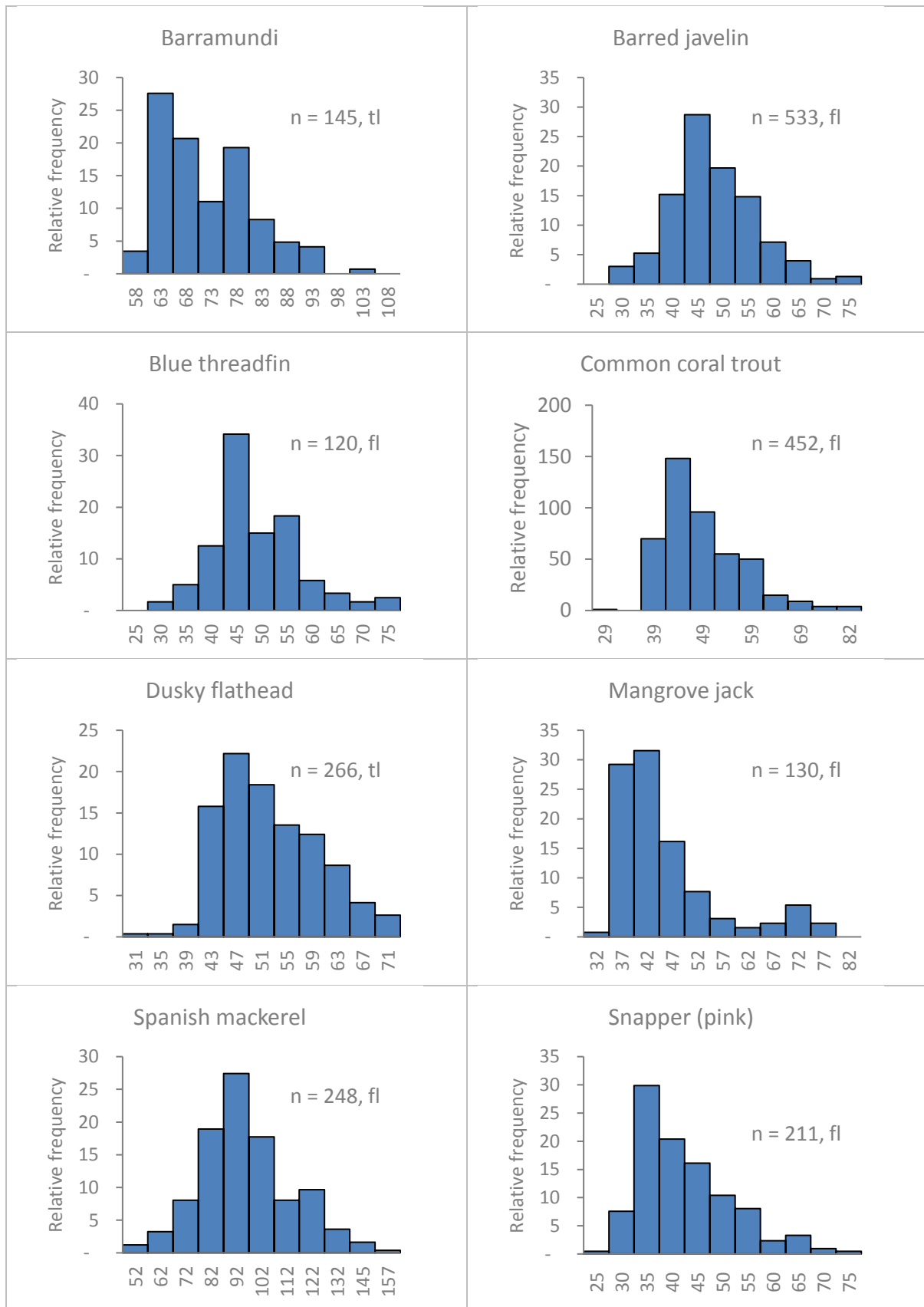


Figure 5: Length frequency distributions for some example species across Queensland—from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is cm representing fish up to and including that length, regionally unweighted)

Regional synopsis

The number of survey shifts undertaken within different regions is not balanced or weighted for the different sizes of the regions, the number of boat ramps or the amount of fishing activity. Therefore, the changes in the indices, averages or proportions will be the most appropriate metrics to use when making comparisons among regions. For example, 'Changes in the proportion of trips by number of fish kept', 'Changes to average fishing time', 'Changes to effort index—trailer count' and 'Changes to average HPUE' can be compared among regions. This highlights the importance of maintaining the boat ramp surveys over time, so that the changes can be recorded.

Numbers of fish measured within a region will be influenced by the number of survey shifts within the respective region, the population and the number of available fishing boat launch sites (such as public boat ramps). As such, they should not be used as a measure to compare boat ramps or regions. Numbers of fish measured is presented here to provide an understanding of the scale or effectiveness of the boat ramp surveys at collecting data about the fish caught within the region.

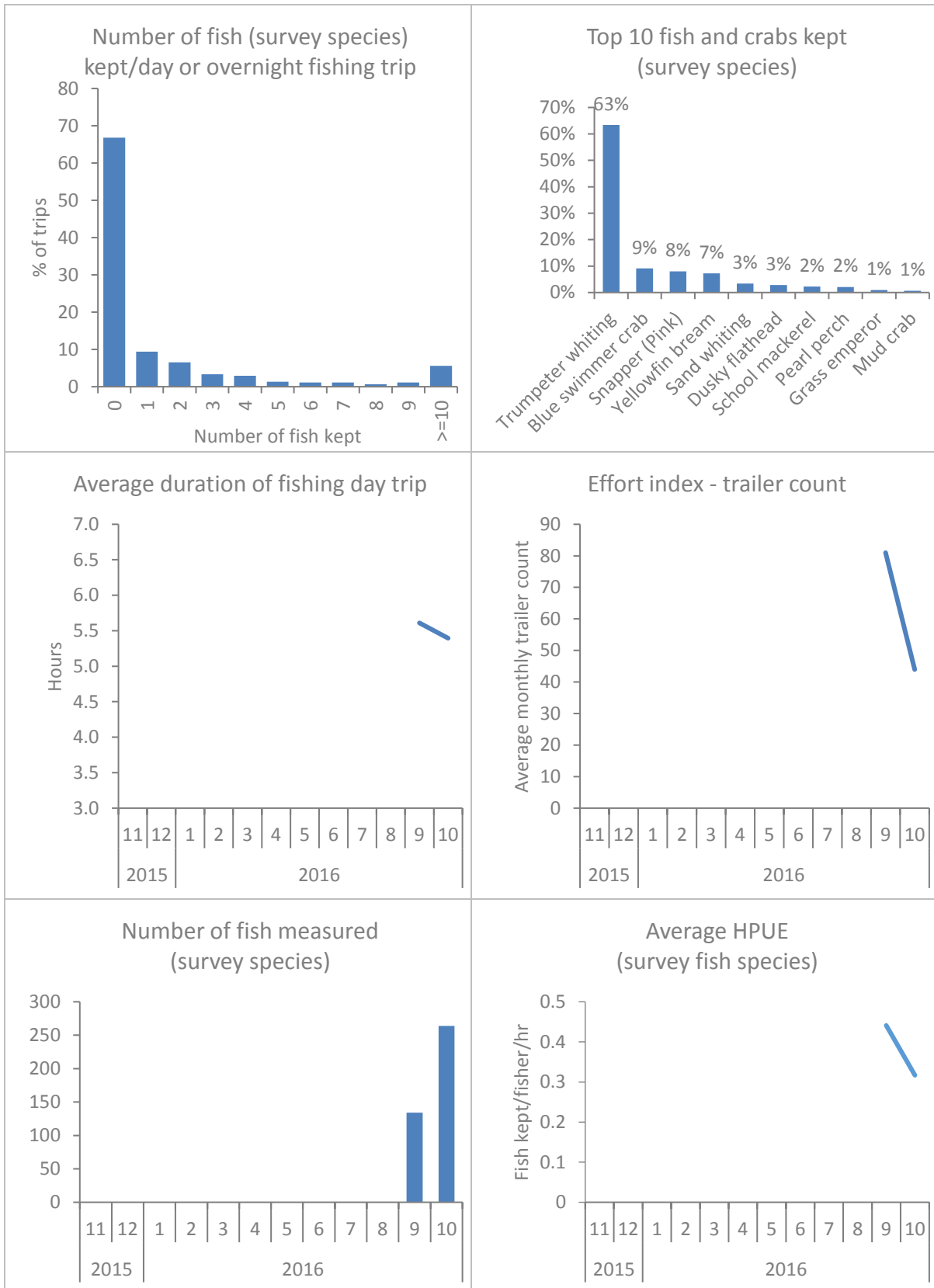
All graphs presented in the remainder of this report for each region relate to the period 1 November 2015 to 31 October 2016 (due to the number of graphs, they are not individually captioned as per previous figures). Individual regions will vary in duration of surveys due to the progressive rollout of the sampling. Explanations for the graphs presented for each region are as follows:

- **Number of fish (survey species) kept per day or overnight fishing trip**
This graph shows the proportion of overnight or day trips by the number of fish from the survey species list that fishers kept. Fishers may have kept other species and crustaceans.
- **Top 10 fish and crabs kept (survey species)**
This graph shows the top 10 most commonly kept fish or crabs as a percentage of the total number of survey species kept for the region. In September 2016, some species were added to the survey species list and those species would not have been counted prior to that addition.
- **Average duration of fishing day trip**
This graph shows the time elapsed from launch time to retrieve time for trips completed within the same day, averaged for the month. It does not include overnight trips. The time elapsed would include time spent travelling to the fishing location from the boat ramp and breaks.
- **Effort index—trailer count**
This graph is the number of trailers counted at the ramp at the start of the survey shift, averaged by ramp and month for the region.
- **Number of fish measured (survey species)**
This graph is the number of fish measured for the survey species within the region per month.
- **Average HPUE (survey fish species)**
This is the average number of fish (survey species excluding crustaceans) harvested per fisher per hour for day and overnight fishing trips for each month. HPUE is calculated for each interview and then averaged across ramp and month within each region. Multi-day trips are excluded from these calculations because of the extent of non-fishing activity (e.g. sleeping, eating and visiting islands) within the launch and retrieve times.

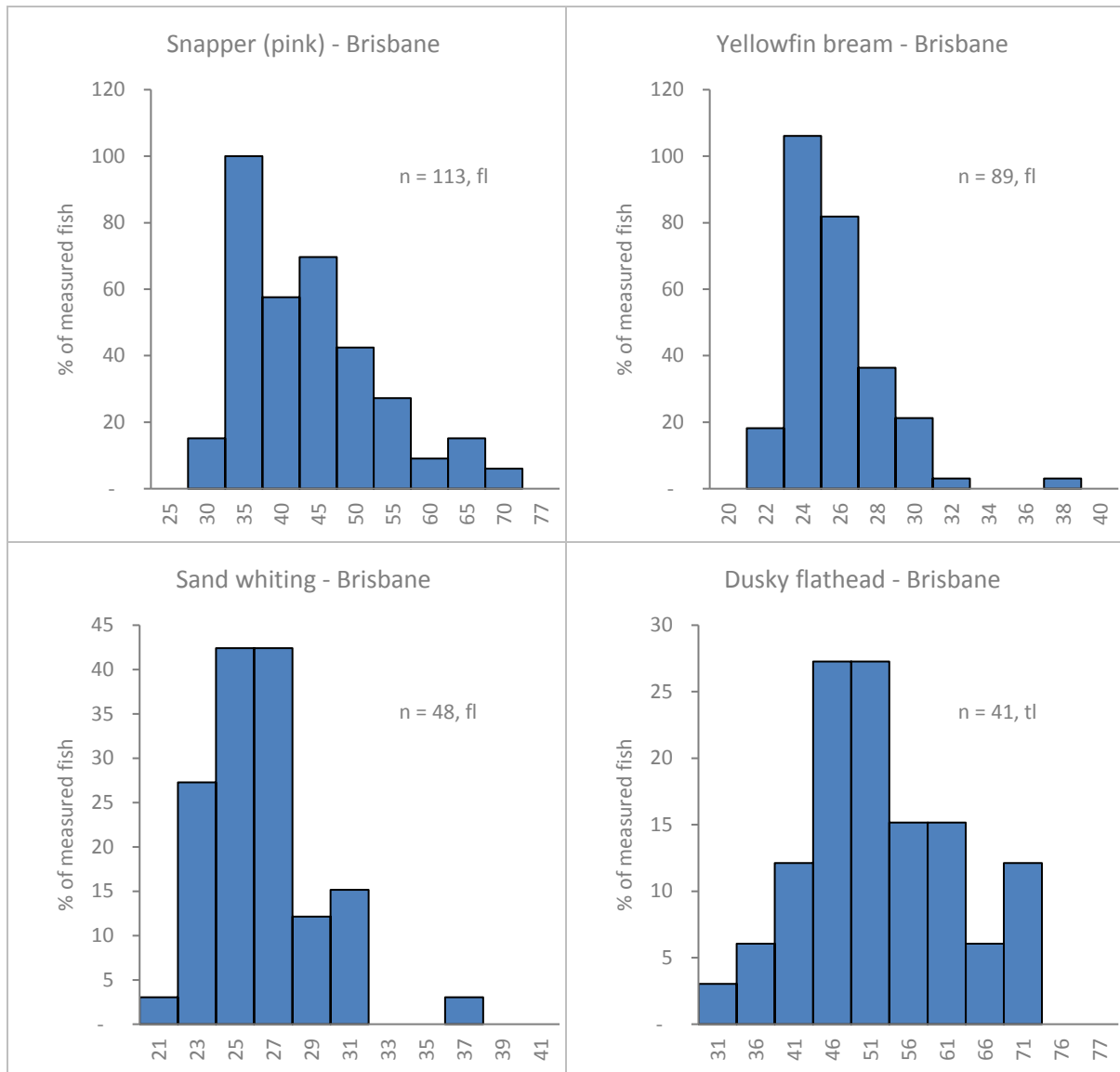
There are also graphs for each region that show the length frequency distributions for the top four or six survey species measured.

Brisbane region

Between 1 September 2016 and 31 October 2016, 806 boat crews were interviewed—59% of those boat crews had been fishing (473 boats) and 398 fish were measured.

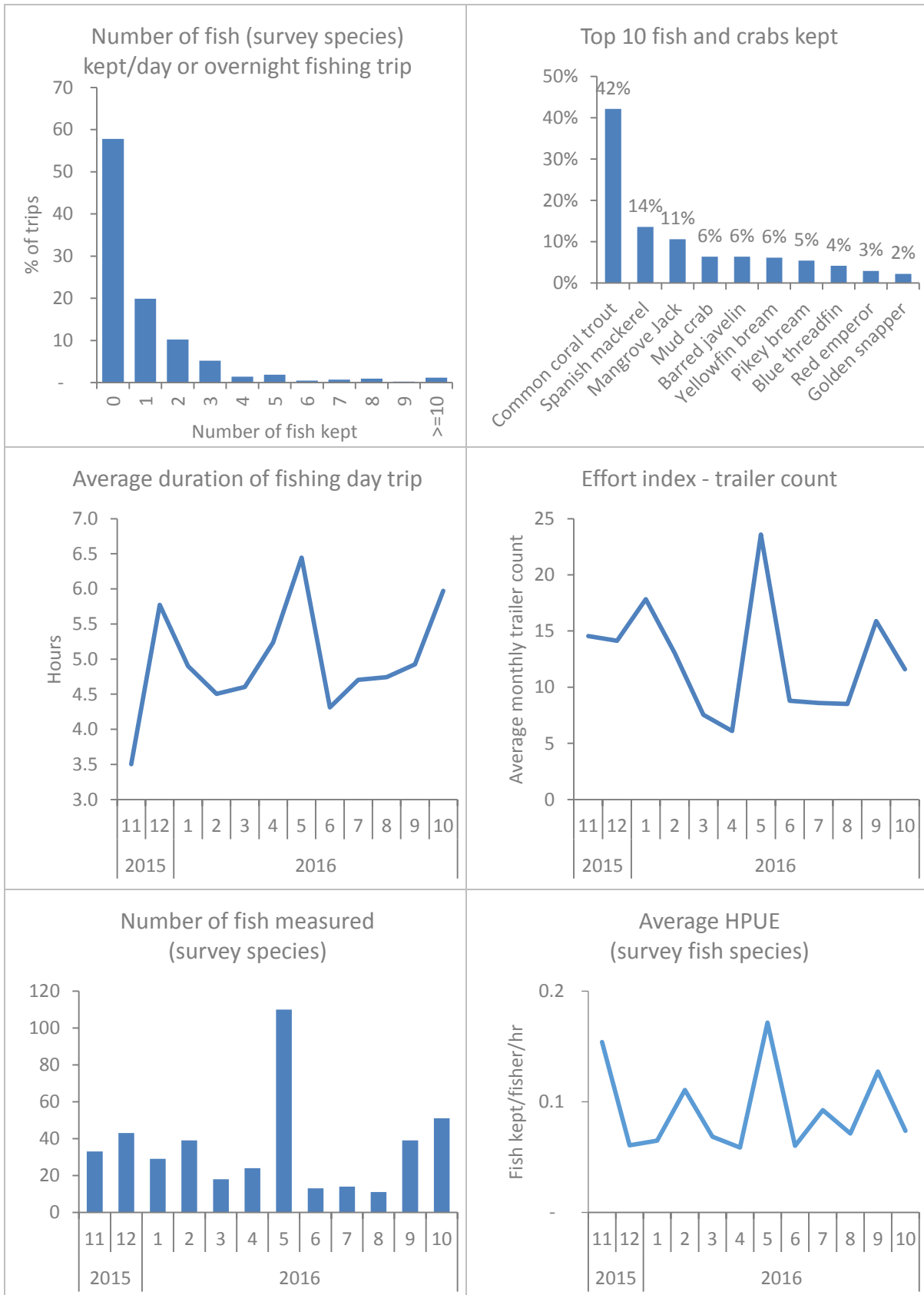


The following graphs show length frequency distributions for the top four survey species measured in the Brisbane region from 1 September 2016 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

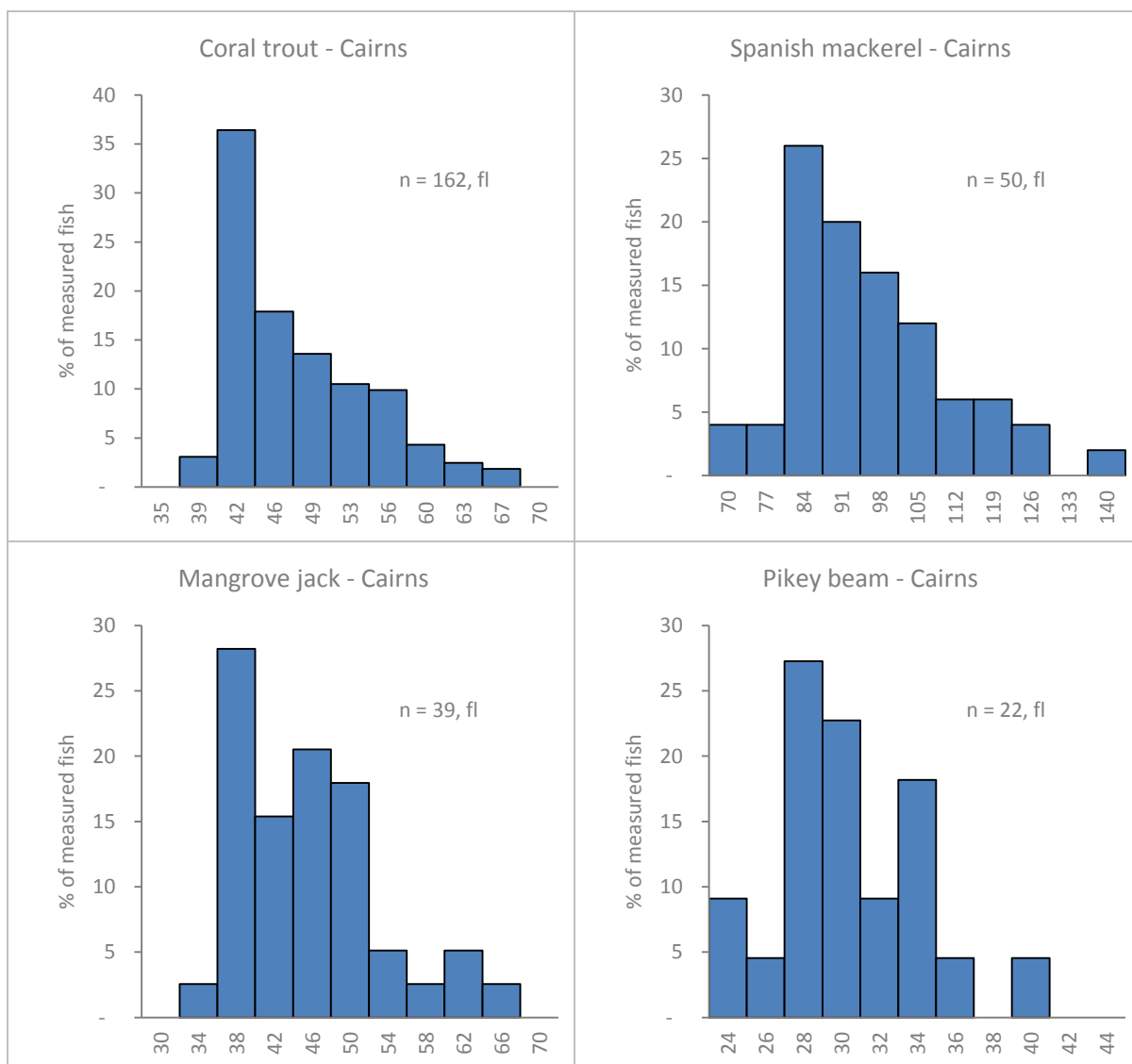


Cairns region

Between 1 November 2015 and 31 October 2016, 663 boat crews were interviewed—89% of those boat crews had been fishing (590 boats) and 424 fish were measured.

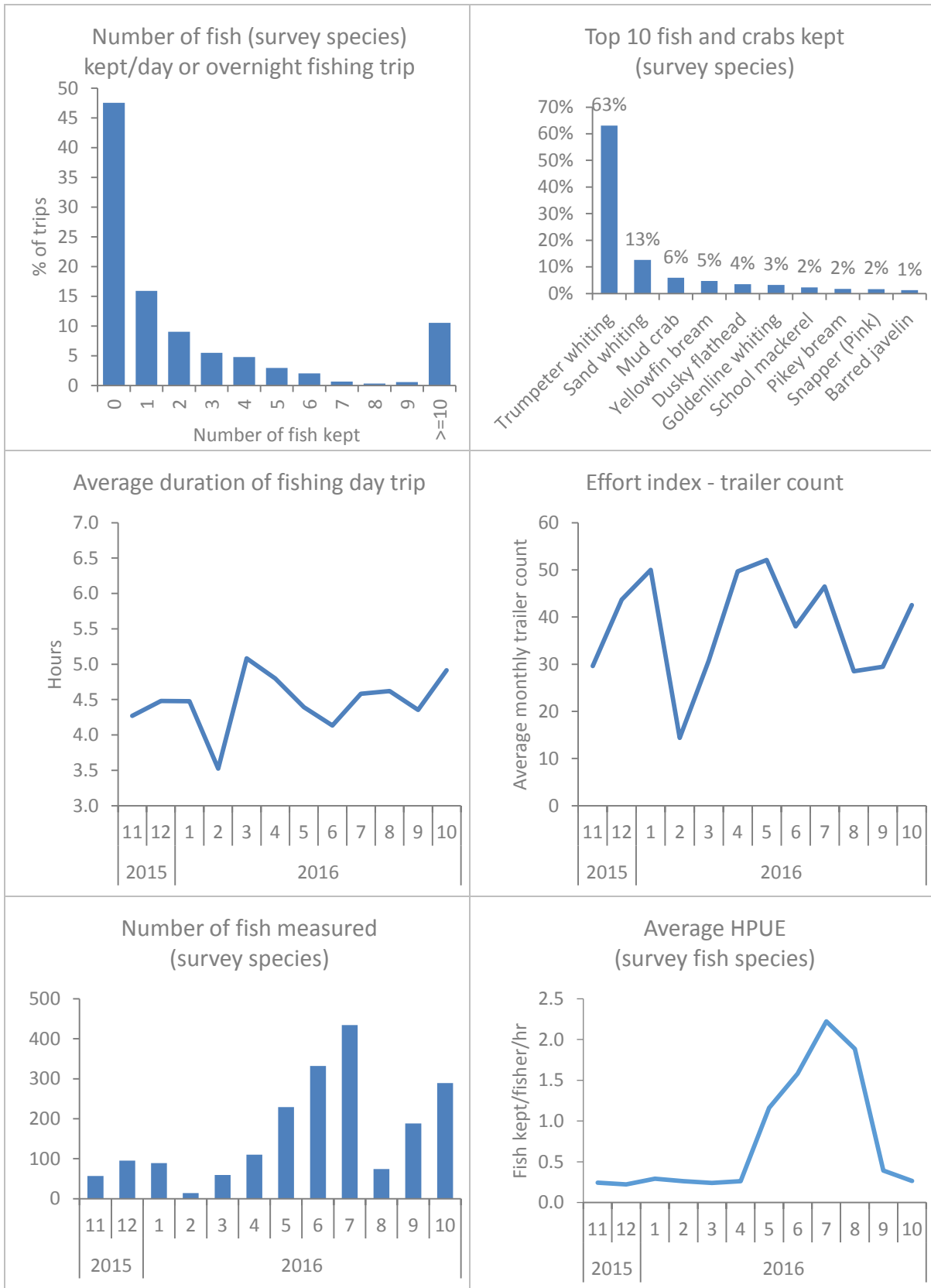


The following graphs show length frequency distributions for four survey species measured in the Cairns region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

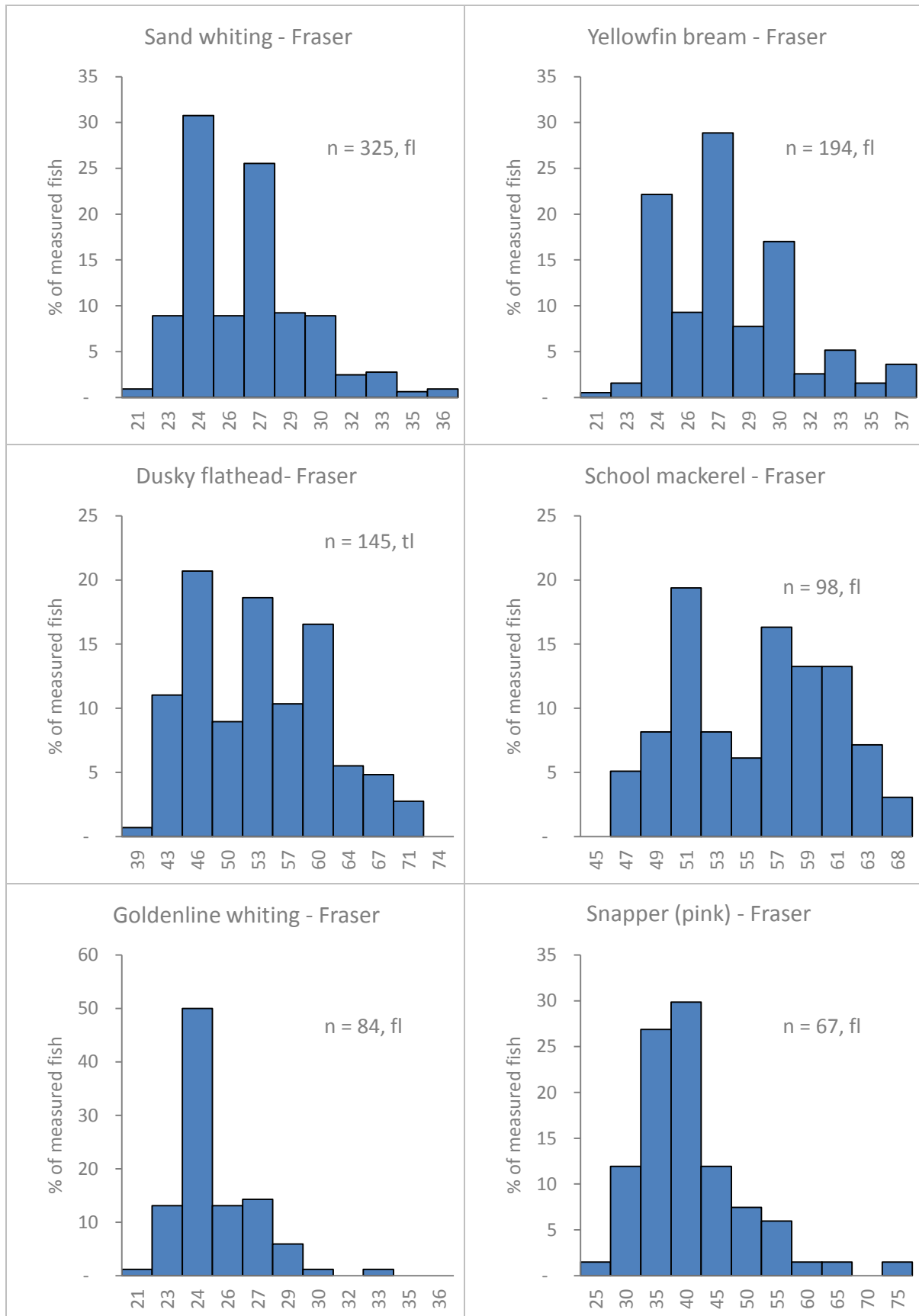


Fraser region

Between 1 November 2015 and 31 October 2016, 1784 boat crews were interviewed—82% of those boat crews had been fishing (1456 boats) and 1970 fish were measured.

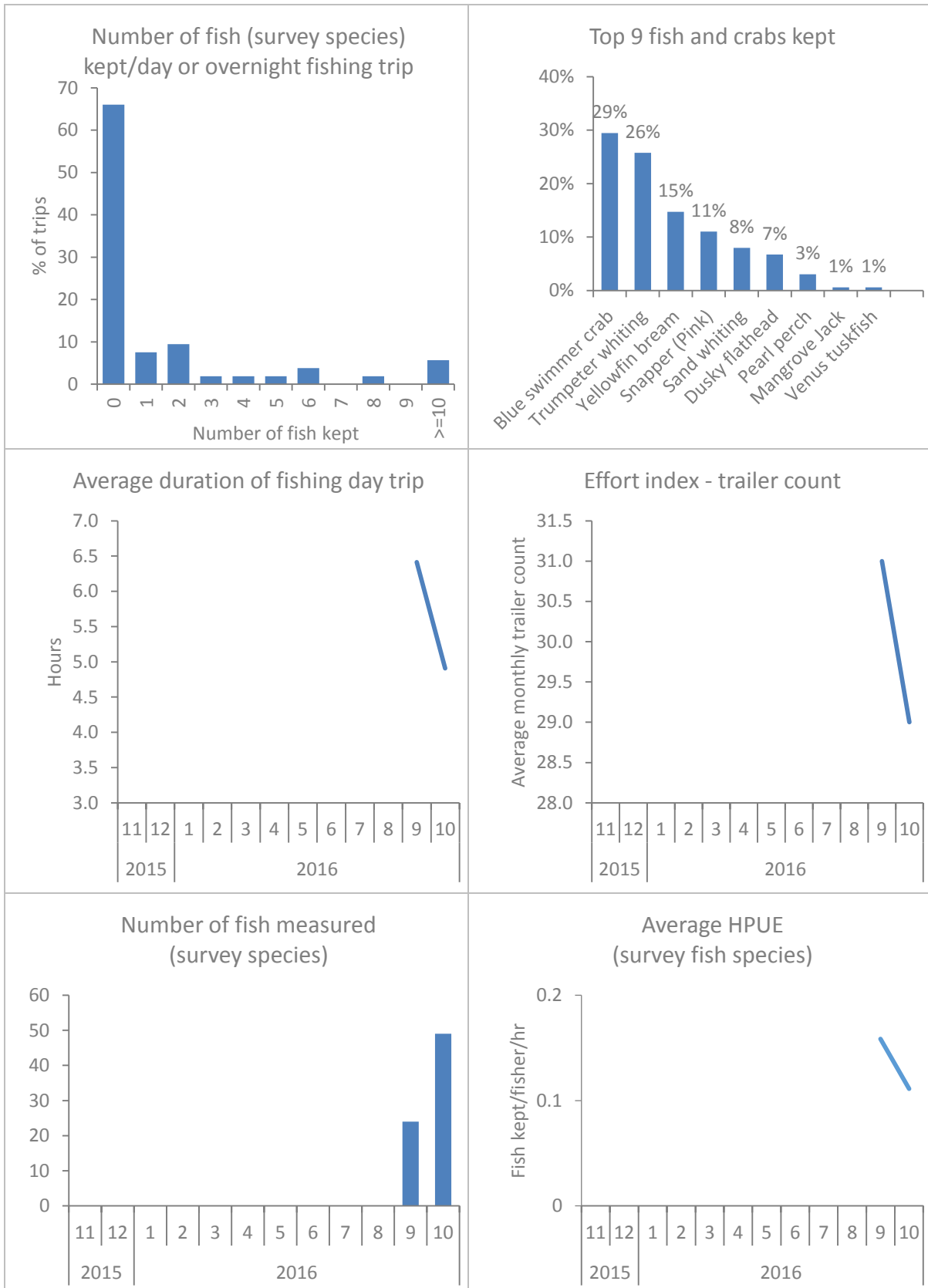


The following graphs show length frequency distributions for six survey species measured in the Fraser region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

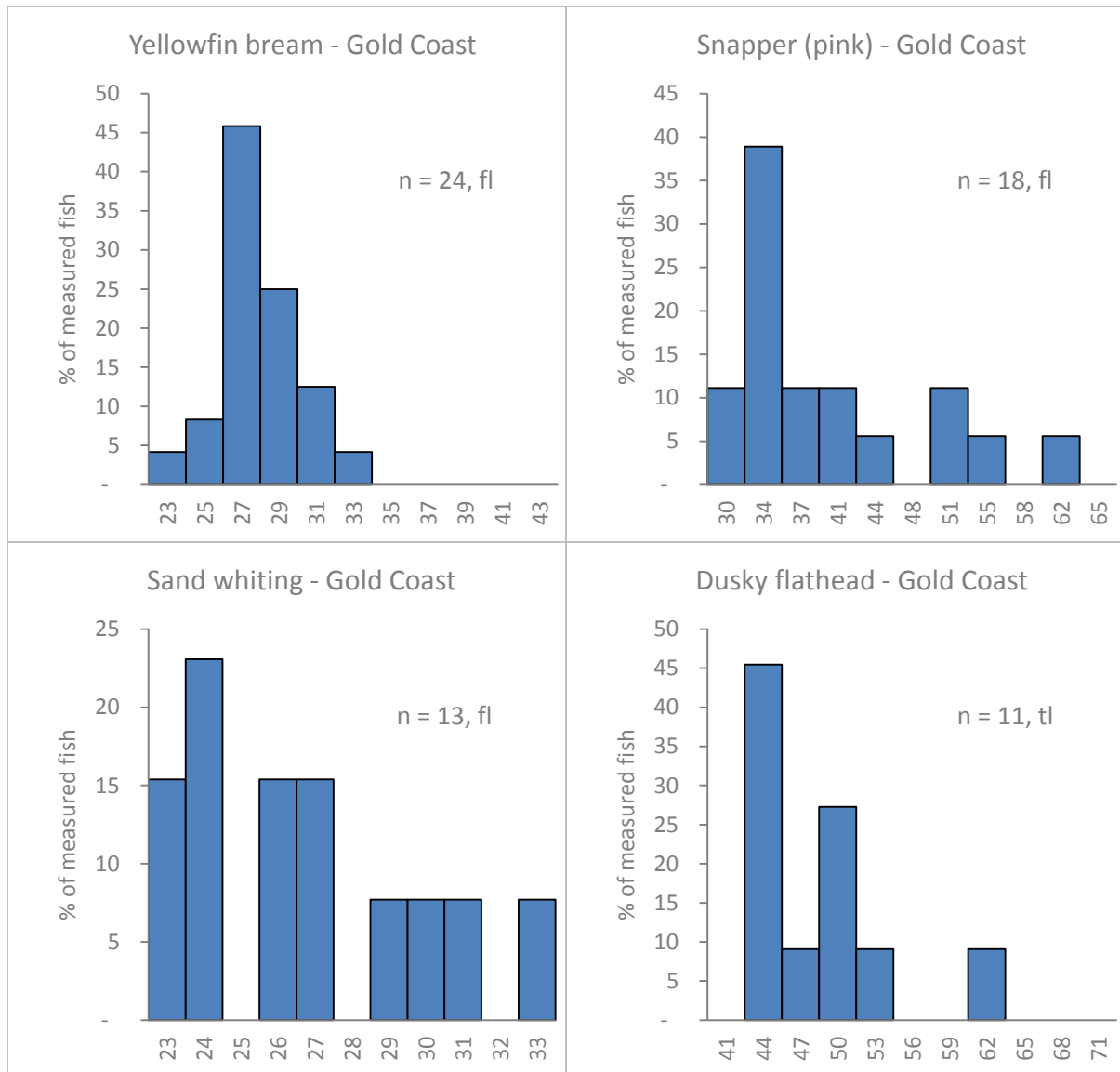


Gold Coast region

Between 1 September 2016 and 31 October 2016, 143 boat crews were interviewed—38% of those boat crews had been fishing (54 boats) and 73 fish were measured.

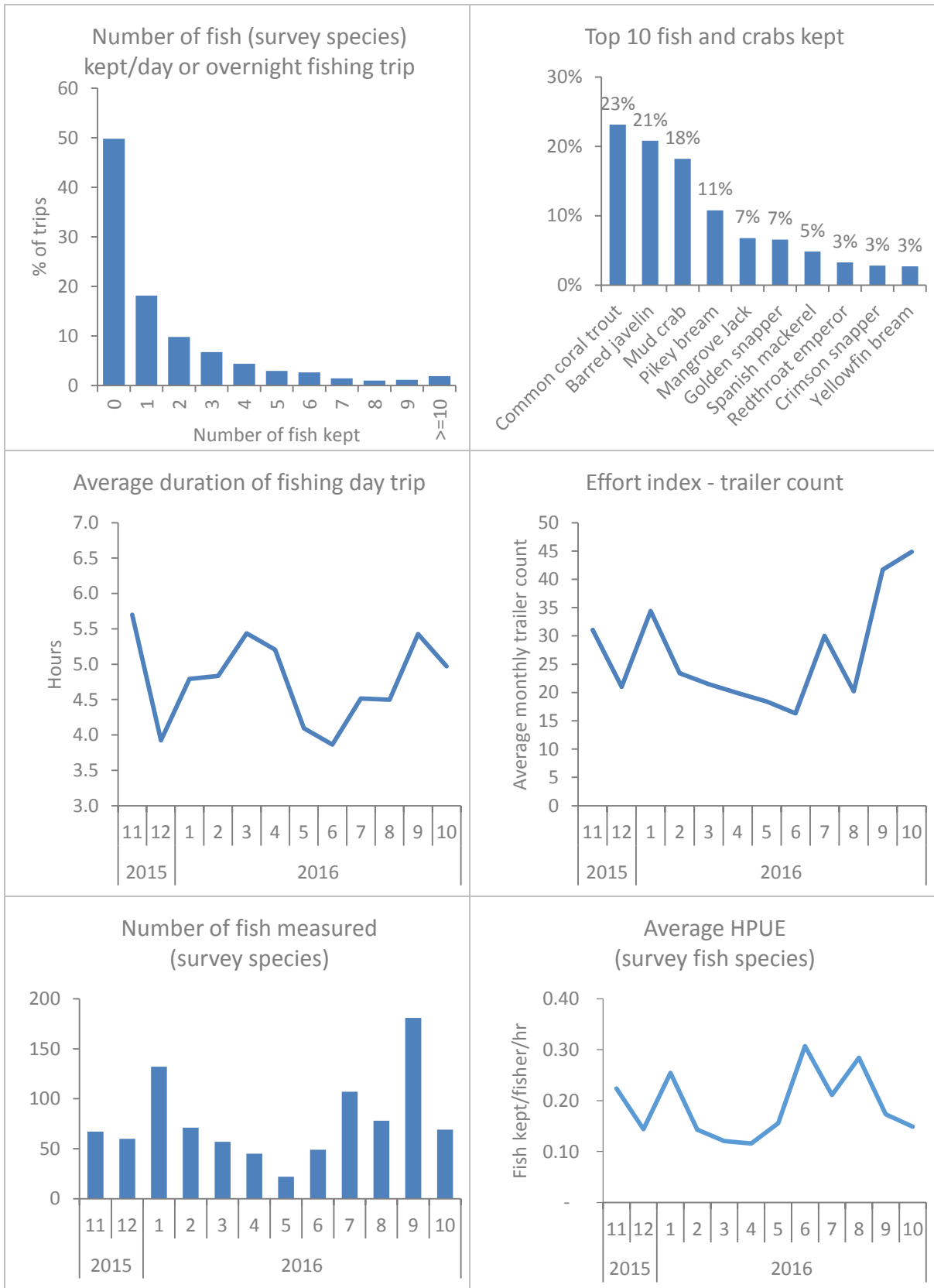


The following graphs show length frequency distributions for four survey species measured in the Gold Coast region from 1 September 2016 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

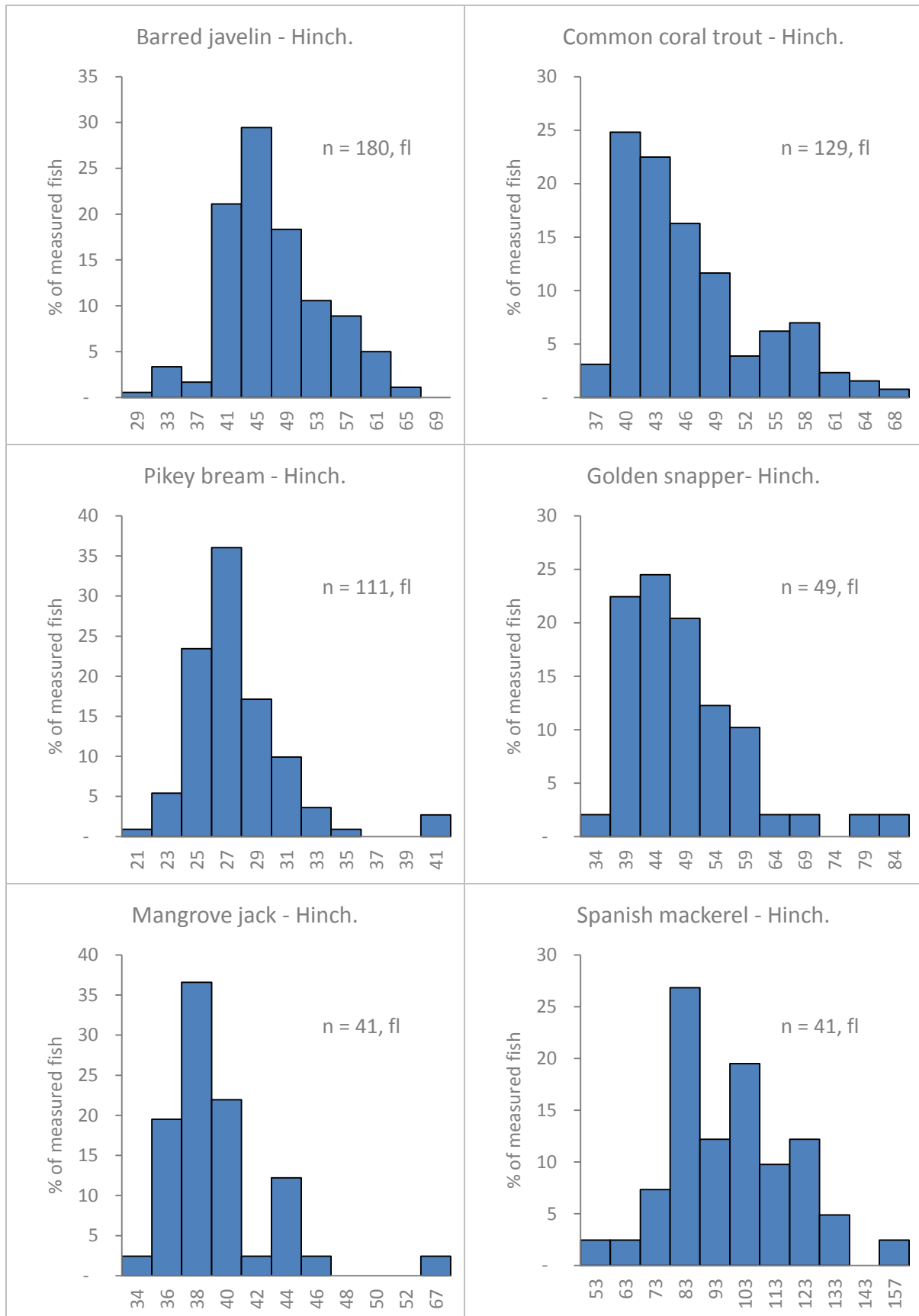


Hinchinbrook region

Between 1 November 2015 and 31 October 2016, 1229 boat crews were interviewed—89% of those boat crews had been fishing (1095 boats) and 938 fish were measured.

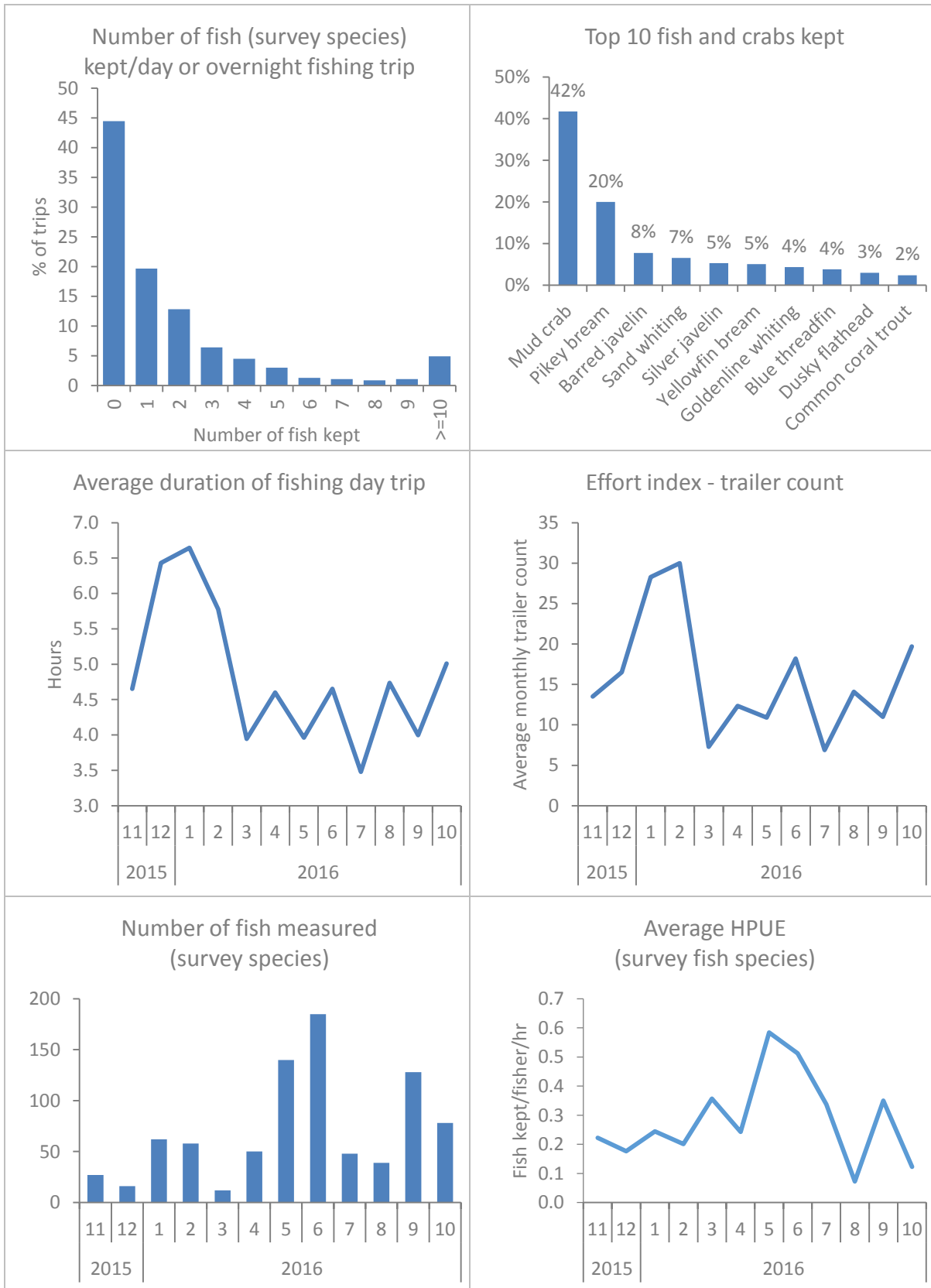


The following graphs show length frequency distributions for six survey species measured in the Hinchinbrook region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

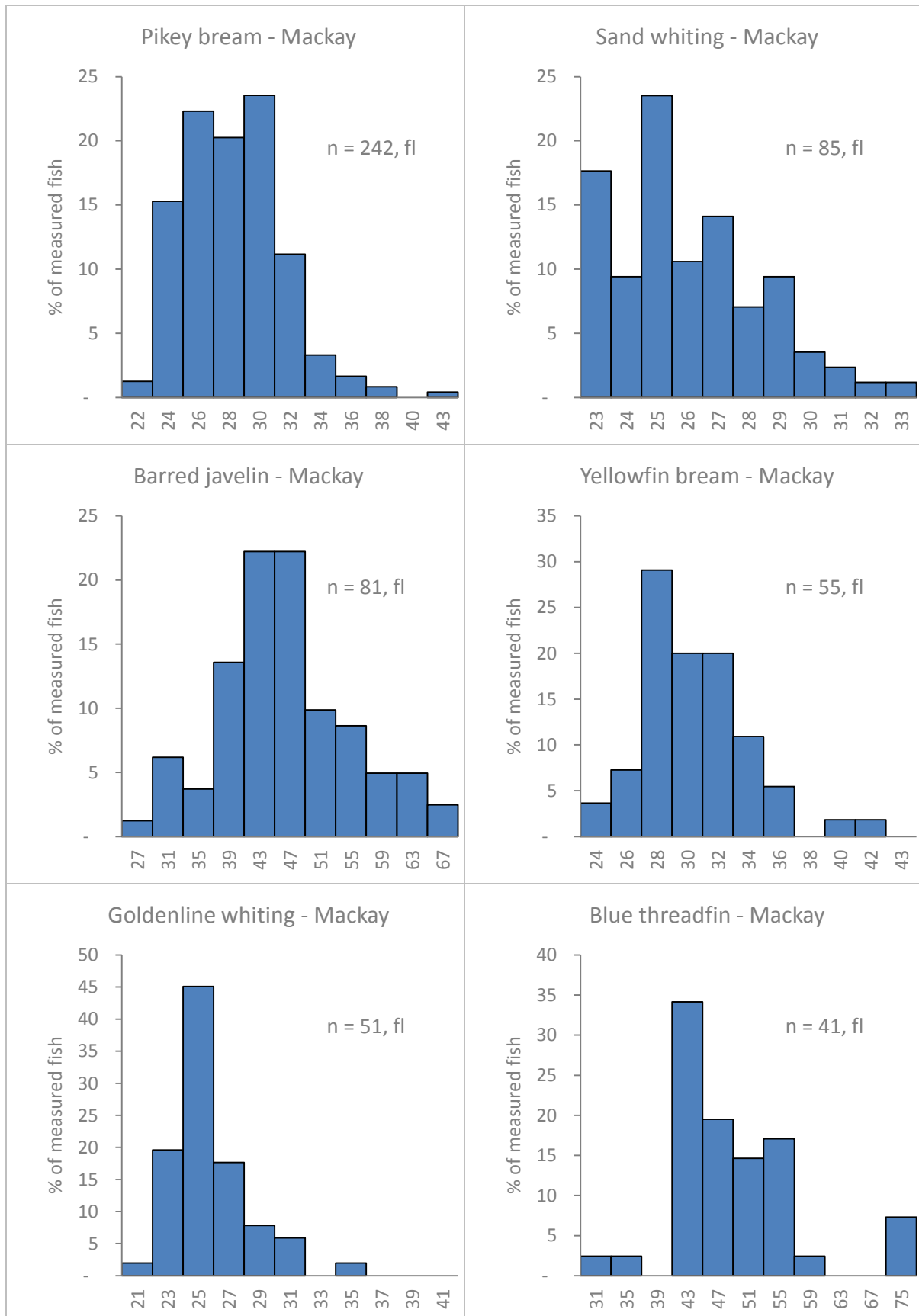


Mackay region

Between 1 November 2015 and 31 October 2016, 796 boat crews were interviewed—95% of those boat crews had been fishing (760 boats) and 843 fish were measured.

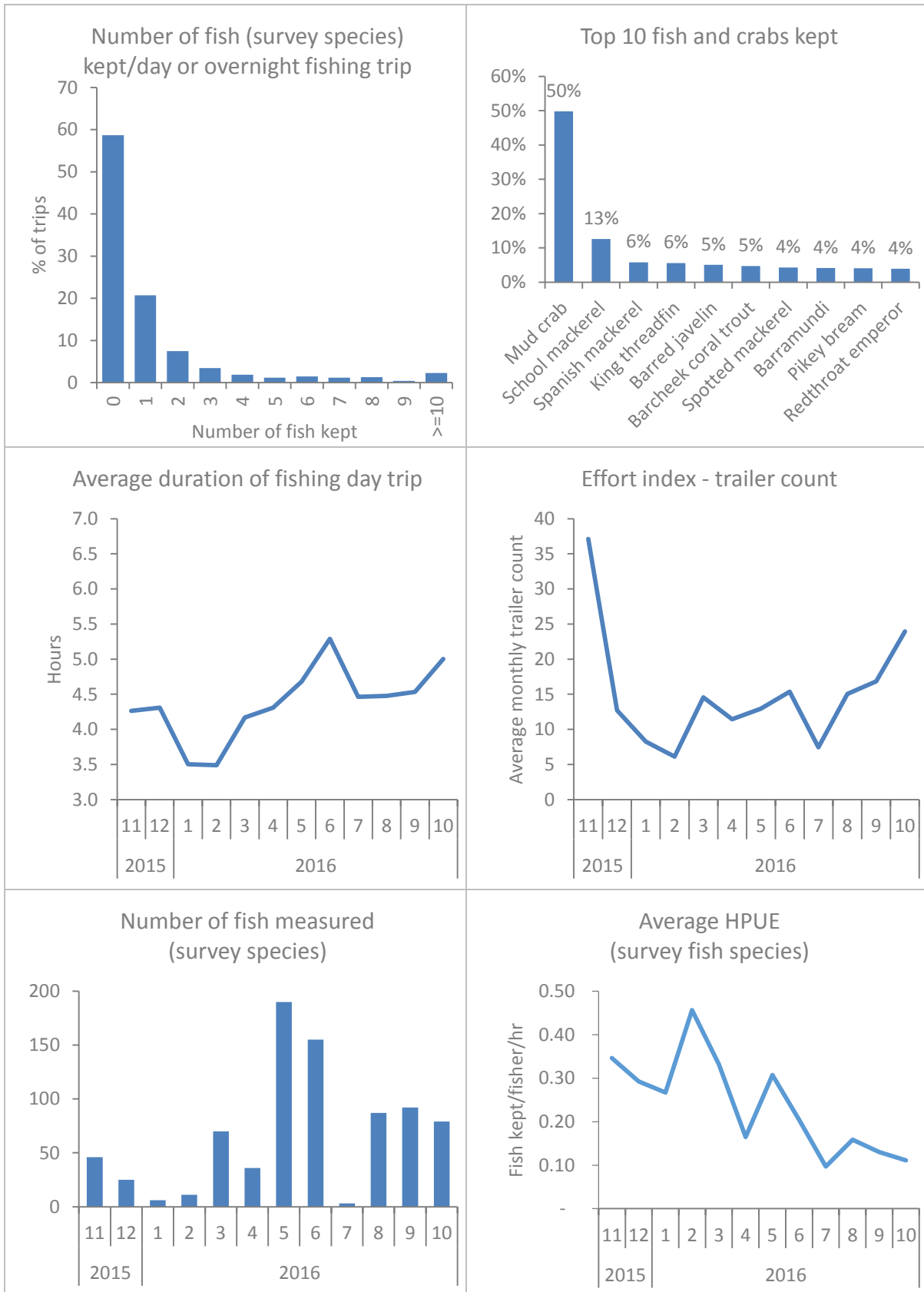


The following graphs show length frequency distributions for the top six survey species measured in the Mackay region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

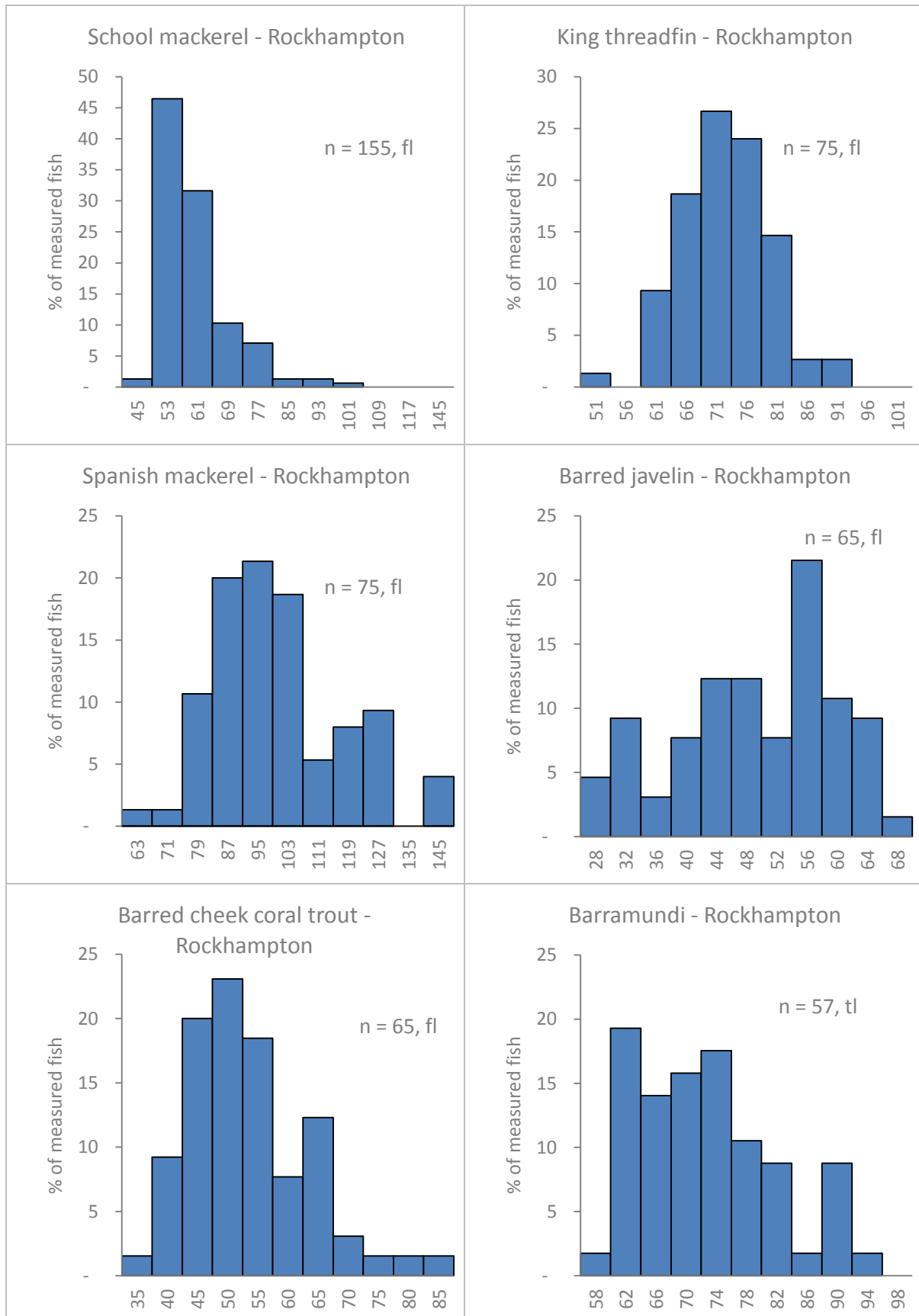


Rockhampton region

Between 1 November 2015 and 31 October 2016, 1381 boat crews were interviewed—86% of those boat crews had been fishing (1192 boats) and 800 fish were measured.



The following graphs show length frequency distributions for the top six survey species measured in the Rockhampton region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).

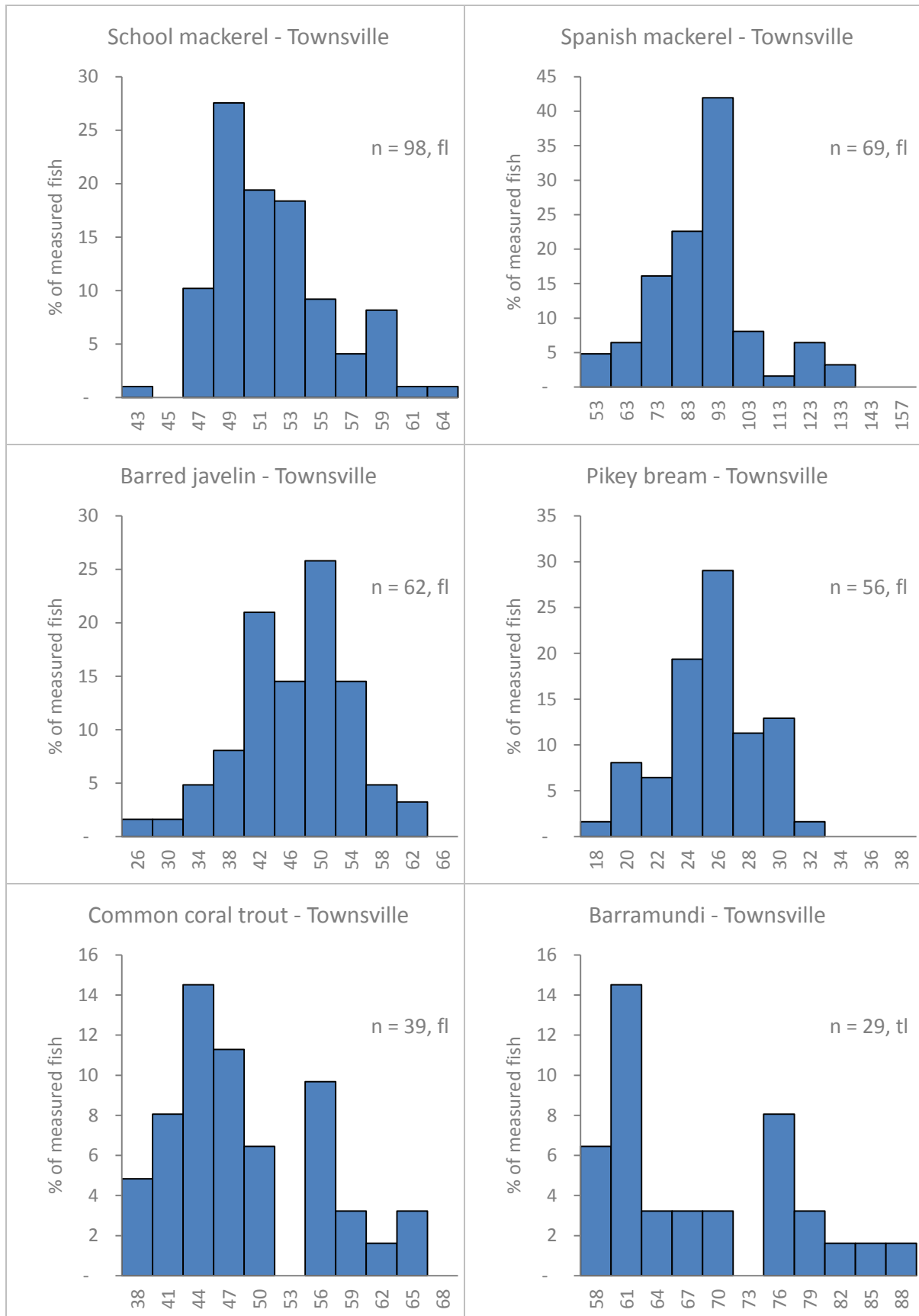


Townsville region

Between 1 November 2016 and 31 October 2016, 1212 boat crews were interviewed—84% of those boat crews had been fishing (1023 boats) and 626 fish were measured.



The following graphs show length frequency distributions for the top six survey species measured in the Townsville region from 1 November 2015 to 31 October 2016 (n = number of fish measured, fl = fork length, tl = total length, x axis is centimetres representing fish up to and including that length).



Sunshine Coast region

The Sunshine Coast interviews began during October 2016. By the end of October, 63 boat crews were interviewed—57% of those boat crews had been fishing (36 boats) and 39 fish were measured. Because sampling in this region had only just commenced, there is insufficient information to present useful graphs.

Discussion

The baseline results presented in this report provide an insight into the time series of recreational fishing information that Fisheries Queensland is collecting through boat ramp surveys across the state. The information will be used to create indices of fishing activity, which can be used to make annual and regional comparisons of changes in those indices through time as the data set grows.

Boat ramp surveys complement Fisheries Queensland's other monitoring programs. They cannot provide estimates of total recreational fishing effort or harvest; however, they complement the statewide surveys by providing information about the trends in fishing activity within a year and between the successive statewide surveys. Information on total statewide recreational fishing harvest and effort is best provided by Fisheries Queensland's statewide recreational fishing surveys (Taylor et al., 2012; Georgeson et al., 2015; Webley et al., 2015). However, the boat ramp surveys can provide important information about changes to recreational fishing effort and harvest in the data gaps between successive statewide surveys.

The boat ramp surveys also provide timely information on changes to recreational fishing activity at a regional scale—something that the statewide recreational fishing surveys are not able to provide. For example, changes in indices of harvest and catch rates for commonly caught survey species can be compared through time and between regions. Regular surveys at boat ramps also provide an opportunity to engage with recreational fishers on fisheries stewardship and management.

The information collected from fishers includes their usual residential suburb. This information can be used in an adaption of the travel cost method (Ward and Beal, 2000; Gregg and Rolfe, 2013; Pascoe et al., 2014) to develop an index of how recreational fishers value fishing in the different regions. This provides a simple method to understand how the value of recreational fishing changes through time. This will be useful when assessing the effect of fisheries management decisions on the value of recreational fishing.

The real benefits of the boat ramp surveys will be realised as the time series of data grows. It is important to recognise that the boat ramp survey program requires a substantial time commitment for its potential value to be fully realised and for the value of the results to be demonstrated.

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- Webley, J. A. C., K. McInnes, D. Teixeira, A. Lawson, and R. Quinn. 2015. Statewide Recreational Fishing Survey 2013-14, Fisheries Queensland, Department of Agriculture and Fisheries, Queensland Government.

Appendix 1: List of boat ramps

| Region | Boat ramp name | Location | Additional notes |
|----------------|--------------------------------------|--|------------------------------------|
| Weipa | Rocky Point Ramp | Marina Rd, Rocky Point | Monitored from March 2017 |
| | Evans Landing Ramp | Kerr Point Dr, Evans Landing | Monitored from March 2017 |
| Karumba | Karumba Point Ramp | Palmer St, Karumba | Monitored from March 2017 |
| | Karumba Town Ramp | Yappar St, Karumba | Monitored from March 2017 |
| Cairns | Yorkey's Ramp | Buckley St, Yorkeys Knob | Monitored from November 2016 |
| | Barron River (Dave's Boat Yard) Ramp | Greenbank Rd, Stratford | NFZ—monitored from 1 November 2015 |
| | Cairns Ramp | Tingira St, Portsmith | NFZ—monitored from 1 November 2015 |
| | Mourilyan Ramp | Esplanade, Fly Fishing Point | Monitored from November 2016 |
| Hinchinbrook | Cardwell Port Hinchinbrook Ramp | Foxtail Ave, Cardwell | NFZ—monitored from 1 November 2015 |
| | Lucinda Ramp | Dungeness Rd, Lucinda | NFZ—monitored from 1 November 2015 |
| Townsville | Bohle River Ramp | Marina Dr, Bushland Beach | NFZ—monitored from 1 November 2015 |
| | Townsville Recreational Boating Park | Fifth/Seventh Ave, South Townsville | NFZ—monitored from 1 November 2015 |
| | Morris Creek Road Boat Ramp | Morris Creek Rd, Giru | Monitored from November 2016 |
| | Bowen Boat Harbour | Starboard Dr, Bowen | Monitored from October 2016 |
| Mackay | Airlie Beach Marina | Shingley Dr, Airlie Beach | Monitored from November 2016 |
| | Shute Harbour Ramp | Whitsunday Dr, Shute Harbour | Monitored from November 2016 |
| | St Helens Ramp | Landing Rd, Mount Pelion | NFZ—monitored from 1 November 2015 |
| | Seaforth Ramp | Victoria Creek Rd, Seaforth | NFZ—monitored from 1 November 2015 |
| | Mackay Harbour | Harbour Rd/Mulherin Dr, Mackay Harbour | Monitored from November 2016 |
| | Rocky Dam Creek Ramp, Sarina | Landing Rd, Koumala | Monitored from November 2016 |
| Fitzroy | Rossllyn Bay Ramp | Anchor Dr, Rossllyn | NFZ—monitored from 1 November 2015 |
| | Coorooman Creek Ramp | Svensden Rd, Zilzie | NFZ—monitored from 1 November 2015 |
| | Quay Street Ramp | Quay St, Rockhampton | NFZ—monitored from 1 November 2015 |
| | Nerimbera Ramp | St Christophers Chapel Rd, Nerimbera | NFZ—monitored from 1 November 2015 |
| Gladstone | Hanson Road Ramp | 403 Hanson Rd, Callemondah | Monitored from March 2017 |
| | O'Rourke Ramp | 222 Alf O'Rourke Dr, Callemondah | Monitored from March 2017 |
| Fraser Coast | 1770 Ramp | Captain Cook Dr, Seventeen Seventy | Monitored from November 2016 |
| | Burnett Heads Ramp | Harbour Esp, Burnett Heads | Monitored from October 2016 |
| | Bundaberg City Ramp | Queen St, Bundaberg North | Monitored from November 2016 |
| | Urangan Boat Harbour | Jetty Rd, Urangan | NFZ—monitored from 1 November 2015 |
| | River Heads Ramp | North Esp, River Heads | NFZ—monitored from 1 November 2015 |
| | Tin Can Bay Ramp | The Esplanade, Tin Can Bay | Monitored from October 2016 |
| Sunshine Coast | Noosa Sailing Club Ramp | Gympie Tce, Noosaville | Monitored from October 2016 |
| | Mooloolaba Coast Guard Ramp | Parkyn Pde, Mooloolaba | Monitored from October 2016 |

| | | | |
|---------------------------|-------------------------------|---------------------------------|-------------------------------|
| | Kawana Ramp | Harbour Pde, Buddina | Monitored from October 2016 |
| | Caloundra Powerboat Club Ramp | The Esplanade, Golden Beach | Monitored from October 2016 |
| Brisbane | Donnybrook Ramp | Grant Ln, Donnybrook | Monitored from October 2016 |
| | Toorbul Ramp | Toorbul | Monitored from October 2016 |
| | Spinnaker Sound Ramp | Kal Ma Kuta Dr, Sandstone Point | Monitored from September 2016 |
| | Scarborough Ramp | Thurect Pde, Scarborough | Monitored from September 2016 |
| | Whyte Island Ramp | Port Dr, Whyte Island | Monitored from October 2016 |
| | Wellington Point Ramp | Reserve Esp, Wellington Point | Monitored from September 2016 |
| | Raby Bay Ramp | William St, Cleveland | Monitored from October 2016 |
| | Victoria Point Ramp | Masters Ave, Victoria Point | Monitored from October 2016 |
| | Jacobs Well Ramp | Jacobs Well Rd, Jacobs Well | Monitored from September 2016 |
| | Gold Coast | Grand Hotel Ramp | Marine Pde, Labrador |
| Broadwater Parklands Ramp | | Marine Pde, Southport | Monitored from November 2016 |

Appendix 2: Data sheets



Boat Ramp Survey BRI01 – BOAT RAMP COVER SHEET

| | |
|-----------|------------|
| Page | 1 of _____ |
| Received: | _____ |
| Verify: | _____ |
| Check: | _____ |
| Batch#: | _____ |

Boat Ramp Survey Details

| Section (Your initials DDMMYY) | Sampling Location | Start Time (24hr) | Trailer count | Finish Time (24hr) | Sampling Activity Code <small>(Office use)</small> |
|---|-------------------|-------------------|---------------|-----------------------|--|
| _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ | | | | | |

| Non-fishing boats (including jet skis and kayaks) - tally count (4 strokes and a slash = 5) |
|---|
| |
| Total |

| Commercial fishing vessels retrieved - tally count (4 strokes and a slash = 5) |
|--|
| |
| Total |

| Full refusal - tally count (4 strokes and a slash = 5) |
|--|
| |
| Total |

| Comments |
|----------|
| |
| |
| |
| |
| |

| Sampling Activity Code | |
|------------------------|-------------------|
| 20 – Core staff | 21 – Casual staff |



Boat Ramp Survey Details

| Session (Your Initials DDMYY) | Sampling Location |
|------------------------------------|-------------------|
| _____ _____ | |

Interview Details

| Interview # | Retrieve Time (24hr) | Launch Date (If not today) | Launch Time (24hr) | No of Fishers | Primary Target Species (Abbreviation) | Secondary Target species (Abbreviation) |
|-------------|----------------------|----------------------------|--------------------|---------------|---------------------------------------|---|
| | | | | | | |

| Town / Suburb | If >100km away then | | | Fishing main purpose? | | |
|---------------|---------------------|--|--|-----------------------|--|--|
| | Post code | | | Post code | | |
| | | | | | | |

Fishing Activity Location & Method Details

| Activity # | Location (Abbreviation) | Fishing Method Code | Days Fished | Activity # | Location (Abbreviation) | Fishing Method Code | Days Fished |
|------------|-------------------------|---------------------|-------------|------------|-------------------------|---------------------|-------------|
| | | | | | | | |
| | | | | | | | |

Total Kept plus Released

| Activity # | Species (Abbreviation) | Total Kept | Total Released | Comments | Activity # | Species (Abbreviation) | Total Kept | Total Released | Comments |
|------------|------------------------|------------|----------------|----------|------------|------------------------|------------|----------------|----------|
| | | | | | | | | | |
| | | | | | | | | | |

Kept Details

| Activity # | Species (Abbreviation) | Length (mm) | Length type | Comments | Activity # | Species (Abbreviation) | Length (mm) | Length type | Comments |
|------------|------------------------|-------------|-------------|----------|------------|------------------------|-------------|-------------|----------|
| | | | | | | | | | |
| | | | | | | | | | |

| Fishing Method Code | | | | Length Type Code | |
|---------------------|-------------------|------------------|-------------------|-------------------|----------------------------------|
| 01 - Line | 6C - Pot Checking | 6S - Pot Setting | 08 - Spearfishing | 94 - Cast Netting | 1 - Fork Length 2 - Total Length |